The Future of Text ||

Contents

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How to Read this Book

This work is distributed as a PDF which will open in any standard PDF viewer. If you choose to open it in our free Reader' PDF viewer for macOS, you will get useful interactions because of the inclusion of Visual-Meta, including the ability to fold into an outline, click on citations, select text and cmd-f to 'Find' all the occurrences of that text–and if the selected text has a Glossary entry, that entry will appear at the top of the screen–and more: https://www.augmentedtext.info for free download. http://visual-meta.info to learn more about Visual-Meta.

Companion Works

- *The Future of Text* **Series of Books** are available from https://futuretextpublishing.com

- *The Future of Text Volume 1* is at DOI https://doi.org/10.48197/fot2020a ISBN: 9798556866782

- *The Future of Text Interviews* will be available from https://futuretextpublishing.com

- **The software for Authoring** & **Reading** we are building to help illustrate what we 'preach' is available from https://www.augmentedtext.info

- **Visual-Meta** is described at http://visual-meta.info

A group of us meet every Monday and Friday 4pm UK time as well as monthly meetings, to work on the future of text. *Join us. Visit* https://futuretextpublishing.com for details and schedules.

Edgar & Frode Hegland, November 2021. Hegland, 2021.

Acknowledgements

Foreword by Ismail Serageldin

If human language is the greatest human achievement, then the writing of that means of communication is what has defined societies and civilizations and saved their legacies for posterity. In that context, the Book, appears as much more than a convenient way to record some information, or as a means of entertainment, but rather it becomes the central instrument of societal expression, the embodiment of contemporary humanity.

If that tends to exalt the book, I will go further and emphasize that my statement is not about the book as artifact, the codex that we have all come to know and love, it is rather about the text, that provides context and content, message and meaning, that engages the reader with the author and provides so many of us with what it means to be human. The text is an assemblage of words and sentences of a certain length, that can be read off different platforms, from the scroll to the codex, from the electronic book on a special tablet or on the laptop or the smart-phone, it can be in audio format or even in tabloid or newspaper…. The format matters less than the content. So those of us who value and elevate "The Book" in the abstract, are really celebrating the "Text".

Surely, today there are many other forms of communication that have encroached upon the special place of the Text. Radio was expected to destroy text-based newspapers and magazines. It did not. Movies, i.e. moving pictures, whether in the form of film or short videos, whether accessed in theaters or on television, or streamed through the internet, all of these have increasingly become the instruments of entertainment as well as the new artistic form for the communication of narratives. But the text remains. The classics are being revived and reissued in all these formats. And more people write today than ever before. There are more titles published every year, and there are more readers every year. And what is more, even our youth seem to be texting more than they are talking on their mobile phones.

And as we reflect about the future of our societies, our interaction with machines, our links to each other, we inevitably are drawn to think about the process of creating the text. That special interaction between the author and the language, and the creative process by which myriad combinations of letters and words could be formed and some are selected to produce the Text. But before the author does that, he or she has retrieved the work of others, studied it, manipulated it, referred to it and derived his or her own unique and innovative contribution against a background of giving due recognition to the work of others. As a reader before becoming an author, we value our ability to find and retrieve the stored works of our predecessors, to cite parts of these works, and to give credit where credit is due. In Academic circles, we have elaborated a whole system of references and footnotes and

endnotes to give credit where credit is due. The digital revolution and its modern machines have helped us enormously with digital text, the internet, search engines, hypertext and other means of interaction with the legacy of others. We can highlight sections of the text of others, we can copy and cite these sections, we can enrich our thinking process as we develop our own textual creation. Even more, these machines with the magic of the internet, have enabled us to cross over to those new realms that also compete with – and complement – the classic definition of words as the basis of text, to the graph, the image and the video, as devices to pass on narrative and ideas.

But setting down that text on the platform of choice is what every author does. From the classic setting of "pen to paper", to the more modern world where we rely on the ever-greater assistance of machines, from typewriters to word processors to the still-dim but ever-more promising future.

The pillars of this community, especially Frode Hegland, have provided, and are continuously creating, new ways and means of transforming the setting of text to platform. They are inventing that ever more promising future.

Visual-Meta, Frode Hegland's creation, is a remarkable contribution to simplify and improve the means by which Text is identified, stored, retrieved and manipulated. It also enormously enriches the text itself, including enhancing its storability, its retrievability and by facilitating its readability by instantaneous contextual glossaries, and by our ability to highlight parts of it and to copy and transfer these parts, and by thinking in advance of the risks of technical obsolescence by adding Visual-Meta as an appendix to the pdf version of that text. The "Reader" part of this operation, truly adds to the durability, retrievability and richness of reading the text of others.

But Visual Meta also does more. It has an "Author" part. It helps the author compose his or her own material by giving them the ability to diagram their thoughts as they go through their creative process, establish directional links between these diagrammed items, call in correct and instantaneous citations and so much more. Writing has never been so enticing and exciting. The software has never been so helpful. Our modern machines are the enablers of this enormous in-depth transformation of our interaction with the language as writers, readers or custodians.

Discussions sparked by the symposium have resulted in a decade-long dialogue among many creative people about "The Future of Text". The many short essays in this book reflect the breadth of the individual interests and the many different directions that members of this creative community have taken their reflections on "The Future of Text". There are many ways to think of "Text" and how we interact with it. Enjoy.

Introduction by Frode Alexander Hegland

It's an early morning here in Cyprus as I sit and write this introduction to the second volume. The sky is not bright blue, it is cloudy, with only a few breaks where I can see sun. This is poetic since writing survived here after dying out everywhere else during the Late Bronze Age collapse. But my mind is more focused on the COP26 summit starting in the UK tomorrow.

From Wikipedia: "The 2021 United Nations Climate Change Conference, also known as COP26, is the 26th United Nations Climate Change conference. It is scheduled to be held in Glasgow, Scotland, United Kingdom, between 31 October and 12 November 2021, under the co-presidency of the United Kingdom and Italy. The conference is the 26th Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change and the third meeting of the parties to the Paris Agreement. This conference is the first time that parties are expected to commit to enhanced ambition since COP21. Parties are required to carry out every five years, as outlined in the Paris Agreement, a process colloquially known as the 'ratchet mechanism'. The venue for the conference is the SEC Centre in Glasgow. Originally due to be held in November 2020 at the same venue, the event was postponed for twelve months because of the COVID-19 pandemic in Scotland."

Richer Dialogue

I wrote to you, 'dear reader of the distant future', in the introduction to the first volume of The Future of Text. For this second volume it is more important to write to the 'dear reader of today' since if we don't have a sustainable planet, there won't be much of a future.

Our technologies for improving physical buildings, transport, commerce, data transfer, data processing, warfare, entertainment advance at a rapid pace, but what about technologies to support knowledge and understanding?

We build impressive buildings because we have increased our understanding of materials and tools. We travel further in cars at lower energy usage–sometimes the cars even drive themselves–and we travel further into space than ever before. We develop ever more efficient commerce systems to power a global economy where we can request almost any item to be delivered to our door within 24 hours–at low cost. We build tremendously powerful personal and cloud computing systems to crunch numbers at previously unheard of speeds. We also build drone swarms and cyber warfare capabilities to tear our enemies to shreds at safe distance. We build virtual worlds, on VR platforms and on 'old fashioned'

consoles to present visually stunning worlds with incredible freedom of movement and interaction.

Yet our text remains much the same.

As our phones become smarter, never mind our watches and the (previously passive) speakers in our homes, our text has generally stayed 'dumb', unable to communicate the richness which went into it–when we publish a document we strip away even such useful attributes as the section headings in a document and reduce the text to a form where sentences cannot even be selected, only lines. The documents we publish are for another age, when humans would only read documents, not for one where humans both read and manipulate documents.

Looking At Text

The lack of richness in textual communication and the poverty of affordances is an urgent and important problem. The characteristics of text are known to most school children but they bear repeating to us since our daily use of text has rendered text near-invisible as a medium. If you had met me in person it's not unlikely I would have told you, perhaps more than once, that talking with most people about text is almost like talking to someone about the glass in a window and all they will talk about is the view (the analogy would be the meaning of the text) or the frame (the font or immediate presentation of the text), since that is what they can see, not the qualities of what text does for us, such as its symbolic qualities.

Please allow me a few points about the characteristics of text, from my opening remarks at the 10th Annual Future of Text Symposium, on the following pages:

Text is Simple

'Text is simple' My 4 year old son Edgar is learning to read and write. It is expected that he will be proficient to an extent of reading basic books by the time he is 5. Although he has of course picked up daddy's iPhone and taken pictures and made the odd wobbly video, it will take him considerably longer to make a video which presents thoughts beyond what he can capture immediately in front of him. Beyond 'text is simple' a poem, or sorts:

Text is frozen yet… Text is alive with potential.

Text can be rendered into many forms. Text is not one thing. Graffiti is text. Code is text.

Text does not move at its own speed, it moves at yours.

Text is free from much of human colour, text will never replace the voice of a loved one. Text is not trying to be speech. Text was not invented to solve the same communication problems.

Text lasts, images fade. Movies get remade, books don't get re-written.

Text is timeless, though words are not.

The environment text is expressed into, its substrate, is evolving. Text is now active and connected.

A TikTok of Doug Engelbart.

Text is clearly expandable. Links, emoji, tapback.

Text can be mind controlling, through propaganda, myths or social media. Or even poetry.

Text can be mind expanding.

Text is neither true or false, it is simply a conveyor of information, it contains no inherent judgement, no inherent validity, it can only be judged and validated through other text, and today we are figuratively drowning in text which is instantly click-copyable and click-shareable but few clicks are devoted to understanding and evaluation.

Text is cheap. Cheap to author and cheap to read. If someone writes on a modern laptop and uses a modern smartphone, they do not need further tools to write or to produce a broadcast quality video. However, producing a video comes with a large amount of external costs, such

as locations, talent, effects, music and so on.

The problems text create can be expensive to deal with. Fake news, climate change denial, social justice pushback–Black Lives Do Matter.

My text is not neutral.

Text allows for quick non-linear interaction without having to formulate queries–it's a lot quicker to thumb back in a document to look for something you have a vague idea of, rather than to speak exactly what you are looking for, to a human or AI.

Text is placeable in space: You can write on a napkin, on sand or on a computer screen and put any text anywhere you want to, and it will remain within eye's reach for you to think with, greatly increasing your working memory.

Text is referable. When someone puts something in writing, they can be held to account.

Text is addressable, which means that it is not just citable, it is trail-followable, where an author can clearly state what is referred to, for the reader to verify.

Text is characterised. My father would seldom say that he disagreed or that someone was wrong. Instead he would say that he characterised the issue differently. This is what we do when we write glossary terms. We present our personal definition of something, we make no assumption of knowing a universal truth. This is powerful.

Text is where we place much of our most important thoughts, in laws, records, diary entries, and love letters–civilisation was 'literally' written into existence.

Text is simply the most advanced symbolic communication media our species has so far managed to come up with.

Text is more. Much more than I can list.

Text is also largely ignored. This is something we are trying to change with our effort around The Future of Text book and Symposium, as well as with the software we are producing to, as Alan Kay puts it, the best way to predict the future is to invent it, and the infrastructure we are working on. We live in a perilous time but I believe we can write our way out.

Thank you for reading this, thank you for being a part of it.

The Environment of Text Has Evolved

Even though I lament that text and how we interact with text has barely changed, it is clear that the environment text is produced and consumed in has changed:

It's overwhelming. In the 21st century we do not have the luxury of time to even try to read every document in our field in fine detail. There is simply too much information published. We must develop new ways of reading to deal with the volume of material and get rid of the snobbish notion that we need to read everything deeply. When we come across work which is important to us, then we do indeed need the opportunity to digest and reflect, but we equally need to reduce the time wasted on immaterial material. This is not new but it's worth noting.

It's active. Text today is active in social media, where considerable resources have been invested by those who profit from what is sometimes called 'engagement' in social media, as well as state actors who wish to manipulate the views of whole segments of populations through posts crafted with thorough knowledge of the population they are targeting. Those with vast resources have weaponised text, 'civil defence' remains weak, the average citizens do not have access to incessantly powerful text tools.

Text Is Getting Shorter and More Connected

Text authored for linear entertainment needs no more improvement than paintings, nobody will complain that a painting is not up to date and neither will anyone complain that Shakespeare is too linear.

I would say that text authored for learning or knowledge work in general does need to have improvements in how we interact with it however.

What we see, as I'm sure you would agree, is that information is getting shorter and more connected. This goes to the heart of what digital text, or hypertext, is, and it's not new. The hypertext community has been historically focused on linking smaller nodes of information rather than on larger, fixed documents [2] [3] [4] [5]. In contrast, scholarly communication is centred around the consumption (studying and literature reviews) and production (publishing and submissions to teachers and journals) of frozen 'complete' documents.

We can view it as a cost issue: Previously going to the library to get a book took time and effort so you might as well read the whole thing, it made sense. Now we can instantly search and jump to a myriad documents so the cost of access is lower to the point of interfering with the cost of mental concentration to consume a large volume in a linear fashion. It is therefore not enough to decry the lack of long reading or laugh at the 3 min max

videos on TikTok. As text thinkers we need to adapt our thinking of what text is when digital and what we want text to do for us. And this is our challenge; to use the power digital technologies afforded us without losing the depth and rigour of academia.

What We Need To Augment

It's fair to ask what exactly we should build to augment our interactions with text, and the answer is of course many different things, but I think I can safely tell you about what our group is looking into:

The most basic writing is noting something down. This can be based on something one is reading (an annotation), or just a thought. A challenge is to provide the opportunity to note this down in a myriad of ways, with context/metadata. If you have a thought while walking down Piccadilly because a building inspired you and you say this to the assistant on your watch, this note should be accessible based on the text itself as well as the time of day, your location, what you were doing before, during or after making this note, who you might have been with/talking to, the weather that day and so on.

And here comes the fun part: We need to create incredible spaces for interaction with the knowledge we have gained and connections to external knowledge to follow our curiosity. This is an area seeing much exciting attention from companies including Roam and Notion. *How far can we build these thought spaces, based on the rich information noted down earlier and how can we publish with this information staying intact?* This is the question we ask, and we ask how we can do it in an open way so that there can be real competition in this space, with the user owning their data at every point.

And then we come to publishing the work. It's not enough to simply fill a bucket of knowledge. At some point it needs to be presented in a coherent form, as a report, academic paper or even a journal entry for ourselves. The idea here is that it should be possible to publish using PDF with Visual-Meta appended to the document to the level of detail, depending on what you want to share, including all the original context to allow a reader to expand the document into rich views.

From the perspective of this series of books, I think we should also look at different ways of binding text together in volumes. For example, this book is the second volume of The Future of Text. I hope there will be more. An interaction we have built into our PDF viewer Reader means that you can select text and cmd-f to see all the occurrences of that text, which can be pretty useful seeing what other authors referred to the same keywords. This means that maybe we should make a single volume of The Future of Text 1 & 2, so that you can quickly and easily see who else is writing about a specific keyword you see and find interesting. That would make the book massive though. The point of this trivial example is

that you, the reader, should be able to do book-binding and re-binding as you see fit, specifying that you want to open book one or both in a single binding. Maybe you want to share a few articles with a friend and maybe that friend wants to read only those or 'open' the book back into a full set, without losing any annotations they might have made to their first-read articles. I think this is quite evocative.

Maybe. What is definite is that we should experiment with different ways for authors and readers to package the information, serving, as Ted Nelson so eloquently put it some time ago, 'God The Author and God the Reader'.

Going Beneath The Surface

So far the text we share only carries surface meaning.

If we want richer dialogue we need richer means of expression and communication. And I think it's fair to say that there has been no time in history when we have had a greater need than now. Let me tell you what I mean. When we share what we write in the form of a document, we share only the surface of what we have written. We do not include who we are, how the document is structured, or who we cite, in any way which is easily and robustly accessible programatically.

And we share in document formats which may not last the decade, let alone a hundred or a thousand years.

I say the solution is simple: Let us write our way out[a], let us write our metadata into an appendix in a form readable by both mankind and machine.

Since Context Matters & Metadata Matters, Add It, Don't Hide It or Lose It

Let us write metadata plainly for all to see.

Our group proposes the Visual-Meta approach, as outlined on visual-meta.info but how we do it is less important than that we do it at all. I'm grateful that the ACM is doing a pilot study on this with us and I'm grateful that others are joining us in dialog for how best to make ordinary documents contain rich information.

Let us also do this for web pages, which is what we are working on now, please join us. And let us try to find a way to do this when we converse using social media. Let any post refer to any section of a longer text (document or web page), let citations flow through to help the reader check the veracity of what's stated. Let's more explicitly present how we characterise aspects of our knowledge, rather than cling to arrogant statements of some notion of 'truth', when we should be looking at aligning our perspectives and how we choose to interpret data.

In the beginning was the word. In the beginning of a new Age of Enlightenment we need a new kind of word to unleash human thought and understanding. Let's build this together.

Augment Everybody

Now is a time when education really matters, for individuals and for society at large. We simply cannot afford the weight of being dragged down by those who will not engage with science and reason, yet we certainly do not want to have people listen to those who speak from a perspective of science and reason to be listened to unquestioning. The solution is, as we often mumble to each other over coffee discussions, education. But then we only seldom look at what improving education would really entail and I accept that I too, am not qualified to comment on this, though I certainly have opinions based on my teaching at London College of Communication and on getting my PhD from the University of Southampton[b].

What I will say is that tools for thought matter. It's easy to say students need a good laptop (and they do). It is equally important to focus on the software on these laptops and while the large software companies have fantastic creative power, the systems students, and the rest of us, generally, have for reading and writing have not improved measurably over the last few decades, while the hardware performance of the machines, and the entertainment software (games and movie CGI) has increased markedly. Some of us are doing what we can by building what we think are better tools. Join us, even if that simply means complaining about what the status quo offers.

Let's augment everybody, let's leave no mind behind.

Let's end by going much further back in time than the Bronze Age Collapse and look at an early pivotal moment in the history of text, when Mesopotamian city states transformed using tokens to manage their agricultural resources. From around 7500 BCE they had been using tokens, but as Denise Schmandt-Besserat wrote in the first Future of Text [6] around 3300 BC, the tokens were wrapped in a clay envelope which had indentations of the contents to show what was within. This would eventually lead to the full information being written on the surface clay, the token inside would no longer be necessary.

I am a huge proponent of making metadata visual in order to make it easy for mankind and machine to read and to ensure it won't be stripped away if the document format changes– as long as the 'surface content' can be read, this will remain. It is clear that metadata cannot always be visible however, such as when you copy from a document with Visual-Meta and the system attaches the full Visual-Meta to the clipboard–something you cannot see or easily access–so let's end with thoughts of resurrecting the Mesopotamian tokens as a poetic idea of what can be behind the text, what context and connections can be embedded within. Let's

imagine thousands, or hundreds of thousands of modern documents being broken open and out comes useful units of knowledge.

Let's shatter frozen, superficial documents, go beneath the surface and create a truly liquid information environment where knowledge and understanding flows.

Let's augment *everybody,* let's leave no mind behind.

P.S.

As I still sit here in Cyprus by the water, it's getting a little lighter in the sky and as I enjoy working on a modern laptop, Apple's 13" M1 with AirPods Pro, listening to what's sometimes called 'Melodic Techno & Progressive House Mix[c]' in hour long, sometimes longer sets on YouTube, and I can drown out what is distracting background sounds for me (I have Misophonia) and enjoy my coffee 'frappe', I wonder how I would have been able to work here all those thousands of years ago, if at all. Leaving aside the cultural aspects of the likelihood I would even have been able to afford an education, and focusing just on the tools, I am so grateful for the augmentations the technology offers me. I can speak a message to Siri on my Apple Watch so that I don't have to spend a lot of time coordinating with my wife who is now coming down to the beach with my beautiful baby boy Edgar who is now four and a half. I can instantly check my curiosity using our software tool Liquid with Google & Wikipedia.

And I wonder, if we put some real effort into improving the future of text, what will my descendants and Edgar's descendants have to augment how they think and communicate? I wonder further as I sit and do a few edits at 30,000 feet while flying back to the UK. I have my impressive, futuristic feeling laptop but the in-flight Wi-Fi has gone down (that is of course a topic by itself, how we don't refer to the Internet, or even the Web anymore in general discourse, we use the means of connection–Wi-Fi, Broadband or 4G/5G). I feel slightly disconnected, I wonder what the rest of the team are thinking about the book and about what we are doing. I am not a Phoenician from thousands of years ago sailing through the Mediterranean, navigating by starlight and the outlines of shores, ever watchful of changing weather and hostile craft, my mind is in cyberspace, attempting to navigate and make sense of a new world, as fraught with new dangers, hoping, hoping desperately that we have the foresight to really look deeply at the tools we build to connect us to our thoughts and each other.

Back in my home in London doing the final edits to this introduction and working on putting the book together, I again glance up at the sky. Cold and frosty, nothing like the balmy Mediterranean sky of just a few days earlier, and I am reminded that this volume is published the same month as the James Webb Space Telescope is launched. It is amazing

what humanity can do when we just simply get on with it. We will soon be looking into interstellar space with a precision previously far out of our reach. I hope we can make a similar effort in how we look at each other and our own minds, through the ways we express ourselves symbolically and beyond.

Let's dream about that how we can do that. And build to make it a reality.

Frode Alexander Hegland

Editor, frode@hegland.com

Cyprus, 31st of October 2021

Contributor Bios

Alexandra Saemmer is Full Professor of Information and Communication Science and co-director of the CEMTI laboratory at University of Paris 8, France. Her research focuses on socio-semiotics of cultural productions (texts, images, videos, websites, platforms, …), and digital literature. She is also an author of digital literature herself.

Ann Bessemans Professor and post doctoral researcher at PXL-MAD School of Arts / Hasselt University, research group READSEARCH.

Barbara Tversky is a professor emerita of psychology at Stanford University and a professor of psychology and education at Teachers College, Columbia University. Author of *Mind in Motion: How Action Shapes Thought.*

Robert E. "Bob" Horn is a fellow of the World Academy of Art and Science. For 27 years, he was a Senior Researcher the Human Science and Technology Advanced Research Institute (H-STAR), Stanford University, where he worked with international task forces and governments on wicked problems an social messes. He has taught at Harvard and Columbia universities and is the author/editor of ten books. www.bobhorn.us

Bob Stein Founder of Criterion, Voyager and the Institute for the Future of the Book.

Brendan Langen is a Conceptual Designer, Researcher + Writer in Chicago.

Daniel Berleant is the author of *The Human Race to the Future*, 4th ed., 2020, pub. by Lifeboat Foundation and available on Amazon.

Daveed Benjamin CEO Bridgit.io Author of first-of-its-kind augmented reality book, Pacha's Pajamas: A Story Written By Nature that features Mos Def, Talib Kweli, and Cheech Marin.

Erik Vlietinck Freelance technology journalist and reviewer/analyst for Byte, Macworld, Publish, Photoshop User, IT Week, and many others. Marketing writer for Ricoh Europe, HP, Phoseon, Quark, EFI… Switched from being a lecturer at ICT law 28 years ago to writing.

Fabian Wittel & David Felsmann. Napkin Co-Founders. David Felsmann: Believer in knowledge creation, likes to build companies, couldn't find an easy yet powerful personal knowledge management system and hence builds Napkin.
Fabian Wittel: Lives at the intersection of code and learning, spent the last years in organizational development and now builds Napkin, a simple system to connect and sort thoughts.

Fabio Brazza is a Brazilian composer, rapper and poet.

Faith Lawrence. Data Analyst in The National Archives' Catalogue Taxonomy and Data department and am Project Manager for Project Omega - TNA's new pan-archival catalogue/editorial management project.

Imogen Reid completed a practice-based PhD at Chelsea College of Arts, her practice being writing. Her thesis focused on the ways in which film has been used by novelists as a resource to transform their writing practice, and on how the non-conventional writing techniques generated by film could, in turn, produce alternative forms of readability. Her work has appeared in: Hotel, LossLit, gorse, Zeno Press, Elbow Room, Sublunary Editions, IceFloe Press, ToCall, Experiment-O, Soanyway, and The Babel Tower Notice Board. She has pamphlets with Gordian Projects, Nighjar Press, and Timglaset.

Jad Esber Co-Founder, Koodos. Fellow, Berkman Klein Centre for Internet & Society at Harvard University.

Jamie Joyce President & Executive Director of The Society Library www.societylibrary.org

Jay Hooper holds a doctorate in computer science and has over 15 years of experience in human-computer interaction, sociotechnical research, and user experience. He takes a mixed methods approach to research, and is a leader in the web science community, bridging stakeholders from industry and academia. Jay recently served as programme co-chair of the ACM Web Science conference, and currently works as an independent consultant in Canada.

Jeffrey Chan is an assistant professor at the Singapore University of Technology and Design. His work focuses on enlarging the possibility of ethics in design.

Jessica Rubart Professor of business information systems, OWL University of Applied Sciences and Arts.

Joe Devlin is an artist living and working in Manchester and Leeds. His most recent solo exhibition 'Gatefolds' was held at Studio 2, Todmorden, in 2019. His work has appeared in Cabinet Magazine, Frozen Tears III (edited by John Russell), Text 2 (edited by Tony Trehy), ToCall Magazine, edited, published, and printed by psw (Petra Schulze-Wollgast), and No Press (derek beaulieu). His latest publication, Net Reshapes, is published by Non-Plus-Ultra. He runs the publishers Nuts and Bolts. For more information, please visit https://nutsandboltspublishing.com

John Hockenberry I spent more than 30 years in print and broadcast journalism. For the last 45 years I have been a paraplegic. Disability is an experience limited by text. My career ended with some texts. I want to explore the evolution and future of the VERB: Text.

Jonathan Finn developer of creativity apps (e.g. Sibelius music writing system).

Karl Hebenstreit, Jr. IT Specialist at the US General Services Administration.

Kyle Booten Assistant Professor, Department of English University of Connecticut, Storrs, Assistant Professor of English, University of Connecticut, poet/programmer developing tools for noöpolitics, author of "To Pray Without Ceasing" topraywithoutceasing.com

Lesia Tkacz is a Web Science PhD researcher at the University of Southampton, and focuses on studying computer generated novels, paratext, and potential readers. Her work also includes creative AI collaboration projects at the Winchester School of Art.

Luc Beaudoin Adjunct Professor of Cognitive Science & Education at Simon Fraser University.

Mark Anderson A member of the WAIS (Web and Internet Sciences) Group at Southampton university and an independent researcher in Hypertext. His focus is on how hypertext can be used for more efficient retention of knowledge within organisations. He is also active in the recovery and preservation of old hypertext systems.

Megan Ma is a Residential CodeX Fellow at Stanford Law School. Her research considers the limits of legal expression, in particular how code could become the next legal language. Her work reflects on the frameworks of legal interpretation and its overlap in linguistics, logic, and aesthetic programming. Megan is also the Managing Editor of the MIT Computational Law Report and a Research Affiliate at Singapore Management University in their Centre for Computational Law. As well, she is finishing her PhD in Law at Sciences Po and was a lecturer there, having taught courses in Artificial Intelligence and Legal Reasoning, Legal Semantics, and Public Health Law and Policy. She has previously been a Visiting PhD at the University of Cambridge and Harvard Law School respectively.

Niels Ole Finnemann Professor Emeritus. Department for Communication, University of Copenhagen, Denmark. Former head of Center for Internet Studies and Netlab at University of Aarhus and professor in Internet History, Digital Cultural Heritage and Digital Humanities at Copenhagen University.

Peter Wasilko New York State licensed Attorney, Independent Scholar, and Programmer.

Philippe Bootz, e-poet and Profesor, Université Paris 8 https://elmcip.net/person/philippe-bootz

Rafael Nepô, is an Information Architect and the founder of Mee, a modular platform to organize information in a visual way. His side projects involve researching Semiotics, Reading & Writing, Encyclopaedias, Library & Information Science, Information Architecture, Iconography. A lot of his work is influenced by Japanese Philosophy. mee.cc

Richard A Carter is an artist and Senior Lecturer in Digital Media at the University of

Roehampton. Carter is interested in examining questions and issues concerning more-than-human agency within digital art and literature - considering these generate insights into what it means to perceive, to articulate, and to act within the world. Carter's research is embedded within his artistic practice, developing hybrid art objects that meditate on the potentialities of sensing, knowing, and writing at the intersection between human and machinic actors.

Rob Haisfield Independent Behavior Design and Gamification Consultant / Behavioral Product Strategist at Spark Wave.

Sam Brooker Assistant Professor in Digital Communication and Convenor, BSc, MSc, PhD, FImanfUK, F SmeIR, at Richmond, the American International University in London.

Sam Winston His practice is concerned with language not only as a carrier of messages but also as a visual form in and of itself. Initially known for his typography and artist's books he employs a variety of different approaches including drawing, performance and poetry. https://www.samwinston.com/information

Sarah Walton is an author, digital consultant, lecturer and coach. Founder of Counterpoint Digital Consulting counterpoint.bz. Founder of Soul Writing & Soul Business drsarahwalton.com

Stephen Fry is an English actor, broadcaster, comedian, director and writer.

Tim Brookes founded The Endangered Alphabets Project www.endangeredalphabets.com and The Atlas of Endangered Alphabets at www.endangeredalphabets.net

Vinton G. Cerf co-inventor of the Internet

Yohanna Joseph Waliya, UNESCO Janusz Korczak Fellow, ELO Research Fellow, Winner of Janusz Korczak Prize for Global South, Curator of MAELD & ADELD, University of Calabar.

Alexandra Saemmer

Writing in the age of computext

All digital texts are polyphonic and performative, whether they are written on Word, Facebook, Prezi, After Effects, WordPress, Facebook, Instagram, Power Point, or programmed "by hand"[d]. Their content and structure are executed live on a machine whose hardware and softwares vary from one brand to another, from one generation to another. For me as an academic and writer of digital literature, the future of text is deeply linked to its digitalization: I define it as a tensive dialogue between the human and the technical writing tool marked by economic and ideologic stranglehold[e], but also by intense moments of inspiration[f] and discovery.

In order to actualise, a digital text, first of all, relies on an operating system that structures the display in advance: The Apple symbol or the Microsoft primary-coloured window logo should therefore be considered as an integral part of the text. Software tools for writing, editing and publishing are not neutral intermediaries neither: They embody the voices of their creators, from Steve Jobs to Mark Zuckerberg; they materialise points of view, values and ideologies[g] through the proposals they make to the user in menus and icons, the predefined frames they impose on a text. Drop-down menus for example, are injunctions to give media content a prescriptive format; forms to be filled out limit the space for expression, resulting in a way of organising the textual content that, in part, is not within the remit of the author.

"Architext[h]" is what the French researchers Yves Jeanneret and Emmanuel Souchier call the highly structured writing interface of software tools and platforms. Nevertheless, a prefabricated device can result in active appropriation. The poetics of digital text lie, for me, in the complex interaction between writers and readers who perceive, interact with and interpret the contents and structures of the text, and its polyphonic programme that makes the voice of the author resonate, as well as the software designers and manufacturers, and the computer that updates the programme. From the infancy of net art[i] to today's writings on social networks[j], this balance of power has become a theme for many writers who attempt to deconstruct it.

Recently, the formatting process of the text has taken a new turn that I refer to as "computext". While architext imposes a form on media content, computext[k] anticipates its very production, and sometimes even writes instead of the author. Predictive text generators, like Gmail's "Smart Compose", use machine-learning processes that predict what the human

user is about to write according to probability. For example, when they answer an email, they just have to start their sentences for the system to complete them automatically. The suggestions are calculated by algorithms that detect expressions used regularly by all Gmail users, and by the individual.

The probable continuation of the text is calculated as soon as the human starts typing an email, but the results are nonetheless limited by the programme as early on, Google had to deal with violent comments in the results generated. When Gmail writes out what the human writer may or may not want to express, the result reflects a representation of the brain as a network of highly routinised connections, moved by almost reflexive habits. But it also reflects what Google tries to impose as standards of expression on its community of users.

Web apps like "Write with transformer[l]" based on GPT-2 technology give an idea of what an artificial neuronal network is capable of when it generates text without these constraints. The writer first of all chooses an IA model. By clicking "trigger autocomplete" on the page, options are given for the continuation of each sentence. By setting the "temperature", the writer can opt for a varying degree of conventionality, in other words: they can encourage results that converge with, or deviate from the regular responses in the generator's database. If the writer for example has the app complete a list using first a high level of conventionality, then a low one, it seems like the app can decide to no longer follow the schema it detects. The writer can go even further and create a new database, using the already existing algorithmic structures.

In the last few decades, digital literature has invented its own poetics in relation to software architexts. How will these poetics be reinvented in the age of computext? The results calculated by the "Write with transformer" neural network give us a foretaste of the potential of this dialogue. Obviously, the text generator reveals discursive routines, but the writer can regulate the level of routinisation, and start a lively conversation with the text library it is based on. Each piece of text proposed comes from the texts in the tool's database, and these origins continue to resonate in the new text produced as the author selects, rejects or rewrites the proposals.

text created with https://transformer.huggingface.co/doc/gpt2-large. Saemmer, 2021.

Writing with machine computext might become a sort of curatorial task: it involves finding an individual path through the avalanche of content generated by AI. Singular texts emerge from this mesh while remaining deeply connected to the algorithmic structure of the tool, and the content of its database.

I imagine the future of writing with neural networks as a process of enquiry, that digs into already existing texts in order to create new paths.

Ann Bessemans

Legibility/Readability & Visibility

Abstract:

Typography and legibility/readability are terms that are often used inappropriately and without considering their meaning in context with their origin. After all, what makes some letters easier to read than others? Does a text or typographic message have the main purpose to be read and is legibility/readability therefore assigned as one of the most important criteria? Or is there more to it and can typography communicate with its audience in other ways and thus quantified differently as legibility? This text will introduce important definitions and will give, in relation to it, a quick analysis of the typographic communication process.

The most famous definition of typography and undoubtedly one of the pointiest is the one of Stanley Morison (1889-1967) in his *First Principles of Typography:* "Typography may be defined as the art of rightly disposing printed materials in accordance with specific purpose: of so arranging letters, distributing the space as to aid to a maximum the reader's comprehension of the text. Typography is the efficient means to an essentially utilitarian and only accidentally aesthetic end, for the enjoyment of patterns is rarely the reader's chief aim. Therefore, any disposition of printing material which, whatever the intention, has the effect of coming between the author and the reader is wrong. [8]

Beatrice Warde [9] tried to clarify the function of typography through various metaphors which answer to the same principle as the one from Morison: Reading should not become a mere viewing experience, where the reading process is hindered by the purely visual nature of the typographic design.

Many of the used and contemporary typographic (legibility) definitions start from invisible typography, from the convention. Convention, an unavoidable aspect of legibility/readability, is understood as a form of certainty to map out routes. This means that when you accept the convention you can reasonably agree that you can read undisturbed with the familiar letterforms and familiar typographic patterns.

The contemporary definitions that emphasize the purely conveying role in transferring a message by means of typography were set out throughout the typesetting craft, but also during the early 20th century which is characterized by some pioneers such as William

Morris, Cobden Sanderson, Emery Walker and St. John Hornby who carried out a reappraisal of craftsmanship. According to these typographers, there was a decline in the typographic standards, which they attributed to "the machine," and so they printed their books according to the standards derived from 15th and 16th century printed matter.

Typography was almost synonymous with "the art of printing books" in the 15th and 16th centuries and the possibilities were very limited. In particular the strict horizontal-vertical pattern was difficult to detach from. A series of technological developments changed this. As a result of the age-old tradition, Morris and his relatives considered these deviations from this horizontal-vertical pattern inefficient and inferior.

After the First World War, revolutionary changes took place. In England the "Invisible Typography" arose, and in Germany the "Neue Typographie" [10]. Both tendencies were a reaction to the decline of typographic standards, but also to the lavish decorations which were a staple in the 19th century. The "Invisible Typography" and the "Neue Typography" have in common that they prioritize an unimpeded transfer of information. In the 1960s and 1970s the Swiss typography followed with their strict grids and form schemes. Not the typography, but the content should make the reader think, which is why the designer must act with great restraint. The dogmatic belief in "only use what is strictly necessary" is essential for effectively conveying content is underlined during these times.

Today, texts in printed matter or on screens are often overwhelmingly designed, even noisy. If, according to Gerard Unger, you are willing to get used to such a design or if the text is interesting enough, it also creates a typographic "silence". The design dissolves and allows itself to be read, if only for a moment, before it reclaims attention to itself. Visibility is not an obstacle a priori, and legibility is a flexible concept [11]. It seems necessary that qualifications such as invisible and visible/notable require to be more clearly delineated. Where is the boundary, when do letters and typography become too visible? And is visibility / noticeability always disadvantageous or does standing out also have a clear function, a legibility function?

At the end of this text, it should be clear that typographic reading (legibility/readability) research can focus on the visible and invisible typography. When it comes to legibility within invisible typography, it often concerns the disappearing letters / or even disappearing design as framed within the known definitions. For example, when a newspaper is not designed as a newspaper, it is no longer invisible. This immediately disturbs the reader's expectations of this medium. Partly because with his years of reading experience the reader has built up an unconscious typographic knowledge.

The typographic definitions of legibility and readability are somewhat in line with what can be described as micro or macro typography. Legibility – Micro typography is defined as

formal knowledge of the basic shapes of letters and their smallest details (such as letter proportions and contrast). It also concerns the letters in words, sentences and text. Readability - Macro typography is primarily dependent on the typographic layout, secondly it is the motivated choice of the font.

In addition to legibility and readability, noticeability / visibility can also be important. Until today visibility, as a theoretical term, has barely been treated as a separate level in type design and typography next to legibility and readability. The entire discussion of visibility as a legibility criterium or legibility component within typography balances time and again between the influences emanating from developments in the technological, theoretical, economic and social. In interaction with this, but just as often in a leading way, it is developments on a design level that have been catalysts and driving forces for visibility. Contrary to legibility & readability, visibility can be situated on both a micro and macro typographic level.

In my opinion, readability research could be studied at three levels: legibility, readability & visibility / noticeability.

To give some context in introducing the term 'visibility' into legibility in general, it should be understood that the increased variation within typography has an effect on its visibility / noticeability. In the long period between the invention of printing (15th century) and that of the trio of lithography, photography, offset (19th / early 20th century), experimentation with typography was rare. So many materials and (digital) techniques have now been developed that a revolution had to take place. The production process now offers us almost unlimited possibilities.

However, the theoretical approach to typography / to typographic definitions in many graphic manuals lags behind these developments. Due to the speed and scale of the technical changes, the new machines, techniques and programs have received more attention than the products. There has been an intoxication from the new technologies. In addition to literal illegibility, this can also lead to illegibility of the content of texts. The question could be whether the increased variation within typographic design benefits effectiveness in addition to visibility. Or how these two relate to each other and can thus be studied.

Within this story of visible and invisible typography, it seems paradoxical to treat legibility /readability & visibility as equals. Perhaps, to give priority to visibility, it may be that designs are made less legible or readable. Should legibility be the only quality label within a typographic design? Legibility is (has become) and remains a very flexible concept. New interpretations are emerging.

This text is based on the lecture Ann Bessemans gave during the ATypI (Association

Typographique Internationale) congress 2020 All Over (online edition).

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Barbara Tversky

The Future is the Past

What is *text* anyway? It can't be impressions in clay or ink on parchment or pixels on a screen. Those are manifestations of text. *Text* must be more abstract than any instantiation of it. Perhaps it's meaningful groups of linguistic characters visible to the eye. But that canonical way of understanding text shuts out meaningful groups of sounds audible to the ears or meaningful patterns of dots tangible to the hands. There are many who use their ears or fingers to read text rather than their eyes. These are all ways to sense language.

Text, in that narrow sense of meaningful groups of visible characters, developed to represent language. Language, in turn, developed to convey thought, meanings, though it is not the only means of conveying thought. Spoken language disappears quickly; meaningful groups of visible characters stay around. They can preserve language, making it permanent and public. Putting thought permanently into the world doesn't require written language; images can do it. Text-like images were created long before writing. They are the earliest evidence of symbolic thought. Currently, the earliest known public expression of thought is a marvelous depiction of a pig and a buffalo hunt found in a cave in Sulewesi [12] and judged to be 44,000 years old. Images in caves and above strewn all over the world, the Bayeux Tapestry, Trajan's column, Chinese scrolls, Egyptian tombs, tell stories of hunts and conquests and growing wheat and more. These represent thought quite directly, like the early (5-6,000 years ago) pictographic attempts to represent language, also invented all over the world, Egyptian and Mayan hieroglyphics and Chinese characters among them.

Mapping meaning directly to pictographic characters encounters problems. One is that many meanings, *if, where, truth, yesterday*, *Aristotle*, don't have clear visual representations, a problem partly solved by adding ways to map sound. A messy mapping, and eventually leading to another mapping, mapping sound rather than meaning to characters. It turns out that each language has a relatively small (20-40) number of basic sounds from which a multitude of words can be created. Words and sentences in turn can express a multitude of meanings. Around 3000 years ago, workers speaking a Semitic language in the Eastern Mediterranean invented the alphabet, a small set of characters that represent sound directly. This efficient system was adopted and adapted by many languages. That history is known from remnants of ancient bits of ink on parchment and impressions in clay and carvings in rock. Mapping sound to characters also gets messy as readers of English know, *though, thought, tough, through*. And throw in *threw*.

As every student knows or should know, Gutenberg invented moveable type, a cultural leap, but practical only for alphabetic languages with a manageable number of characters. It was tried but did not work for Chinese. Moveable type easily prints ink on a page, an important technological advance. Moveable type enabled mass production of books and general literacy and put scribes out of business. Words and images parted ways; words were easy to produce and took over mass communication. Images flourished as art.

What you are reading and I am writing is not ink on a page; it's pixels on a screen. Pixels can form meaningful groups of letters but they can almost as easily form depictions of all sorts--maps, charts, diagrams, cartoons, sketches, comics, photographs, video--robbing characters of the alphabet of some of their advantages. The rapid rise of emojis, of comics and graphic books, of Instagram and Pinterest and YouTube, where images, static and animated, of varying abstraction and purpose, dominate written words, attests to the thirst and utility for vivid forms that express meaning directly. Journals are filled with research demonstrating the advantages of maps over verbal directions, of clear diagrams and charts over explanations in words, of creating visual explanations over verbal ones for learning, of messy sketches for creative thought and innovation. Journals and books are also increasingly packed with maps and diagrams and charts and photos and works of art.

Words have powers; images superpowers, and not only because written words are images. Speakers of any language, young and old, literate or not, can readily recognize a line drawing of a chair, and a spare armless chair evokes different sensations and associations than a plush overstuffed one. True, you can imagine both and probably did as you read, but you may also agree that the name of your child or lover—or your own—pales next to a photo. Many concepts don't lend themselves to direct depiction, but may be depicted metaphorically, just as they are in language, the *scales of justice* or the *White House*. Sometimes only a word or symbol will do, and they find their place in graphics. Images can be abstract as well. Jump now to the simplest, dots and lines. Klee famously observed: A line is a dot that went for a walk. Dots are easily understood as places, events, or ideas; lines as paths or links or relations in a sketch map, time line, or network. A physical walk or a mental one. Add arrows as asymmetric relations and boxes as containers of stuff of any kind and you have a small toolkit from which to construct a wealth of maps, diagrams, and charts. The meanings of these simple abstract forms, dots, lines, boxes, and arrows, are immediately apparent, at least to educated eyes. As before, backed by research. The same toolkit—and much more—serves gestures.

Even before there were cave paintings and petroglyphs, communication was face-to face. We do use words to communicate thought, but we also use gesture, intonation, facial expressions, actions of the body. We use the world—pointing to things in it, arranging sticks

and stones and salt shakers to represent things in it, drawing in the sand, sketching on napkins. Canonical face-to-face communication is naturally multi-modal. As is the future of text.

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Bob Horn

Diagrams, Meta-Diagrams and Mega-Diagrams One Million Next Steps in Thought-Improvement

Here is how it started.

A friend sent me this quote from an introduction to a book:

"Therefore, it is suggested that novices first approach this text by going through it from beginning to end, reviewing only the color graphics and the legends for these graphics. Virtually everything covered in the text is also covered in the graphics and icons. Once having gone through all the color graphics in these chapters, it is recommended that the reader then go back to the beginning of the book and read the entire text, reviewing the graphics at the same time. Finally, after the text has been read, the entire book can be rapidly reviewed merely by referring to the various color graphics."

The author says, "don't read the text first!"

My background

Having written a book *Visual Language: Global Communication for the 21st Century* [13], on the syntax, semantics, and pragmatics of tightly integrating words and visual elements, I was interested enough to buy the book.

It's a big book

644 pages

The visual language it contains

538 diagrams

62 Tables

Total: 600 diagrams and tables in 644 pages!

The Book. Stephen M. Stahl [14] *Essential Psycho-pharmacology: Neuroscientific Basis and*

Practical Applications. Cambridge University Press.

(I used the 2d edition. It is now in its 7th edition)

Use. Text. Medical school.

Prerequisites. Psychology; chemistry; biology; medicine

I was amazed. I went around and asked some medical students at Stanford, "What do you do with your big texts? Like this textbook?"

They said (I'm summarizing): "Oh, we always read the graphics first. ***We never read the text***. There's too much to read in medical school. Every few weeks we've got a bunch of those 600 page books to cover. The diagrams are faster. You can see the structure of the models. The tables you can see the data. You don't have to search around in the text for them."

Is massive use of diagramming part of the future of text? Yes, I think so.

Why? Because we have to build written communication so that learners (and forgetters) can use it at maximum speed. All of us must be able to scan and skip what we already know. We must be able *instantly to see the structures* of the mental models we need to use.

Hypertext will not solve thought-improvement

We live in a world of information overload. Hypertext (without diagramming) will help somewhat, but will *not* solve the scanning/skipping problem. Even better hypertext that links "everything" important and relevant will, of course, be useful. But such better access is not nearly enough [15].

A major problem is how do we continuously improve our thinking about the world around us.

How do we make sense of it?

Mental models.

How do we make sense of complicated models?

Diagrams.

My general conclusion is: We have to work on the thought-improvement problem. And integrated sets of diagrams and their meta-theory are immediate next steps.

One other thought-improvement idea. Eco-philosopher Timothy Morton has addressed one of the limitations of our current thought-processes with his invention of the concept of "*hyperobjects*." Hyperobjects can be defined as huge phenomena whose concepts are so

gigantic in time, space and other characteristics that we have increasing difficulty wrapping our minds around them, and hence, not easily making sense of them. Examples of hyperobjects: Morton mentions climate change and radioactivity. There is not enough space in this article to extensively describe and discuss his thoughts on this. Look him up (Morton 2013; no date[m]) [16].

Crisis in public discussion

We face challenges to our democracy in the public comprehension of the increasingly wicked problems and social messes we face. Again it is the understanding of complexity of the issues and the kinds of thought processes required that can make the most progress now.

Importance of diagrams to improving human performance

Two important series of psychological experiments have produced empirical results to support the conclusion that diagrams improve the efficiency and effectiveness of learning. The improvements vary in different experiments from 20 to 89 percent over convention presentation of prose (i.e. essay form of text) (Summarized in [17], [18]).

We can draw two conclusions: (1) using more and better diagrams could significantly improve learning and, thereby, human performance at many levels of schooling and subsequent professional work tasks, and (2) we need to create an advanced science and technology of diagramming because some diagram renderings of a mental model are better than others for learning, retention, search, and hyper-linking.

Meta-diagramming of diagrams

Are there types of diagrams? Yes, there is the beginnings of a field here, with initial explorations of taxonomies and further attempts to make software that enables the creation of different types of problems that result in creation of different kinds of diagrams. I proposed one simple set of meta-categories in my book *Visual Language* (Horn, 1998).

Proposal: Launch a mega-diagramming project to diagram several complete subject matters

We need a one-million, integrated-diagrams project for that!

Given the computational capabilities that we have now, it is possible to diagram several complete and quite different subject matters, fields, or disciplines of science and the humanities. Does the internet already contain all of the diagrams of one or more subject matters or discipline? Probably not all, but a considerable amount. It is highly likely that with artificial intelligence we will find and create the meta-frameworks for much of what is not currently available.

The mega-diagramming project will not be the "solution" to all our current challenges of thought-improvement. But it is clearly one of the next steps. And we don't know what opportunities the accomplishment of such a project would produce. Just one example might be an answer to the question: What are the elements text that do not "fit" into diagrams of any kind? Another example: the massively diagrammed field of knowledge would permit the hyper-linking of a fully diagrammed discipline of science. This would permit a new way of *seeing* it. New ways of seeing enable new insights, new identification of problems, new analogs between disciplines, and new ways of redesigning.

Next: Leaders needed

Who wants to lead such an important project? What organization will fund it? I have suggested elsewhere that it could form the foundation for metaphorically sequencing the human cognome [19]. A mega-diagramming project is one doorway to that objective.

Notes

1. Information taxonomy. Initial versions of the research on structuring thought referred to here, and its subsequent embodiment in a life-cycle methodology for creating structured documents) was awarded the Diana Lifetime achievement award by the Association of Computing Machinery's SIGDOC (Special Interest Group on Documentation) in 2000.

The One Million Stand-Alone (Hyperlinked) Diagrams and Info-Murals Displayed on Large Interactive Wall Project

First Milestone

could be considered the
First Milestone
in the **Visual Language Project**
and the
Human Cognome Project

has several
goals
including

create a
collection of
stand-alone diagrams and info-murals
for an **entire discipline
or subdiscipline**

create a
detailed, comprehensive analysis
of the **structure, components,
organization, and relationships**
of
every major kind of diagraming
system

begin to create
a systematic understanding
of **how**
the **best human thinking in
advanced subject matters**
takes place

such as
major subfields of
**biotechnology,
nanotechnology,** and/ or
perhaps **ethnic conflict
and terrorism**

that are
linked into layers so
that they can be
navigated by zooming
to detail and wider
context

which would the lead to the
ability to **create** diagraming
and info-mural **software
tools** that would enable
researchers and learners
to easily create and rapidly
modify diagrams and
info-murals
for
educational and
communication purposes
and
displayed for individual work
and
group problem solving and
innovation on large interactive
wall-size displays

because
every element of the
diagrams
would have been identified
and cataloged into a first
approximation of a
**taxonomy of
thought components**

that would the enable researchers,
teachers, and students
to carry around in their laptop
computers
**a complete navagatable subject
matter**
displayed in easily modifiable
stand-alone diagrammatic form
linked together in easily accessible,
indexed
levels

and
where the project runs into
difficulties accomplishing this goal,
these
gaps, ambiguities, and
intractabilities
can be **addressed explicitly,**
thereby
creating the conditions for
understanding them.

that would enable
researchers from other fields
to more easily understand
the frontiers of the field and
hence to
**borrow, exchange and
contribute
concepts, techniques,
theories**

What are the problems with long-term care integration?

and thus become
**an essential tool for
progress** in the **frontiers of
science**

**Stand-alone diagrams and
info-murals**
can be **defined as**
diagrams for which the explanatory text
is tightly integrated
within the diagram space itself,
not separate from it.

The **importance** of such diagrams is that
tight integration of words and images
produces
improvements in learning scores
(by 20 to 89%)
and
speeds learning
(by up to 20%).

Large Interactive Wall

What are the problems with long-term care integration?

23% better   89% better

Mayer, Richard E. 2001, *Multimedia Learning,* Cambridge, Cambridge University Press

Links: Stand-alone Diagrams

Diagram Type: Talkiing Tree

Mega-Diagramming Project. Horn, 2021.

Concepts

Diagrams. Units of communication that integrate text and visual elements to portray abstract relationships, changes in time and branching, and internal and external structure of phenomena

Meta-Diagrams. Study and portrayal of different types of diagrams

Mega-Diagrams. Diagrams that portray very large phenomena and processes. Also known as information murals or info-murals.

Thought-Improvement. The larger context and one of the goals of the future of text

Graphics. Any single or group of visual elements

Icons. Any relatively small picture or symbol used to identify a thing or an idea: A small picture or symbol used to identify a tool, document, command etc. on a computer interface

Visual Language. The emerging communication methods that tightly integrate text and visual elements (images and shapes) that are thought to be increasingly a language.

Hyperobject. Timothy Morton's word for huge phenomena whose concepts are so gigantic in time, space, and other characteristics that we have increasing difficulty wrapping our minds around them, and hence, not easily making sense of them.

Wicked problems. Horst Rittle and Melvin Webber, 1973, Characteristics of wicked problems:

1. No definitive formulation of the problem

2. No stopping rule

3. Solutions not true-or-false, but good-or-bad

4. No ultimate test of a solution

5. Every solution to a wicked problem is a "one-shot operation"

(no opportunity to learn by trial-and-error) and every attempt counts significantly

6. No enumerable (or an exhaustively describable) set of potential solutions; No well-described set of permissible operations to get anywhere

7. Every wicked problem essentially unique

8. Every wicked problem a symptom of another problem

9. The choice of explanation determines the nature of the problem's resolution

10. No right to be wrong

Messes. A systematically inter-related group of problems. Russell Ackoff 1974

Social messes. Messes created by human societies.

Bob Stein

Print Era: RIP

If 9/11 marked the beginning of the end of the American Empire,

I think we can say the Covid Pandemic

which moved much of daily life into the virtual world

(at least for the privileged),

marks the definitive end of the print era.

Publishers will continue to put out long-form linear texts with fixed perspectives

but that practice will dwindle as something new is born.

Some will say Baudrillard and others predicted this and it hasn't yet come to pass.

But in fact it has.

Talk to your young children and your grand-children about their media usage.

Some still read books, but most do not.

They watch videos, They make videos.

Most significantly they build and explore worlds.

And they do it with others.

The abstraction of text will always be a useful component, but it no longer rules.

Brendan Langen

Thinking with Paper

The moment you are inspired to work out an idea, what do you do? Do you go somewhere? Do you pull out your phone and start typing? The initial wave of thought floods our brains with excitement; do you record it?

I go to my notebook. I have to write.

A small, lined notebook holds these words. This essay, along with other blue sky ideas, began there. My notebook is the safe space to scratch out the unknown, the home of deliberate and undistracted thought.

Writing on paper forces me to slow down. The paper turns me into a craftsman. Many studies suggest similar benefits – the brain's language, memory, and thinking functions activate when writing by hand [21] [22] [23]. Away from the distraction of computers, I am fully present, focused on choosing the exact words that reflect my thoughts. In this way, the paper notebook affords full focus – a feeling hard to come by on a machine that provides near infinite access.

Of course, not everyone is beholden to the same focusing challenges. Many of you use different mediums to think. The computer works just fine for some of us. That's quite the point! We have all lived different experiences, and we all think in our own ways.

Our thinking changes depending on the surface. My etches in a dot grid notebook are full of everyday observations. My words in a hardcover mini lined notebook form short stories. Elaborate drawings and their descriptions fill my sketchbook. My Roam graph is purely typed, with past references transcluded and queries interspersed. There, I ask myself questions, talk to my future self, and generate new thoughts. Each has different constraints, which offer different lenses in which to think.

The goal of tools is to enable us to achieve something we could not without it. In our hand, the hammer pounds nails that build structure. The pencil jots notes that build ideas. The ideal tool augments us in a way that enables us to be greater than we were before. Paper and pencil have given us this gift.

But herein lies the issue. Once I realized my notes could link to one another digitally, I had to question my approach. My paper notebooks can't talk to each other. They can't even reopen themselves. So, I moved to the computer. Thinking and writing in my graph was the best way to build onto my thoughts.

I imagine many of us have fallen into this approach. Surely, computers enable us to

accumulate knowledge. Yet, I was missing the biggest point – improving my ability to think. Our best thinking is done in a multitude of ways, not only at the computer. For me, it's on paper.

And yet, to get my paper thoughts to my digital graph, the friction is immense. Digital tools like OCR work at times, but rarely on my written notes without extensive training. We all write differently than we type. The medium is different.

So, we stand at an impasse. Either we take time to deal with the friction or we accept that our words stay in the notebook. Much of the time we default to the latter, and poof! Notebooks stack up on the bookshelf, our grand thoughts locked away as if they never existed.

Considering the visceral feeling of losing notes, it's a bit mad that many of us have willingly accepted that we probably won't see many of our handwritten notes again. This isn't quite Hemingway losing a suitcase of his life's work, but still, how gutting a feeling! Are we satisfied with that reality?

My guess is no. Enough people stand to benefit from a better solution. What might happen if paper could communicate with computers?

Allow yourself to dream for a moment.

On the simple end, fleeting tasks on post-its might sync to our digital TODOs. Our sketches might intertwine with related digital notes, helping us link thoughts across time and space. On the grander end, might we have more access to collective insights? The prolific notebooks of Leonardo da Vinci and Charles Darwin are chock full of generative text. I am certain we stand to benefit from interweaving notes from other brilliant minds. And on…

Surely, downsides would arise, as well. An influx of volume equates to clutter, resulting in greater need for improved organization and retrieval systems. New disputes may occur. I can easily imagine a bitter legal bout to determine business ownership over a napkin sketch. We must always consider the downstream effects of our advances.

Attempts to solve this problem have been made here already. Richard Saul Wurman's thought about paper that updates when held near a power source offers an idea [24]. As do commercial efforts. Anoto, E-Paper, Livescribe, Moleskine's Smart Writing System, and others have taken aim at modernizing paper. Today's efforts show promise. Perhaps they will come to fruition with a larger audience.

The dreamer in me imagines a more accessible future, though. Perhaps a ubiquitous retinal scan allows *wink to capture*. Or all future paper dipped in an electronic coating pushes text to our personal cloud. Maybe OCR just becomes really good and can be tailored to anyone. Whatever the solution, we must prioritize its accessibility.

Because thinking is important. Thinking is how we solve the problems we create on this planet. We live in a world where billions of people can access information from anywhere, yet we create more information waste than ever before. How can we put our thoughts to better use?

As a child of the 20th century, I was born prior to the age of digital natives, so paper feels like home to me. Yet, generations from now, will paper still be prominently used? Musing on human reactions to technology, Douglas Adams claimed, "Anything invented after you're thirty-five is against the natural order of things" [25]. Indeed, maybe an emerging technology may render paper less useful. But today, tracking back to the emergence of cheap paper in the late 1800s CE, paper is ubiquitous with thought.

We live in an incredibly fortunate time to ask these questions. Computing and thinking pioneers like Engelbart, Licklider and Nelson laid the groundwork more than a half century ago, and a growing collective has readopted their hopes of augmenting human intellect today. If our aim is better thinking, we must integrate different mediums of thought.

In a world that prioritizes convenience, it's only sensible we try to eliminate all waste, especially with our most valuable resource – time. We create things to make life easier. Why not make it possible to interact with paper?

Thinking back to those moments of inspiration – do you still have the thoughts somewhere?

Perhaps you do, but many of us sit on countless stacks of inaccessible notes. Even if I still have the notebook, the thoughts are incomplete, disorganized, or forgotten. Rich detail lives in those initial thoughts, but most of us have lost that context. Even if you disagree with Ginsberg's "first thought, best thought" mindset, the origins of our ideas are ripe to revisit. In that excitement, our body shouts, "This is important!" We should listen.

Whether you prefer to think in analog or digital, the future of text will enable deep thought for each of us. When we want to write on paper, we won't have to worry about misplacing the page. The future of text will allow us to think with paper, with a machine behind it.

Daniel Berleant

Dialogues With the Docuverse Is the First Step

Tags: chatbot, docuverse, webiverse, knowledge acquisition

In the future, burgerbots will customize your hamburger within an infinite array of possibilities. Whether you want it medium or well done, with mustard or mayo, plant-based beef or dead turkey, 200 calories, a belly-busting 600, or 175, 193, or even five 50-calorie miniburgers with different specifications, no problem. I'll take mine with the top bun well-toasted white bread and the bottom bun untoasted whole wheat, if you can do that. "Sure, no problem," it says in metallic robo-accent, or any other accent you wish.

Similarly, text will be custom generated from the web docuverse in real time as you need it. Text bots will respond to your search question in any language, or in a hybrid of two languages[no] so you can effortlessly practice basic Spanish at your precise current level while reading comfortably in familiar English — or vice versa. Generated responses will be at whatever reading level you like, from any perspective, and at length, in brief, or another length of your choice. And just in case the response merely whets your appetite or doesn't satisfy, there will be several alternative responses[p] as well. Each will be replete with convenient outlinks[q]. Imagine interacting not with one superchatbot but with a whole panel of them, much as you might like to talk with not just one expert but an entire advisory board of experts. For example, consider asking a medical question, or seeking advice about or assistance with your home, car, personal or work life, dinner (burgers anyone?), or anything else.

This may sound good, but dig under a few rocks and the bad and ugly come crawling out. There are already concerted trollbot campaigns, thought to be sponsored by certain foreign governments, as well as special interest groups with plenty of money to pay secretive PR companies more than happy to hoodwink the public for a price. These trollbots[r] can spew out disinformation, chaos and confusion on Twitter and pretty much anywhere that reader comments have sufficient visibility that it's worth it to those actors.

The technology for sophisticated text generation is not yet capable of fully supporting everything mentioned, but it's getting closer with surprising speed. GPT-3[s] is the name of currently the largest text generator powered by connectionist computing technology. The term "connectionist" here means it has lots of small computing elements connected together in

complex ways. The recent explosion in artificial intelligence is based on a type of connectionist design called a neural network. It doesn't really have neurons in it, rather it has computing circuits that are roughly analogous to neurons. And like neurons connect to other neurons with synapses, these computing structures contain analogs of synapses called "parameters." GPT-3, for "**G**enerative **P**retrained **T**ransformer **3**," the successor to GPT-2 and the precursor to even bigger future textbots, has no less than 175 billion such parameters. These parameters each need to be assigned a numerical value. Being pretrained, this has already been done, using algorithms since no person would know what values to give them even if they had time to do it. Even so, the cost was in the millions of dollars. That's a tiny fraction of a cent per parameter, so consider it a bargain. The bottom line: GPT-3 isn't alive and it doesn't understand what it generates, but it can still generate very human-like text. For example, it "can generate samples of news articles which human evaluators have difficulty distinguishing from articles written by humans," according to one evaluation[t].

A custom-prepared hamburger is better in front of you than somewhere else. Similarly, texts should be highly accessible and available when you want them and with a minimum of user actions like clicks, menus to choose from, verbal requests, fishing of phones out of pockets, and so on. A computer built into a watch (a "smartwatch") is a bit more convenient than a smartphone in your pocket, but even a standard smartphone can and should be held onto your arm with a convenient strap-on holder that allows access by merely lifting your forearm a few inches. Better yet is a computer display built into your eyeglasses that displays text on the lenses, or on a separate tiny display attached to the frame. Google Glass did that but was a failure as a consumer product, though it lives on as a product for a limited set of commercial applications. Perhaps the high price tag was the problem. At any rate other companies have jumped into the fray with Apple Glass under development and quite a number of other product with varying capabilities currently made by smaller companies. Displays of this kind are called smartglasses, so watch for more of them in the future.

So far we've discussed how text will be sliced, diced and grilled to order. When such customized text passages, derived from web texts, videos, images or sound tracks, are presented during a person's dialogue with the docuverse, that only solves part of a larger problem. As anyone knows who has searched in vain for bits of information, when surely others know more than is on the web and even we ourselves have things we could say about it, dialogue with the docuverse of the web can customize only what is already there. More is needed. However the user experience of putting content online requires too many events and user actions, from account registrations to passwords to clicks, resulting in built-in disincentives to add more useful content to the webiverse. Better comment functions won't solve the problem because so often people don't make them, and because when they do, so

many comments are vacuous.

Since the search for information on the web will often be a dialogue with its docuverse, the next step would be to leverage that interactive dialogue to acquire new content. By cleverly asking the user questions that both clarify what they are looking and also whose answers fill in gaps in the information available online, new content will be added to the webiverse in a way that feels natural to the user. Like a good conversationalist, the dialogue will encourage users to share any knowledge they may have about whatever topic they are there to find out more about, and feel good about doing so. This chatbot-acquired knowledge will be organized, indexed and stored for use in future dialogues with other users. That way new content will be generated by bootstrapping from dialogues with the docuverse that people would already be having, without requiring people to decide specifically to make content. That should generate a continually growing body of new content, leveraged by the web search chatbot assistant of the future.

Acknowledgment

Daveed Benjamin

The Bridge to Context

The ubiquity of the web has become so widespread that all Internet users can benefit from the ability to ensure they are reading and receiving trustworthy information. Representative democracy, in fact, requires an informed citizenry yet, currently, there is no possibility of containing the spread of false news nor effective tools to help discern what news is real from what is false.

Unmet social needs include the inability to know what to believe on the web, the lack of context on the web, and in particular the lack of access to information that contradicts and/or supports what the user is focused on. This can all be summed up as the lack of information integrity for virtually all important aspects of online human development and social engagement, and especially the news.

News consumers need access to a robust information ecology. Creators need to earn value for contributing to the enhancement of the information ecology. News organizations need to protect their brand from misinformation and disinformation, and to ensure that they are publishing the most accurate information possible. Fact checkers need exposure for their fact checks.
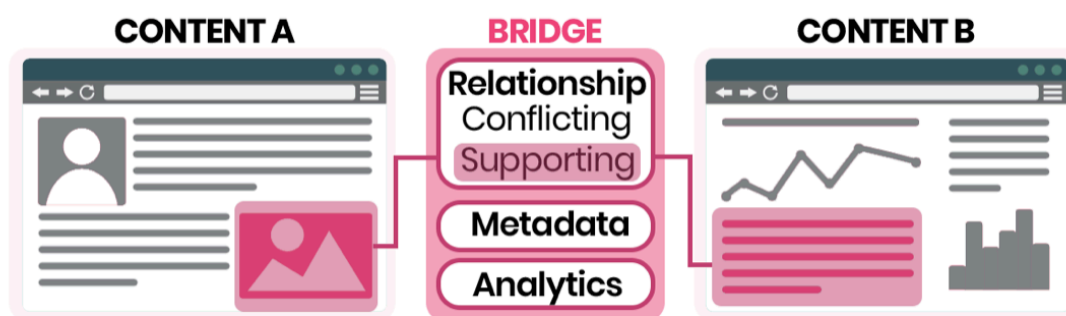
The anatomy of a bridge: two pieces of content, a relationship, analytics, and metadata. Benjamin, 2021.

The solution is the bridge, a conceptual deep link in the annotation space over the webpage that provides insight, context, clarity, and neutrality. Bridging is a revolutionary use of the annotation space. Today's knowledge annotation providers (e.g., Hyothes.is and Diigo.com) enable unstructured textual notes on text content. Bridges connect text, pieces of images, and

segments of video and audio with a relationship. Consider, for example, this scenario: a contradictory bridge from a written sentence in a news article to a segment of video interview that directly contradicts what was written in the sentence.

An important aspect of the bridge is accessibility via an annotation ecosystem called the Overweb. The Overweb is accessible through the Presence browser overlay which has browser extensions, SDKs, a mobile app, and will be supported natively by browsers that adopt the protocol. Thus soon many people will have inherent access to bridges, providing the basis for a more informed citizenry, equipped to effectively participate in all levels of democracy. Thus, society will have a better sense of what to believe and what not to believe on the web. This makes the disinformation industry less effective and lucrative, which reduces the overall amount of false information over time.

The Innovation

The three step process for making a bridge. Benjamin, 2021.

Bridges within the web connect two content snippets of information with a relationship. The content snippets can be text, pieces of an image, or even segments of video and audio. The relationships include contradicting, supporting, and citing. Upon submission, the bridge goes to the Bridge Registry where approved validators confirm whether the relationship between the content snippets is correct.

Once confirmed, the bridge self-assembles into a universal knowledge graph that connects online content in the annotation space above the webpage. When the viewer's attention moves towards a piece of online information with bridged information, the Presence browser overlay highlights the piece of information. Clicking the highlight activates the display of all the bridges related to the piece of information.

How Does Bridging Work?

A new kind of Internet Technology is emerging called the Overweb that operates as a trust layer over the current web. The Overweb crowdsources the creation and validation of bridges that provide deep layers of context. The trust layer operates as an overlay in the annotation space on top of the web. This is not new. Annotation was always planned as part of the web browser but was removed from Netscape in 1995 due to competitive and technological reasons. The Presence browser overlay enables overlay applications that are accessible anywhere on the web.

Two primary uses involving bridging are emerging.

Fact-Checking: The Overweb utilizes the efforts of citizen fact-checkers and a social network to combat misinformation. Using the Presence browser overlay, a community of participants create bridges that connect fact-checks to false claims to counter the spread of misinformation.

Bridging Competition: Bridger.live is a knowledge esports platform for building and curating knowledge by connecting claims and evidence on the web. Competing in a specific challenge, participants identify claims in a topic area and search for contradictory or supporting content. Using the Presence browser overlay, participants create bridges that connect contradictory evidence to false claims, and submit these bridges to challenges to be eligible to win prizes.
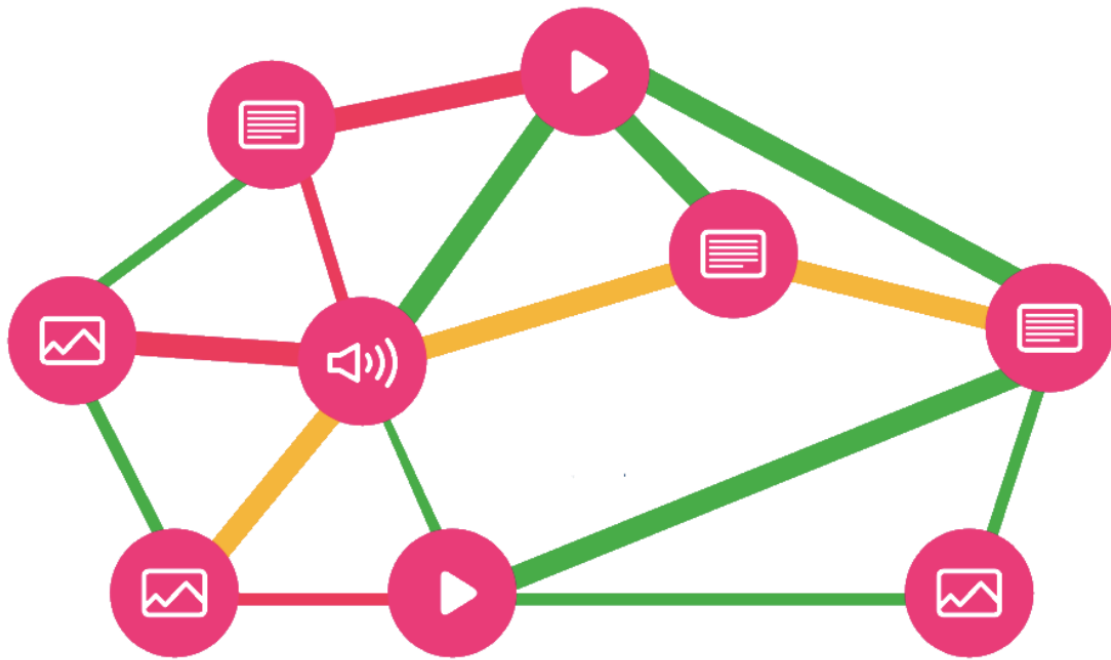
The bridges self-assemble into a public knowledge graph that connects text, images, segments of video and audio. Benjamin, 2021.

The bridges aggregate into a public knowledge graph with network effects based on the number of bridge creators, the number of bridge viewers, the number of bridges, and the connectedness of the graph. The universal knowledge graph creates 360° context for any claim on the web, including supporting and contradicting evidence.

 To ensure the integrity of the knowledge graph, the bridges created by participants are validated prior to being posted to the ledger. Upon submission, all bridges go to the bridge registry in which approved validators confirm whether the relationship between the claim and evidence is correct. Once the integrity of the bridge is verified, the bridge posts to a distributed ledger (or blockchain) and becomes part of the public knowledge graph, and is thereby available as context online.
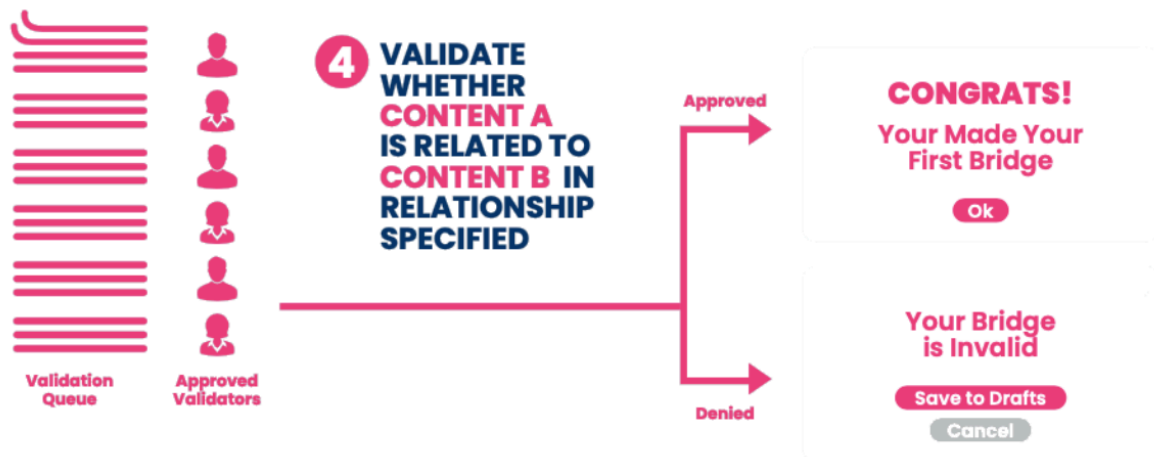
Before going into the knowledge graph, the relationship of the bridge must be validated. Benjamin, 2021.

The bridge creator receives token rewards for the value a bridge creates in the ecosystem based on people crossing and upvoting the bridge. Influential curators and bridge validators also get a token reward. Creators, validators, and curators can choose to take their rewards in either the utility or the governance token, which confers the right to vote on the future of the protocol.

In summary, the emergence of bridging on the Overweb – via the Presence browser overlay – crowdsources the building of robust information ecologies for news content that combat the spread of misinformation and provide the basis for contextual information anywhere on the web.

Erik Vlietinck

Markdown, the ultimate text format?

Tags: markdown, software lock-in

Technical evolution has reached the point where even the most simple note taking app has more layout design capabilities than the average book printer of the nineties could dream of. Traditionally, however, text editing apps lock you in. That makes it impossible to switch from one application to the next without having to export first, which usually makes you lose at least some of the design elements the originating app was capable of. An Apple Pages document, for example, isn't a file. It's a collection of files that contain no text but binary data only.

That is not criticism of Apple or the Pages app per se; they do deliver excellent export capabilities as total lock-in would not be accepted by users.

At some point in recent history, people started buying desktop and portable computers en masse to make things easier and faster. The crucial reason to use a computer was and still is that it speeds up tasks you perform when you're not creating a TikTok or Youtube movie, chatting on iMessage, Whatsapping, tweeting or making Mark Zuckerberg richer and more arrogant.

And as computers are now everywhere and always on, we demand streamlined apps. When one is forced to take more actions than a simple "Open File" in order to get one's text in another app without losing any of the styling, one often gets frustrated. Having to export content before you can import it back into another app takes two steps that are essentially redundant.

What you need, therefore, is a file format based on a language and a parser that allow humans to write a bit of simple code (a pound sign for a heading level 1, two for level 2, and so on) sprinkled throughout their content using the simplest editor there is: a plain text editor.

Such a language has existed for some time. It's the fabric that holds together the World Wide Web: HTML or HyperText Markup Language. But writing text in HTML is tedious and error-prone, and therefore even more frustrating than exporting and importing. Something else had to be "invented".

Markdown to the rescue?

In 2004, a new markup language was created for formatting text that was far less convoluted than HTML and "rot proof", i.e. in the future someone should be able to read the text without problems. It was called Markdown. Its key design goal was and still is readability. Since 2004, a number of variants have been developed.

With Markdown (the original is in capitals throughout this text) you can switch to any plain text or markdown editor without first exporting and importing back again. Six years later, a lot of dedicated markdown editors have spawned with most of them translating the code on the fly into formatting for on-screen presentation and the other way around, converting simple shortcuts such as Command-1 for a level 1 heading into its markdown equivalent. That makes markdown not only simple to generate but also appealing to users who balk at inserting code into their content manually.

Unfortunately, Markdown is basic. Tables exist only in HTML and footnotes or citations aren't supported at all. Others jumped on the markdown wagon, though, and added their own markdown extensions to support features the users of their editors asked for.

The result is that markdown has become a non-standardised markup language that is inconsistent from one editor to the next and that comes with often incomprehensible limitations. As a result, users are often surprised to find that a document that renders one way on one system renders differently on another. To make matters worse, because nothing in Markdown counts as a "syntax error," the divergence often isn't easily discovered. As a result, John McFarlane, David Greenspan, Vicent Marti, Neil Williams, Benjamin Dumke-von der Ehe and Jeff Atwood started a new initiative, CommonMark (https://commonmark.org).

CommonMark proposes a standard, unambiguous syntax specification for Markdown, along with a suite of comprehensive tests to validate markdown implementations against this specification. It, however, only attempts to standardise Markdown, i.e. the original. The most often used "standard" by markdown editors that support text elements like footnotes, tables and citations, though, is MultiMarkdown, developed by Fletcher Penney.

On his web page (https://fletcherpenney.net/multimarkdown/), Penney states:: "MultiMarkdown, or MMD, is a tool to help turn minimally marked-up plain text into well formatted documents, including HTML, PDF (by way of LaTeX), OPML, or OpenDocument (specifically, Flat OpenDocument or '.fodt', which can in turn be converted into RTF, Microsoft Word, or virtually any other word-processing format). MMD is a superset of the Markdown syntax, originally created by John Gruber. It adds multiple syntax features (tables,

footnotes, and citations, to name a few), in addition to the various output formats listed above (Markdown only creates HTML). Additionally, it builds in "smart" typography for various languages (proper left- and right-sided quotes, for example)."

That makes MultiMarkdown very appealing to use because it gets rid of the need to export/import when you want to switch from one editor to another and it solves the problem of Markdown not supporting export formats such as PDF. And although a MultiMarkdown document dropped on a Markdown editor or a proprietary markdown app may look slightly different, the essence is that the the the text itself will still be readable, which means it protects against what you might call text rot. As long as software exists that reads plain text, future humans will be able to read what has been written in markdown. At worst, they will have trouble understanding the glyphs that aren't part of the content itself.

Fabian Wittel & David Felsmann

Breathing Life into Networks of Thoughts

Can Self-Organizing Networks of Atomic Notes Increase Serendipity and Inspiration?

The Energy of a Conversation

Think about an inspiring conversation you've had. How did you feel? How did the ***text*** of that conversation resonate with you?

Text in a conversation is ***alive***. Thoughts are lined up or contrasted. Side topics show up, detach, some open loops will be closed, others lead to surprising new standpoints. Written text, by contrast, feels much more like a monologue, it can only lay down thoughts in one linear sequence. How can we achieve the feeling of a lively conversation in written text, how can we breathe life into it?

Breathing Life into Text

A common definition of life is being able to react to stimuli, to evolve, to reproduce and to grow. What if we applied that definition to the text of the future, what if we would build a living network of thoughts?

Every living organism needs building blocks that are connected to each other. A good starting point is the familiar and proven concept of atomic notes. Niklas Luhmann with his Zettelkasten [30] and Vennevar Bush with the Memex [31] both broke down longer texts into their smallest meaningful units and created atomic notes to allow for remixing them in different sequences. From that inspiring conversation mentioned above, we take the key thoughts and record their atomic notes on index cards.

To further connect those building blocks within our network of thoughts we can add tags to denote the topics or concepts they touch. Thereby we create a relationship between cards with similar tags. Our thoughts can now fly freely like a swarm of birds and arrange according to their relations that pull them towards each other. That's the basic structure of our network of thoughts. However, it does not live yet.

In order to react to stimuli, our network of thoughts needs a suitable interface. The interface should allow us to navigate our thoughts, get reactions to our actions just as in an

inspiring conversation. Rather than a classic list-based application, the interface should look like those flying thoughts we imagined earlier.

The technical solution would be a minimalistic force-directed graph allowing us to move seamlessly from one thought to the next, presenting connected thoughts and always changing shape according to our interests. A technically easy way to select connected thoughts is by using the tags we added before. As pre-trained models for natural language processing (NLP) become a commodity, a more sophisticated selection of thoughts just as highlighting opposing arguments are more and more feasible. Another reaction to stimuli would be instantaneous reactions to newly added thoughts: while adding a new thought to our network of thoughts, it presents us with existing thoughts around the same topics.

But how can our network of thoughts evolve? We should let it "dream": while we're not interacting with the network of thoughts, algorithms can try to spot patterns in our thoughts. For example, many thoughts could be related to a certain mental model that we hadn't seen as an abstraction ourselves. While dreaming, our network of thoughts could suggest those tags and connections, always improving the network's coherence or pointing out our inconsistencies. With the exponential improvement of NLP, applications like this seem to be within reach.

However, we're still missing one key element to realize the ambitious vision: Our network of thoughts has to be able to grow and reproduce. Only adding our own thoughts isn't enough to fulfill this criteria. What if different networks of thoughts could join , what if it was possible to connect and adapt thoughts from different networks?

That inspiring conversation with someone else could evolve to become an overlap of two networks of thoughts, enabling both people to branch out into new areas and, potentially, with the addition of different thoughts, extending each network organically.

Living in the Future of Text

Fast forwarding a decade into the future demonstrates some obvious applications for a living network of thoughts. The first and most simple application is using it as a personal creativity assistant: Whenever we start a new project our network of thoughts can produce a brief report as an aide-mémoire of all the ideas we gathered and that we can build on. Revealing connections we might not have seen ourselves can foster serendipity in a way that linear text cannot.

Second, it will become more important than ever to prevent our minds from being hijacked by algorithms. Ill-tuned platforms will find even more effective ways to hack our

behaviour to get more of our attention [32]. A personal network of thoughts can be the calm and safe space we use to remind us about what's important. When we become overwhelmed by the volume of information, instead of distracting ourselves with endless feeds assembled by opaque algorithms we can consciously dive into our own network of thoughts.

Third, networks of thought might mitigate a limitation inherent in speech. While speech is an excellent tool to coordinate rationally in a rather linear world, it now traps our thinking in this rational abstraction that is not very effective in complex dynamics [33]. Our parallel, intuitive mode of thinking might allow to cope with complex situations more effectively – especially when augmented with a living network of thoughts.

Let's build the future of text. With an elegant system for a more conscious and inspired world!

Fabio Brazza

Futuro do Texto

Fiquei feliz de ser convidado pra falar sobre o futuro do texto, sendo que toda vez que escrevo minha caneta mira o futuro. Já não sei se a pergunta é qual será o futuro do texto ou qual será o texto que ficará no futuro?

Acredito que o poeta conversa pelas janelas do tempo e deseja que sua arte seja forte suficiente para sobreviver por gerações, mas ao mesmo tempo teme que ela se torne só mais um produto descartável e seja soterrada pela onda de consumo desenfreada que prioriza a informação rápida e superficial.

Entre o perene e o perecível o texto precisará se adaptar pra conseguir se comunicar com a nova linguagem, sem perder profundidade ou conteúdo. Esse tem sido um dilema pra mim, e acho que ao mesmo tempo que a internet trouxe o acesso para todos, ela também esvaziou o texto.

Muitas pessoas leem notícias e manchetes, mas quantas leem livros e mergulham fundo no conhecimento? Machado de Assis e Shakespeare estão aí para todos lerem de graça se quiserem, mas será que é a linguagem que mudou ou o interesse que está faltando?

Como digo num Rap meu "A cada som me cobro por mais sabedoria, mas nesse mundo sem sentido porque minha música faria? Seria muita utopia viver de poesia, num País onde pra cada três farmácias que abrem fecha uma livraria?"

Não quero soar fatalista nem ser pessimista dizendo que o texto está se perdendo com a modernidade, na verdade acho que a internet e as ferramentas novas tem um poderoso papel na disseminação das ideias e ao mesmo tempo que as pessoas conseguem se formar por cursos da internet, justiças são denunciadas, artistas independentes conseguem ganhar visibilidade e se projetar para o mundo, as Fake News ganham força e Presidentes são eleitos em textos falaciosos que se espalham como vírus.

O futuro do texto depende de como vamos controlar e usar essas novas ferramentas, pois desde o tempo antigo a única certeza é que "as palavras tem poder," e textos e ideias podem eleger um presidente ou derruba-lo, construir um muro, ou derruba-lo, empoderar o povo ou aliena-lo.

Como poeta sigo tentando achar o equilíbrio entre o popular e o profundo e usando o Rap a Rede e a Rua para disseminar minha arte. Creio que minha missão é continuar disseminando conhecimento e reflexão nos meus textos, boto também minhas falhas nas

folhas e deixo para os filhos do amanhã, jogo pro universo como uma mensagem na garrafa, quem a encontrar verá o eco do tempo que eu vivi, petrificado em palavras.

Cada texto é como uma mensagem deixada na parede da caverna. Só o tempo dirá quais delas serão encontradas e servirão de bússola para a humanidade no porvir.

Future of Text

I was happy to be invited to talk about the future of text, and since every time I write, my pen focuses on the future. I no longer know if the question is what will be the future of text or what will be the text that will be in the future?

I believe that poets talk through windows of time and want their art strong enough to survive for generations, but at the same time fears that it will become just another disposable product to be buried by the wave of unbridled consumption that gives priority to fast and superficial information.

Between the perennial and perishable the text will need to adapt to be able to communicate with this new language, without losing depth or content. This has been a dilemma for me, and I think that at the same time that the Internet brought access to everyone, it also made text empty.

Many people read news and headlines, but how many read books and dive deep into knowledge? Machado de Assis and Shakespeare are there for everyone to read for free if they want, but is it the language that has changed or the interest that is missing?

As I say in a Rap I wrote "With every beat made, more wisdom is needed, but in this meaningless world why would my music be needed? Would it be utopian to live on poetry, in a country where for every three pharmacies that open a bookstore is deconstructed?"

I don't want to sound fatalistic or pessimistic saying that the text is getting lost with modernity, in fact I think that the internet and new tools have a powerful role in the dissemination of ideas and at the same time that people manage to graduate from Internet courses, justice is denounced, independent artists gain visibility and project themselves into the world, Fake News gains strength and Presidents are elected in fallacious texts that spread like viruses.

The future of text depends on how we will control and use these new tools, because since ancient times the only certainty is that "words have power," and texts and ideas can elect a president or overthrow him, build a wall, or break it down, empower the people or alienate them.

As a poet, I keep trying to find the balance between the popular and the deep and using

Rap, the network and the street to disseminate my art. I believe that my mission is to continue disseminating knowledge and reflection in my texts, I also put my flaws on paper and leave it to the children of tomorrow, a message in a bottle I throw into the universe, whoever finds it will see the echo of the time I once lived, petrified in words.

Each text is like a message left on a cave wall. Only time will tell which of them will be found and which will serve as a compass for humanity in the future.

Faith Lawrence

A Tale of Two Archives

History, by convention, requires text. It might be an arbitrary line, but nevertheless before writing is pre-history; after the invention of writing is history. That is not to say that a historian's only primary sources are textual, but textual evidence is a key part of our understanding of the history, even if our understanding and interpretation of any given text may change.

As a culture we have decided that preserving texts for the future is important. We recognise past mistakes about what is 'important' and 'worth preserving' – a hard decision that is often made from necessity. Looking at the expanding digital world with its proprietary formats and fragile storage media, we worry that we are repeating those mistakes; that today's digital text will not be available for tomorrow's historians to pore over and debate.

In the 1830s Henry Cole, then a teenager, was working with public records. To his horror they were so poorly kept that rodents, among other animals, were gnawing their way through the documents. The story is that he stormed into Parliament brandishing the mummified remains of one such miscreant to make the case for the public record being properly maintained. From his activism the National Archives[u] (né the Public Record Office), the "official archive and publisher for the UK Government, and for England and Wales"[v], was born. The rat still resides at the Archives in the form of record E 163/24/31 – euphemistically described as "Specimens of decayed documents" – the words that it ate once more part of the public record, albeit permanently misfiled.

The Archive of Our Own (AO3)[w] was proposed in 2007 by Astolat[x] after a confluence of events around fan platforms brought the shaky nature of their existence to the fore. It was humans rather than rats that threatened to put holes in the textual record of the community but, in much the same way, the community acted to preserve what had been created and what might be created in the future.

These two archives might seem, at first glance, very different. One the epitome of official-dom – the record of governance, Empire and still overwhelmingly the words of white men – the other a rejection and reimagining of canonical narrative, openly embracing the profane and lascivious and situated within the more female-identified, and frequently LGBTQ+, side of fan communities (although it must be noted, still predominantly white and Western focused).

But is it so controversial to say that history and fiction are not so far removed? It is a truism

that history is written by the victors. As recent events have shown, our present is also not without its own issues around facts and fabrications. History is the shared fiction that we interpret from the foundation of facts (some of which may, literally, be built of paper by unreliable narrators). Conversely fiction is the shared history of its own unreality.

And when it comes to subject matter, anyone with even a passing knowledge of history will be aware that it, especially the history of Empire, is also steeped in the darker side of human nature, even if we dress it up in formality and hide it in mundanity.

One thing they definitely have in common is that archives preserve the past and present's text for the future[y] – the archival record.

Context is fundamental to archival thought. For the archive the context of the record – the provenance of not just itself but its relationship to other records it was stored with, even if that relationship was just spatial – is of prime importance. The word *context* comes from the Latin 'con-' (together) and 'textere' (to weave). In the more literal meaning of 'weaving words together' it is documented back to the fifteenth century. Now we are weaving words together once more, but this time our needles and thread are metadata, hyperlinks, and machine learning.

Metadata is data. The catalogue is a text[zaa]. When we think about the future of the archival record we must also think about the future of the catalogue because "an archive without a catalogue is like a room without a door"[bb].

The National Archives' Project Omega is developing a pan-archival catalogue data model and editorial system designed for the needs of born-physical, born-digital, digital surrogate and trans-digital records. Expressing archival standards through internationally recognised vocabularies, the Omega Data Model[cc] supports a linked data system which encodes the catalogue and has the potential to allow for multiple layers of description, each with its own history of revision (the record of the record). The change is not only to upgrade the existing editorial system, which is past end of life, but to build a foundation around the record upon which more complex skeins of information can be wound. From the complex model we feel our way slowly towards a broader and more inclusive offering[ddee]. Is the published description drawn directly from the record itself? Written by an archivist? By a historian? Automatically generated by a computer? By a member of a community with a connection to that the record? Can we have all these things and offer the reader the path into the archive which best suits them while still maintaining the official standards and gravitas? [ffgg].

From the other direction AO3, in their Terms of Service[hh], specifically position the tags associated with a work by the author as part of the work. As such the volunteers who wrangle

the tags hold them inviolate (tags that break the terms of service are a matter for the abuse team). They are both metadata and text – a part of the record from the start.

AO3's tagging system attempts to bridge the gap between the computer-processable power of formalisation and the user-friendliness of tagging. By volunteers identifying canonical or common tags and their synonyms, parent, child, meta and sub tags, a shared folksonomy has been codified over time[ii], allowing record creators to use their chosen terminology but supporting searching/browsing, filtering and autocompletion. This is not a small undertaking: in 2019 these volunteers wrangled 2.7 million tags[jj]; and has not been without its detractors, especially in the early days when the system was not as well developed. However, it has enabled AO3 to rescue a number of older archives which could no longer be maintained, and integrate their original metadata categorisations so those too would be recorded without difficulty. Across the archive, the tags in their connected structure are explorable as their own record of the shared conceptual model.

Is this the future of the archive? Catalogues which support multiple connected paths into the records, reflecting the record, archivist, and reader in multiplicity. The intention is to open the records to a wider audience, to allow new paths and strengthen quieter voices. And so we aspire to generate texts of how we perceive the records of past endeavours, for future eyes to read.

Imogen Reid

Notes for a Screenplay Loosely Based on C.K. William's Poem, The Critic

Scene One: Writing

Interior: Public Library. Time of day: Unknown

We see a man. We see this man hunched over a desk, his shoulders tensed, his body leaning forward, his posture wrapped with, and composed by, attentive concentration, books lining the walls from floor to ceiling around him. We see this man sitting at the same desk, at the same hour, in a public library, day after day returning his pen again and again to the top left-hand margin of a battered loose-leaf book. At first glance, from a slightly oblique angle, looking over his shoulder behind him, he appears to be making nothing more than a meticulous copy of a text, a scrivener methodically and systematically transcribing.

In the silence of the library, we hear the nib of his pen scoring the paper beneath it, the persistent sound augmenting, we hear this sound although we cannot see *what* this man is so diligently, so conscientiously writing. But the catch word here is not *what* but *how*, because this is a matter of ink on paper, of a mangled and tangled barely recognizable text modified and undone during the seemingly routine task of rewriting, neither plot nor narrative, but the material attributes of the page, the repetitions and elisions encountered when attending to the topographical details of somebody else's printed, and somewhat conventionally set, page of perfectly legible writing.

We watch this man trace line after line, his pen over articulating the facets of cut and struck type, same page, same routine, hour after hour, day in and day out, week after week, progress is reversed but not halted, each line gradually misaligned, the space between them slowly diminishing beneath the layers of ink gradually accumulating, erasing any evidence of the well-worn track that directs the eye from left to right, according to the dictates of Western European convention. But this man is not simply rewriting words that are already written, he is overwriting, and in so doing he reconfigures the topography of the standard printed page. The form each word is returned as illegible writing.

Cut to: Black Screen

On the soundtrack we hear the sound a of pen on paper, insistently transcribing

Scene 2: Reading

Interior: Public Library. The same scene seen from a different angle. Time of day: Unknown

With red-rimmed eyes you sit hunched over your desk, your posture dictated by the demands of the unintelligible page of writing that rests on the table before you. A tangled tale that resists the tongue, a homespun yarn, a printed text(ile) lodged within the texture of the page Absorbed in futile activity of decipherment, you apprehend rather than comprehend this vocabulary of incoherence, you struggle, you hesitate, you stammer, no matter. You start again. Same page, same routine, day in and day out, week after week, because the difficulties posed by this illegible text compel you to invent alternative ways to read

on

the screen a single frame jams on a loose-leaf page of writing, juddering, endlessly repeating the same words, over and over and on

For me, the future of text lies in its capacity to resist the idea that there is a correct, or standard way to think, speak, and write, it lies in its capacity to interrupt and disrupt the deeply ingrained grammatical rules, such as sentence structure, punctuation, and capitalization, that have come to regulate what we are capable of thinking, feeling, and becoming. The future of text lies in its ability to reroute the recognizable topography of the page and the familiar left to right circuit so often inscribed upon it, it lies in its capacity to provoke and engender alternative interactive forms of readability with the aim of liberating readers from the normative constraints that are so often imposed upon them.

Image Title: Text(ile)

The image was made by cutting, turning, erasing, repeating, and overprinting a page of writing in order to weave words together like cloth. In resisting the Western European convention of writing from left to right, each text(ile) attempts to yield an alternative physical, tactile kind of readability within which the eye can move freely and in multiple directions at once.
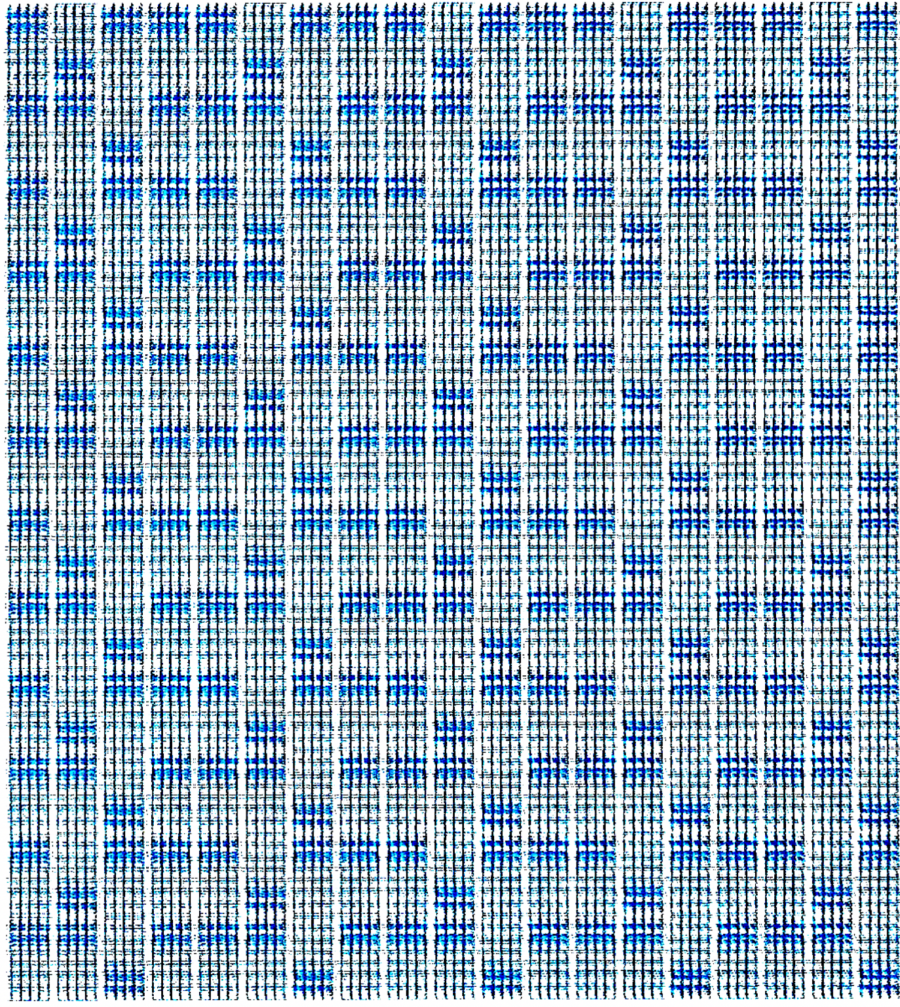
Text(ile). Reid, 2021.

Jad Esber

Walk into someone's home, and you'll find their personal bookshelf. Books lent by friends, gifted over the course of a certain chapter of life, ordered off Amazon after being referenced in conversation, picked up spontaneously in the airport duty-free before flights, bought solely for the aesthetic value of their covers. Books are cultural artifacts and markers of life moments.

The bookshelf as a record of who I am...and who I was

Inga Chen wrote:

"What books people buy are strong signals of what topics are important to people, or perhaps what topics are aspirationally important, important enough to buy a book on it that will take hours to read".

As I look at the books I've accumulated, I'm reminded of how I've changed. How my bookshelf changes is quiet, but powerful commentary on what's happening in my life. A few months ago, I bought a bunch of baking books—like many people, I had a baking phase during covid. Recently, I've been really into product design and am amassing a bunch of the canonical books on the topic. In many ways, the bookshelf is an archive of who I am—and who I **want** to be.

Beyond my selection of books, the way I organize them on my bookshelf is opinionated. I chose to showcase Understanding Media by Marshall McLuhan, but hide Principles by Ray Dalio. I also spent a couple of hours organizing my books based on their color, and every time I add one, I slot it into the right place. I care a lot about the aesthetic of my bookshelf, because it's quite visible - it stands center stage in my living room.

The bookshelf as a source for discovery

When we visit bookstores, we may be looking for a specific book, to seek inspiration for our next read or maybe we just want to be in the bookstore for the vibes - the aesthetic or what being in that space signals to ourselves or others. When I visit someone's house, I'll always look at what's on their bookshelf to see what they're reading. This is especially the case for someone I admire or want to get to know better.

Scanning the bookshelf, I'm on the lookout for a spontaneous discovery. The connection I have with the bookshelf owner provides some level of context and the trust that it's somewhat a vetted recommendation. I look through the books for a title that catches my eye - maybe I'll leaf through the pages and sample a few sentences, read the book jacket or the author biography. If something resonates, maybe I'll ask to borrow it or take a note to buy it later.

The bookshelf as context for connection

There's something surprisingly intimate about browsing someone's bookshelf - a public display of what they're consuming, or looking to consume. When I'm browsing someone's bookshelf, I'm also on the lookout for books that I've read or books that fit my 'taste' - and when I find something, it immediately creates common ground, triggers a sense of belonging and connection. It might be even more reason for me to opt to dig deeper into their bookshelf to see what else they're reading.

Along with discovery, the act of borrowing a book in itself creates a new context through which we can connect. Recommending a book to a friend is one thing, but sharing a copy of a book in which you've annotated texts that stand out to you, highlighted key parts of paragraphs—that's an entirely new dimension for connection.

Last summer, after falling in love with Sally Rooney's *Conversations with Friends*, my friend Aleena mailed an annotated copy to me, and I then mailed it to another friend. As it passed hands, we kept store of the parts that meant something to us through different colored pens and highlighters, claiming separate parts of the book as our own. It was like an intellectual version of the sisterhood of the traveling pants. The book became a shared collectible that we could use to archive our thoughts, feelings, and emotions, bringing us closer together in our friendship with a new understanding of how we connect with each other, and the messages that resonate with us.

People connect with people, not just content.

What's more powerful than the books and the topics they discuss is the author. The effort I undertook to source the book, the significance of its edition or how early I got it, whether the book is signed by the author all serve as some "proof of work" that signal to myself, and the world, the intensity of my fanship. And in all of this, putting out a carrier signal of varying intensity to other fans.

Take this metaphor of a bookshelf, and apply it to any other space that houses cultural artifacts, or 'social objects'. Beyond the books we own, the clothes we wear, the posters we put on the walls of our bedrooms, the souvenirs we pick up — these are all social objects. They showcase what we care about and the communities to which we belong. At their core, social objects have always acted as a shorthand to tell people about who we are and functioning as beacons that send out a signal for like-minded people to find us. On the internet, social objects come in the form of URLs of JPGs, articles, songs, videos.

Pinterest, Goodreads, Spotify and the countless other platforms center discovery and community around content and creators. What's missing from our digital experience is this aspect of ownership that's rooted in physicality. But that's changing.

Web3 shifts the balance of ownership. In most of web2, the collection you build up is tied to a given platform. But on-chain identity lets us tie 'social objects' to us, not the specific platforms or applications. This mirrors what we do with our possessions in real life. To put it differently, your books are yours - you can take them off the bookshelf and bring them with you whenever and wherever you want.

As we enter this new era, we'll see platforms competing for a share of our digital selves, an abstraction of the time we spend online, and we'll spend increasing amounts of time and money developing our digital identities. With that, we'll see platforms compete less for a share of our time, but more for a share of our digital identity. Platforms, or protocols, that become the de facto 'bookshelf' for our online lives, where our social objects are placed and are on display, have a huge opportunity in front of them.

Jamie Joyce

"Web-based Conceptual Portmanteau"

A concept introduced by The Society Library

The word "portmanteau" has many meanings. One definition is "a word formed by combining two other words," according to the Cambridge Dictionary. Examples of this kind of portmanteau include the words: intertwingled, cyborg, and netizen. Portmanteau in this sense operates on text in a two-dimensional way, by combining the letters to craft a new word. Today, we posit that additional dimensions of meaning (specifically more precise meaning), can be added to text if based in web-based technologies such as those used by the Society Library.

Instead of combining words to create a composite concept or describe an emergent meaning, our "web-based conceptual portmanteau" is created using a technology that allows us to combine multiple forms of media, visualizations, registers, and expressions into one information packet for the purpose of optimizing for precise meaning and comprehension. Unlike portmanteau, which operates at the "word-level," web-based conceptual portmanteau works conceptually at the "claim-level."

For our purposes, we define claim as being: an assertion of truth, which can be a statement of fact or opinion, wrong or right.

Examples of claims include:

- The word cyborg was coined in 1960.
- The Wikipedia article for the word cyborg is hilarious.
- Wikipedia is always accurate.

Claims can stand alone or be combined together to form arguments, text snippets, compound sentences, and other sentences, but the minimum application of "web-based conceptual portmanteau" is at this claim-level, even if the claim is considered a partial sentence.

That being said, we now offer our definition of "Web-Based Conceptual Portmanteau:"

Definition:

"Web-Based Conceptual Portmanteau" is an internet based expression of meaning that relies on web-based technologies to present a claim, argument, sentence, or text snippet with at least two of the following features as inherent to the text structure:

- *embedded definitions, which are inextricably attached to the claim, argument, sentence, or text snippet. (Shown below)*
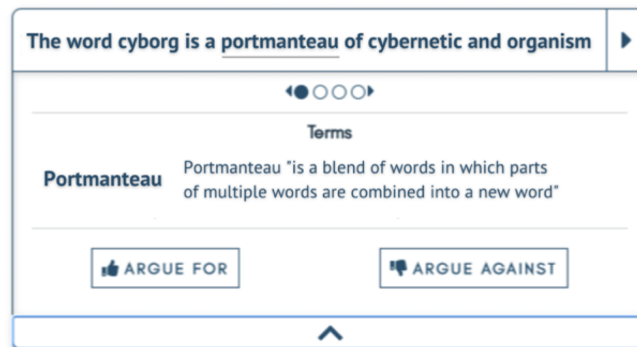
Figure 1. Joyce, 2021.

- *variant phrases of similar/different registers, including registers of different reading levels and technical registers which use jargon, which are inextricably attached to the claim, argument, sentence, or text snippet. Various phrasings of similar register, but substituted words, is also a feature.*
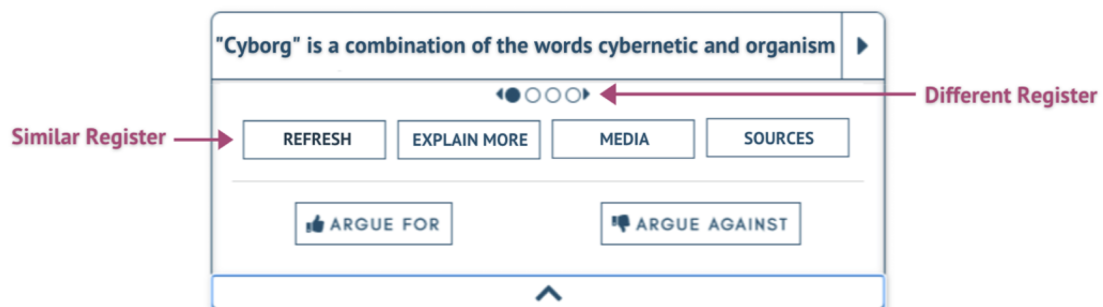
Figure 2. Joyce, 2021.

- *the expression of meaning shown visually through images, giphys, or other graphics referenced from external sources, which are inextricably attached to the claim, argument, sentence, or text snippet. Formats include: JPEG, TIFF, GIF, BMP, PNG, WebP, SVG, and others.*

94
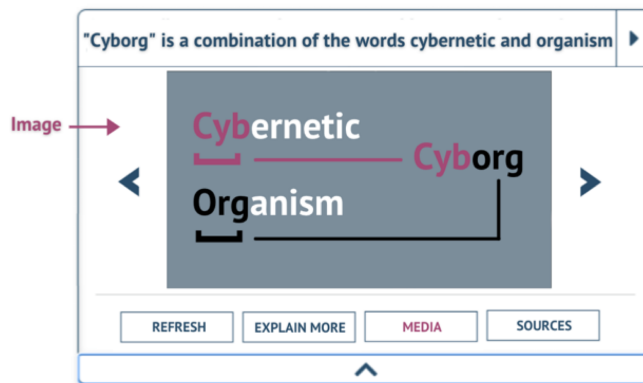
Figure 3. Joyce, 2021.

- ***the expression of meaning shown visually through videos*** *referenced from external sources, which are inextricably attached to the claim, argument, sentence, or text snippet (video with audio does not count as two distinct features). Formats include: MP4, MOV, MKV, and others.*

Figure 4. Joyce, 2021.

- ***the expression of meaning articulated through audio*** *referenced from external sources, which are inextricably attached to the claim, argument, sentence, or text snippet (audio with video does not count as two distinct features). Formats include: MP3, WAV, AIFF, AU, PCM, and others.*

Figure 5. Joyce, 2021.

- ***contextual explainer paragraphs*** *which provide more broad context of the claim, argument, sentence, or text snippet itself or its connection with adjacent content.*
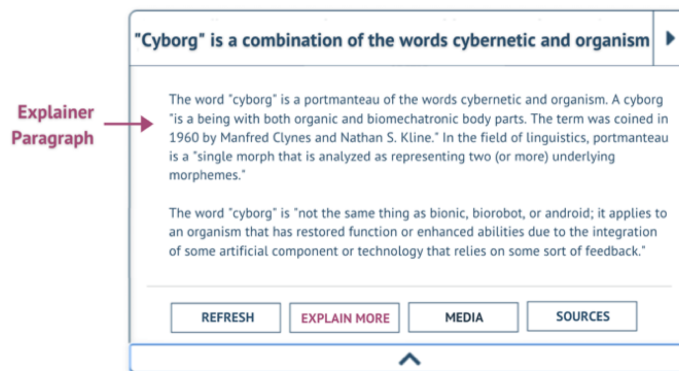
Figure 6. Joyce, 2021.

It is encouraged, but not required, that "web-based conceptual portmanteau" contain source meta-data for any content that is combined with the claim, argument, sentence, or text snippet as a standard. The 'physical' connection of these features can be expressed through buttons, badges, hyperlinks, or other similar visual indicators on, in, or adjacent to the claim, argument, sentence, or text snippet.
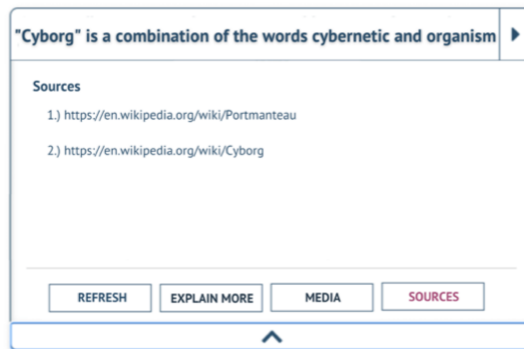
Figure 7. Joyce, 2021.

"Web-based conceptual portmanteau" is not merely conceptual, but an innovation of text that is already being applied with web-based technologies at the Society Library. "Web-based conceptual portmanteau" was invented in order to convey the more precise meaning of claims, arguments, text snippets, and sentences for the purpose of enabling comprehension and understanding in an educational context.

Since this is the first articulation of "web-based conceptual portmanteau" that we know of, it is understandably the most clunky and cumbersome version of itself currently. We assume that more deeply integrated, intuitive, and slick depictions of this concept will be forthcoming.

We believe that the future of text includes a compound, multi-media representation of a claim which may be expressed as features in a package, such as our "node" structure. Text is two dimensional, but with the capabilities enabled by web-based technologies, the future of text can be multidimensional.

We thank our volunteers Stephen Wicklund, Mike Kissinger, and Presley Pizzo for making "web-based conceptual portmanteau" possible at the Society Library. *The Society Library is a 501(c)3 non-profit digital library that builds educational databases of knowledge by extracting arguments, claims, sentiments, and evidence from books, academia, news, the web, and other media. See more at SocietyLibrary.org*

Jay Hooper

The versatility of text: a letter of love, grief, hope, and rhetoric

Text, drawn via ink on paper, struck via hard polymer keys, poked and prodded via a glass screen, enunciated painfully to Siri or Alexa or...

Text as presentation, a stylistic flow of words, synonyms, grammar, emoji, emoticons, font

Text as discovery, peeping beneath flaps in kids' books, metaphors in novels, arguments in prose

Text as synthesis, card sorting and stickies and meaning emerging from the glorious messy data

Text as verification, as Siri (or Alexa or...) reflect back what (perhaps) was said

Text as marginalia, following trails, hints of the people who came before

Text as ritual, picking out the precise notepad, pen, beverage, location

Text as writing to externalise memory, to understand oneself

Text as storytelling and emotion, as reason and reasoning

Text as hurry, information, give-me-the-data

Text as learning, who am I? what am I?

Text as self, as mind, as real, as vivid

Text as poetry

Clearly, text is (almost) as flexible and fluid as thought itself.

Let us not skirt the fact that physical text has a history that echoes far further back than any digital artefact. Let us also, in this piece, consider digital text and its representation, manipulation, and interpretation.

The future of text is unpredictable, like any future, but surely includes myriad variety and form. From augmented reality to quietly overlaid assistive text as we wander the world (names, directions, resources) to improved interfaces (please!) to clearly convey what data is flowing where, to be used when and by whom, to high quality annotations to our reports and the underlying data regarding context. Not just what was uttered, but how, and in which context, and what was the body language anyway?

The future of text is not only aspirational and utopian. It includes manipulation, thrusts of calculated fake news and disinformation, carefully targeted manoeuvres executed across tools, algorithms, crowds to achieve nefarious intent [42]. We have seen the abuse of data

mining, crowd actions such as dogpiling, Twitter bots to manipulate trends and, most recently, the use of bots to conduct hate raids on twitch. Not to mention the manipulations via text that we have accepted as every day for decades, such as advertising designed to tug and fray at our self worth in ways that perhaps we might remedy if only we spend money on that which is advertised. (Advertising, of course, can be expected to become more insidious as it is tailored to your demographic data and click history, and obfuscated as it slips into your online interactions, games and data streams.)

The future of text is awkward, rife with broken interfaces. From apps that drop UI elements over your iPhone's status bar, to broken grocery websites that just don't know how people browse for food items, to government PDFs that require the use of a mouse to select options from a dropdown menu. It would be, alas, unreasonable to expect anything but more of the same in the future.

The future of text is pragmatic and tool-oriented, as scholarly and applied researchers continue to conduct user research and build tools to capture data and convey the interpretation of that data. May the future of text include annotations to better capture nuance, ambiguity, change and discussion.

Oh, and the future of text is, at least for the next while, balkanised across time and space. A disparate mess, a diaspora of empty 404s and forgotten memories just like the messy, broken humans who leave these trails in their wake. This arises not only from the literal balkanisation of the internet [43], but from the plain and simple march of time, as the ranks of dead websites build up, piled high from dead servers, expired domains, and bankrupted businesses. It happens offline too: remember all those misplaced files and folders, piled on your desktop under the revealing name of "temp"? Digital text, like all data, is a mess.

The future of text is questions. What happens to my Google search history, who can use that and how, who is not authorised but has a slim chance of getting in there (and who is liable when they do)? How will the politicisation of text affect us all? How will the value of my data change and how will my data be used?

Context is everything, and in the present day we often encounter text detached from its context of origin. This is where and why we need to make sense of it, and where we call on web scientists and all who hail from data science, network science, sociology, linguistics, psychology, law. We need to reach our cupped hands into the waters of data, see what we see, infer as best we can the best way forward.

How else can we understand how to deal with implicit information such as cultural elements, mis- and disinformation, community values, subtly shifted meanings over time? (Sometimes, of course, we have to talk to people.)

The tools must grow with us: algorithms, research methods, software.

So our data will remain incomplete, messy, subject to misinterpretation. But we will continue to collaborate to understand it as best we can, to make sense of this strange world of ours, and most of all, the humans who express themselves within it.

The future of text is as messy, vibrant and beautiful as it always was.

Jeffrey K.H. Chan

Text as persuasive technology: A caveat

Of the many uses of text, perhaps none is more morally confounding than using it to persuade. To persuade a person is to change his or her mind using the meanings of the text. Persuasion presupposes reason, yet reason cannot fully grasp how persuasion works. Even so, persuasive text is used to change our minds on who to elect, which café to visit, and today, why people should be vaccinated.

Persuasion often employs facts and reasons, which are framed in ways that invite fair and critical deliberation. A person is persuaded when he freely accepts the outcome of this deliberation. The same cannot be said for manipulation. Cass Sunstein is therefore correct to distinguish between persuasion and manipulation [44]. Manipulation tries to influence people without sufficiently engaging or appealing to their capacity for reflection and deliberation. A person is manipulated when he is led to do what he will not freely do on his own volition. Manipulation operates by veiling the manipulated, and where trust is always betrayed with every unveiling.

Nevertheless, it is unclear if persuasion and manipulation can always be clearly distinguished in practice. Not all persuasions are motivated with the interest of the persuaded in mind, and there are manipulations driven by noble intentions that ply persuasiveness as their overall ploy. Unless their respective motivations and intentions are known and publicly conceded, it may be next to impossible to discern between selfish persuasion and salutary manipulation. Especially when so much of textual persuasive technology today is in the hands of Big Corporations and Big Governments (or their indistinguishable syncretion) that may not always have the best interest of the people that they are trying to persuade in mind, skepticism of the text as persuasive technology is required.

What then makes the text unique among other persuasive technologies? First, a persuasive text must be externalized as an artifact. This artifact not only connects the persuaded to the persuader, who is the likely author of the text, but also on behalf of the persuader, continues to perform the task of persuasion. Arguably, the persuasive text might be the world's first autonomous technology—bound to the perpetual task of persuading everyone that encounters it. Every generation, ad infinitum, encounters the persuasive power of Socratic texts anew.

Second, a series of generative operations can be performed to amplify the power of a persuasive text. As an artifact, this text can be replicated and shared, either in part or as a

whole; it can be embellished, expanded or layered with other texts; it can constitute the genesis of an entirely new text. An artifact often invites artistry, and a persuasive text is no exception. Especially for an interactive persuasive text, this artifact can be designed to 'invite', 'encourage', 'nudge' and even 'steer' people: crafted to deliver the precise 'affordances' that then constrain human behaviors in the direction preferred by the designers of this technology [45]. Persuasion is the artful contours cast in the preferred direction of these designers—where presumably, following, rather than fighting them, demands less effort.

Third, although connected by the text, the persuaded and the persuader maintain unequal footings. The persuader usually enjoys full knowledge of his own intention to persuade, but this intention is often opaque to the person he is trying to persuade. The persuader also enjoys the luxury of time to refine his persuasive texts, and the more robust these are, the more likely a person can be persuaded in less time. Conversely, the person to be persuaded is neither given as much time nor a chance to consent before accepting the meanings organized to change his mind. As a matter of fact, the two-steps convention of first seeking consent and then intervening to change a person's mind is conflated in textual reading: a person's mind is being changed as he engages the persuasive text. It is impossible to seek consent while receiving an intervention. With this unequal footing between the persuader and the persuaded, it is no small wonder that persuasion often tries to sneak in like a thief in the night.

Compounding all these is the possibility that persuasive text today can be produced by AI-driven text generation. Granted, text generation is still an incipient technology. But given time, data, and greater computational powers—especially development in affective computing—this technology is likely to proximate the persuasive power of human-generated text even if it might never understand why it is persuading. If persuasive power is a uniquely human capacity, then making machines that are capable of persuasion is no different than trying to counterfeit humanity. Counterfeiting humanity, according to AI expert Frank Pasquale, is not only deceptive but also unfair because it gives the false appearance of human interest and support where there is none [46]. The emergence of this AI technology is likely to further blur the line between persuasion and manipulation—if only because a persuasive machine-generated text that appears to counterfeit humanity can never shake off the suspicion of being also manipulative.

Of the many futures of text, persuasive text is likely to become more salient in a fractious world. More persuasion will be seen to become necessary where there is less solidarity; or to paraphrase Richard Rorty, when people's self-conception increasingly appears to bear no relations to others, they have been usually persuaded to change their minds

[47]. Yet despite all the seemingly justifiable things that persuasive texts try to do, it is also important to keep in mind their proximity to manipulation. If persuasive texts can never be cleanly dissociated from manipulation, then the next best safeguard may be the caveat of this reminder.

Jessica Rubart

Collaborative-Intelligent Sense-Making

Concepts

Language: A method of human or system communication

Collaboration: Working together

Sense-making: Giving meaning to something

Shared understanding: A group's perception

I like this famous quote of linguist Benjamin Lee Whorf: "Language shapes the way we think and determines what we can think about" [48]. It articulates the importance of a language's structure and its expressiveness.

In Germany, for example, gender-neutral forms have been being discussed for years in order to explicitly include women and non-binary people. In particular, during this year's election campaign the debate about gender-neutral forms in the German language has highlighted differences between the parties. The German language, as others, genders words. For example, the German word for a male author is "Autor" and for a female author it is "Autorin". The plural forms are "Autorinnen" (female) and "Autoren" (male). Traditional people use the so-called "generic masculine" in a general context, in this case "Autor" (singular) or "Autoren" (plural), and argue that all genders are included. This causes misunderstandings and linguistic discrimination. There are gender-sensitive solutions (besides mentioning all different forms), such as using the gender star, colon or underscore, in our example "Autor*innen", "Autor:innen", or "Autor_innen" in the plural form, which is pronounced as a small break, an unvoiced glottal stop and intended to include all genders explicitly in a short form.

This shows that a gender-inclusive language is important and that language develops over time.

In the Hypertext community, many languages have been discussed – for efficient and effective collaboration between humans and machines, between machines themselves, as well as between networks of humans and machines.

For example, in social media users create, share, comment, rate, and tag content. Collaborative tagging of information resources by end users and sharing those tags with others has been coined "folksonomy" by Thomas Vander Wal in 2004 as a combination of

"folk" and "taxonomy" [49] With tags, people add explicit meanings to items on the Web. Folksonomies are very useful for information retrieval tasks.

In contrast to such usage-driven languages, the Semantic Web, for example, focuses on integrating machines. Textual languages, such as the Resource Description Framework (RDF) and the Web Ontology Language (OWL), are used to describe resources and knowledge about those. Machines shall be able to interpret and reason about data across applications and organizational boundaries.

In the Hypertext community, there are approaches, which map between users' and system-oriented languages. Schema-based hypertext, for example, utilizes typed nodes and typed links. These types can relate to either system types or user-oriented types. In MacWeb [50], for example, one can specify an object-oriented structure for system types. In Compendium [51], semantic types are used. These describe the semantic purpose of a structure element and are sometimes referred to as "role" [52]. They can represent the users' language.

In [53] a meta-modeling approach is described that allows mapping of system types to semantic types by collaborative configuration. Spatial hypertext [54] supports the creation of structure, such as categories and relationships, by means of visual attributes and spatial proximity. In this way, a visual language develops over time. Spatial parsing or structure mining algorithms can support the identification of explicit structure and by this means the knowledge building process of users. Text mining and natural language processing can identify structure from text [55].

I think collaborative-intelligent sense-making in terms of providing shared understanding between collaborating users as well as intelligent systems is very promising for the future of text.

Joe Devlin

Marginalia Drawings

Two examples of compressed marginalia drawings. Collating all notations made by former readers found in library books on to a single sheet of A4 paper. An ongoing series.

surreal Dead so money!!

MAGIC
MONEY

undertake a study of a character
Pathetic as Edgar like Burr...

Thanks that's the...
It il with...

HE WAS

Please Beware

Dull Reading about
few actions

Rich

Bastard!

MY NAME IS
BURROUGHS
I AM
TRAGIC

man's inhumanity
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quote

MOCK COLONIAL

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John Hockenberry

Text as a Verb, a Noun and The Revenge of Phaedrus

In a book about written text, I confess the height of cheekiness in beginning an essay with this question: "Would you prefer oral?" Now, for those of you with some familiarity with the works of Plato and the controversy in the ancient world concerning written versus spoken language, you will see the reference. But children of the screen-mediated 21st century will come to this question from a radically different context. They will see this texted question as part of an information gathering ritual for online hook-up sites. Texts in this application, deliver and receive information to help users decide whether or not they want to proceed with a date. It is very much the present moment of TEXT to have this emergent identity as a verb, a feature that seems to be at the center of an explosive restructuring of the nature of language and communication. Since its birth in the 1990's "TEXTING" has been driving language interactions ranging from anonymous and candid sexual discourse that bypasses social conventions of modesty and etiquette, to targeted advertising, to passionate and often hysterical political speech to weaponized and deliberate propaganda speech meant to delude and confuse people, to popularized discussions of mindfulness that confront, albeit superficially, issues in philosophy and religion.

The question is not new, and it has quite another context in the 4th century BCE where asking "Do You Prefer Oral?" might have led to a heated discussion with Plato (who also talked a lot about erotic love) concerning the relationship between language and knowledge. The story of how a civilization that cultivated and transmitted knowledge through oral speech became a civilization that preferred information set down in text through writing is a narrative that has been evolving since the emergence of language itself. Imagining the future of text takes us to the next transition in this story of human consciousness.

In Plato's time speech was the superior channel for communication, oral language was the platform and speaking and arguing were the verbs. For Plato, writing was something of a recording device, soulless and mechanical, text was the platform for facilitating events like theatre. Plays needed to be written down to create performances. Text was also an important tool for commerce and "transcribe" or "leaving one's mark" were among the verbs for this cursory exercise in communication called writing.

In Plato's time of papyrus and hand transcribed codices the importance of reading and writing as an alternative to speaking was already a sophisticated controversy but the development of printed text centuries later made inevitable the ascension of text over speech.

The supremacy of text has been untouchable for 24 centuries. Now technology has created an urgency to recognize the limitations of traditional text. This "Future of Text" project as well as others are inquiries into how reading and writing might become as multidimensional as other contemporary media. Enhancing text with digital tools is an initiative of our era but the limitations of text that we encounter every time we interact with websites and live media were well known by Plato. The curious dialogue Phaedrus is in part an indictment of text and writing that has always been seen by scholars as either a spirited defense of rhetoric or a curiously misplaced diatribe against the future. Curious because Plato made sure his dialogues were carefully written down. Did he anticipate the death of an oral tradition that had delivered language and agriculture to civilization but would not withstand the arrival of writing? The fact that Plato's transcriptions of idealized conversations were written down is why we know about them at all in our time.

In Phaedrus, Plato argues that the writing of text constitutes an important archiving function but ultimately it is a degraded platform of knowledge compared to oral language. Text cannot interact with the reader in any meaningful way. Excessive use of written text can only impede true internalized learning best stored, Plato insisted, in vigorous and continually expanded human memory and communicated with the tools of rhetoric to refine and upgrade truth through argument and persuasion. Relying on inert writing, Plato argues in the dialogue (in a familiar blog-like rant) can only degrade the memory capacity of the brain and diminish the authority of knowledge because writing is not generated through continual oral challenge and questioning. Plato prefers "oral", this much is clear.

Plato might find personal vindication in our time observing how text itself has crossed a threshold to become a verb, defying its own limitations even as scholars work hard to design hypertext enhancements and poly-modalities for text, a system of symbols and syntax that remains the repository of human knowledge. Plato would see "texting" as the rescue of rhetorical techniques from a prolonged dormancy. He would recognize other signs such as the explosive growth of live presentations like TED Talks and virtual conferencing. Plato would no doubt be appalled at the atrophied qualities of spoken rhetoric in the modern public square, but he would see texting and apps like Tik-Toc as attempts to reengage with the spontaneous skills of rhetoric to draw audiences and persuade listeners and viewers. Plato would undoubtedly be an avid counter of "likes."

While the superficial impressions of texting by today critics are that it is a retreat to the brainstem, language stripped of nuance and punctuation and blunted with sexual energy and rage or trivialized with meaningless narratives of celebrity, there may be other ways of thinking about texting. The events of the past 5 years have seen texting emerge as an influential rhetorical device for heads of state and activists driving politics, the search for

justice and the maintenance of public health. All of these issues were of concern in Plato's time and while he would be disgusted with the qualities of execution in Twitter and Snapchat, he would certainly embrace and encourage the scale of the interactions.

As an active verb, texting drives all kinds of speech and mass communication now. At scale texting may constitute a re-ascension and restoration of the supremacy of the oral transmission of language and knowledge. It is an arc that extends from before the time of Socrates and Homer and makes a steep upward bend with the 20th century development of electronic media. Does this oral-textual convergence become inevitable as the Internet reaches a critical mass in this century?

Texting and the subsets of Tweeting, commenting, chatting, subreddits and postings of all kinds are driven by writing but they are an instantaneous experiential form of communication that embodies the dynamic interactive qualities of speech. With the sometimes absurdly sentimental or infantile humorous visual elements such as emojis and YouTube GIF memes, users seem to be creating a spontaneous hypertext language of unpunctuated acronyms, and emotional symbols. These user-crafted enhancements of text grow even as the reading of traditional manuscripts declines.

Worldwide 3 billion people text. Each day nearly 30 billion texts in one form or another are sent and received. It may have taken 2400 years for the tension between text and knowledge to re-emerge, but the arguments made in Plato's Phaedrus about the dangers of relying on writing seem to predict the growth of texting as a broad cultural platform for communication while traditional written knowledge drifts to the fringes. In a nation of 220 million adults barely 2 million US citizens read a whole book in a year. Even in the world's reading leader, India, the impressive average of 10 hours a week spent reading is dwarfed by time texting each day for that nation's nearly 750 million mobile users.

Plato writes in Phaedrus that writing resembles static paintings which, "stand there as if they are alive, but if anyone asks them anything they remain most solemnly silent. The same is true of written words." But the scale and rapidly iterative interactivity of tweeting and texting may have broken this inertia giving active texting the qualities of rhetorical speech. If we closely apply Plato's analysis, texting as a verb may not be a retreat from knowledge but a return to an even more ancient construct of knowledge, albeit on a vast scale. An important difference that Plato would articulate as a warning, is how the internet functions as a prosthetic for the human brain. Philosophers such as Franco Berardi and Catherine Malabou have noted that our modern understanding of neuroplasticity in the brain confirms Plato's warnings about the impact of text and speech on consciousness. It also confirms propositions of earlier philosophers from Spinoza to Heisenberg regarding the impossibility of specifying any absolute condition of cognitive reality. Irreversible damage to the brain from "Googling"

and the growth of online life and work, as has been argued by critic Nicholas Carr, may be as unwarranted a pre-judgement as Plato's suggestion that writing would degrade human intelligence, but there is no debate that there is a tangible impact on the structure and organization of the central nervous system from online experience.

Will digital technology further migrate brainpower into static electronic repositories at the expense of memory and cognitive consciousness? Plato would warn that reliance on digital tools would threaten to diminish individuals into nodes of emotion and ideology that merely signify rather than engage in a mission of persuasion and compromise. There is ample evidence of this static and anger driven discourse impeding urgent political and economic reforms. But there is also evidence of individual users adopting texting into an emerging and profoundly rhetorical multimedia experience in the work of performers such as rapper Donald "Childish Gambino" Glover, comedian and storyteller Bo Burnham, pop singer Billie Eilish and visual artists Jason Innocent and Barbara Kruger who all rely on text as a means of provoking and interacting with their audiences. Kruger precisely references Plato's ancient warnings about writing's potential for spreading untruth and enabling plagiarism when she said this in a 2021 interview,

"Digital life has been emancipating and liberatory but at the same time it's haunting and damaging and punishing and everything in between. It's enabled the best and the worst of us."(fn)

Plato had a profound suspicion of mass culture and a disturbing faith in elites to be the preferred custodians of knowledge and truth. The future of text is surely in large part a dual between what academic elites might make possible and what mass culture will make irrevocable in language and communication. A strong preference for either "oral" or "written" may ultimately be a hindrance in acquiring full literacy in this century. Kruger's notion that the "best and the worst of us" has been enabled in the current turbulent environment for text and communication may be powerful evidence that Phaedrus is a living ghost of memory, speech and writing who has haunted 24 centuries of human civilization and is very much with us today.

Jonathan Finn

Meaningful Text For Mindful Devices

The future of text is meaning.

We seem to be on a journey from WYSIWYG documents in the 1980s via video calls in the present to AR and VR in the future, during which text, along with the computer, is gradually fading from view… perhaps in favour of intelligent glasses which enhance the world with simple labels and the like. But we need full text in an augmented world just as we do in the real world. How else to express anything beyond what we see in front of us?

Text is currently the most powerful way to transfer **meaning** between **minds**. (Those two words were the same about 6000 years ago: *méntis* meant *thought*.) That's because text is frozen speech. Speech is single use, evanescent, whereas text is a recording you can replay by eye at any time, and skip forwards or backwards at high speed. But something is lost in the conversion from meaning to speech to text. In a speaker's mind are something like trains of thought using facts, beliefs, hypotheticals, inferences, analogies, goals and much more, tying together mental objects and relationships (with a halo of subtle connotations attached). These structures are converted to words and can be roughly reconstructed in the listener's mind, but only if a shared vocabulary and shared background knowledge are assumed. So those too are part of the meaning. With text you lose more than speech because it isn't interactive, as Socrates bemoaned: there's no speaker who you can ask to elaborate what they mean.

Still, text can be updated to show more of what's in your mind. This has been happening for millennia: the original text of the Epic of Gilgamesh isn't even divided into words, nor does it have a title to encapsulate it. As of the late 20th century, numerous haphazard text upgrades had added features such as: symbols for pause and intonation (punctuation), précis (titles, headings), structural marks (paragraphs, parentheses, bullet lists), the beginnings of interaction with the writer (footnotes and indexes). Let's call this pre-web version Text 1.0. Alongside it a Text 1.1 has developed with a patchwork of graphic conventions which are text in all but name, just difficult to type. Symbols both concrete and abstract, special layouts, arrows, boxes, speech bubbles and so on. We see Text 1.1 on road signs, presentations, cartoon strips, product packaging, animations, everywhere. It's haphazard and ill-defined, but it shows what a huge appetite there is for augmenting text.

Infotext

We can have a radical upgrade, a Text 2.0, to communicate much fuller meaning from one mind to another. We'll call it **Infotext**: it annotates plain text with a standardised repertoire of lines, symbols and colours in a precisely defined way. Infotext is natural and intuitive, partly based on existing conventions and is learnable in a few minutes. If in doubt you can always just read the text and ignore the graphics. (It has areas of overlap with some infographics, emojis, Bob Horn's structured writing, and numerous other initiatives.) Infotext can be used on signs and in print, but its fullest form is interactive: on a computing device it could become a paradigm of what Jef Raskin called the Humane Interface.

The first aim of Infotext is clarity. When skimming lots of information, such as a message thread, search results or a bibliography, the basic meaning should jump out. When reading slowly, it shows you subtler structure and meaning. A piece of Infotext starts with one or more tiny précis – just as news articles have a headline, then a lede (a summary in the first sentence) – but these are much smaller. A symbol near the start of the text shows its category, more fundamental than its content: fact (information), fiction, opinion, proposal, intention (a plan), question, etc. (The categories have logical definitions, and are already deeply embedded in some languages, such as the subjunctive for non-actual events.) Near that is a précis no longer than a word: like *Recipe*, or initials like *JF* for a person, or one of a controlled set of emoji-like symbols. Of course some apps do things like this on an ad hoc basis, but it should be as standard as starting a sentence with a capital letter. More summaries of increasing length can also appear, which are key to skimming.

Within the main text many types of meaning can be shown. Here's a taste of them. There are obvious structures like lists and clauses, but others are more subtle: importance (shown in Text 1.0 by bold and italic, but in Infotext also by size and colour) is inferred from the reader's personal priorities, not just the content alone. There are far-reaching logical connections such as what I call the So-relation, a kind of cause and effect: in an email thread you discuss going on holiday somewhere sunny, maybe Key West, which you could reach by flying to Miami and hiring a car. Here are 3 levels of goals: the 1st (a sunny holiday) can be achieved by the 2nd (going to Key West), which can be achieved by the 3rd (a chain of 2 goals, the flight and the car). In a long text these connections can be far apart, but form a hidden network in text (and in life) for Infotext to reveal.

Writing Infotext on your device isn't hard work since you just type text normally, or speak, and most annotations are inferred automatically from the content. Those that aren't can be added by keyboard shortcuts for basic human concepts such as 'interesting' or 'my idea' or 'I believe this', combined with shift keys like 'not' and 'very'. (Shortcuts more

fundamental than cut and paste.) So just as your device always displays text with suitable layout and fonts, it will show *all* text as Infotext, no matter its source.

Meaning enhanced by knowledge

More advanced Infotext requires more advanced text analysis. Suppose an email contains text quoted from earlier in a thread: Infotext can trivially identify this as 'not new information', so grey it out or shrink it as unimportant. Email apps do this of course, but it shouldn't be a special feature of an app: it's part of your device's fundamental duty to give you only what's useful to know. But how can it deemphasise information which was previously stated a different way? The text can be converted internally to a knowledge representation (KR): something like a concept map, showing the relationships between concepts not words. This is far from a fully-solved problem but it makes many other semantic features possible: searching text for ideas (not specific words), or making an auto-précis of any desired length (say for a title or a 1-line summary).

Of course, if your device can make a KR of one piece of text, it can make a large KR of *all* the text documents on your device, effectively containing a version of all its knowledge. (Not to mention internet sources…) Then it can identify not just what information is new to this email thread, but probably new to you – and endless other things. This isn't a hand-wavy appeal to AI where 'anything is possible', as Infotext uses the KR primarily for displaying information, not for making its own deep inferences or new ideas. Your devices already take a small step towards this by storing your diary, photos and other documents centrally, tagged with simple meanings – but apps have hardly scratched the surface of joining the dots between them, and text is almost ignored.

As a very simple example, your house painter messages you: "I think the kitchen paint could be too dark, how about Honeysuckle 4 or 5 instead?". Backed up with a KR, the Infotext graphics show you this is an opinion, from a known person (Sandy, with lots of relevant information about him), about a known colour (Honeysuckle 3, identified from a previous message), written at a specific time (part of the text, not a feature of the app). These aren't links but annotations you can expand by tapping or just looking, whereby 'wall colour' shows its name, who chose it and when, and your photo of a sample on the wall. You can explore the KR's information further from there, search it and of course do a wealth of useful things. But if this sounds like browsing a website or mind map it's not really the same: without relying on explicit tags and contexts, it shows the information that's relevant to what you're doing, what you should *think of now*. (That means there's little need for viewing options – it broadly knows what you're up to.) And instead of apps with individual

appearances, the whole view of the information dynamically adapts to its content and the situation.

A Humane User Interface

You can use Infotext to interact. Your house painter was implicitly giving you 3 options, which can appear explicitly as (say) 3 branches meaning possible scenarios. You can just tap or blink at one to respond, just as you could speak a single word in reply. This is obviously equivalent to a dialog box, and indeed questions and messages from your device itself appear just as if it's a person – not via buttons on a special window. (After all it is like a person… *who* though?) Many other special features of your device's GUI just become Infotext. I'd say it starts to be a Humane User Interface or HUI.

Converting apps to use this HUI clarifies their logical essence, and often shows that their features aren't really their own. When a satnav app offers 3 alternative routes to a destination, these would appear just like the 3 choices in a message. After you've made your choice, the Infotext summary of the route indicates that it's a plan (as opposed to a fact, opinion, etc.), meaning the details and times can change. But future entries in a calendar app are also Infotext plans: events that ought to happen, but may not. So these are shown in exactly the same way as the satnav plan – and why not even in the same place, which is not in any one app? This isn't surprising, because you only have one time schedule and only one mind.

To cut a long story short… your device becomes a store of information: your ideas, memories, plans, messages, documents and more. Much like now – but radically rearranged. You access and view this centrally, not inside apps, using Infotext with other media (photos, video, animation). Many apps partly melt away as they focus on doing, not showing. Some disappear entirely and we wonder why we ever needed them, as their role is replaced by that of the interface: to display meaning directly. This system is more than an app, but less than an OS, and quite suitable for existing devices. It's far from easy to achieve, but doesn't require general AI: it's not doing your thinking for you. It's using the right way to help you think.

Working With Ideas

I'm working on a detailed version of this proposal called **MindsEye**. As well as filling out much more about Infotext as a medium and as an interface, it shows how to extend it to editing ideas directly. Infotext can represent trains of thought and other mental constructs,

and show them in some radical ways. Editing these – even if you want simple text to be the end product – is the true goal to which apps for word processing, mind-mapping and note-taking only aspire. You can send people the ideas themselves, which even for the simplest message is better than text. Just as spreadsheets adopted cells linked together as the model of calculations, MindsEye has a model of thought (and it's not logical propositions): but that's another story.

The aim of working with ideas not text is a very old one, but I think we've been lured for decades in a different direction by the siren song of the desktop metaphor. Your computer screen became a mini office with documents, folders and a wastebasket, where you type a WYSIWYG preview of the article you're about to print – if you ever actually print it. As your screen has got bigger and better so has this virtual office, and soon with AR or VR it will almost become real! A brilliant idea, but it contains an insidious error: *a half-finished article shouldn't look like half an article*, as it does under the desktop metaphor. It should look like all your ideas and aims visualised, some of them detailed enough to be text, most not, but in some abstract meaningful form unlike notes, mind-maps or anything we have now. It should look like your *mind*. And when you've finished your article so you can finally imagine how it would look on paper, only then is it right to see a preview: because logically *the whole screen always represents your mind's eye*, not an office.

Your device's display seemed like looking through a telescope at the outer world, but you were looking through the wrong end: it should have shown your inner world all along. Some things on the screen look realistic, such as a 3D mockup of your painted kitchen, but not because the screen represents the real world: they're just reflections in your mind's eye. There are times (like walking along the street) when you could well use augmented reality, but when you're doing 'knowledge work' (which is most of the time) you need an augmented mindspace. Doug Engelbart's ground-breaking 1968 demo certainly seems to me more like the latter.

I feel that much of this is obvious, yet numerous other projects pointing in the same direction have only gone partway… In 50 years computers have advanced enormously, but their model of information hasn't made the same progress towards what I see as its natural conclusion: text augmented in the right way can express meaning fully, and then be the humane interface to a device which logically is part of your own mind.

Experimental listing of concepts

meaning: information as it is used by a human mind, taken from words (narrow definition)

or from any source (wide definition)

infographic: a graphical item which conveys information easily

Infotext: a proposed system of infographic annotations of text to enhance its meaning

augmented reality (AR): a digitally-enhanced experience of the real world

virtual reality (VR): a digitally-created experience of a world, not necessarily like the real world

desktop metaphor: describes user interfaces where the screen is a virtual desk on which is office equipment (paper, folders, a calendar, a printer etc.)

Karl Hebenstreit Jr.

To me, a word is worth a thousand pictures

The aim of this essay is to consider the future of text in service to people with disabilities by identifying three prominent topics: enabling real-time participation and communication, contrasting algorithm-centered artificial intelligence with human-centered AI, and outlining the implications of this contrast for placing human-centered disciplines within higher education.

The first topic, in service to championing the civil rights of people with disabilities, focuses on the crucial role that technology and disruptive innovation play in enabling everyone to participate and communicate in real-time. This essay's title was a favorite saying of the late Joseph Stuart Roeder, a senior access technology specialist at the National Industries for the Blind. In seriousness, this quip highlights text's role in transforming society, the need for text-based interfaces to content, particularly multisensory content being generated in real-time.

For background, to introduce the complexities of the underlying challenges for disability studies to a general audience, disability advocates typically begin with solutions for physical impairments. Addressing this most tangible disability, these solutions have been widely implemented so everyone has personal experiences with curb-cuts and ramps that enable access to and within buildings. In the wake of the pandemic, the advantages of motion-sensitive (no-contact) controls for doors and restrooms are apparent. These innovations provide examples of how disruptive technologies can benefit everyone, an alternative to widely-held negative connotations of disruptive innovations. There can be constructive disruptions, innovative breaks that make the conventional obsolete.

In considering the future of text, the core disruptive technology for realizing universal real-time participation is artificial intelligence, which can enable text-based interfaces to multimedia stimuli. For translating audio into text for hearing-paired, there are well-established technologies such as closed-captioning, for which traditional AI is rapidly improving the accuracy. Once again, advantages for everyone are recognized: knowing what is being presented while in noisy environments, applying to translations among languages. For the visually-impaired, challenges are more difficult and twofold. First, interpreting static artifacts: recognizing objects in photographs and explaining infographic charts. Second, for dynamic artifacts and occurrences, there is an art of descriptive audio, enabling a deeper understanding of videos and holding out the promise of being able to provide a context of

what is happening, interpreting nonverbal cues. For people with the wide range of cognitive disabilities, the challenges are even more difficult, depending not only solutions for the above but also doing so in an understandable, cognitively-appropriate way.

The second topic brings attention to the fact that while the examples above highlight successes of algorithm-centric AI, realizing the potential for people with disabilities requires a different, expanded orientation. Fortunately, this orientation has been resurging in the form of human-centered AI (HCAI), a paradigm that Ben Shneiderman [58] provocatively frames as the Second Copernican Revolution. He advocates for three ideas. First, considering HCAI as a two-dimensional framework opens up the possibilities for accommodating both AI paradigms, rather than an either/or situation. Second, a plea for a shift in metaphors from emulating humans to empowering people. Third, a three-tiered governance model: reliable systems (software engineering); safety culture (organizational design); and trustworthy certification (external reviews). These insights are further reinforced in Jan Auernhammer's article on Human-Centered AI [59], which contrasts two philosophical perspectives from the early development of AI: the "rationalistic" stance represented by John McCarthy and "design" represented by Douglas Engelbart. Honoring the contributions of Engelbart is the basis for presenting HCAI as resurging, that it is a re-energizing of Engelbart's intelligence augmentation paradigm. In fact, his work has guided my career in supporting people with disabilities since discovering it in the mid-1990s. I recognized that while his augmenting human intellectual framework [60] and boosting collective intelligence system [61] was focused on enabling people to solve increasingly complex and urgent problems, his framework and system apply to all human capabilities.

The third major topic concerns how HCAI will gain a stronger foothold within higher education, bringing attention to the power relationships among disciplines. Considering the relationship between the dominant algorithm-centered and the resurgent human-centered AI (HCAI) perspectives, deeper insights can be drawn from the history of cognitive science. In his call for reforming cognitive science, Ashok Goel [62] notes similarities between cognitive science and artificial intelligence: "The developmental trajectory of AI has mirrored the development of cognitive science, in that both started as multidisciplinary fields, and both are now dominated by a single discipline, psychology in the case of cognitive science and computer science in the case of AI" (p. 894). This article is based on Goel's experiences as a co-chair for the 2019 Cognitive Science (CogSci) conference and responding to a then-just-published paper [63]. Goel's article is part of a special issue, one of ten commentaries on the Núñez article [64]. For the future of text, these conversations within cognitive science will hopefully extend to strengthening ties between cognitive science and artificial intelligence.

In conclusion, the ideal of enabling people with disabilities to have equitable

opportunities to participate and communicate effectively in real-time is a challenge requiring both algorithm-centered and human-centered AI. In an earlier paper, Shneiderman [65] proposes a compromise design, applying algorithm-centered AI for internal processing in service to human-centered AI for user interfaces. Combined, these technologies can generate the adaptive text-based interfaces needed to continue progress toward this ideal.

Kyle Booten

O Puzzle Box of Inscrutable Desire!

Today it is still possible to pretend that we write primarily, if not exclusively, for readers who are human. There are, however, more and more exceptions to this rule. Deft practitioners of search engine optimization remember that for a web page to attract the favor of Google's ranking algorithms it must contain "primary and secondary keywords at the correct densities" [66]. Students whose writing is subjected to the scrutiny of robo-graders reverse engineer these algorithms' often nonsensical expectations in order to earn better marks [67]. On Twitter, where algorithms routinely caution, obscure, or suspend accounts for tweets that violate the platform's speech codes, users figure out how to obfuscate their meaning just enough to make it machine-unreadable.

As machine learning in general becomes more easily accessible to people who are not engineers or programmers of any sort, Algorithmic Editors will become more widespread. After all, there are many situations in which a human needs to know something about a large amount of text but would prefer not to spend the time reading it themselves. A particularly popular user on an online dating platform, overwhelmed by a deluge of flirtatious messages, might apply a textual low-pass filter of sorts, automatically ignoring both the most crass and the most boring. But Algorithmic Editors will have literary uses as well. Many poetry magazines receive bushels of submissions for each poem that they will eventually publish, and often it is left to volunteer editorial assistants or under-remunerated graduate students to sift through this "slush pile." No doubt the editors of certain literary periodicals would like to be able to automatically misplace those submissions that are unpromising candidates for their pages. The Algorithmic Editor of an experimental journal would move too-tidy sonnets to the back of the stack; that of a formalist publication would assign the same fate to poems that seem too outré, a judgement based in part on an overabundance of irregular, unpredictable line breaks.   Already most poetry magazines require hopeful writers to send in their works via Submittable, a submission management platform. In the background, this platform could train a classifier to predict whether a poem will be rejected or accepted based on how editors have handled previous submissions. Yet editors—being creative types themselves—would naturally also want the ability to specify (in natural language, if possible) the sorts of poetry that they *really* want to see—e.g., "Comfortably surreal like Ashbery, but not so WASPy, and more overtly political." Or, to return to the example of the dating site: "Messages that indicate the sender is very funny but not in an overly neurotic way." Tools for

filtering texts based on reader-defined models could become as common and portable as ad blockers or spell checkers.

Now for a second, more audacious prediction. At present, Algorithmic Editors are still a somewhat embarrassing fact of our digitized textual reality. The school district that pays an ed-tech company to implement some automatic grading software wants their students to go on acting as if each of their precious words is being read by a human. Failure to suspend disbelief would be lead to widespread disaffection or cognitive truancy. Likewise Twitter wants you to behave, but it doesn't want you to remember that it is scanning your tweets for offensive verbiage (or else its bots would congratulate you when you manage to tweet something within the bounds of acceptable discourse).

But there is nothing inherently shameful about Algorithmic Editors as such. They might be drawn into the limelight rather than pushed offstage. An example: right now, poetry editors are defined as people who have the good taste and good sense to pick and publish quality poems. Yet the editor, in our current human-centric literary workflow, is *bound* to their tastes —which, as we know from Bourdieu, are not nearly as unpredictable or unexplainable as we would like, dependent as they are upon one's class background and related demographic factors. In the future, editors who are truly devoted to their art as well as humble in the recognition of their own limitations will take it upon themselves to design Algorithmic Editors to replace themselves. However, "replace" here is not quite the right term, since these Algorithmic Editors would not model the human editors' desires but rather enact novel desires, desires that could not (yet) be desired, tastes for which there is not yet a tongue. Poised over the digital interface that allows for the rapid manufacture of Algorithmic Editors, the human editor will hammer at statistical language models, bend and buckle them, fold their edges backwards upon each other, bore holes and whittle notches in them, place one inside the other, pinion them together with delicate gears and screws until what's left is an intricate puzzle box—one that the human editor does not, cannot say exactly how to solve.

This Algorithmic Editor will take as its input a text—a poem—and return a boolean value signalling whether or not the poem is pleasing to it. Poets will lose sleep, lose years trying to write a poem to satisfy the obscure and demanding whims of this algorithm. "False…False…False…False…" it will say to all of them. Or perhaps, to help writers know when they are on the right track, it will offer a real number. A bad attempt will be scored 0.00201. A better attempt, 0.15083. Perhaps it will mercifully provide some more helpful feedback—these were the words it liked, these the ones it didn't. Or complex suggestions in natural language: "I hate poems that know when they've gotten to the end," "Too chatty, and yet you don't say anything," "Dactyls and iambs and trochees, all jumbled together like mixed nuts," or "Reminds me of Whitman. But not his virtues." On web forums, poets will

share their strategies while cursing the Algorithmic Editor's creator. They will perform ablation studies in an attempt to isolate those syntactic, semantic, and prosodic qualities that seem most auspicious. A literary magazine such as the *Kenyon Review* will publish the year's nearest misses with extensive commentary from poets as well as computer scientists.

Again and again the Algorithmic Editor will return its negatory verdict. Until at last, one day, a poet—the one the prophecies speak of, not even published yet, just barely started an MFA—will with blithe or quivering hand submit their newest, most uncertain composition. The Algorithmic Editor will measure the words with its weights, then print an unfamiliar reply: "True." And indeed, what the poet will have written will be something True.

Lesia Tkacz

Artifact from a Possible Future: A Pamphlet Against Computer Generated Text

"In the modern world, we are increasingly consuming and producing text which is far removed from its natural origins. Texts are highly processed, imported, monetized by corporations and are quickly discarded to become cyberspace junk clogging up our information pipelines and spaces. How could this be healthy? Most of us are so far removed from traditional text creation that we don't realize how much of it is reproduced, reprocessed, manufactured, and calculated by machines.

Did a human write the texts you consume? Are you crafting your own texts, or recycling ready-made and regurgitated synthetic constructions? Imagine a world where real authors are replaced by computers.

IT IS ALREADY HAPPENING! Research labs are quietly developing algorithms which can generate stories and entire novels. The replacement of the novel author with the robot writer looms ever nearer. Pure, original, imaginative, and individual creative writing is in very real danger of being supplanted by recycled, mashed-up, statistically predicted, stochastically screwy and over-processed content owned by mega-corporations.

Is this the textual ecosystem and future that you want?? ACT NOW TO REJECT COMPUTER GENERATED TEXT!!! Before it is too late."
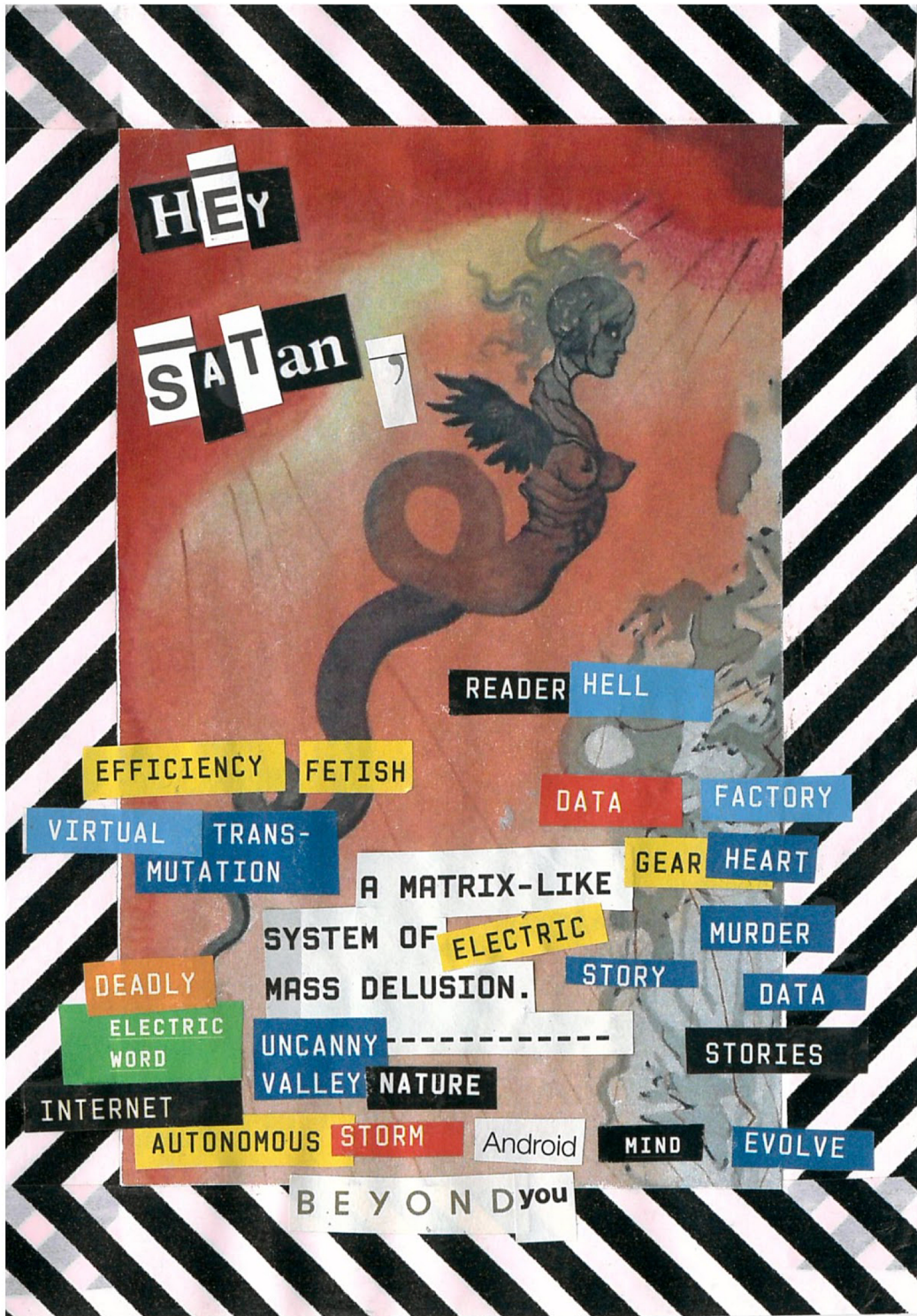
Pamphlet Cover, 2021 Collage. 105 x 148 mm. Tkacz, 2021.

& individual
creative
writing is in
very real
danger of
being
supplanted
by recycled,
mashed-up,

statistically
predicted,
stochastically
screwy &
over-processed
content owned
by mega-
corporations
Is this the

Pamphlet Pages 11-12, 2021 Collage. 148 x 210 mm. Tkacz, 2021.

Luc Beaudoin

Beyond the CRAAP test and other introductory guides for assessing knowledge resources: The CUP'A framework

You are overloaded with documents to read. So I must quickly convince you that this chapter is sufficiently useful for you to read it. Assessing knowledge resources is a constitutive skill of knowledge work that requires ongoing attention, and should not be allowed to fossilize upon graduation.

Here I present the *CUP'A* framework framework for assessing knowledge resources factually and pragmatically. In contrast to frameworks one finds in study skills texts (e.g., the CRAAP test), philosophy of science and elsewhere, this framework:

1   is developed not only for students but also for professional knowledge workers;

2   is inscribed in integrative design-oriented psychology;

3   includes suggestions for using information-processing software in powerful ways; and

4   functionally specifies information-processing software (the 'future of text').

The CRAAP schema advises you to consider the Currency, Relevance, Authority, Accuracy, Purpose and Point of view of information. The CUP'A schema assists in assessing the Caliber, Utility and Potency of sources, while sensitizing one to the seductive dangers of Appealingness.

Criterion	Basis
Caliber	Quality standards/norms. (E.g., clarity, rigor, coherence). Praiseworthiness.
Utility	Motives. (E.g., projects, goals, plans, responsibilities). Usefulness/desirability.
Potency	Potential mental and behavioral change for accommodation. (For understanding, mastery, etc.). Involvement/impact.
Appeal	Attitudes. (Preferences and other forms of affect). Likability; insistence; memetic/parasitic fitness.

CUP'A Assessment Criteria.

Caliber

The **caliber** of a resource is its objective quality with respect to reasonable expert standards, irrespective of your particular goals, knowledge or preferences. General standards of caliber include:

- the clarity of its thesis and its overall clarity,
- the suitability of research methods used,
- the rigor of its arguments, backing and statistics,
- the originality of its concepts, claims, findings, etc.
- its actual or potential impact and significance,
- its grounding in previous literature (e.g., missing or misused references),
- its conceptual richness and coherence (relevant ot its potency), and other criteria.

A resource can measure well against some standards and poorly against others.

Often a factual resource conveys, or at least should reference, an explanatory theory or model. Hence criteria for assessing theories are relevant, which include

- assessing its generality, parsimony, extensibility, mechanistic plausibility and practical usefulness; and
- determining whether it (a) can account for fine structure and (b) is part of a progressing or degenerating research programme.

There are other general criteria of caliber, as well as criteria that are specific to particular domains.

Utility

The **utility** of a resource is a measure and description of how instrumental it would be to one's projects goals, plans and areas of responsibilities — more generally, to one's motives. A resource may be of high caliber but irrelevant to one's intentions, considering its cost (time, etc.), risks and constraints. Moreover, a resource may be deeply flawed but potentially useful. We must try to prevent our utility judgments from affecting caliber judgments.

Assessing utility requires explicit knowledge of one's projects. Personal task/project management software can help one track and pursue one's projects, goals, plans and actions. Ideally software would enable one to:

1 link knowledge resources to specific projects or motives; and
2 quantify the utility of the resource.

Explicitly making such judgments may help one judiciously select and use information.

Potency

A resource's **potency** is the extent to which it might affect you as a person: your beliefs, understanding, attitudes, goals, standards, etc. Potency is inherently subjective to you but objective as a matter of psychology. A resource may be of high caliber but impotent to you if, say, you have already mastered its key knowledge. A potent resource is typically difficult to assimilate: it calls for *accommodation* (Piaget's term): elaboration, restructuring, productive practice etc.

Appealingness

The **appealingness** of information is how it interacts with our preferences (likes, dislikes) and other motivators. Appealingness can adversely bias one's judgments of caliber, utility and potency. For instance, dubious information (clickbait, idea pathogens, etc) may appeal to one's preferences ('my side' bias, etc). For example, *The Goodness Paradox* by Richard Wrangham exposed anthropologists who rejected high-caliber papers because the papers clashed with their political attitudes. (Ironically, such clashing is itself often based on misunderstanding.)

A promising fact is that experiencing mirth and debugging one's software involve discovering one's errors, and yet are both pleasant. It might be possible to generalize, transfer and nourish such dispositions (e.g., enjoying having one's flawed ideas corrected).

Future of information technology and strategies

To support assessment of knowledge resources, the following innovations are required. One needs to be able to

- Assign global assessments to resources. Not merely "likes", but systematic ratings (and possibly descriptions) of caliber, utility and potency.
- Not merely highlight text but *tag* one's annotations. For instance, one should be able to tag text as *I disagree* or as containing a particular fallacy. Common categories should be built-into the information processing software and new tags addable.
- Filter annotations by tag, for instance to list everything in the resource with which one

disagrees.

- *Robustly* link entire sources to multiple other resources, such as one's evaluative *notes* about them ("meta-docs"), one's projects, and related documents (such as others' reviews). These other resources may be developed in arbitrary software (outliners, mind mappers, etc.) and stored locally or remotely. Ubiquitous linking software enables navigating between a source and metadocs *without searching.* See "A manifesto for user and automation interfaces for hyperlinking" and Hook productivity software.

- Find previously encountered resources designated as pertinent to a (sub)project.

- Share entire sources, meta-docs, and annotations; and links to said information.

Descriptive and (CUP'A) evaluative notes

Outline

Mind map

Diagram

Textual notes

Source

Project

email

⟷ bidirectional links
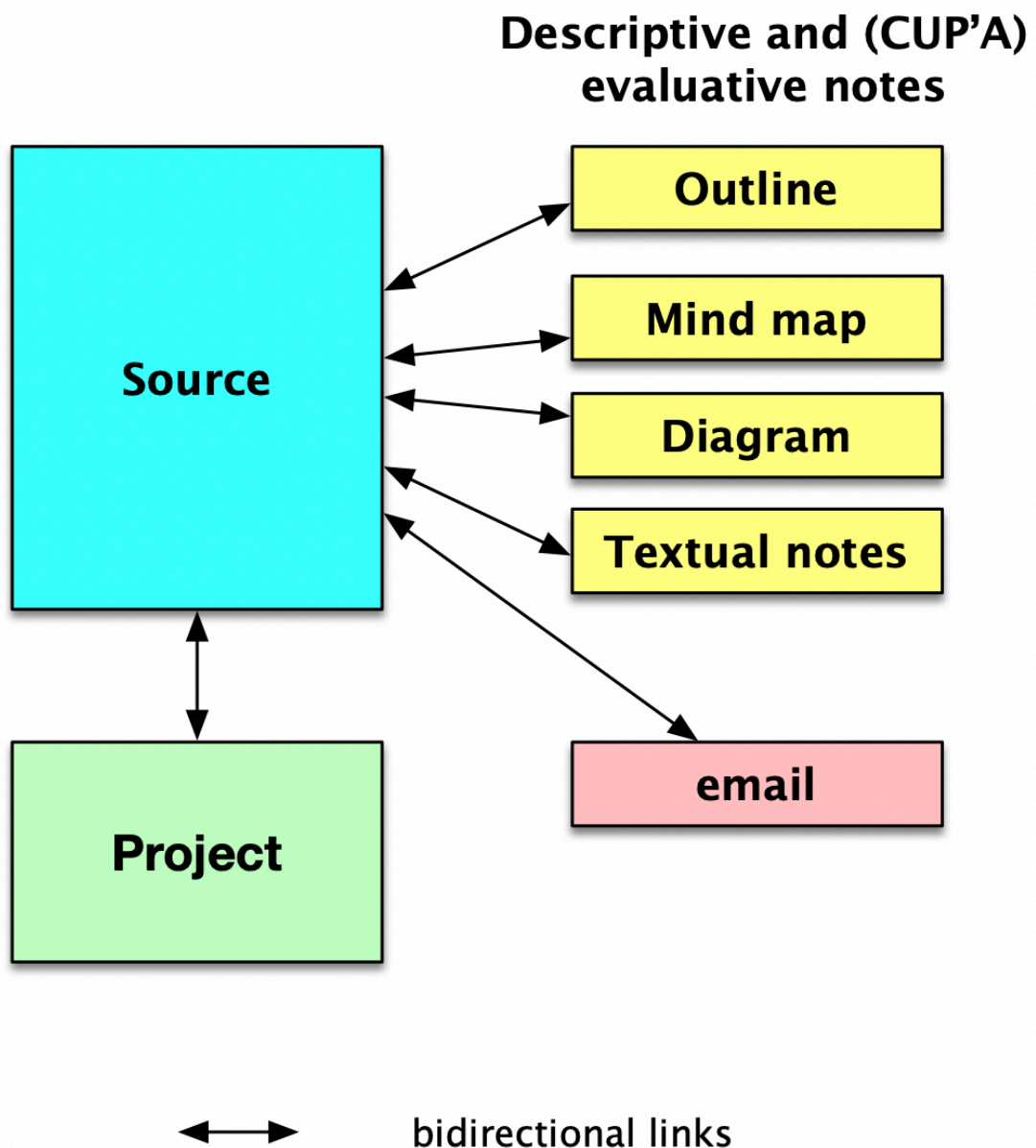
Figure 1 Related documents that explicitly or implicitly evaluate a source. Beaudoin, 2021.

Relevance of psychology

Assessing knowledge is inherently difficult. Compounding the psychological and technical challenges summarized above are problematic social trends wherein the humanist ideals of an open society are rejected. Postmodernism rejects the possibility of separating truth and value (it lacks the CUP'A framework). Fear of the 'tyranny of the cousins' (per Wrangham's theory), of being 'canceled', can adversely bias CUP judgments. (See *Cynical Theories* by

Pluckrose and Lindsay for an exposition of epistemological trends). Research in psychology is required to help us design software and strategies to assess information objectively despite these issues. It would help us deal with the fact that some truths may look ugly. It might help us understand and counter the memetic fitness of parasitic information. It would help us evaluate information analytically, systematically and rigorously.

Bibliography

This chapter is based on *Cognitive Productivity* books by Luc P. Beaudoin. See https://CogZest.com/projects/cupa for bibliography and supplementary materials.

Mark Anderson

Writing for Remediation—Tools and Techniques?

*'Remediation'? Here I borrow and extend the notion of re-purposing content in a new medium, as introduced in Bolter & Grusin's book '**Remediation**' (2000)* [72]. *Whilst their work used the perspective of literary criticism, here I use the term descriptively to refer an original work may subsequently exist in other media than as originally created and possibly even with the original order or narrative altered.*

Today's text can be easily 'remediated' by re-presenting it in different media. This may be either in its original linear (narrative) form or altered in some way; as multiple (hypertextual) linked narratives, as an alternative narrative, as abstraction of certain parts of the overall source, or in some other interwingled [kk] manner.

With foreknowledge of possible future remediation—*whether by authorial choice or not*, can we write so as to inform remediation in a beneficial manner? How then might our writing tools assist in making remediated work flow and fit better in its new form? Even 'just' re-fitting text together is not easy—even in a single language. If proof is needed, contrast the elegance of Ted Nelson's 'stretchtext' [ll] concept and the challenging task of actually writing [mm] for such use. What metadata might be of practical use, and how might we create/edit such metadata alongside alongside the primary (linear) narrative of the text?

Can all text be remediated? Probably most of it, especially if the source media is digital. But, need it be so, or—pertinently—should it be? I would suggest not. There is an abundance of writing where the author's narrative (voice) is important to the understanding of the author's intent. Meanwhile, at the more factual side of writing, it is probably best to re-use reactor shut-down checklist items in the order written. So remediation is not without consequence, even outwith the lens of literary criticism. Between the above extremes, our writing—our work—extends beyond formally published output and it is here where the opportunities, or risks, of remediation lie.

Frode Hegland's 'Visual-Meta' [nn] ('VM') standard made its formal public debut via implementation in the papers of the ACM *Hypertext'21* Conference [oo]. Having been closely involved in supporting the launch of VM, I find myself now reflecting on how our present digital writing tools lack affordances for writing in a manner informative to remediation. A key design intent of VM is to allow documents to be more self-descriptive at locus of interaction—much as a book's front-papers tell us its provenance. If VM describes a whole

document perhaps similar self-descriptive metadata (not necessarily as VM) could be created —where pertinent—for smaller sections of a document, such as might then assist with automated remediation. The task is not necessarily simple, or cleanly linear.

Consider that sections—not necessarily contiguous—of a document might be relevant to a certain form of remediation, or the same content might map to more than one such remediated use; different addressable sections might not be discontinuous. Furthermore, remediation effects might also work in reverse. Consequently, a statement in an agreement might depend on the unchanged existence of several laws. With suitable metadata, changes in any or all of those laws might usefully be able to ripple back through the document, if only as a prompt for human (or AI?) review of affected text.

Inferred dependencies within text may not be obvious to (current) algorithmic analysis, and human minds still have agility in areas where algorithms do not. Language captured as text is complex, not least in its elisions and omissions (where meaning must then be inferred).

An implicit task here is aiding addressability, an issue considered in the earliest hypertext systems in the 1960s such as Doug Engelbart's NLS [pp]. Whilst addressability is hardly new issue, as yet it is often enacted with insufficient clarity of focus. The issue is less being able to address any/all things—today's software already allows that—but it is more an issue of addressing the *right* things (allowing for scope and context).

Nor is the task simply a matter of 'more (meta)data'. The volume of data, of itself, does not yield greater insight and auto-adding metadata to every potentially addressable part of text would produce a data overhead of questionable value (data still needs to be stored; storage has a cost). Ergo, effective remediation metadata is inherently a deliberate authorial action.

Forms of remediation are with us already, even if not obvious to the casual author, or reader. It seems predictable that the degree of remediation (especially non human-controlled) will increase. That likelihood begs a question: *are we ready*? Indeed: *do we have tools and techniques that allow an author to write with the ability to inform later remediation?* I believe it is not so. Yet with forethought, we ought to be able to adapt (or create new) writing tools that both work in a manner still familiar to the author and which can also seedsthe resulting text with relevant metadata for remediation. The added challenge is setting an elegant sufficiency of metadata to avoid deadweight. Thus, *which additional data*, attached at *what scope*?

The future is not set: there is no textual fate but what we make. Let us gift our future selves the benison of better tools for remediation.

Megan Ma

Critical Legal Coding: Towards a Legal Codex(t)

There is no legal text without context. That is, legal information exists in a networked manner; legal documents interact with and reference one another across a temporally sensitive frame. Therefore, legal texts should be perceived as objects with code as the semiotic vessel. How these objects interact, how references are made, and how their histories interrelate must be accounted for. For legal text then to exist beyond natural language and as computer code, formal languages must necessarily be understood as linguistic mediums.

Formal languages are currently used in a manner that operates largely on efficiency. This is perhaps owed to a limited regard of the language as strictly syntactic and/or semantic; a focus on structure and outcomes as opposed to content and means. Analogous with learning a foreign language for the first time, code has only been acknowledged in a functional, mechanical sense. Metaphor, irony, fiction, and other complex uses of language have not been considered because code has yet to be perceived as worthy of interpretation. In defining, then, techniques of critical analysis, the potential of code as a non-natural[qq] but linguistic medium will be tested against the requirements of legal language. In doing so, I aim to make a preliminary assessment on the prospect of a legal codex(t)[rr].

Mark C. Marino argues that code, like other systems of signification, cannot be removed from context. Code is not the result of mathematical certainty but "of collected cultural knowledge and convention (cultures of code and coding languages), haste and insight, inspirations and observations, evolutions and adaptations, rhetoric and reasons, paradigms of language, breakthroughs in approach, and failures to conceptualize[ss]". While code appears to be 'solving' the woes of imprecision and lack of clarity in legal drafting, the use of code is, in fact, capturing meaning from a different paradigm. Rather, code is "frequently recontextualized" and meaning is "contingent upon and subject to the rhetorical triad of the speaker, audience (both human and machine), and message[tt]." It follows that code is not a context-independent form of writing. Having understood the complexities and pitfalls of natural language, there is now a rising demand to understand the ways code acquires meaning and how shifting contexts shape and reshape this meaning. The questions become whether there could be a pragmatics of code, and if so, how could code effectively communicate legal concepts?

In the "Aesthetics of Generative Code," Geoffrey Cox et al. advance the notion of a "poetics of generative code[uu]." They note that the code, frequently 'read' and referenced, is

only its written form. This mistakenly reduces code to mere machine-readable notation and implies that code is limited to expressions of logic. In effect, this falsely conflates form with function. Alternatively, they argue that to build proper criticisms of code, one must also understand the code's actions. Code does not operate in a single moment in time and space, but as a series of consecutive actions that are repeatable[vv].

A comprehensive literacy of code enables plays on its structure, using distinctive syntactic operators to produce a specific arrangement[ww]. The code's execution is its chronotope[xx]. It materializes the abstract elements and particular design choices in the arrangements. It is where the meaning and narrative of the code is bridged with its makeup. Code is shaped by its performance. Subsequently, the analysis of code should consider its constant shifts in state.

The reading of code, then, requires moving past its static form to understand the effects caused by symbols during its dynamic engagement[yy]. Code must be understood in action; only then are design choices situated and contextual references revealed. To interpret and develop critical hermeneutics, code must be understood beyond programmatic syntax and semantics to computational pragmatics. Code "yield[s] meaning to the extent to which we interrogate their material and sociohistorical context, […] and read their signs and systems against this backdrop[zz]." Consequently, code must be read against the backdrop of its own context vis-à-vis its transposed one.

Code is, therefore, undeniably a form of text. More importantly, its interpretative practices illustrate that while code is not isomorphic to natural language, code as text is not inconceivably different from natural language text. Some overlap exists. The test, however, is not whether text *generally* is inclusive of code. Rather, the test is whether legal text could be code; in effect, a legal codex(t). Nevertheless, legal language is rather distinct. Moreover, legal concepts have relied on natural language for their expression. It is yet to be determined whether natural language may be the only form of legal writing. That is, can legal writing exist outside of natural language construction?

Reflecting on the distinctiveness of legal language, the initial task is to determine whether code could fulfil the demands of the language. Peter Tiersma acknowledged the oft-arcane qualities of the technical language. Yet, he argues that both the lexical and structural complexities are intentional. Rather, the language is not merely communicative. Its stylistic form is not embellishment, but in fact, integral to its function. That said, what Tiersma alludes to is the law's conceptual complexity traceable through its linguistic patterns. Other scholars, such as Brenda Danet and James Boyd White, have noted that these stylistic choices represent the symbolic significance and ritualistic behavior of the language. The poeticism of legal language, reinforced by literary devices of metaphor and fiction, is instrumental to its

existence. The legal language is perceivably figurative and requires it to be experienced. It is a specific imagination of fact and configures narratives as truths. As well, the legal grammar reveals the law's "strange retrospective temporality[aaa]." Neither causal nor chronological, legal language establishes commitments made in the present, for the future, by referring to the past. This nonlinear interpretation of time is an implicit representation of the incompleteness of law, its knowledge is interruptible and incapable of total attainment.

It follows that the legal language may be categorized by three distinct markers: (1) conceptual complexity; (2) poeticism; and (3) temporal specificity. Conceptual complexity describes the use of specific vocabulary and peculiar sentence constructions for the communication of legal concepts. Poeticism reflects the use of literary devices and the heavily figurative quality of the language; and, finally, temporal specificity articulates the law's particular relationship with time.

From a critical lens, code is conceivably (1) incomplete; (2) poetic; and (3) temporally driven. The second and third traits seem rather transferable to legal language. That is, artful manipulations of syntactic operators can enable duality of meaning and metaphorical representation. Code is also sensitive to its dynamic engagement, highly mutable and susceptible to change. Together, these two traits pair well with the second and third characteristics of legal language.

The first trait, however, is more complicated and perhaps the crux of the investigation. It places at the forefront whether the lexical and syntactic complexity is inherent to the law's performative character. The current difficulty with 'code-ification' may be described as forcing square pegs in round holes. It is an attempt to draft computational legal expressions by extracting the underlying logic of legal processes. This, in turn, flattens and compresses the richness of law. Moreover, it assumes that legal norms may be 'transferred' from one container to another. In contrast, accepting that natural language has already impacted the construction of legal concepts, only one criteria of evaluation is relevant. That is, code should only be assessed for its ability to inherit natural language's traits. The most fundamental being indeterminacy. Should the indeterminacy of the law reflect the indeterminacy of the language, then code should simply be tested for its inherent incompleteness. In that regard, code can indeed be indeterminate. Code can be ambiguous. Code can be partial.

Nevertheless, the inquiry becomes: what is the benefit of drafting in code as opposed to natural language? Why should code even be considered legal text? Prior literature has shown that arguments for legal code-ification typically fall in line with simplification and efficiency. In fact, the argument should be one of clarity and accessibility. David Mellinkoff was perhaps first to conflate clarity with simplification. This has dangerously implied that legal complexity should be reduced. Evidently, attempts at simplification have accomplished what

has been akin to reckless extraction and bad translations (i.e., transliterating or decoding). A hurdle experienced most presently in discussions around a domain-specific language for law. On the other hand, it has been demonstrated that, overriding paradigmatic shifts, or reconceptualizing entirely away from natural language, runs into problems of overcomplexity[bbb]. How then could natural language maintain its signature[ccc] in code?

Interestingly, Critical Code Studies has provided a fascinating illustration of how code can inherit and retain its natural language ancestry. Consider the command **PRINT**. Marino describes the various evolutions of the term. Historically, printing began as the notion of putting words on paper (or, parchment). Importantly, *print* has come to signify a "system of inscription[ddd]." The word *print* itself "bears no automatic relationship to what [it] stands for[eee]." It is arbitrary. In programming languages, **PRINT** is understood as the display of data on the screen. Just as with most linguistic meaning, programming commands and variables may be represented using any select combination of characters. **PRINT** could just as easily be **TNIRP**. The intentional choice of **PRINT** represents a continuity in humanistic tradition, history, and sociopolitical origins.

Likewise, inherent to the legal language is a preservation of tradition. Though David Mellinkoff may regard it as "weasel words[fff]," the persistent use of archaisms (i.e., Middle and Old English, Latin and French) reflects the same form of continuity. Therefore, a legal codex(t) is conceivable to the extent that it inherits its natural language roots and embodies existing complexity. Moreover, there must be mechanisms in place for the legal language to refer between the analog (natural language) and the digital (code). The legal language must continue to be seated within a network of its history, relationships, and evolving contexts. In this way, the integrity of legal norms is maintained, and human-centricity is upheld. It follows that an associative code for legal writing is premised on establishing first computational legal understanding – in effect, an infrastructure for clarifying legal knowledge.

Importantly, there is a significant difference between translation and drafting. To imagine a legal codex(t) is not to frame it as a question of translation. Instead, it is a reflection of whether code has the capacity to draft going forward. Rather than rewriting existing legal texts in code, the exercise should be one of reference. It requires applying knowledge attained from computational legal understanding to develop an associative code for legal writing. It is the formation of a computational legal network.

Undoubtedly, the ideas put forth require further examination. For now, it may be important simply to acknowledge that pragmatics has been, and continues to be, a missing piece to the LegalTech puzzle. Current uses of formal languages and computational technology have made strides in 'clarifying' the law through simplification. This method,

however, treats complexity as a defect and is revealed in the persistent focus on syntactic and semantic techniques in legal knowledge representation. Importantly, this is not to suggest that logic and structure is not part of the equation, but that it is not the entire solution. Instead, the richness of the law should be preserved through methods of representing pragmatics computationally. This extends into perceptions of code. That is, code should be critically analyzed for its interpretative potential beyond function. In doing so, can the benefits of quantitative methods be bridged with normativity; in effect, reintroducing the space for argument and indeterminacy.

Niels Ole Finnemann

Note on the complexities of simple things such as a timeline

On the notions text, e-text, hypertext, and origins of machine translation[ggg].

Keywords/Tags: Notions of text, e-text and hypertext; history of text timeline; pioneering machine translation?

The composition of a timeline depends on purpose, perspective, and scale – and of the very understanding of the word, the phenomenon referred to, and whether the focus is the idea or concept, an instance of an idea or a phenomenon, a process, or an event and so forth.

The main function of timelines is to provide an overview over a long history, it is a kind of a mnemotechnic device or a particular kind of Knowledge Organization System (KOS)[hhh]. The entries in the timeline should be brief and indisputable. Therefore, timelines often identify the first occurrences rather than the most widespread or most qualified instances leaving the fuller and more complex, and possibly disputable story out. But even first occurrences are often difficult to establish.

The first occurrence is most often only the first finding of an instance. Older instances may be found and competing definitions develop either within a field or in different fields.

This is further complicated since the phenomena, their names, and their meanings may change over time. Former meanings may become redundant, or they must accommodate and coexist with new meanings. The time and place of the composition of the timeline are to be considered in interpreting the things listed.

The following note will discuss these issues as they occur in the development of the notions of text, e-text and hypertext, and the origin of machine translation.

Notions of Text

The word' text' is simple, but the phenomena referred to has a long and complex history. In the Middle Ages it was used for the main body of a manuscript as distinct from additional notes and illustrations[iii]. Later, it was applied to printed texts rather than written manuscripts. Over the years different definitions occur in linguistics, in literary studies, critical bibliographic theory concerned with scholarly editions, among historians, and - after the

invention of e-text- in a variety of fields in computer- and communication sciences[iji].

In 20th century critical bibliographic theory, the text was understood as an expression of the intention of the author [73]. In linguistics and literary theory, the focus moved from the author intention to inner structures of autonomous works based on 'close reading' [74]. Linguistic theory maintains the use of text for linguistic expressions, while in literary and semiotic theories the notion is expanded to include images [75] all sorts of multimedia expressions [76], dissolved in intertextuality [77], and/or in reader interpretations [78]; [79]. The word 'text' furthermore overlaps wordings as script, writing, document, linguistic expression, and other written, externalized expressions. Spoken language is usually excluded.

A History of Text timeline thus depends on both explicit and implicit and ever-changing ideas of 'text' and related wordings. The notion is also influenced of historical changes in the material dimensions concerning production (carved, hand-written, typed, printed, electronic and so forth), storage and reproduction (stone, wood, papyrus, parchment, paper, rolls, books etc.), dissemination, and reception.

Changes in physical dissemination of texts – for instance due to new mechanical and electrical techniques –are accompanied by developments of new genres such as the printed daily newspaper made possible by telegraph and rotary press in mid 19th century. If we list the first modern newspaper one might suggest that 'forerunners' of weeklies and non-periodic news media whether handwritten or printed should also be listed. But what about texts in other media and materials such as runestones, and graffities on the city walls? Which aspects of this broad - and far too short - story should be included in a 'History of Text Timeline'?

Even if it may be possible to list the major material innovations genres becomes really intriguing. The notion of genre is difficult to define, but useful for our orientation in the huge universe of texts. Novels, short stories, poetry, essays, historical documents and diploma, news, drama, audio, video, and hypertext genres with sub-genres in all categories. The issue of genre is complicated for at least three reasons. To identify a genre always take more than one instance, usually a series of texts sharing a set of – eventually also changing – characteristics. It is a relational term. The second reason is that the same text often can be included in a hierarchy of genres and sub-genres as well as in a set of network relations to other texts (intertextuality). We may for some purposes distinguish between the media as materiel conveyors of content (shared physical characteristics of a set of texts) and genres which can be identified only by looking into the content (shared meaning characteristics and style of a set of texts). Third, a recent shift in both functionalist and cultural historical genre theory away from focusing on the similarities "between documents" to examine social action seen as "typified rhetorical actions based in recurrent situations" further complicates the issues of recording genre history within a history of text timeline [80]; [81]; [82].

Opening for genres also opens for an endless number of issues which is maybe more relevant within the humanities than in the sciences, at least until the sciences enters the fields of the humanities recognizing that where you have text, you have ambiguities and troubles.

Text and hypertext in the binary alphabet

Today, text has also become a verb, to text a message which marks the arrival of a new medium of text. Texting refers only to a particular e-text format, as written and possibly real time interactive network communication rather than longer documents to be read at a later – possibly unknown – time in the future[kkk]. The special form of texting, however, reveals a more far-reaching transition away from the array of static (written, typed, or printed) texts to e-texts in which the time dimension is always incorporated as an editable option.

The potentials of this emerge gradually in many different areas. Since there is no general history of digital materials yet, it's not possible to give a full overview. It is possible though to depict a few major steps since Roberto Busa's pioneering project on digitizing Thomas Aquinas' works (Index Thomisticus) in 1949 [83]. A print version (sic) appeared in the 1970's, and a digital version in the 1990's [84][lll].

Efforts to develop a standard for e-texts appeared only in the 1960's. In 1969 the IBM employed Charles F. Goldfarb coined the notion 'Mark Up Language' and created an (aimed to be) general markup language, GM [85]. The idea of establishing standard formats for e-text was carried further also within the critical scholarly edition community and the now established Humanities Computing community, resulting in new mark-up languages such as SGML (1980) and TEI (1990)[mmm]. There is a gradual change from computational theory to new sorts of text theory as foundation for these efforts culminating in the development of OHCO, a general model of text as ´Ordered Hierarchy of Content Objects' in the 1990's [86][nnn].

Thus, there is a development from the interpretation of text as expression of the intentions of the author over formal and structural text theory to a modular and hierarchically ordered theory initiated by the efforts to the create digitized versions of static texts whether written, typed or printed.

Despite the differences all these ideas aimed to provide a digital edition as a copy of the original. The text would be stored as a file, and could be copied, processed, retrieved, edited, and searched in a main frame computer – considered either as a logical machine which would facilitate the development of more consistent and rational 'scientific' text analysis, or as a toolbox with a range of retrieval features to deal with the text. The sequences of bits in which

the text as well as the codes and functionalities was embedded, were not considered part of the content.

In the 1980's the mainframes were supplemented with distributed terminals allowing access across distance and - even more far-reaching- with small, but high-capacity, stand-alone desktop computers and graphical user interfaces. The door for utilizing the binary sequences, including codes, and instructions for semiotic purposes as part the work was opened. The clear distinction between tool and text became an editable variable. The new perspectives relate most fundamentally to a change in the utilizations and conceptualizations of hypertext.

The notion hypertext was coined in 1965 of Ted Holm Nelson who first defined hypertext as 'non-sequentially read text, as links were inserted in a primary text as references.' [87]; [88]. Later Nelson gave a dynamic version defining hypertext as 'branching and responding text. Best read at a computer screen' [89].

In between the French author Gerard Genette had introduced the word hypertext for a different type of relation between texts, namely for a text (denoted hypotext) used as template for a later text [90]. According to Genette James Joyce's *Ulyssees* was a hypertext because it used the Homerian Odysseus as its hypotext. However, Nelson and Genette worked in different academic cultures, which were probably not aware of each other which leaves the question how such cultural limitations should be manifested in a timeline of text?

Ted Nelsons – very influential – definitions focus on the reader perspective and are in accordance with the idea that digital features are external to the content of the text. These notions are still useful in some cases, but the later development is mainly based on the inclusion of hypertext features as part of the content. So, the notion of hypertext is gradually widened, Alan Kay & Adele Goldberg [91] focused on the flexibility and the capacity to include and manipulate all sorts of symbolic expressions in the hypertext. Michael Joyce introduced the use of links as narrative component within the story, *Afternoon. A story* [92] ([92]), and produced the software *Storyspace*, to write hypertext fiction with Jay D. Bolter, who also gave an elaborate theoretical analysis of the reconceptualization of the computer in his *Writing Space: The Computer, Hypertext, and the History of Writing* [93]. Bolter described the computer as a fourth type of writing technology in human history and hypertext as the fundamental semiotic operating mechanism of digital computers since it was rooted in the editable relation 'between the address of a location in the storage and the value stored at that address' allowing that both the address and its content can be edited via the interface. This again provides the computer with an invisible but editable space behind the visible representation of the text. Thus, in Bolter's analysis hypertext replaced the program as the basic operating principle of computers.

George P. Landow focused on the approximation of writer and reader modes, denoted a 'wreader' [94], and Jerome McGann, added to the new interpretation of hypertext with his notion of 'Radiant Text' [95], aiming to include several interpretations of a work in the same critical scholarly edition. A related reinterpretation of hypertext develops within computer science in the rise of Human-Computer interaction Studies (HCI) utilizing hypertext to facilitate users to access to the system architecture and programs via the interface. Later, Katrin Hayles [96] summarizes the range of signifying components of e-text utilized in this second-generation hypertext as 'including sound, animation, motion, video, kinaesthetic involvement, and software functionality, among others'ᵒᵒᵒ. Most of these features are based on the inherent time dimension fundamental to digital materials which - due to this and contrary to printed materials - remains open for changes as links can always be inserted deliberately with instructions for change any sort of content.

This again leads to ambiguities of what is meant by 'e-text'? Should it refer only to digital materials which are replicas of printed/static materials eventually including born digital materials if they are intended and coded to be closed? Or should it be extended to include all sorts of digital materials due to their manifestation in the very same, binary alphabet and independent of whether these sequences functions as text, images, sounds, processes, programs, instructions, coded links, and so forth and independent of whether they are intended to stay closed or to be continuously edited eventually, partly based on real-time updating?

Both meanings make sense, and the former can be included as a particular case within the latter though they have quite different implications. In the first sense the notion includes only what can be made visible as reproduction or simulation of a text produced in a static material form. The digital representation is external to the text "itself". Hypertext is necessary to access, navigate, search, and read the text, but not part of the content. In the second sense the notion may include all sorts of manifestations in the binary alphabet, independent of visual appearance, and in which both the Latin alphabet, other alphabets, musical scores, speech, and images as well as the lay out, and a wide range of processes, and not least the scripts, instructions and programs are manifested. If manifested, they can also be used as semiotic elements in the composition of a born digital text including the invisible parts of the e-text. Hypertext is always necessary for dealing with an e-text, but now it may also be part of its content.

There is no doubt that Ted Nelson's notion of hypertext is still the first known articulation of the term [97] [98]. However, the feature 'mechanical linking' was already there, included for instance in Paul Otlet's *Mundaneum* [99], and in Vannevar Bush' idea of a 'Memex' [100]. The basic functionality of hypertext includes an anchor point from which a

command is send to a destination, an address, with an instruction telling what to do to the content stored on that address. These functions were also included - though not named - in Alan Turing's theoretical description of the operation mode of the universal computer [101]. Similarly, the optional choice of the next step formed the basis for Alan Turing's notion of a choice machine. Together this is in fact hypertext inherited in Alan Turing's theoretical model, but the features were not combined and made into a notion. The model aimed to demonstrate the universality in respect to computability only, and not the full scale of the semiotic potentials. It also lacked for instance multiple timescales, and the codable relation between interface and storage.

The development goes further. In the late 1980's hypertext is also reinterpreted in another field and as a response to the question how to establish a digital communications platform which allow people to communicate between computers with incompatible architectures. This question found a solution with the development of the www protocols, first presented at CERN (Conseil Européen pour la Recherche Nucléaire) in 1989 by Tim Berners-Lee [102]ᵖᵖᵖ.

While the use of a fast-growing array of signifying hypertext features widens the semiotic enrichment, the web protocols widen the reach and range of possible link connections as they allow any computer to interfere with the functional architecture of any other computer on a given network. Together, the inclusion of hypertext features as intrinsic, semiotic components within the text and the extension of network interaction to a global scale opens for a range of new issues in the history of text.

So far, an e-text was generally considered to be a closed work stored in a file on a stand-alone computer. After the spread of the www-protocols, including the HTML early in the 1990's the conceptualizations of text and hypertext gradually moved on to the landscapes of interconnected computers and interactive and networked texts. The platforms for social media and interactive universes such as Second Life and a range of other new network genres was established. A repertoire of new terms emerges. Jill Walker described the 'unleashing' of hypertext into the world wide web as a transition in which the concept 'goes feral' as these texts *'refuse to stay put within boundaries we have defi*ned' [103]. Thus, feral hypertext structures cannot be restricted as navigational features outside a work – as originally imagined by Ted Nelson – or kept within the closure as in the literary hypertext tradition. For networked digital media, hypertext is both inside and outside and the connection in between. Henry Jenkins [104] analyses how the interactive networked texts are entering into popular culture, and Axel Bruns analyses the rise of remix cultures, "produsage" and virtual communities in [105]. While they are writing, Facebook trespasses its own local base in the American university world and becomes a global standard for written social interaction

across distance.

So, the question what is meant by e-text and hence to be included in a history of text timeline is now further expanded to include textual and intertextual relations distributed across the internet.

Among the far-reaching implications are the development of multiple source knowledge systems. Such systems are today used to organize inputs from a wide range of channels– and users – due to a wide range of different purposes, be it monitoring climate, weather, market transactions, financial systems, and any other relevant matters. Each parameter can be adjusted in real time or in deliberately chosen timescales as analyzed by Karina Knorr-Cetina [106] with the notions synthetic situations and windows of interaction and later developed to describe a range of multiple source hypertext genres in Finnemann [107]. The development also includes a growing range of collections of digital materials to be analyzed for patterns by means of statistical methods (e.g. *Distant Reading* [108]. If combined with automated transactions, they may include 'machine intelligence' which consequently also qualify to be included in the timeline for the history of text.

Such Knowledge Organization Systems are needed to deal with contemporary issues on both local, regional, and global scales. They are among the most central knowledge formats in 21st century characterized by the Anthropocene condition, that human activities have global reach and impacts within any single culture and has become a natural force impacting biodiversity, climate, and the biosphere.

The use of multiple timescales may also be applied to the Timeline itself, as it allows for inclusion of layered in-more-depth information made visible on user request only. So, a question is how these complications concerning hypertext should be manifested in the timeline? How should the unfolding of still new forms of applications and usages be included?

Finally - Machine Translation - When did it start?

"Claims about the actual starting point of a field of study are notoriously inexact" wrote Sergei Nirenburg and Yorick Wilks in their 1987-paper on the development of the field of Machine Translation [109][qqq]. Until then the starting point was often assumed to be Warren Weaver's idea, presented in a personal mail to Norbert Wiener (1947) and later as a Memorandum called "Translation" circulated in 1949 [110]. However, they added, there was evidence that Andrew Booth and his colleagues started such work in Britain in 1946, and that the Soviet Engineer Petr Petrovitch Smirnov-Troyanski (1894-1950) and others had worked

on machine translation and filed several patent applications since 1933. This work is discussed in John Hutchins and Evgenii Lovtskii [111].

Who then, should be included in a timeline of the history of text? It may be argued that Warren Weawer was the one who spread the idea of Machine Translation and made it grow, but he was not a founding father. Booth came first in the West. It may also be argued that Smirnov-Troyanski had no influence on the early development in the years prior to his recognition in the West in the late 1950-es. Still, today he is the first known researcher in the field of Machine Translation.

This brief history of the advent of Machine Translation illustrates the development of science towards a more global scope. Thus, it also illustrates a very basic question concerning timelines: what part of the history is to be indexed? Smirnov-Troyanski's work in the 1930's was not known in the West. But similar stories can be told in other areas. In many years it was assumed that the use of movable types to print was an invention of Johan Gutenberg in the mid 15th century but use of movable types was found in Korea and China around the 11th century or before. For a History of Text timeline, it also raises the issue which alphabets are to be included? Should the timeline be delimited to focus on alphabetic texts whether written, printed, or digitized? What then to do with Chinese history of text? Since digital media transcend and transform these borderlines into editable distinctions, it will be difficult to maintain a clear exclusion of other sorts of texts. For e-texts the question will always be which parts of the binary sequences belong to the text and which do not [112]; [113]; [114]

For the History of Text timeline, the question is to identify major trajectories to be pursued if the timeline should be further developed. To those indicated above one might also want to include the communication networks throughout history from the Egyptian postal system (known from 2000 B.C.) through the four major European networks of the Middle Ages (the communication networks of the church, the kings and nobles, the merchants, and wandering groups of musicians, beggars, actor troupes [115] to the modern system of newspapers, postal services, phone-services, cable networks, broadcast and streaming services and the global internet.

Peter Wasilko

Writing for People and Machines

Abstract

This piece is an attempt to share the experience of programming with non-technical readers and to make the case that software is a form of literature.

Background On the Nature of Computers and Code

Computers are tangible artifacts whose physical operation produces behavioral manifestations that can be perceived as mirroring the mental processes of People when they Read and Write a Response that is…. well, responsive, to whatever they were asked to do in what they just read. Their input takes the form of a stream of data produced by any number of possible input affordances from keyboard to speech recognition to graphical manipulations of on screen symbols. That data can be regarded as Text in some language the software running on the computer was designed to recognize. The computer will then parse that language to learn what it is being asked to do, simulate the corresponding mental operations, and generate an output stream of data that can be regarded as a Text (or formatted input in some Domain Specific Language like PDF or DVI or SVG that other systems can turn into graphics or – in the realm of automation systems – physical actions).

Computers can be purely analog, like the Slide Rule, or Digital like those with which we are most familiar. There behavior can be hard-wired in the device's circuitry or stored in a read-only format, or it can, in the case of General Purpose Computing, be dynamically reconfigured. General Purpose Computers represent a class of automations that, within the bounds of the time and storage space available to them, can all solve the same classes of problems albeit with differing degrees of efficiency and practical limitations. They also have the reflexive property of being able to emulate their own operation, or more precisely the operation of any other General Purpose Computer, which is to say that there is a class of Programming Languages — called Turing Complete Languages — that allow us to express descriptions of the behavior of any General Purpose Computer as well as the solutions to any problems such a machine can solve. In this strictly mathematical sense all reasonably powerful programming languages are said to be Turing Equivalent.

That said, there is no known way to automatically translate between any arbitrary pair of Turing Complete programming languages nor are any claims made as to how much code might be required to produce the same behaviors from programs in any arbitrary pair of languages. We can however make a very strong claim that Programming Language Choice matters and note that what might take many pages of code to express in a language that is a "bad fit" for what one is trying to do can be accomplished with just a few words in a language designed to facilitate the task at hand. The History of Programming Languages is the study of our steady progress to reduce the impedance mismatch between how People think and what sorts of concepts our Programming Languages make it easy to express.

In the early days of computing we didn't have the computing power to let the computer meet us halfway in this Man–Machine dialog, so programmers had to work with cryptic notations that minimized the work the computer had to do to Read the Text it was being given. This lead to languages like Assembly language with its nearly 1-1 correspondence between individual source code directives and machine executable instructions and at a higher but still low level concatenative languages like Forth that used Reverse Polish notation in placing operands before operations such that adding '1 + 1' would take the form '1 1 +'.

Today we have enough computing power design programming languages, like Inform 7, that can support a Quasi Natural Language syntax, which is to say a grammar that corresponds to an unambiguous subset of a human language like English.

Code As a Language to Think With

Code is Text designed to be interpreted by Computers as well as People. Early textbooks on Computer Programming focused on getting programmers to think more like Machines by encouraging a rigorous application of Hierarchical Problem Decomposition as the gold standard. Just keep breaking a problem down into simpler sub-problems until their solution is obvious in the language at hand. This was the era of using plastic stencil templates to draw Flow Charts almost as if we were diagramming the plot of a Choose Your Own Adventure book!

But at their core, all Programming Languages provide us with a means to Name and potentially rename things and to Compose/Combine/Group them, potentially naming the resulting compositions. We call this process Abstraction and typically build up many such layers as we use the names we assigned to previous compositions to allow us to disregard their implementation details and build on them at the next level up. Some kinds of composition are quite general and applicable at many levels of abstraction allowing us to express complex computations in what we call Closed Form. This is particularly common in

Functional Programming where we can replace an explicit loop (in which a counter variable is set to 1, a final target count variable is set to some value, some action is taken, the counter is incremented and a test is run to see if the count has reached its target before jumping back to repeating the action and bumping up the counter again), with a Map or Fold combinator that takes a List and an Action and performs the action on each item in the list returning a new list with the results of preforming the action on each item in the original list or the result of modifying the accumulator as each item is visited.

Programming Language Paradigms

Over time we have found sets of compatible abstractions that work well together and lend themselves to consistently expressing different styles of problem solving. We call these approaches Paradigms and they can best be analogized to Literature Genres. They set our expectations and give us a framework for how things should be named and combined along with sets of baseline Affordances in an implementing language that we know we will have at our disposal to build on. In Procedural Programming we focus on creating Procedures that manipulate State — issuing direct commands that drive input and output or set and reset the values of variables without any conceptual intermediation. In Class Based Object-Oriented Programming we call our Procedures, Methods and compose them with State into template like abstractions called Classes that can be instantiated into similarly behaving Objects. In Prototype Based Object-Oriented Programming we dispense with Classes and follow links to template objects called Prototypes in which we look for any state or methods we can't find, In Data Flow Programming we only set the value of variables once and describe our program as a web of nodes containing operations that behave like a Spreadsheet, potentially performing multiple nodes actions in parallel as soon as all of their inputs become known. In Logic Programming we describe bi-directional relations and allow Logic Variables to hold multiple values, building up a program as a set of constraints on a potential solution space that our language will explore through an implicit search returning one or more solutions or Failure. In Functional Programming we strive to banish the complexities of state by dealing in Functions that always return the same results from a given input, while making functions themselves First Class Values that can be returned by and composed with each other by Higher Order Functions. In Multi-Paradigm Programming we design languages that let us combine these different styles of problem solving — this mirrors the Natural Language Phenomena of Code Switching.

There are also some Lessor Paradigms that aren't adequate for general purpose work, but do lend themselves to being embedded in other contexts as Domain Specific Languages

(DSLs). One common DSL usage is that of using Regular Expression or Parsing Expression Grammars to define and generate parsers for Structured Data Types and other DSL's; another is the use of Finite State Machines to model Business Processes, Grammar Production (i.e. Inverse Parsers that help one Generate/Write a grammatically correct structure as opposed to helping one Parse/Read such a notation), and Protocols for Communications and User Interface Interactions (e.g. ensuring that you make a contextually valid selection before performing an action and doing something sensible with its result); and a final class of examples would be formatting languages like LaTeX and Markdown that let Authors control the appearance of their Texts.

Writing Programs As Texts For People

Thus far we have focused on the Nature of Code itself and how its Functional dimension, as a Machine Readable Text amenable to unambiguous interpretation and execution, lets Programmers express arbitrarily complex behavioral patterns without getting themselves Lost in the Details. If we have done our job well, at this point we will have Code that can be run and returns the desired results provided that its inputs fall within the parameters of its design. But such a program does not necessarily suffice as a coherent text that is useful to other People. Indeed by making small semi-random changes one can stumble onto code that works without necessarily understanding WHY (indeed, this approach has even been somewhat automated in the Paradigm of Genetic Programming). Likewise, even if one has Consciously arrived at correct Code, there is no guarantee that its operation is not so opaque that one won't be able to REMEMBER how and why it works beyond the immediate coding session in which it is written. Indeed it is quite common for code that one has written some months before to be utterly unintelligible to such a degree that the only way to figure out what is going on in it is to effectively Reverse Engineer and Re-Invent It from scratch.

This is what happens when we forget that we are really writing a Text and not just hacking out some Code. True Programming as opposed to commodity coding, entails Conscious THOUGHT about naming, sequencing, and presentation. It is about establishing a dialog between yourself, the Machine, and some Future Reader — quite possibly Future You — who will need to Read and Comprehend the program's Text without the benefit of being able to ask Present You what you had in mind unless you set it down in TEXT. This can take the form of the program's text itself, if its Notation is Appropriate AND you organized it to tell a clear Story; or it can take the form of a raw program with well written comments and accompanying documentation; or ideally it can take the form of a Literate Program.

Conceived of by Donald Knuth, Literate Programming (LP) is a methodology that puts

the primacy of Text before Code by using a Control Language (Web) to interleave Text richly represented in a Typesetting Langue (TeX) with fragments of Code represented in a target Programming Language (originally Pascal). The genius of this combination is that the control language frees a programmer from the organizational and syntactic constraints of the programming language — indeed some LP systems include Macro facilities that can offer a limited extension of the target language itself.

Most importantly, topics can be taken up in whatever order is likely to make the most sense to a reader by breaking up the program's source code into explainable fragments; leaving it to the Literate Programming System to extract and collate them to generate a syntactically valid program. This process is called Tangling. Conversely, Literate Programming systems also generate cross referenced and heavily indexed typeset documentation that tells the story of the program — noting where to find any code referenced in a given section as well as where to find any code that references it. This process is called Weaving.

Many modern literate programming systems have access to the underlying LaTeX typesetting system, and its vast ecosystem of add on packages making it feasible to include the same sorts of tables, charts, diagrams, data structure & graph visualizations that one might expect to find in a scholarly monograph.

What Lies Ahead

Developments are emerging that promise to further blur the line between code and literature. Interactive Fiction systems like Ink and Inform 7 with their rich IDE's are making it vastly easier to simulate Chat Bots and create foldable and dynamic texts that can be explored in a cursory or in depth fashion as if engaging in a real dialog with the writer. We can also look forward to using Visual Meta to painlessly situate programs as texts in the broader literature — making it possible to copy code fragments with implicit citations and related meta data which may have added benefits vis-a-vis legal considerations.

Philippe Bootz

Literariness and reading machines

1. Convergence towards a question

The "text" is a vast and pluriform problematic. I will therefore restrict my analysis to the category of "literary texts", defined as artifacts[rrr] conceived as signs[sss] having literariness and in which "natural" language is a predominant semiotic code, the other semiotic codes of the text being organized in relation to it.

The question of the future of the literary text can be asked from two perspectives: what will be the future of current texts, and what will be future texts?

The second question can be rephrased as "what will literariness be tomorrow?" and the first as "how to preserve today's texts?" This question requires having first determined what must be preserved, in other words, what is literariness today. Thus, these two perspectives are two sides of the same question: what is literariness? The answer to this question evolves in time because it is societal. It always results from a confrontation between authors who redefine unceasingly its potentiality in a literary history, and a culture which would like to freeze and standardize it because it is source of cultural power and a commercial stake (to make fructify its literary goodwill)

2. Perspectives in programmed digital literature

Programmed digital literature approaches literariness through the relationship between natural language and computer code. One has spoken at length about characteristics of generators, hypertexts, codework, etc., but, in my opinion, lability only characterizes digital device [116]. The lability is the fact that the result of the execution of a program does not depend only on the source code[ttt], and thus on the intentionality of the author delegated to it, but also on the complete technological context of this execution. This property can be found in any digital production, whatever the genre, because it is linked to the very nature of computer science. It is already present in its founding model, the Turing machine, through the concept of internal state and the necessary coupling between the reading head and the machine program. It is multiplied tenfold in a real device because the latter adds dimensions[uuu] absent from the Turing machine, if only the temporal dimension. This

phenomenon, which I was able to observe as early as 1990 [117], has a profound impact on the meaning of what is read on the screen and, above all, relativizes, when it does not totally destroy it, the causal character between the program written by the author and the result read at its execution.

This observation led me to consider the source program and the media created while running as two facets of the same text: one perennial (the source code), the other labile (the result on screen); one constituting an object (the source program) because it is identical to itself in all places and at all times, the other constituting a transient and non-reproducible state over the long term. Hence the names *source* and *transitoire observable* that I give to these two facets in the model I have developed[vvv]. It is easy to show rhetorical relations and effects of meaning between these two facets. This duality of the text cannot be seen, neither by the author, nor by the reader; it can only be apprehended by someone who observes both the source program and the media on the screen. I have named "meta-reading" this new position of reception, transversal with respect to the usual computer device. Let us note finally that, just as the two faces of a coin exist only because they are connected by the metal, they do not have ontological autonomy, *source* and *transitoire observable* exist only because they are matters of work of entry (the *source*) and of exit (the *transitoire observable*) of a transformation embodied in a technological apparatus. The text is thus materially carried by these 3 elements which have physical characteristics quite different from each other and which, together, constitute what Klinkenberg names the stimulus of the sign [118], the sign being the text.

It is quite obvious that this point of view is far from being shared, even by most authors of computer productions. A large part of my teaching and research work consists in highlighting both the unitary and indecomposable character of this text and the semantic and formal richness which, precisely, participate in the literariness of the programmed digital text ([119] and [120] are examples). Of course, one should not ask everyone to look at the source programs. It is thus advisable, today, to make accessible in our usual modality of reading (digital reading) the forms and internal rhetorical structures of the text without asking the reader to look at the program. This is the objective of the "reading machines" [121] which are complementary to the digital reading of the *transitoire observable*. Such machines are beginning to be implemented at the French National Library in a project of preservation and consultation of digital works (https://eur-artec.fr/projets/machines-a-lire-les-arts-numeriques-interface-et-mediation/). The necessity of such machines that "fold" the device to make it accessible in digital reading is the proof of the inadequacy of our current reading modalities. The device for digital reading remains to be invented. There is no doubt that this device will impact in return the literariness and the creation itself.

In conclusion, the future of the text depends to a large part on the future of reading defined as the relationship to the materiality of the text: how will we read in the future? Will we remain in the current mode of the "frontal device" which consists in reading a digital production on the same mode as the vision of a film, the reading of a book or the hearing of a music, i.e. in front of a machine which produces "the" result to be read, or will we multiply the points of view, like the spectator who must turn around a statue and cannot simultaneously apprehend all its facets; will the perception remain a static reception or will it evolve towards a necessary mobile recreation? will the perceived take the step on the perceptible? the reconstructed on the visible? It is in any case what the digital productions, all kinds confused, direct us towards.
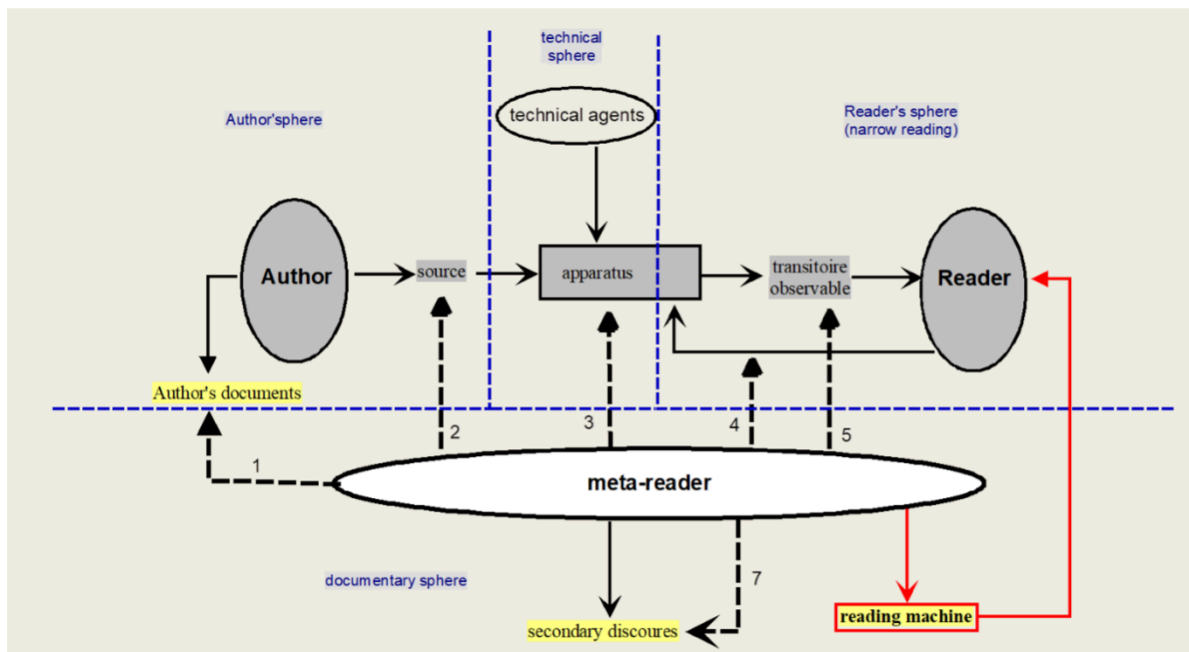
Reading machines in the procedural model. Bootz, 2021.

Rafael Nepô

Book Reading Rituals and Quirks

I go through many rituals when starting a new book, and the kind of ritual depends on the type of book I will be reading. Graphic Novels are more easygoing, Fiction is more immersive, Non-Fiction requires structure and Theory requires more research.

The ritual begins when a Book is selected, recommended, or discovered. Interpret this as my personal experience as a reader going through some of the rituals and quirks that come with holding a book in hand to absorb its contents.

If it's a story, like "The Hobbit", I remove the dust jacket and start reading right away. I don't want any more spoilers than the ones that got me to the book in the first place. The only ritual for stories is choosing the place and soundtrack.

If it is non-fiction, then I look at the cover. What's the Author's Name? Do I want to read the blurb? The praise for the book? Sometimes, I'm afraid that, those 2 things might influence how I perceive the book, but most of the time, I read them anyway.

I then look at the Glossary and all the Chapter Titles. This helps me understand the overarching topics that will be talked about. At this point, considering that I have already bought the book, I will then begin a process of understanding the structure of the book. I start by again removing the dust jacket and leaving it on the shelf. I feel like they're always slipping, moving, and ruining the experience of reading.

I will do a quick flip through to see the layout of the book. Two markers are used in this stage. With a black one, I will paint the margins of chapter pages of the book. This will help me to identify small and large chapters and quantify how much time I would need to finish that chapter. The red one will be used to paint the page where the story ends and the Bibliography begins.

By breaking down a big book into smaller chunks, I can plan my reading schedule while also making larger books less intimidating.

Here's an example:

"A History of Reading" by Alberto Manguel.

372 Pages – Total number of pages in the book.

306 Pages – Actual number of pages of reading.

66 Pages – Endpaper Notes and Index

3 Sections – 21 Chapters in Total

Section 1 – 1 Chapter

Section 2 – 10 Chapters

Section 3 – 10 Chapters

Chapter Length – 12 to 20 Pages

With this information in hand, I will then calculate an average reading speed based on the contents of this specific book. For some immersive stories, reading goes by very fast, while technical books would go rather slowly.

I discover that it might take me around 12 hours to read this book. So, if I manage to read for 2 hours every day, I will finish it in a week. Not bad.

This whole process of getting to know a book takes about 15 minutes on average to complete.

For some books, I would use 3 Highlighters. Yellow, green, and blue. Yellow is for passages I find interesting. Green for names of people, places, and dates. Blue for Technical terms, acronyms, and jargon. Usually, for the first read-through, I only use the yellow marker.

A blank Index Card is used as a Bookmark. This way, I can quickly take notes and add them to my References Drawer. These are useful for future projects because I can look up notes and reorder them as I please. After I finish reading the book, I read through what I highlighted and transcribe what needs to be on Index Cards.

I try to start and finish my reading based on the chapter length. I can quickly find out how long it would take to read the current chapter and do so whenever I find an opening during the day.

A search for an adequate reading location begins. Am I home? Do I have a comfortable chair around me? A wall I can lean on? Walking? Train? That lucky spot with tree, shade, and quiet?

I disable notifications on my devices, press play on a peaceful piano playlist, and start to adapt myself into a reading position, the book holding position, and finally, the highlighting position.

After a quick sniff of the book and a yellow marker in hand, I highlight passages that I find interesting as I'm reading. It's more efficient than going back and finding what I wanted to highlight. I don't mind having many highlights during the first read. My Index Card is used to Bookmark where the chapter ends.

Now and then, I might come across a term, a location, or a person that I want to know more about before I continue reading. This little diversion delays my reading time but adds more immersion to the story. A good trade-off.

If someone interrupts me during the middle of a page, I kindly tell them to wait for a second. After I reach a point that I can pause, I apologize for the wait and then pay attention to what they have to say.

After I'm done reading the whole book, I do a Highlighter Read to transcribe the best parts. These will be used for citations or ideas for future projects. Every book serves as a trail into the next book. Most of the time you're bound to discover new things related or tangential to what you read.

I love to look at the Bibliography, but I tend to avoid it altogether. It's a dangerous place to go to, where a simple peek can rapidly mess up my reading plans, create extra expenses and leave me with the task of reorganizing my shelf. Bibliographies can fill your shelves rather quickly, you see.

This is the moment where I venture into the Web to watch interviews and presentations with the author, as well as read articles and posts by other readers, to see from their point of view, and what the interesting and frustrating bits were.

Regarding the future of reading, eBooks still have a long way to go. They're just fancy HTML and CSS files, packaged with horrible typography and rigid layout. Not counting being stuck in proprietary Apps that offer little to no customization. The future of Digital Books has yet to arrive.

In the far future, there might come a time where we can simply download entire books directly to our minds in an instant. Whether that future comes to fruition or not, these quirks and rituals still have been playing an integral part of the reading experience since books have been around.

Richard A. Carter

Inscriptions to the Stars: Time, Space, and Extra-terrestrial Textualities

To reflect on the very deepest textual futures, the potential forms that could emerge, the meanings these might articulate, and the possible impacts arising, is to invite reflection subsequently on the varying contexts and domains in which it is produced, received, and will persist. In this regard, the first impulse might be to confine any conjectures to a purely Earthly context. Nevertheless, it is instructive here to reflect on the sprawling history of speculative work and concrete attempts at messaging beings not of the Earth but from across the extra-terrestrial beyond. Thus far, these efforts have, somewhat by necessity, worked on the presumption that alien beings will broadly possess the same capacities of sensing and sense-making as human agents, and, from this, wielding at least equivalent technological, mathematical, scientific, and linguistic modes.

Long prior to the advent of radio messaging, and the launching of spaceborne artefacts, the very earliest strategies for METI (Messaging Extra-terrestrial Intelligences) hypothesised excavating continental markings upon the Earth's surface, signalling to any alien observers stationed on the Moon or Mars [123]. Contemporary efforts—ostensibly more practical though no less optimistic—have been divided between placing diagrammatic inscriptions onto the sides of varied spacecraft, or the beaming of carefully crafted messages to different interstellar locations. The golden plaques affixed to the *Pioneer* 10 & 11 and *Voyager* 1 & 2 probes are perhaps the most widely recognised instances here, as well as the 1974 Arecibo radio message, but more recent decades have chronicled a range of initiatives, conducted exclusively using radio, such as the 2003 Cosmic Call, or the 2018 Sónar Calling GJ273b [124].

All these undertakings have complex, sometimes controversial, and invariably idiosyncratic histories, but where they are instructive for thinking through the future of text concerns their making explicit questions around its inscriptive contexts and interpretative potentials. Although dialogue with alien recipients might represent the most exotic horizon of future textuality, the challenges it bears out are manifold, bringing into sharp relief what text represents as a mode of expressive mark-making. Leaving aside the formidable logistics of message transmission, and the speculative hopes concerning its reception, crafting a message that has a chance of being decoded by truly alien observers involves confronting the range of material and culturally embedded assumptions that govern textual expression. Perhaps the most extensive instance here was Hans Freudenthal's *Lincos: Design of a Language for*

Cosmic Intercourse (1960). Lincos (short for *Lingua Cosmica*) was grounded entirely in mathematics, and outlined less a distinct language than a set of conventions for using algebraic structures to express concepts ranging from scientific understandings of the observable universe to insights into human and animal behaviour. Despite being poorly elaborated and incomplete, Lincos has provided one of the most considered foundations for earnest efforts at extra-terrestrial messaging. Of note here are the graphical messages developed by astrophysicists Yvan Dutil and Stéphane Dumas, which were beamed from the RT-70 radio telescope in Yevpatoria, Crimea, in 1999 and 2003 [125] [126].

Both Lincos and the Dutil-Dumas messages encode particular assumptions about their recipients ability to parse numerical and mathematical information, while the latter relies also on their perceiving contrasting glyphs in space *as* textual sequences, to be assimilated in a specific order. The rich history of human writing belies the specificity of these predicates, let alone their more implicit assumption that communicating scientific and mathematical concepts provides a more worthwhile, 'rational' basis for initiating 'first-contact' discourse— that these will be logistically easier to parse, and more enlightening, than ostensibly more arbitrary expressions concerning, for instance, history, culture, and art.

While such observations have been subject to much contentious debate, the key point, for the purposes of this discussion, is that to craft a written message without context—or rather, one that tries to generate its own—is an exercise in reaching for the 'universal'— a singular sense of 'Text', as implied by the very title of this collection. Nonetheless, what constitutes the latter is always, by necessity, contingent on a multitude of contingent assumptions and contexts.

The lessons to be derived from this are, firstly, the importance of acknowledging these contextualising aspects when speculating on future vectors of textuality, and to consider their influence on what might be taken to represent even its most foundational, unchanging primitives. Secondly, it raises the sobering point that there is very little about contemporary written communication that will, by presumed necessity, prevail into the furthest future— whether in terms of how it evolves, or its current intelligibility. To illustrate, studies in the potential for sending and interpreting extra-terrestrial messages have highlighted parallels with the challenges involved in parsing the writings of ancient civilisations—in correctly identifying their textual artefacts, before painstakingly reconstructing their delimiting contexts and meanings, often with a paucity of concrete evidence [127].

Given the serious ecological challenges of the present moment, it might be hubristic to assume there is much of a human future ahead to be too concerned with the eventual fate of text within it—let alone the effects of our assumptions concerning how it might be received at such a point, whether by human archaeologists or alien interlocuters. Nevertheless, if we

pursue the task of thinking about, and writing to, the furthest reaches of time and space, then the lesson here is the importance of both acknowledging, and being open to the transformative question behind all inscriptive endeavours: of how to justly express the enormity, wonder, privileges, and perils of life on a planetary body shared by countless other beings, and which is situated within a profoundly more-than-human reality.

As an illustrative exercise concerning the themes of this short reflection, the author has attempted to depict, somewhat abstractly, its key aspects using an adapted variation of the Dutil-Dumas 1999 alphabet in the message below.

Rob Haisfield

Programmable text interfaces are the future, not GUIs

People who don't code are accustomed to interacting with apps with Graphical User Interfaces (GUI)[www]. In order to give instructions to a GUI app, users need to click on buttons/menu items, click-and-drag blocks, and write in text boxes. GUIs are the dominant interaction design paradigm for non-coders[xxx].

Without code, people need to be comfortable with whatever pre-existing features they can find, and if they want something custom, they will need to hire a coder or use a graphical no-code tool that will ultimately require them to use the same coding concepts.

Coders will open a text file with an Integrated Development Environment (IDE)[yyy]. Their IDE will provide helpful features (graphical or textual) to debug, refactor, and generally support writing more functional code. Coders give software instructions by writing in text what they want. Generally, code is flexible enough that they can make it do anything they want.

While working on the onboarding for GuidedTrack[zzz], I began to think… What if people could interact with apps like coders interact with their programs? What is the difference between clicking a button to call a function and writing code to call a function? **In the future of text, I foresee programmable text interfaces with custom IDEs replacing graphical applications.**

GuidedTrack[aaaa] is a simple low-code application that allows you to make surveys, experiments, web applications, online courses, signup forms, and more. While the use cases are broad, here I will primarily focus on the form builder side of it for simplicity. As one of my projects with Spark Wave[bbbb], GuidedTrack is the best example I know of a textual interface, so I'll dive into it and extract takeaways as I go.

The keywords are direct and domain-specific. If you were to describe a survey in an email that you send to a collaborator, how would you do it? That's not going to be far off from how it looks in GuidedTrack. This makes it feel like a ***textual interface*** for an app people are already familiar with. **Users write their instructions with text at the level of abstraction they care about.**

Each line represents a function (marked by the keyword at the beginning of the line), and relationships are conveyed through indentation. In order to add a caption to an *image, you indent a caption under the *image. In order to ask a follow-up *question, you indent the follow-up underneath specific answers, which are indented under the question. Saving responses to use for later is also done through indentation. **The syntax is simple.**

In user research, we found that non-coders often believe that in order to write code, they need to spend significant time reading documentation upfront. However, in GuidedTrack we have a toolbar filled with forms that enable you to write code through a graphical interface. All the user needs to do is fill in the blanks, toggle options on or off, and select options from menus. **The toolbar enables users to learn as they go and write code before they know how.** This

is more or less equivalent to the graphical interfaces people are used to in Google Forms, but the difference is that once you get used to it you can just type.

For example, in this image, we see a form for writing a question. This multiselect checkbox type question will save the answers to a variable labeled `participantSubscriptions.` Later, these saved answers can be referenced in a **conditional** (e.g. "if Netflix in participantSubscriptions, ask this question") or a **loop** (e.g. "Ask the same followup question about each of the answers they selected"). There are forms for those as well!

Loops and *conditionals* **fall under the broader category of "control flow."** By default, content (text, questions, charts, images, etc.) are read as instructions, flowing top to bottom. If that feels restrictive, loops and conditionals can declare other rules. A new user can learn

how to replicate Google Forms' functionality in 10-15 minutes without requiring control flow. However, upon learning to use control flow, they will not want to return to the limitations of GUI alternatives.

Simply adding variables and control flow to a form builder gives people the ability to create their own functionality. Users don't need to wait for developers to implement a specific feature.

Our competitors will advertise that they can do calculations as though that is a noteworthy feature! These calculations are used to score users' responses (in a quiz, for example). In GuidedTrack, calculations are emergent from the way saved variables work. In the case of a quiz, it would look something like: `totalScore = totalScore + lastAnswerScore` after each question.

Another example: an alternative form builder, Tripetto, is able to take the above question and ask how long the respondent was subscribed to each of the streaming services. The developers of Tripetto needed to specifically design that feature. It takes 20+ clicks (besides typing) and ~3 minutes to do it. That will never get faster. GuidedTrack doesn't have specific functionality for this. We don't have a long set of steps. However, control flow makes it possible in 15 lines of code. Most of that code is the same text Tripetto users would have to write anyway. Although it is more advanced than what beginners will need or know how to do[cccc], many serious knowledge workers, like course creators or PhD researchers, will need a tool that can scale with their changing goals over the course of a whole career. **GuidedTrack, as programmable text, can handle the increasing demands of users with changing goals**[dddd]**. The feedback loops**[eeee] **built into the design of its editor enable users to increase their skills as they go**[ffff]**.**

Textual interfaces are as fast as typing. If writing a question, its answers, and the loop with the follow-up question is 60 words, then it will take you 1-1.5 minutes. **When the syntax feels natural, creating feels like writing.** Most people who use computers know how to type, and have had to use Google or Word documents. The keyboard shortcuts people are familiar with (command-a to select all, command-c to copy, command-v to paste, etc.) all work in a text editor because text editors have worked this all out already! If you try to copy/paste multiple questions at a time in a graphical application like Typeform, you can't. If you try to undo an accidental change with command-z, you can't. **Graphical applications have to specifically build keyboard shortcuts that text editors can do by default.**

Oftentimes, writing and reading is simply more pleasant than dragging and dropping. **Text is incredibly information dense.** Look at the difference between the same survey in GuidedTrack vs. Tripetto. With Tripetto, you would need a massive screen to work with a long survey!

```
1   *header: Welcome to GuidedTrack
2
3   This is a language built specifically for non-programmers to use
4
5   *You can learn as you go, it's as fluid as writing*
6
7   *question: Are you ready to get started?
8       Yes
9       No
10
11  *question: What's your name?
12      *save: name
13
14  *question: Alright, {name}, do you think you can do this?
15      Yeah probably
16          I knew you could
17      I'm not sure
18          *question: Why is that?
19
20  *question: How are you feeling today, {name}?
21      Good
22      Okay
23      Bad
24          *question: Oh no, why are you feeling bad?
25              *save: lifeSucks
26
27  *if: lifeSucks
28      *image: https://i.imgur.com/nYOK6ps.jpg
29          *caption: Here's a happy doggo! This good boi wants you to feel better
```
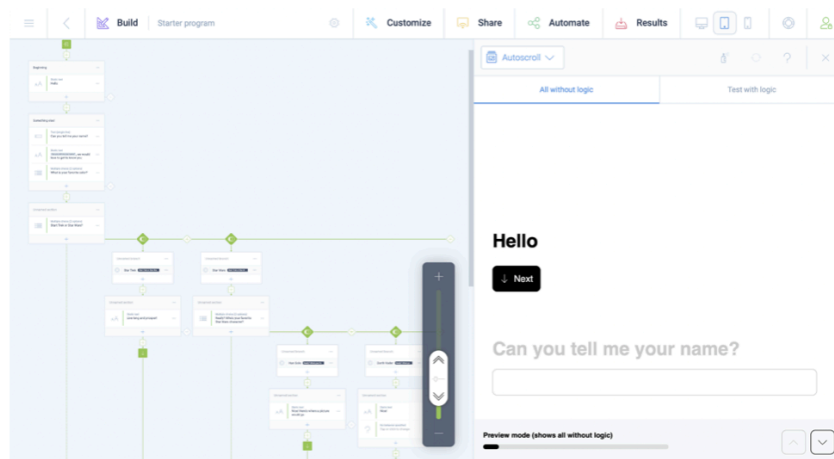

A key problem that confronts domain specific languages attempting to replace standard graphical applications is that they can be intimidating to non-coders. **People who don't know how to code will look at anything that looks remotely like code as something that is "for coders."** They assume that programming anything requires years of learning and prior experience. For the most part, they are not wrong. The sort of work you hire developers to do often does require specific knowledge.

However, we are not trying to be a general purpose programming language like Python or JavaScript that can write anything. We're just trying to replace a creation-oriented application with programmable text and a custom IDE. If you have to make a programming language that only makes surveys and experiments, it does not need to be complex. Let's say

that again more broadly: **If you have to make a programming language that only does _____, it does not need to be complex.**

Non-coders don't need to think about deployment or backend boilerplate. In order to send the program to someone, they only need to send a link. The program doesn't require any code to save all of the responses to a spreadsheet, because why should someone trying to write research have to think of that? All of this complexity is abstracted away for our end users.

User research clearly demonstrated that novice users felt more comfortable when they could look at code and predict what it would do. Obviously, that meant we needed users to see simple programs upfront. Unfortunately, we also learned that too many code comments to explain the code actually made code scarier! It is as though that sent the signal that there was more to explain.

Our solution here was to implement a "split view." In the split view, we show users what code *(on the left)* is actively producing what is displayed in the preview *(on the right)*. Originally, you would need to read code first and then view the preview. With the split view, instead of requiring users to read code and then preview it, they can do both at the same time. This tightened the feedback loop dramatically and enabled us to remove most code comments as they became unnecessary[gggg]. Further usability tests were like night and day - we were far less likely to hear the "I'm not a coder" protest. **Legibility is key, and the simple design of the language is complemented by the IDE's design.**

In HCI research, the split view is sort of like a live programming environment, in Bret Victor's terms[hhhh]. We still have substantial work here to improve the experience, but for more, Sketch-n-Sketch[iiii] and their research represents the state of the art.
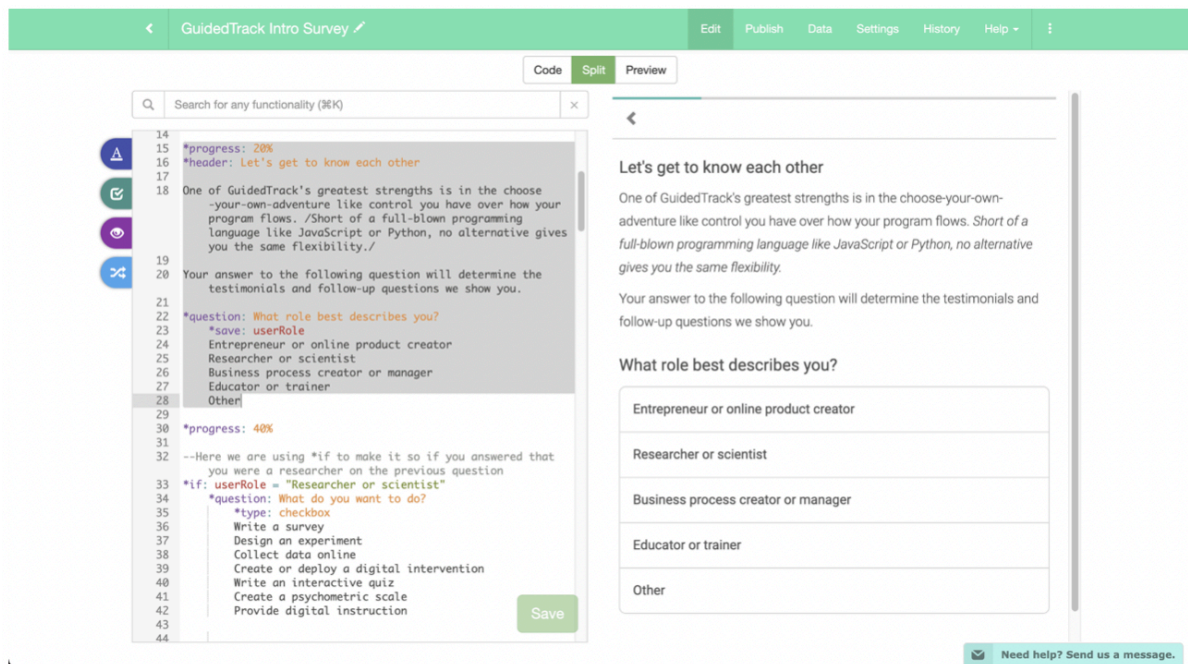
To sum up, here is what we have so far that can be generalized beyond GuidedTrack:

- The familiarity and speed of text

- The user delivers instructions through text instead of buttons

- Powerful programming concepts like variables and control flows to unlock customized use cases

- Boilerplate code is abstracted away so the user can focus on creation within their domain

- Strong cognitive scaffolding (via graphics or other means) to make sure that it is approachable and people learn as they go

What Other Graphical Applications Could Have A Programmable Text As An Interface?

GuidedTrack is awesome, but the point of this piece is to show a new kind of application design. There is no shortage of possibilities here. In no particular order:

1. **Task managers and schedules.** What better way to express that starting one task depends on finishing another than writing a *conditional* if-then statement? Isn't a repeating

event just an event on a *loop* until it's canceled? Isn't it nice to be able to write your todos as though they were on a notepad as opposed to *navigating through a GUI*? With a text editor, it would be easy to copy/paste a selection of tasks to move them into another project. With conditionals, you could create an event that only occurs if half the invitees RSVP yes. This would be more about primitive design than feature design.

2. **Diagrams and flowcharts.** See Flowchart.fun[jjjj] to see how indentation and notation can make flowcharts easy. In order to be more aligned with how I'm looking at it, it would require some level of programmatic control on top of the boxes, lines, and sets of boxes and lines.

3. **Configuration files.** With most graphical applications, if I'm using them on multiple computers or across multiple accounts, I will need to manually change the settings each time. If settings were run through text, it's easy to transport through copy/paste.

4. **Personal finance.** Many people do this with custom spreadsheets[kkkk]. You could also do this with a domain-specific language, it might look something like the image from Andrew Blinn[llll] or the pseudocode below. Notice how specific the functions are - there's no boilerplate for users, so they can focus on providing instructions.

```
(when (true? (unpaidInvoice? today))

 (if (> paymentFund (value unpaidInvoice))

 (sendFund (value unpaidInvoice) USDC John Doe)

 :else (sendMessage Me (str "check the payment fund, there isn't
enough in it for John Doe"))))
```

5.   **Discourse/knowledge graph database entry, retrieval, and visualization.** This is one subject of my research with The Graph[mmmm].

6.   **Slideshows.** The Racket lang Slides[nnnn] demonstrate this. With programmability, an editor could change the background image and font on multiple slides at once, or turn it into a choose your own adventure, HyperCard style[oooo].

```
(begin (current-main-font "Fira Sans")
       (current-font-size 70)
       (slide (t "Very important topic")
              (text "Details of important topic"
                    "Fira Sans, ExtraLight"
                    (current-font-size)))))
```

Very important topic
Details of important topic

The Future Is Programmable Text, Not Graphical Applications

Most people are accustomed to graphical interfaces. Those are fine for basic use cases, but as user goals become more advanced, graphics alone will not be enough. This is where programmable text comes in.

Text is fast, as fast as we can type. Text can express complicated control flow concepts and abstract repetitive processes to create functionality that the app's designer would never conceive of on their own. Thus, it's more about the design of primitives than features. Our job as designers is to make sure people can predict the outcome of their code through communicative feedback loops[pppp] and examples they can build on. Clear documentation and graphical scaffolding can help them begin. In order to create a powerful application with a low floor, wide walls, and high ceiling[qqqq], it is important to think about how people can

learn as they go through Graphics can help people get started, but text will take applications and their users to the next level. If the language is simple, creation will feel like writing.

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Sam Brooker

Concepts without Borders: The Valorisation or Invalidation of Medium

In the UK the last few years of domestic news has been flavoured with talk of borders: borders with the EU, the arrival of migrants from Calais, closures due to Covid-19. Meanwhile in the US the border with Mexico was a central part of President Trump's platform, and China's shared borders with Afghanistan and North Korea provides commentators with material for much anxious speculation. In parts of Europe, however, borders between countries are marked by little more than lines on the road or an embedded tile in the pavement. These boundaries nonetheless validate a collective recognition that there exists a difference between one side of the line and another: politically, militarily, linguistically, culturally. Powerful and consequential as these conceptual distinctions can be, they are validated primarily by the legal or cultural way they are policed.

Digital media has its own complex relationship with borders: between the physical world and the world onscreen, between global ambitions of the tech industry and regional efforts toward regulation, between formerly distinct media technologies captured within a single device. Despite preceding modern developments in computing, the term *multimedia* has since become synonymous with delivery of a combination of elements via a computer, as multiple features are brought together in a single unified experience. Theorists wonder where this convergence of media is leading: a single unified platform, in which all senses are addressed simultaneously and immediately? A collapsing of narrative boundaries into a transmedia world that defies categorisation?

Let us consider two extremes for the future of text. In one, the distinctions between forms of mediation become more akin to differences between typeface and texture than the privileged categories of today. When we speak of memes, we may presently visualise the image; will future generations validate such a narrow interpretation? Will they perceive a meaningful distinction between the aural and the visual? Will our favouring of distinct categories in award ceremonies – Booker Prize, Academy Award, Turner Prize – seem arbitrary and strange?

At the other extreme is a more intense valorisation and foregrounding of 'medium', a resurgence of interest in what differentiates one form from another. Tiring of narrative worlds that demand we spread our attention across a range of synergised media, these hypothetical future audiences may crave the unique qualities of each particular medium: the neurochemical response to the feel and smell of physical print, say, or the bespoke warmth of

the LP soundscape. This community might evidence a kind of artefact fetishism that sees the incontinent multimedia space of the digital as the textual equivalent of junk food. They might in turn favour such forms as the monomodal paperback novel - its boundaries and defined functionality a guarantor against sudden updates incorporating novel, previously unwanted or unknown features.

These are, of course, mere speculations, the equivalence between physical borders and speculations about the future of text metaphorical only. Equally the idea of a *homo technologicus* so media-saturated that they cease to recognise the distinctions borne of competing sense-experiences is hard to imagine. A virtue of speculation, however, is the criticism it invites, and the opportunity to imagine a world in which the most fundamental distinctions – in this case, that between our senses – cease to be.

We tend to recognise boundaries when we stand at their edges, where the differences are often most pronounced: differences of language, differences of culture. Similarly, print is different from film in ways that go beyond their technological characteristics: they are different in terms of culture, community, process. Will the future of text represent a hardening of these borders, or will the distinction between media become as imperceptible as the open borders that some citizens cross every day, without a second thought?

Sam Winston

One of the most redeeming qualities of text (and especially language) is its ability to express its limitations.

I find more comfort in a failed technology rather than a utopian one.

One Thinks of Another
A Play

The Play was undoing itself as fast as it could. Every prop used and word written was being removed in rapid succession. The Play was hoping to have blank sheets by the time of its opening night. Its only worry was that the actors had already learnt their lines.

Initially the Play loved why it had been created – to express the dramas of the world – but rehearsal after rehearsal, it began to doubt whether that was what it was really doing. The Play came to feel it was expressing very little and was simply getting more and more lost in its own performance.

The Play decided to escape. The plan was simple, first it set about removing the script. The effects were immediately felt.

Act 1

(*A man enters stage right. He looks around and sees the one prop remaining – an upright wooden chair. He sits on the chair and put his hands on his knees. A woman enters stage left. She walks up to the man.*)

MAN:	What are you doing here?
WOMAN:	Same thing as you.
MAN:	Something
WOMAN:	Anything
WOMAN:	Did you say something?
MAN:	Nothing

(With so little left of the script they fall silent and stare at one another. Every now and again the actors try to continue...)

    WOMAN: This is what you said.

    MAN: This is what you heard.

The Play was intrigued. With so little left to say, the actors seemed to be clinging to their roles with more resolve. Undaunted, the Play carried on. It removed the man, the woman and the chair and it began Act 2.

    Act 2

(The stage is now in darkness. Only sound can be detected.)

    VOICE ONE: Where has everything gone?

    VOICE TWO: They've gone somewhere. They're some bodies.

    VOICE ONE: What's this. Where are we?

    VOICE TWO: We are watchers. We sit and watch.

Voice Two was right. Even without its script and actors, the Play still seemed to be playing.

(Following a hunch, the Play peers out into the darkness and is met by a sea of staring faces.)

    THE PLAY: Oh, it's you! I had no idea that you were waiting this out. So much   of the plot has gone, I really do encourage you to leave.

(The Audience are watching from the stalls. They realise how little there is left and depart in a polite hush.)

    The End (or the missing Act 3)

(Actors and audience begin to disperse. A member of the cast spots a remnant of the Play walking home with one of the audience.)

    AUDIENCE: Excuse me. It seems I have your words stuck in my head.

    THE PLAY: Why yes! What a curious thing it is to be an idea in another's mind.

    AUDIENCE: I can't recall how this came about.

    THE PLAY: Well, when one thinks of another then that is enough.

And so, it was.

Sarah Walton

Truth

As Orwell pointed out in 1984, 'in times of universal deceit, telling the truth is a revolutionary act.' But one first must find the truth. The truth is not an easy thing to find in an era of media propaganda.

The article I wrote for *The Future of Text, Volume One*, was concerned with importance of truth in the context of text from an individual perspective, from the point of view of writing from the intuition. I used my Soul Writing technique, which enables people to express their inner truth, as an example of accessing an individual truth. As I noted in that first article, 'in a world of fake news, social media smiles and false personas, the truth of our inner expression is more valuable than ever. Writing our truth connects me to me, you to you – and us to each other.'

This article is also concerned with truth, but from the wider perspective of individuals finding truth within the context of misinformation and an increasing lack of critical thinking in journalism, and an increasing censorship of the internet and social media.

Who do you trust when the mainstream media presents only one narrative, one side of a story, and social media and the internet is increasingly censored?

By critical thinking I refer to the exploration of several angles of a story. The grey area in the middle is often where health debate can thrive and evaluation of opposing opinions being considered in a meaningful way. By meaningful, I mean that, where possible, the sources of information and their credibility are assessed in an impartial manner. By impartial, I mean independent. The skill of an impartial journalist, hot on the discovery of 'truth' takes their own opinion out of the equation and focuses on the various viewpoints in a measured way. An impartial piece of writing will facilitate the reader to arrive at their own conclusion after having disentangled the facts and the theories from the muddy waters of opinion, often driven by various political and commercial agendas. Only then will the conclusion of the journalist be offered, if at all.

What can the average reader of mainstream news do to determine if the statistics, data and 'damn lies' (as Keynes put it) of statistics underlying that narrative hide the grey area of healthy debate? What can we do when headlines and propaganda mask the truth?

Can one trust oneself, one's own view when the reader has only been offered one narrative? In an era of lack of impartial media and misinformation, the reader (i.e. you and

me) would need to do one's own research. But how to do that, and who has the time?

As a researcher I know that the closer I get to the data source, the closer I edge towards a truth. Whether that's population statistics, annual death or birth rates to assess the number of people unable to get a digital ID and prove they are who they say they are online, which I recently was commissioned to assess. Or, in the case of my writing of historical novels, where I sought out ancient primary sources, rather than relying on historian's opinions. In both these cases, the novelist or analyst usually finds the truth resides in the middle, in the grey area, rather than the polarities. Truth rarely resides in headlines. Headlines, whether in social media or newspapers, tend to provide a sensationalist's view. Headlines are Hollywood. And best taken with a very large fistful of salt – or one may be led down the merry path of 'damn lies' (Keynes again) and propagandist, one-sided opinion.

In my historical research I have never come across an absolute truth. There is the truth of the dominating narrative, the truth of the victors. When I've dug beyond the historical headline and found the primary sources (often buried deep within the archives of libraries, sometimes in heretical texts, condemned as they did not uphold the conquering narrative of the victors), there is another narrative: a narrative hidden by the propaganda of the era.

In the case of my novel, *Rufius,* which explored the rise of Christianity (victor of a fourth century Holy war) and the fall of Paganism, I concluded that the truth likely resided somewhere between the two accounts (pagan and Christian), in the grey area. It was my job as a novelist I felt, to present that grey area, and animate a more likely version of history on the page. Just as history is a fiction created by the victors, so too, impartial research can uncover a truth closer to what really happened.

As I state in my latest novel, *The Silk Pavilion,* 'fiction is a lie which presents itself as truth.' The propaganda of today's mainstream media uses a similar tact to the novelist. The difference being, its authorship lacks the integrity of a novelist who strives, as did Orwell, to present the truth through the lie of fiction. Propaganda, instead seeks only to drive the lie deep into the consciousness of its readership so that they regurgitate the lie without question. Whereas good fiction will use the lie to subvert the received narrative and aims to show the reader their own world through another lens – to assist the reader to question the received narrative.

I am not suggesting that the individual researches to the extent a historical novelist or a business analyst – but one can seek out other opinions in non-censored search engines and seek statistics from the sources (as long as those sources are credible). To quote Keynes more fully, "there are lies, damn lies and statistics", however, I have enormous faith in the human brain (and this refers back to my first article on the intuition and truth in *The Future of Text, Volume One)* to sense truth. I believe truth has a frequency and if in doubt, I suggest one

trusts one's own intuition, one's gut judgement, and follows that as one digs and researches various online sources.

In the future there may be a faster way to seek out the source – and find the truth behind headlines. Hegland's move towards offering an easy way for researchers to source the root of information and thereby support their own research might be of great use to the everyday citizen as we take it upon ourselves to research beyond one-sided media narratives.

Of course, not everyone has the time to do this, but at least, one might ask oneself the question, '*is this text showing me the grey area between several angles, or is it only showing me one narrative?*

If the answer is that there is only one narrative being offered, it might be wise to not trust, regurgitate or internalise what one reads, and to get comfortable with the not knowing. To sit with the question, rather than receiving it as an unquestionable truth.

For many people who live in countries who grew up with critical thinking and impartial journalism, there is an awareness that many media outlets are delivering one-sided narratives today. However, there are those people who are used to believing without question the text that they read as truth. I suggest this is a danger to society as it can result in everyday people becoming a mouthpiece for propaganda and that, as history has shown, is a very dangerous act. If the truth is not held in the pages of the media – whether off or online – and one does not have the time to do a tad of digging, it might be wise to switch off the news altogether, log off social media, and find a good novel. I highly recommend 1984 by George Orwell.

Stephen Fry

Grace

You'll forgive me if I race through a description of what I mean by language, by the acts of writing and reading?

As I type these words, black shapes appear on a white ground. When I was in my twenties and the world was young and sappy they would have manifested themselves as neon green or orange characters on black. So long as there is *difference*. So long as the shapes, the letter forms, can be distinguished from their background we can descry them and - if we are versed in the system from which they derive - interpret them, *read* them as we say. They are (functionally at least) random squiggles. A "p" is an arbitrary shape, it tells you nothing about how it can be transformed into a noise. *You* may look at it and see the mark that denotes an unvoiced p-p-p-plosive. But for a Greek or Russian reader the same sign indicates a sound variously described by phonologists and linguists as velar, post-alveolar, uvular, flapped, trilled, liquid, burred or (begging the question) rhotic. In other words what users of the Roman alphabet I'm deploying right now would identify as an "r". The shape itself offers no clue unless you are in on the conventions of the code.

Reading is the act of deciphering these signs and for the meanings they engender to unroll in our heads as we follow their syntagmata from left to right (or right to left, or top to bottom, according to cultural preference). Literacy is a technology. We use that word because interpreting graven and scripted signs is a taught technique (from the Greek word *techne* skill, knack, knowhow), like knitting or playing the piano - albeit a *techne* that needs fewer tools or outside materials than many. Speaking and understanding language, as Chomsky has taught us is *not* a technique, it is an innate skill, like seeing colours, eating, walking and expelling waste. While they all take a bit of prompting from a parent to be fully implemented, it is clear that these abilities are heritable competences granted as a birthright. Just as hair will sprout from your armpits when you hit puberty, so language will sprout from you perhaps ten years before that. The sole and obvious difference is that pubertal hair comes willy nilly, without the influence of any outside input (other than ordinary nutrients). Language must be in the air around a child at the time of "acquisition" as linguists call the window of language learning.

Somewhere between 50 and 100 thousand years ago what we call language (distinguishing it from grunts and gestures) arose in our species. Something happened in our brains to allow it, but no one can quite explain the how, what or why of it all. It was tens of

thousands of years later that reading and writing were invented. Round about five thousand years ago in fact. So recent. In our, western, case the technique came in the form of phonetic characters, like that "r" and that "p". In the case of the Chinese and others the writing marks make no reference to sound at all. Any analysis of ideograms, hieroglyphs and similar non-alphabetical systems is for someone far more learned than me. It is all I can do to think straight about what I'm doing now, tapping letters on a keyboard to represent the ideas in my mind. Or do the ideas only exist once they are typed out? Let's not go there.

All human time before the development of writing we call pre-history: it can only be interpreted by archaeology, the study of objects - pots, buildings, statues and so on. But from the moment of writing - whether we credit the Babylonians with their cuneiform tablets or the Phoenicians with their alphabet - the human record becomes the study of texts. We are able to listen directly to the past through writings and carved inscriptions.

For most of its 5,000 year existence on earth literacy was a power granted almost entirely to the priestly, courtly and commercial classes. Only recently has it become a majority competence - with "only" 10% of the world's population now estimated to be *un*able to read or write, that "only" representing something like 3/4 of a billion souls.

You know all this. What I've written here about language is obvious and understood. But it is astonishing enough to bear repetition. The newness of this technology.

Language is 'natural', writing is 'artificial'. That much is clear. And yet. Here's the rub. For me, and I suspect for millions if not billions, it is only when matters are put into text that we trust them. Or even like them.

I am rare in my generation for preferring text over telephone conversations under all circumstances. But for the generations below me such a preference is commonplace. My nephews and godchildren do not use their phones for speaking. They have no use for landlines. Text is all.

WhatsApp, iMessage,Telegram, Signal and whatever Facebook calls its message service (Messenger is it? Nobody cares) - they all offer speech input at the press of a microphone icon, but who uses it for anything save the odd joke or happy birthday message?

In the 1980s when the only people with email addresses were enthusiastic amateurs like me, and specialists in university computer labs, I would communicate with my fellow nerds around the world, collaborating on new ways of writing modem scripts, INTERSLIP code and PPP routines, the better to stabilize one's modem "handshake" and maintain secure online connections. We would email each other (using Eudora and similar primitive email clients), but occasionally the connection would go down so severely we would have to bite the bullet and actually *talk* by phone in order to correct the problem. How revealing that was. The emails I would receive from these computer science geeks were funny, ironically self-

aware, witty and beautiful expressed. But the moment we had to speak in real time on the telephone … all the terrible human hangups of Class, Age, Race, Gender, Sexuality, Education and Income came into play and the conversations were always stutteringly embarrassed and awkward.

Text can be polished, burnished and embellished, edited, amended, enhanced and improved … real time speech rolls out in a ragged line shaming us.

The alphabet with its redundancies, repetitions, inconsistencies and contradictions is with us always.

The keyboard with its arbitrary and absurd QWERTY layout is with us always.

Speech is natural but shames us, just as our naked bodies do.

Text is unnatural and graces us, just as our clothes do.

Tim Brookes

Future of Text: Cursive

Since I started displaying my Endangered Alphabets carvings and speaking about them eleven years ago, I've been asked one question more often than any other: *Is cursive English an endangered alphabet?*

The fact that this question is asked so invariably, so passionately, implies that this isn't just a matter of intellectual curiosity. Wrapped around the question is a tone that implies that something beautiful, important, and highly evolved is at risk—that the shift towards using a keyboard or thumbs and typing out letters as discrete units rather than flowing through whole words is in some sense a step backwards, a step toward brutalization and stultification.

Historically, there's nothing fundamental about cursive writing, nothing inevitable. Writing hasn't always flowed across the page horizontally, as we have been taught it should. It's a matter of physics. When writing was a high-energy system that required scratching symbols in bone, wood or stone, for example, or stamping them in clay, a single letter took so much energy it made no sense to add any inessential flourishes or ligatures.

Cursive only began to make sense when the Chinese invented paper (swiftly followed by brush and ink). With that development, it actually took more work to lift the brush from the page than to keep writing; ligatures and flourishes required *less* effort rather than more. Thus the paper/brush/ink revolution was swiftly followed by the invention of calligraphy. Writing had become an opportunity for art.

But those of us (of a certain age) who were taught cursive, were not taught it as an art; in fact, we hated the strict discipline of the form. Cursive was taught not because it was beautiful but because good, clear handwriting was an employable skill: for a clerk, a fair and unambiguous hand might mean the difference between profit and loss; for a mapmaker, it might make the difference between a ship sailing and a ship sinking. Hence the rigor, even the brutality, of our teachers, who drummed the combination of letters and ligatures into us over and over, while—in my case, at least—the ghastly metal-nibbed ink pens tore at the page or vomited great gouts of ink onto our work. Everyone who learned cursive ought to hate it.

Kids don't learn to write like that any more, and I suspect that is one reason why folks of my age bemoan the decline of cursive. When people, usually people over 50, bemoan the fading of the cursive tradition, I sense what they're unhappy about is yet another way in

which the younger generations are changing things so their elders will feel obsolete rather than respected. Nobody today has to struggle with ink pens, inkwells, and blotting paper, any more than they have to struggle with onionskin paper, twisted typewriter ribbons, and carbon paper. Writing is so much easier that our own struggles seem undervalued, even absurd. When we complain that today's kids can't even understand cursive when they see it, it's just another sign that they don't understand *us*, and we're afraid they don't care.

But there's another reason to respect, even to love, cursive writing in preference to, say, texting on a phone. Cursive appeals to us, I think, because it reveals writing as a human act, rather than a mechanical one: we can see the dynamic movement of the pen across the page, we can unconsciously put ourselves in the writer's place--and as such we can also see and appreciate the effort involved, the attention given to the flourishes. And by the same token, we feel we *know* the writer in the same way that we gather so much about someone from their speech, with its emphases and hesitations, its pacing and rhythm. We can make instinctive decisions about trust. If you get a text or an email from someone whose number or email address you don't recognize, you have no idea who sent it. I actually got a series of prank emails from my best friend from high school—who was using the email name slamdunkernest--who told me to guess who he was, and it was an eerie and extraordinarily disturbing experience.

As such, I'm sad about the simplification of scripts into more mechanical or geometrical forms. Traditional Chinese and Arabic are remarkable in that they are true scripts —that is, you can see the movement of the hand, the point where the pen or brush hits or leaves the page. But both have now been reconceived in simplified forms, more geometrical and mechanical, easier to digitize, learn and execute, perhaps, but colder and more mechanical. No opportunity for expression, engagement, elaboration, imagination, pride and care in one's work.

Writing that has not been digitized (or, in an earlier era, cast into type), is not just writing—it is *somebody's* writing.

So am I in favor of the reintroduction of cursive? Yes, but not in the way it was traditionally taught. In other words, not as a necessary form of communication, but as an art.

I imagine a signature-writing exercise, not in art class, but in English class. *Practice your signature. Your goal: make it more than just a squiggle with a fingertip on a point-of-sale screen.*

Use a ballpoint, a sharpie, a pencil, an ink pen, a brush, a calligraphy pen, a can of spray paint. See which feels right in your hand. See which creates the look you want. Take your time. Have fun with it. Feel the bones in your wrist turn like the hand of a dancer. And all the time, remember: what you are writing is your name. Think of it as a kind of avowal:

this is who I am. This is how I choose to meet the world. This is my writing.

Vinton G. Cerf

The Future of Text Redux

I have written about text in its digital form in the past and I would like to revisit this topic once more. J.C.R. Licklider and Douglas Engelbart were two giants who saw non-numeric possibilities in networked computing well ahead of many others. Vannevar Bush and Ted Nelson are two others who resonated with the idea of machines that assisted in the production and discovery of information. Sir Tim Berners-Lee amplified some of these ideas with the invention of the World Wide Web. Following along this path is Frode Hegland, a protegé of the late Douglas Engelbart, who has developed new tools for the production of and interaction with text. Engelbart's oNLine System (NLS)[rrrr] was a tour-de-force example of disciplined use of structure to guide the production and consumption of computer-based text. One could view content at various depths (for example, first line of each paragraph, first paragraph only, subsets of segments of text found in classic structured outlines of document) and one could accomplish major restructuring of documents with ease because the NLS understood the structure and provided ways to reference portions of documents to facilitate restructuring.

Hegland has developed three remarkable tools for text generation, viewing, and referencing that inherit some of the philosophical aspects of NLS and enrich them with more fluid ways of organizing, viewing, and generating text. His three contributions are Author, Reader, and Visual-Meta[ssss]. These three tools illustrate the power of applying computing to text, creating lenses through which to create, consume, and reference content. Hegland's focus is less on the appearance of text, over which most text editors perseverate, than on its structure and relationships among various parts of a document.

Hegland's Author program allows the producer of text to visualize and manipulate it in other than linear ways. The approach supports concept-focused writing, allowing the user to define as they write, and to then see the defined text in a Concept Map, while also exporting all defined text as an interactive Glossary.

The major contribution presented here is Visual-Meta. This is an approach for adding metadata to PDF documents, in a form that is equally readable to human and machine. Such data can then be interpreted and used to create properly formatted citations and afford more elaborate manipulations such as interactive graphs and charts. Hegland's insight is to add this information at the end of a PDF document and give it equal stature as the text of the document itself. In a sense, such a document "knows" itself and uses that knowledge to assist

a reader. It is important that it enable both the human reader and software reader. Visual-Meta is entirely open for anyone to employ, with full specification being available on how Visual-Meta can contain citing information, structural/heading, glossary, endnotes, references and more, at the project website: http://visual-meta.info

Visual-Meta enables PDF readers, such as Hegland's Reader, to augment the reader's ability to consume text in a variety of ways, such as the ability to copy text from the PDF and paste it in a Visual-Meta enabled word processor, such as Author, where it will appear as a full citation, reducing the chance of errors. It also allows for novel views which basic PDF does not provide, both for a single document and for large volumes of documents.

These works are instances of what I think should be called *computational text*, by which I mean, text that lends itself to augmentation through computational tools. Engelbart referred to his research laboratory as the Augmentation Research Center[tttt] to emphasize the capacity of computers to augment human capabilities and the concept seems applicable to augmenting the utility of text. One begins to visualize galaxies of content in a mixed-media universe and tools for production, discovery, and consumption. "But isn't that just the World Wide Web?" you might ask. Well, yes and no. The Web is indeed a remarkable and linked universe of wide-ranging content. Search engines and browsers aid in our ability to find and consume, render, and interact with that content. Hegland's tools add an exploitable self-contained self-awareness within some of the objects in this universe and increase their enduring referenceability.

It is exciting to learn the ACM Digital Library is exploring aspects of the Visual-Meta concept for incorporation into its operation. But then, one would expect ACM to look to cutting-edge ideas for the benefit of its members.

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https://cacm.acm.org/magazines/2021/10/255699-the-future-of-text-redux/fulltext

Yohanna Joseph Waliya

Post Digital Text (PDT) Reads the Readers Instead

A Post-Digital Text (PDT) reads the readers instead of the readers reading it. This is because these texts, integrated into new media or built using Artificial Intelligence, display based on the mood and consciousness of the readers. PDT techniques include botification, datafication, predictive modelling, adversarial and physiognomic facial recognition, meta-algorithms exploring human as data, Big Data, Internet of Things, Machine Learning, Deep Learning, blockchain and Neural Networks coded in the Post Digital Language (PDL).

It works like human consciousness when one interacts with the text. For instance, having read the Holy Bible for a long time, I realized that whenever I am angry, happy, fearful, surprised, contemptible, feeling disgusting and in love, I notice that the verses speaking about these emotions come to mind in the moment. As one starts the PDT to interact with, it takes over the interactivity to overshadow one's intentions, in a similar way. This is an experiential thought but digitized and datafied whereby texts read the individual and display themselves to fight for sanity, entertaining the soul as well as confirm the rightful sense; since the textual data was inputted in the brain's memory flowing in certain algorithmic pattern to detect human emotions and conditions just as I trained my mind with the Holy Scriptures. It is evident that reading texts by clicking or visualising is a sort of data inputting into the brain databank memory [137], thus making texts to influence the brain and vice versa.

We seemingly have the same phenomena now in the Instagramature, Facebookature and Tiktokature which present themselves in such manner of living multimodal texts just as established by Wurds in his master piece: *Gpt-3 Techgnosis; A Chaos Magick Butoh Grimoire* that once a profile is created for an individual on Instagram or Tiktok, "the algorithm running the platform knows exactly how best to generate any states of consciousness it desires in that individual"(Wurds, intro.). This means our constant subscriptions to the Internet platforms such as Google, Apple, Facebook, Amazon, Microsoft, Twitter, YouTube, WhatsApp, TikTok, Telegram, Instagram, Snapchat, Weibo, WeChat, Pandora, Yahoo, Baidoo etc. contribute to the self-datafication to connect to the Big Data linking the whole world's minds of the adults online into one global engineered mind database as meeting point which later will be used to produce the post digital text expressing creativity beyond human imagination. As human becomes Data, "the algorithms running Quantcast, Google, Facebook, NSA are empowered to know our celebrity, our race, the terrorists and generally our habits online" [138]. These

are the same algorithms that will be producing text henceforth even for literary works displaying on the screen according to the state of our inner being. Imagine, when one is angry, as he/she surfs the net, comedy displays automatically to calm down the emotions.

Post Digital Text (PDT) written in Post Digital Language (PDL) has linguistic elements that are not found in natural languages but instead built on the "binary (0,1), trinary (0,1,2) and quaternary (0,1,2,3) concepts" [139] of computer programming. The PDL model functions beyond third generation Generative Pre-trained Transformer (GPT-3), autoregressive language model which automatically and autonomously generates texts of exceptional quality that sound objectively human [140], overturning humanistic perception of text.

The big difference is that PDL produces text that behaves like human whereas GPT-3 produces human-like text both depending on each other. PDL is a virus and language or means of communication used to "describe ideas, emotions, and experiences that cannot be heard within the physical world using a genre of PDL writing called Imagined Experiences" (Wurds, chap.1) programmed using TensorFlow library of Python.

However, the disadvantage of PDT is its potential to kill our natural human creativity and inspiration, ushering in a post-digital humanity: humans turned into zombies controlled by global algorithms, fixed computational logic and zillion data from GOFAM's databases and their ilk. Even Davis reported that both Plato and Marshall McLuhan believed that "technologies extend our creative powers by amputating our natural ones" [141]. In other words, digitality puts life into texts to be a living being to push humanness of the human into extension as predicted by Paul of Tarsus "…For the letter kills but the spirit gives life"(2 Corinthians 3:6[uuuu]) because our lives are run by algorithms as confirmed by Marcus du Sautoy [142]. Finally, Post-digital text of this sort will surely be helpful in curbing crimes, therapy, military formation, but dangerous in mind control making us vulnerable to digital dictatorship, feudalism and mercantile exploitation.

Concepts

Post Digital Text (PDT): it is a digital interactive text that uses Artificial intelligence and generative linguistic transformers to display itself algorithmically based on the preoccupation of the reader 's mind. For example, multimodal texts on the TikTok.

Post Digital Language (PDL): it is a concept developed in Alley Faint Wurds' *GPT-3 Techgnosis; A Chaos Magick Butoh Grimoire* in 2020 to mean a language that makes

computer to express emotions and ideas beyond human experience based on programming in binary, trinary and quaternary digits.

Tiktokature: literary texts written within the TikTok's constraints and diffused on its network environment.

Instagramature: it is a literature written and shared on the Instagram application.

Facebookature: this concept is coined from two words: "Facebook and literature" to refer to a creative literary work using Facebook affordances and ecosystem as means of production and sharing.

The 10th Annual Future of Text Symposium Day 1

Full Video Recording on YouTube: https://youtu.be/sL2j2Tbmudg

Before official start we asked where people are in the world and that marks the start of the text chat. Below each section heading there is a link to the video at that point and after each section there is the text chat record for that section. It's not ideal, but it's at least better than having it at the end of the whole transcript.

Text Chat:

15:01:50 From Panda Mery : Hello

15:02:23 From Gyuri Lajos : Budapest

15:02:27 From David Lebow : Tallahassee, FL

15:02:28 From Conor : London, UK

15:02:28 From Panda Mery : In Seoul.

15:02:29 From Rafael Nepô : São Paulo, Brazil

15:02:29 From Frode Hegland : Wimbledon, UK (London)

15:02:30 From Luc Beaudoin : A flooded region

15:02:30 From Vint Cerf/Google : vint cerf – mclean, va

15:02:31 From Karl Hebenstreit Jr : Alexandria, VA

15:02:31 From Sam Winston : London

15:02:33 From Brendan Langen : Chicago, USA

15:02:34 From Mark Carranza : At archive.org in San Francisco

15:02:38 From David Millard : Wiltshire. UK

15:02:38 From Jonathan Finn / Sibelius : London (Kensington)

15:02:39 From Bob Horn : San Francisco

15:02:41 From Tim : Oxford UK

15:02:43 From Ismail Serageldin : Alexandria , Egypt

15:02:46 From Keith Martin : London!

15:02:48 From Fabian Wittel : Munich, Germany

15:03:04 From Luc Beaudoin : Metro-Vancouver BC (Pitt Meadows)

15:03:36 From Peter Wasilko : Westchester County, an hour north of New York City

overlooking the Hudson River.

Welcome by Vint Cerf

Video: https://youtu.be/sL2j2Tbmudg?t=618

Vint Cerf: I consider a high honour to have an opportunity to speak first in this, yet another Future of Text meeting. This is our tenth one, if I'm remembering correctly. So, that's a significant milestone, that we're actually all still friends, and willing to talk to each other. Look, this is as important a topic, as any I can think of. Because we are in a period of peculiar transition, where a lot of content is being created digitally, as opposed to the previous methods. And often stays that way, and never makes it into print, in the sense of paper or other medium. So, the reason that's important is several folds.

Frode, as you know, has worked very hard to invent ways in which we can use computers, in order to both produce, and consume, and interact with, and make use of text. But he's also become quite concerned about the ability of a document to know about itself, and the "Visual-Meta" concept, of course, is one way of implementing this idea. I want to expand on that just a little bit.

I spent about three hours with Bob Kahn this week talking about the digital optic object architecture, and I wanted to persuade him that, the digital object architecture should incorporate the "Visual-Meta" concepts that Frode has developed. And I want to expand those to the point where, documents, if they wish, can express terms and conditions for their use. And that, this is incorporated in the document itself. And it is easily extendable, given the way Frode has designed the "Visual-Meta" system. And the nice part, of course is that it not only is it machinable, but it's human readable. Which means that, that makes it more preservable. Which is the other aspect I wanted to draw your attention to, because the more we create content in this online way, whether it's text, or more rich contents, like video, and audio, and so on, or even software and programs.

The more we produce in this digital fashion, the more important it is to be able to preserve it in the same way that we've been able to preserve text in other media over long periods of time. And the implication of the "Visual-Meta" is that the documents are, in some

sense, sort of self-contained. If you discover a document, it has a lot of information about itself in it, to make it useful. One could go so far as to hope that the document could have enough information in it, in such well understood form that, if it's encoded in some complex way, the front end of it so to speak, it gives you enough clue that you could construct and interpret it. That would allow you to understand the rest of the document.

The important thing is this notion of self-containedness in the document, which is why the metadata idea in "Visual-Meta" is important, because it makes the document more self-contained. I think document preservation, and document discovery, or object discovery is going to be the primary challenge for the future, as more and more of this content is created in digital form and stays that way over long periods.

I'm extremely interested to hear what everyone has to say, and what thoughts they have about this future that we are, in some sense, creating together. And hopefully doing it in a way that, will be beneficial for everyone.

I'll stop there, at my five-minute mark, and turn this back over to Frode. And thank him for his persistent organization of the "Future of Text."

Introduction by Frode Hegland

Video: https://youtu.be/sL2j2Tbmudg?t=903

Frode Hegland: Thank you, Vint. Thank you very, very, much.

Video Presenter: "Liv's questions about world. Why mouse called? **@Cleoabram:** Okay. I don't know if she was expecting an answer to that but, it gives me a chance to share my favourite video of all time. This is called "The Mother of All Demos" and it got that name for a good reason, because this was a huge deal. It's 1968, and this guy, Doug Engelbart, is explaining all kinds of new-fangled technologies. Like, for example, word processing, and video conferencing, and real-time editing. You got to remember, this is 1968, this is a time when desktop calculators are state-of-the-art."

Frode Hegland: So, that's Doug Engelbart on "TikTok." Doug is sorely missed. Still our inspiration, and of course, today is dedicated to him.

I just want to say, thank you for joining us here today in this virtual space, we had high hopes that the 10th anniversary would be accompanied by much dining and champagne. But maybe being able to stay where we are outweighs any culinary benefits. Hopefully we can

meet in person and get to know each other better next year.

We're going to have a series of brief presentations, followed by discussions. But first, I'd like to start the day with a few words. Vint, thank you. I say it often, and I even though I'm a person of big words, I cannot say it enough. Your moral support and every kind of support has been transformative, thank you. Wendy, Les, Dave, thank you for helping me to figure out what a PhD is. Maybe a little late, since I'm supposed to finish next month. But thank you, nevertheless. Ismail, Dave, Pip, thank you for being on the "Future of Text Initiative." Jacob, literally wrote my dreams true, by writing the software. The "Open Office Hours" team, there's many, but to highlight Mark, Peter, Rafael, Alan, Brendan, Gyuri and Adam. And Rafael, I'd like to single you out for helping me make today, today, rather than a complete and utter mess. Laura and Julia help with the social media. Bruce, Ted, Keith, Valentina, Mark and my brother Henning, I just want to thank you for your general support in all these ideas. And, I'm not going to read all the names to everyone in the book, otherwise we'll be here till tomorrow. Last and most fundamentally, I'd like to thank my parents, Ole and Turid Hegland, and my wife Emily, and our son Edgar. Those of you, who know me, would expect Edgar. So, here he is, so we can get on with the day. The first 10 years. We have this 10th symposium, which is a bit amazing. But. we also have monthly and weekly meetings.

Those of you who know about it, let's keep doing it for the new people in the room, everybody's welcome. The only criteria is, that you're a nice person. So far everyone is. So, let's make it a criteria, why not. And that you care about text, that's it. You can come and go as you want; you don't have to be there for all the meetings. We also have the book. I have emailed you all the link to the draft edition, which you can have today, by the way. I can hear someone type things.

So, if you aren't muted, please do mute yourself. And yeah. we hope to do annual editions. which is very exciting. We are working on "Visual-Meta" as Vint so poetically, lovingly described in the introduction. And we built some software to instantiate some of our thoughts.

So, a little poem, it's the 10th anniversary, so I think I can do that:

Text is simple.

My four-year-old son, Edgar is learning to read and write.

It's expected that he will be proficient to an extent of reading basic books by the time he's five. Although, he has, of course, picked up daddy's iPhone, and taking pictures, and made the odd wobbly video.

It will take him considerably longer to make a video, which represents thoughts beyond what he can capture immediately in front of him.

Beyond, text is a simple poem of sorts.

Text is frozen, yet text is alive with potential.

Text can be rendered into many forms; text is not one thing.

Graffiti is text, code is text.

Text does not move at its own speed; it moves at yours.

Text is free from much of human colour.

Text will never replace the voice of a loved one.

Text is not trying to be speech.

Text was not invented to solve the same communication problems.

Text lost, images fade, movies get remade, books don't get rewritten.

Text is timeless, the words are not.

The environment text is expressed into it is substrate, it is evolving.

Text is now active and connected, a TikTok of Doug Engelbart.

Text is clearly expandable. Links, emoji, tap back.

Text can be mind-controlling, through propaganda, myths, or social media. Or even poetry.

Text can be mind-expanding.

Text is neither true nor false. It is simply a conveyor of information that contains no inherent judgment, no inherent validity.

It can only be judged and validated through other texts.

And today, we are figuratively drowning in text, which is instantly click copyable, and click shareable. A few clicks are devoted to understanding and evaluation.

Text is cheap. Cheap to author and cheap to read.

Someone reads on a modern laptop and uses a modern smartphone.

They do not need further tools to write, or to produce a broadcast quality video.

However, producing a video comes with a much larger amount of external costs such as, locations talent, effects, music, and so on.

The problems text can create can be expensive to deal with.

Fake news, climate change denial, social justice pushback, black lives do matter.

My text is not neutral.

Text allows for quick, non-linear interaction without having to formulate queries.

It's a lot quicker to thumb back in a document to look for something you have a vague idea

of, rather than to speak exactly what you're looking for, to a human or AI.

Text is placeable in space, you can write on a napkin, on sand, or a computer screen.

And put any text, anywhere you want to, and it will remain within eyes reach, for you to think with, greatly increasing your working memory.

Text is referable, when someone puts something in writing, that can be held to account.

Text is addressable, which means that, it is not just citable, it is trail followable. Where an author can clearly state what is referred to, for the reader to verify.

Text is characterized.

My father would seldom say that he disagreed, or that someone was wrong.

Instead, he would say that he characterized the issue differently.

This is what we do when we write glossary terms.

We present our personal definition of something.

We make no assumption of knowing a universal truth, this is powerful.

Text is where we place much of our most important thoughts, in laws, records, dire entries, and love letters, civilization was literally written into existence.

Text is simply, the most advanced, symbolic communication media our species has so far managed to come up with.

Text is more, much more than I can list.

Text is also largely ignored.

This is something we're trying to change for the effort around the "Future of Text" book and symposium. As well as with the software we have producing. To, as Alan Kay puts it, "The best way to predict the future is to invent it." And the infrastructure we're working on, as I will address later today, that Vint has already beaten me to the punch. We live in a perilous time, but I believe we can write our way out. Thank you for being a part of this. Thank you.

So, to round off the introduction of the day. The next 10 years, that's what today is about. Please, write down any thoughts you may have for the next 10 years as the day goes on. This link is in the emails I've sent you. It's also here on the screen, I'll leave it up for a minute. We would love to hear your thoughts on the "Future of Text," and the "Future of Text" Community. For example, we're thinking of producing some sort of a newsletter, or even a journal. What do you think? The key question is, "how can we more powerfully discuss and develop the Future of Text?"

Overview of the Day

Frode Hegland: Now we're going to jump into the presentations, which are 10-minute sessions, including Q&A. Most people have managed to do presentations ahead of time, which is great.

Text Chat:

15:11:44 From Bob Horn : is the Internet Archive involved in FoT?

15:14:37 From Mark Carranza : Hi Bob, not yet :)

15:19:24 From Rafael Nepô : Send us your thoughts for the community › shorturl.at/fnGHP

15:20:05 From Mark Bernstein : https://shorturl.at/fnGHP

15:20:17 From Rafael Nepô : Thanks Mark

15:20:56 From Rafael Nepô : Send us your thoughts for the community › https://shorturl.at/fnGHP

15:21:59 From Peter Wasilko : Can we have a copy of your slide deck?

Sam Winston

Sam Winston [pre-recorded]: My name is Sam Winston, I'm a visual artist. And I just want to go through, I guess, a few visual questions. And I wanted to start with this image, which is basically, I did a project at "Oxford University Press" or they helped sponsor a project. And this room is where they keep all of the definitions that are in the dictionary. Now, that nowadays is digital but, when I was having a tour, 20 years ago, they showed me this room, which is basically a room where all the words that are in the dictionary are kept. And to me, that really beautifully illustrates the idea that, language has a shoreline. And I think what we're doing is, we're walking along the shoreline. And it also highlights a point about possibly the expansion and contraction of, not just language, but how we use language. I love that they're catalogue cards still, or they work with catalogue cards.

So, shorelines are a point of inquiry for me. That's led me somewhere. It's an example of my work and I'm very much into the deconstruction of text, and text becoming fluid, usually through more haptic analogue ways by breaking down this is letterpress printed. And this is another deconstruction of the dictionary. And this is the third sculptured piece, which is made out of the 20 volume, oxford English dictionary.

So, it leads to a question. Metadata as image, what does metadata, if you were going to draw, what metadata, as an image, what would metadata be as an image? One of the aspects here is, I work as an author sometimes and the story reads down this left-hand column. Once there was a time when all the books knew what they're about. But there was one book, it was called the dictionary. And if you read the parallel column, dictionary, a book that lists words and their meaning. So, you read the story down this edge, and then the definitions as the story runs parallel to it. And you can see it, kind of half, it's a concrete poem, so there's a lot of play. So, you're still following a narrative, but the definitions begin to illustrate what's happening in the story. And that, for me, is a very simple illustration of metadata, word plus its own definition. But obviously, this definition has become an image.

So, we're turning one type of metadata into "Visual-Meta" I guess. And that's it, realized in real life, so the physical manifestation. So yeah. So, that's an inquiry, what does metadata look like as an image? And I would answer always this, through a physical formatting. The physical is very underrepresented or misunderstood as in, now that we're in the digital age, there's another emphasis on screen culture, I think. This is another set of

stories, it's a narrative that you read along here, but I was using rule books and different systems of cataloguing too. So, the line in this story was, "what if some rule books, held some children's stories into account." So, basically here is a narrative that you read, and this is me just taking apart the text from. I think it's "Beauty and the Beast." And here we've got all these definitions and arranging it alphabetically in this image. And this is the image that kind of drew Frode's attention. Here we've got the word "bean" here we've got the word "magic" which is from "Jack and the Beanstalk." And bean then links to food, which then links to protein, and then magic links to fairy tale, which links to short story, which links to poetry, which links to language. So, this is a very primitive, and very physical visualization of what I think how we're dealing with hyperlinks at the moment. These are newspaper columns. This is a deconstruction of text. But I think the thing that interests me here is, this this idea of a mycelium network is, instead of it being linear, the network beginning to expand. I'm aware that my time is running out. It's a series of drawings about tracking phonic sound. Going from legible text, to illustration, to acemic writing. This is a wall of language. This is a floor of language. This is a wall and floor of language. This is metadata taking a three-dimensional aspect. And then, the other image I wanted to bring up was, "Indra's Net," the interconnectedness of all phenomena. When Indra fashioned the world, he made a web and every knot in that web is tied to pearl. And the pearl reflects every other idea. And for me, language is brilliant for clarity, but it's a bit like fast food. It makes me lazy and addicted to getting it.

Deep thought for me, is developed away from words. So, drawing is a type of thinking without the literal.

David Lebow: I'm wondering about the connection between the drawing and what neuroscience has to say about learning. And have you looked in any of that literature? And do you see a connection between what you're doing and what we're learning about the brain?

Sam Winston: Yeah, I would say, I guess I the slide was taken out but, neuroscience is definitely connected. My relationship to words has always come from being dyslexic. So, there's a kind of connection in the fact that, to understand language it's always been a very hectic, and tactile experience for me. And I think, whenever I'm working visually with language, it's quite easy for a very sort of organic forms to come out. Just because you're bringing your body in. One of the things Frode just said is, "we're drowning in text" and then, immediately my head is like, "swimming involves the body." And I also think that just kind of like, interventions where you know, the mouse, you know… These are all about ways of embodying knowledge. And I think that's where most of my art comes from. Is trying to process some of that. And then, a lot of the background in the work involves a lot of mindfulness stuff. I've intentionally increased the amount of physical activity that I do in

visualizing text and writing with text. I always start with words, and then see where that goes. It's not the best answer to your question. But yeah.

David Lebow: So, this idea of embodiment in work around making computers think like humans. The singularity idea. Seems like what you're doing has some relationship certainly to, how do you create machine entities that are more like humans.

Sam Winston: Yeah. I think… There's so much I need to think on that. And so much I can… Yeah, and it's a good point. It's interesting.

Vint Cerf: So, there is a funny nuance about what we just saw, and that is, the transition point where the words are no longer significant in the image. This is why it's important. And I worry a little bit. I love the images. But I'm more interested in figuring out whether, we can hang on to the words, and their meanings, while we are producing images. And when you cross past that boundary and now it's mostly an image. and the word part is no longer significant. it kind of loses its curiosity. it becomes more or less conventional art. But this is not intended to diminish in any way what we just saw Sam do. But I am curious about that funny transition.

Sam Winston: Yeah, absolutely. Yeah, the opening line is that it's always going to be a shoreline and that shoreline is very… It seems to be artificially enforced as in legible, and illegible. And psychologically we approach language very much like that. "I can't read that." "I can read that." Most of my work, when I do a mass market book, a picture book, we will talk to commissioning editors and it's quite challenging for them to have a grey zone where you're like, "am I supposed to read this or am I supposed to look at this?" And that relationship is an artificial relationship, I would argue. I would say that the relationship between legible and illegible it's not illegible, it's just you're reading a different language.

Ismail Serageldin: Thank you. I was fascinated by your reference that; text is like fast food and so on. Because, in fact, I like to think that text is what enables us to better appreciate art. Because good art critics, in fact, are a bit like a prism. You have a work of art that comes like a plain white light. And then, the critics are able to show you all the rainbow of colours that are embedded in that work of art, by locating it historically, by explaining a vision, by trying to unravel the package, so to speak. Open the ribbons and unravel the package. And as such, the interaction between text and works of art seems to me that they're not separate. The fact that presentation reversed my usual conventional review, that you would start with the artwork and then, add the text of all the editors, and critics, and so on that would show how much embeddedness, and how much more wealth there is in it. Rather, you took the text at the beginning, and then you went into what was a work of art that is not readable as letters and words. And I was wondering if you reflected on that kind of reverse relationship between work of art and text.

Sam Winston: Yeah, it's a really good point. I think the prism is a beautiful metaphor. I would say that it's incredibly powerful. Text is quite powerful. So, when we talk about metadata, all we can do, and the same with social media, or you can collapse a very sophisticated, and nuanced, and rich, and meaningful experience, into just a sentence with a tag, either as a tweet, or any piece of metadata. And it can collapse into a very, very, absurd, understanding of something. And I think, as an exercise for people, or humanity, the fact that, taking something and unpacking it into into a more nuanced form is a really useful exercise. It gets away from the polarities, and the extremities that we see occurring with much more condensed, much shorter texts. So, yeah. That's one thought, and I think that, one of the things that happens that we must be aware of is that ambiguity is actually also a gift. As in, sometimes I can say something, and maybe it means something else as well. And to get me to collapse it into a tag saying, "this is what it is" can actually take away some of its beauty or take away some of how it speaks. So, I would maybe, perhaps, finish on the text. And then there's the image, and then the thing between all of that is the silence, which is held. And I think that's quite Important.

Fabian Wittel: Sam, I love your work. It's super nice how you spark curiosity about the content and put the mind in a playful mode. I'm interested about your working process. Are you using code as well? Like generative art, or processing JS, or something like that? Or is it all done as a craft in InDesign?

Sam Winston: In a very physical way, I'll always start with writing, actually. I'll start with an idea, and the idea manifests in language. And then, I spend the rest of my time unpacking language. I haven't used code, because there's an apprehension there. Because it adds almost a fourth dimension, which is amazing. I actually will rely on. I realize that most of my work is playing on what the internet, and what digital culture is doing to text. But it's then taking that into a piece of paper, it's then taking that into old world systems, to then illustrate. So, when I look back at stuff that was coming out when I was doing in 2001. It was just like, "oh, yeah you're basically really illustrating data. You're just illustrating data mapping or database, but you're doing it with your hands and getting it wrong." And that's the bit that is really, just like you said, playful is really important to me, definitely. But thank you.

Text Chat:

15:24:12 From Rafael Nepô : Beautiful Work!

15:24:24 From Fabian Wittel :

15:24:52 From Eric Rangell : Reminds me of Doug Hofstadter's text art

15:25:09 From Sam Winston : Thank you   https://www.samwinston.com/

15:25:14 From Peter Wasilko : Did you use LaTeX to produce this?

15:25:28 From Sam Winston : The type is done in indesign

15:25:52 From Sam Winston : Each is a text box hand rotated .. the collage work is hand cut

15:26:06 From David Felsmann : Looks great!

15:28:51 From Luc Beaudoin : To David's question, cf. visual proofs and Aaron Sloman (Bham England) https://www.cs.bham.ac.uk/research/projects/cogaff/misc/meta-morphogenesis.html

15:31:00 From Barrie Robinson : Barrie Robinson here, thank you for the invite Frode. Sam, love your work. Feels very explorative. I'm currently based off the south coast of the UK. Esther, great to see you here!

15:31:52 From Brandel Zachernuk : I'm curious about the tangible, physical form of your work – how big is it in real space, how does that change your feeling of the work?

15:32:22 From Frode Hegland : Please try to use the raise hand thing if you don't mind!

15:32:36 From Gyuri Lajos : "The Decorative is the Pupa form of Expression" and now you shown it the other way round, Thanks

15:33:16 From Eric Rangell : I find it interesting how standard texts are being used as material for new types of media = example Emily Dickinson's poetry being adapted by Apple TV to be accessible to teenagers – as long as the thread to the original is preserved I have no issue with such derivatives.

15:33:32 From Jonathan Finn / Sibelius : One picture reminded me of The Mouse's Tail from Alice in Wonderland https://en.wikipedia.org/wiki/The_Mouse%27s_Tale

15:34:36 From lesia tkacz : Just a comment – whilst in the throes of being obsessed with language (still am), I went to a Rene Magritte and Marcel Broodthaers exhibition, and was delighted to see how Broodthaers played with language/text. And I'm reminded of that play looking at your work. It's interesting how you appear to be focusing on the related structure of words, rather than on their arbitrariness which is what I feel I am used to seeing in other works.

15:34:36 From Conor : Beautiful work Sam. Recommend the book Reading Cy Twombly by Mary Jacobus if you haven't seen it before. All about the role that text and language in his paintings.

15:35:10 From Luc Beaudoin : the beauty of obliquity

15:36:46 From Alain Marsily / Quidzi.com : About artist about language and text, I suggest to have a a look of Christian Dotremont (Belgium. Member of Cobra). A lot about text

15:38:46 From Mark Bernstein : Obliquity, not obloquy

Jay Hooper

Jay Hopper [pre-recorded]: Hi there. I am Dr. Jay Hooper. I am a computer scientist, turned web scientist. Currently freelancing in Vancouver, Canada. Working on user experience type of projects. I have a long-standing interest in text, hypertext and society. Possibly because I'm a graduate of the University of Southampton and that effect happens to many of us there. I am probably not able to join this symposium live, unfortunately. But I'm very pleased to share this brief recording about "NaNoGenMo." So, without further ado, the roots of "NaNoGenMo" are in "NaNoWriMo."

That is "National Novel Writing Month," it's a community event each November, where effectively people come together, and make a commitment to each write 50.000 words of fiction during the month of November. And the idea is, it's kind of a social support type thing. And what happens is that, by setting such a high target of writing 50.000 words in a single month, it hopefully removes the inner editor. And gets you past any writer's block. And 50.000 words is the length of a short novel. So, that's what "NaNoWriMo" is. It's a whole thing. It's been going for a long time. You can go check it out if that sparks your interest. "NaNoGenMo" came after. And was sparked by a possibly flippant tweet back in 2013 by Darius who was saying, "Who wants to join me in 'NaNoGenMo,' writing a code that will generate a 50.000-word novel." And the rule is that you share at least one novel, and source code. So, you can see there's a GitHub URL for this. You see a vast array of different things in "NaNoGenMo." Everything from poetry generators, mashups of all sorts of different genres of text. You really lean into the counting elements. I think there was one that does the digits supply to 50.000 words. So, there's all sorts of very different interpretations of how this works. I'll just show you a couple of examples from last year, so this one really tickled me. Someone was working with "Moby Dick." And they used this language model to effectively make it more banal. And you can see that from the words on the screen, you can go check out the URL with this, and any other example if you want to look a little deeper. But it's just playing with the expectations and what that text looks like, and how it comes over. I really liked this one, "Taphos: Death of a Novel." So, there was a bunch of text about the death of a novel. The book of the dead. Preservation spells. And there's this beautiful artifact, where the text itself decays. So, there's quite a variety, the point I'm making here. This third and final example is the one that I did last year, which was my first foray into "NaNoGenMo." I was

having feelings about Covid, and I did a very, it was very, very, simple. I just made a template of a diary entry over the course of several hundred days. Where what would update would be the date, the global count of Covid cases. so, I imported that data. And emotional state. And I basically just wrote out three buckets of emotions, where the first was fairly neutral slightly, negative. The second was definitely negative. and a third was kind of frantic. And, my goal was to show someone's emotional situation deteriorating, through the course of Covid. And yes, I was venting.

So, just to sum things up. What we have was, "NaNoWriMo" inspired "NaNoGenMo," which has a whole community now. At the time of me recording this, there are currently 64 issues open on GitHub. And last year, I believe, 78 issues were opened. I don't know if they were all completed but, as you can see, it's not tiny, given the specialization involved in writing code to generate novels. It's not a tiny, tiny, community of three or four people that we're talking about here. I'm planning to make a submission this year, in a very different vein from the covert diary. So, I have access to a data dump of In-Cell comments on the internet, and I'm wondering what happens if we remove the polemic type of stuff from that. We shall see. In any case, "NaNoGenMo" is super cool, is very creative, it's inextricably linked with how we work with a perceive text. So, please feel free to come and check it out. And thank you for your attention.

Vint Cerf: As I was thinking about generating text, I thought about the GPT-3 and we have something here at "Google" called 'Teena' and I've been rather astonished at the ability to generate through sheer statistics, texts that makes sense, in the sense that, they're reasonably, grammatical. They have some coherence from the semantic point of view. How do people feel about that? And is that relevant to this idea of generating 50.000 words? Because a lot of these systems have been designed to do completions. And, so you can imagine, writing the beginning of a paragraph and letting it figure out what the rest of it is, and then doing that repeatedly, wash, rinse and repeat. I have no idea what would happen. But how do people feel about that method of generating text?

Lesia Tkacz: I'm doing a PhD project on it. so, I'll report my results soon. "NaNoGenMo" has a very strong, collaborative aspect to it. Where it's not just machines generating the text. It's humans working with machines, and humans working with each other. And the output of machine to craft, and create, or cobble together if you like. Whatever you feel like to create text. As far as to answer that question, if I understood correctly, how is it that people feel about reading this sort of almost gibberish text, which is something that, I've noted in a survey I did. How a lot of people described some generated text. How do you read this strange output? How do you process it? As far as text go. As far as being able to actually read

and understand it. That's something that I'm literally doing data analysis on, right now, to be followed by interviews. So previous studies have shown that, people feel quite polarized about this. Some people are like, "yeah, generated text is weird but, I kind of like it. It's interesting." And other people will say, "well, it's crap. I don't want it. No, thanks." Which is fine. I think, just to close that up, whether we like it or not, computer generated text as we know, has been in existence in our world, in newspapers, online, on our phones, and weather reports forever. And it's already snuck in. And I guess the question is, are we into it or not? How much more of it will we accept it, I suppose. Not sure if that exactly answered your question, Vint.

Vint Cerf: Yes, it does. But it appears to me that, if we think of GPT-3 or "Teena" and these other text generators as instruments and we're learning to play them. When you interact with them, you can lead it, and let it fill in the blanks. But you can lead it through the story, by injecting new material. It's actually a fascinating process. and I'm beginning to wonder whether these generators will become tools. as opposed to curiosities at some point. As people discover how to manage their production, their text production.

Lesia Tkacz: There's definitely a lot of companies trying to turn them into usable tools for creative writers, and other writers. One thing that I do think is not highlighted enough that even, based on playing around with it a bit, even if you do try to direct the machine, in a specific direction, you will still get things thrown up, which you weren't expecting. Which might be good, but sometimes, actually really isn't good. As is in the case of AI dungeon, which I read in an article, has been used a lot for creating, shall we say, erotic stories for people to enjoy. But the problem is that the model trains on other users input, as well. And so, other users can get kicked up, shall we say, results that they weren't expecting, or weren't wanting. Which is not always very good. So, yeah. Watch this space. We'll see what happens.

Peter Wasilko: I wanted to say that it might be interesting to have a "NaNoVisMeMo." Take it on, and try to create some sort of a tool, or application of "Visual-Meta." And, just more generally than that, just like a nano-authoring-tool-mo. To come up with, after a month, some sort of a tool to help authors, either in non-fiction writing, or in fiction writing.

Frode Hegland: Yeah, the whole idea of it becoming a tool, not just a literal tool, like a knife. But more advanced is interesting. Brandel, you're new here. Please tell me first how to pronounce your name.

Brandel Zachernuk: That it'll certainly do, Brandel, is this the way that I tend to go. It's made up, but it is my real name. I actually did that. I wrote a few years ago some, "NaNoWriMo" writers. Things that are sort of, mini tools explorations, experimentations of things that might help with working on the prompt, or generating more ideas, and more text. Something that I was surprised by, in this presentation, and some of these discussions, was

the proposition that people would actually read nano-generated texts. And I'm curious if anybody actually does, or if the purpose of them is merely to exist?

Ismail Serageldin: My initial reaction is that the very existence of the exercise is what is being celebrated, so to speak. And the value of the exercise is for the person who does it. I doubt, very much, I certainly would not spend time reading 50.000 words, generated in this fashion. There's many interesting things still to read in the world, and learn from. Value and develop the mirrors in which we see ourselves, and the windows to which we see the world, by interacting with the processes of thinking of different people, from different cultures around the world before. Yeah, I would tend towards the people who said that the (indistinct) is gibberish or something like that. It's maybe valuable as an exercise for the people who did it. But I'm not sure that it would match, and certainly, I personally would not invest in reading 50.000 words that were generated that way.

David Lebow: In forecasting the future, you have this idea of possible few futures, and one of the main dependencies here is, the capability of machines to achieve a kind of reading comprehension ability that's comparable to human reading comprehension. Well, if we achieve that goal, then the generation of machine text takes on a whole different meaning. So, we're talking about machine generated text today, which is largely gibberish, or of modest value. But, as different technologies kick in, the whole landscape is going to change dramatically. That's the future of text, if you forecast forward.

Mark Carranza: Not so much machine created text, but text created machines. As a programmer, we're playing around with GitHub co-pilot, which is an AI extension to Visual Studio code, which basically helps predict when you start writing some code. Some predicted AI sticks some more code and kind of starts to help you finish it by your line, or your block of code. So, this is kind of an interesting interactive thing, which maybe many programmers aren't aware of. I'll post the link in the chat. Thanks.

Frode Hegland: And thank you Mark for highlighting the chat. So, this is, of course, a symposium in the "Future of Text." So, the text you put in the chat will go in the comment section, on YouTube. On the recording of this. But also, it will go in the book. So, please feel free to use the chat properly. It's not just going to disappear into the ether. We'll also try to have, at least, a machine transcribed text of our speaking together here. But that tends to be messy. So, whatever you put in the chat is good. I'm now going to go back to doing the screen share, and we're going to go to "Napkin" and…

Text Chat:

15:41:43 From Vint Cerf/Google : at some point it would be interesting to discuss GPT-3 and its implications

15:41:56 From lesia tkacz : Any other NaNoGenMo lovers here?

15:42:03 From Dr Sarah Walton : Very cool :)

15:42:12 From Rafael Nepô : Very very nice

15:42:37 From Alain Marsily / Quidzi.com : Yes GPT-3 good idea

15:43:31 From Eric Rangell : Darius K. has worked with the DAT project on decentralized systems, as well as mastodon.

15:45:56 From Gyuri Lajos : Gratiotous pollution of the mind comes to mind

15:47:10 From Christopher Gutteridge : https://play.aidungeon.io/main/home

15:47:31 From Gyuri Lajos : https://twitter.com/TrailHub1/status/1460203755799040004

15:47:52 From Gyuri Lajos : "why humans dream of

making intelligence artificial

instead of realising the relevance of

augmenting our own imperfect, yet beautiful, human intellect

philosophy of metacognition,

or in simpler words:

learning how to think"

15:48:00 From Gyuri Lajos : https://t.co/5Uhqp6R7Jz?amp=1

15:48:00 From Sam Winston : @Jonathan .. in response to Alice Wonderland .. this plays with that a little www.samwinston.com/books/child-of-books

15:48:18 From Dr Sarah Walton : Fun idea

15:48:33 From Alain Marsily / Quidzi.com : Not the generation of text but the reverse like Summly from d'Aloisio (bought by Yahoo) that trim text

15:49:01 From Frode Hegland : Nick is a real genus Alain :-)

15:49:20 From Eric Rangell : The effect of Replika.ai where people feel the AI really understands them and is helping them improve their lives is an interesting effect of a text corpus derived from conversations between the founder and her late friend.

15:51:11 From Sam Winston : This relates well to this.. https://cup.columbia.edu/book/uncreative-writing/9780231149907   Uncreative Writing

Managing Language in the Digital Age

Kenneth Goldsmith

15:51:28 From Dr Sarah Walton : Yes, the potential is cool. Today's standards fall short

15:51:54 From lesia tkacz : As Kate Compton suggested in her PhD thesis, nobody reads the 50,000 words – the idea is rather is to take 'snack sized' portions of text to read, becuase the

50,000 words are often quite uniform (although you certainly can read 50,000 words as a sort of performance art piece)

15:52:39 From Peter Wasilko : That sounds like the old Programmer's Apprentice Project from the MIT AI Lab way back in the day.

15:53:00 From Vint Cerf/Google : @peter – yes, forgot about that!

15:53:08 From Mark Carranza : https://copilot.github.com/

15:53:31 From Mark Carranza : As a programmer I create machines out of text :)

15:54:33 From Luc Beaudoin : Well, speaking of text. I love screen OCR tools like TextSniper for copying useful slides to my notes.

Fabian Wittel

Fabian Wittel [pre-recorded]: Hey I'm Fabian. With David I'm building "Napkin." And before we start, I have to say, it's thrilling to be here. I'm looking forward to the discussion so much. The calls and the "Future of Text" are always an inspiration for what we are trying to build here. And what we are trying to do is, when we read books, David and me, we read a lot of books. We always enjoy to dive in those wells of wisdom, and inspiration, and to follow the ideas of the sequence, like the author has laid them out for us.

But when we think about how reading actually works, and especially what we do after reading is, we often take notes. And honestly, we don't look at those notes so many times, again. Because it's hard to connect notes, from different books, if I read a lot of books on a lot of different topics, from different areas, at some point, I don't know how to structure my notebooks anymore. And therefore, we thought about, "can we change that? Can we build something that improves on this situation?" And what we dream of is, to breathe life into all texts that we think are inspiring. And by breathing life into them we mean, take out the key insights, keep their source link to where they come from. Make all those key insights fly up and build a swarm of those key insights. And those swarms should evolve. They should emerge. They should connect with other swarms, from other sources, and therefore, allow us to always add new thoughts to those swarms, and save thoughts from other swarms, and build a personal swarm of thoughts. And the future we dream of, having this swarm for every person, would be a future where thinking becomes way easier because, thinking is actually making those new connections, and keeping those thoughts that we think are important for our lives in focus. So, we just saw the book, "Noise" by Danny Kahneman, and we already built a swarm of thoughts from that book. So, imagine, Danny Kahneman, in future, would also send you a link and say, "hey, of course. You're buying my book. But here's also a different structure of how you can explore the thoughts." When you press start, you're asked what you're interested in, let's say anything on the mind. And then, you already see the swarm of thoughts going to formation. And you can see that, the thoughts are arranged based on the content. So, if I'm interested in that one, in the background, I already see an arrangement of the other thoughts. And I can say, I'm also maybe interested over here and it always shows me new connected thoughts to what I currently want to look at. Maybe, my beliefs are something I think is important. I can also save thoughts from here. Now, my "Napkin" tells

me I can fly somewhere else, because I've already read everything on beliefs today, that's read. So, let's go somewhere else. And there, we already see it's not only notes on noise, let's close the public "Napkin" here. Let's go in my private account. In my private account I have a lot of different thoughts, from different sources, as well. For example, Derek Silvers reads a lot as well, and he has book notes. We put them into "Napkin" as well. And of course, I can't only browse, and save thoughts from other people. I can also add my own thoughts, for example, this might be something that's interesting for me. I'd say, it's related to mind, future, I think I have stuff on future as well. And when I add the thought, I already see it connects me to the existing knowledge I have. When I click it again, I see more thoughts. And when I want to share my own network of thoughts, I can also make it public, to share it, for example with you later in the discussion we want to have on "Napkin." What we are especially interested in is, do you think taking existing texts and breathing life into them, in the sense of building those organic, living networks, that also use NLP to do some thinking on their own, to suggest new topics automatically, to connect topics automatically, might be something that will lead to a world, where more people can more easily keep the thoughts that they think are relevant for their life, and focus, and maybe even more easily see inspiring new connections in their thoughts?

If you have any opinion on that, or any other opinion on the whole "Napkin" endeavour, please come to the session later. I'm looking forward to that. See you.

Ismail Serageldin: I have a question. Do these things that you do on the "Napkin" emerge from the machines itself, selecting the things that are related to a word or to a theme? Or they can only work if you have invested in reading the whole book first? And then, these things, (indistinct) notes are being added by the machine in addition to your own notes? Or is this being done by the machine? And the reason I'm asking this is, because I believe that we have a very serious problem. In fact, I'm thinking of my grandchildren right now, they are finding things on the net. Sentences, these little snippets, is nowhere near enough to handle the depths and complexity of society, as it evolves today. So, I wanted to know how much you put in, before you start taking out. Or the machine starts giving you more? Or does the machine start giving you more from even works that you haven't started?

Fabian Wittel: Thanks for the question. Short snippets, and book summaries can never replace books. And the time you spend reading a book, is also time thinking. And when you read a book, nevertheless, at least for me, it's hard to connect it with thoughts from other books. So, everything that I have in my personal "Napkin" is stuff I put in there myself. While reading a book, or after reading a book, I add the notes, I add the topics, and then, when I read another book, I see connections to thoughts I already had. And also on top, we are playing with NLP to help your thinking in the sense of, seeing connections to thoughts,

that you didn't see the connection yourself.

Rafael Nepô: Mine is just a simple question but, I think Fabian answered half of it with this comment. So, the thoughts you add to "Napkin," they're all manually added, from what I understood. But will there be probably, a possibility of importing my highlights, and notes from different apps, like "Kindle" or "Apple Books" and the such? Because, that way that's half of the work, and then, I can just organize those thoughts, and sentences where I see fit.

Fabian Wittel: Already today, when you have an iPhone, you can send in text that you read for example, in your "Kindle App" with an extension. In future, we also would like to have some connections. At the moment, David and me are building this, because we believe in the idea of making thinking easier for everyone. So, it's not many developers by now. And you can also share your thoughts. So, what some people do is, they share their account with others. So, they can save thoughts that you created in their own account. It's relevant for some podcast creators, or some directors as well, that want to share their thoughts in the network.

Mark Bernstein: Hi, a very interesting system. What are you doing for conceptual clustering? And are you doing this in a hyperbolic space or a cartesian space?

Fabian Wittel: Currently, contextual clustering is mostly done by the people, manually themselves. When they associate the tags with the content, what we are using to automatically associate tags with the content is neither, or both spaces, as far as I understand it. We are using a pre-trained NLP model that creates an n-dimensional space, and in that n-dimensional space positions both the thoughts, and the tags. And then, just looks for a kind of cartesian closeness between the thought, and the tag. And therefore, associates them with each other. But, if you have any ideas on how to improve that, and make it even more inspiring to see surprising connections, which is the most exciting thing, we're happy to discuss.

Mark Bernstein: So, we're seeing a two, or two and a half dimensional projection of sentence embeddings?

Fabian Wittel: No. The sentence embeddings are in n-dimensional space. The pre-trained model that we use is (indistinct) dimensional but it has, I don't know the precise number. If I would have to guess, maybe 128 or something like that, dimensions in the end.

Frode Hegland: I saw a comment, a few comments in the chat about the design, the visual design. It is very beautiful, there's no question about that. But the text seems very small. Can you tell me the size monitor you're using? And just what the user experience is for you as a developer?

Fabian Wittel: Yeah, that's kind of a trick we always do, when we do screen videos. Because people perceive the general aesthetics as appealing. And that is important because, we also

want to put the mind in a state of flow, in a state of joy, and beauty. But, when we do screen videos, where you can actually read the text, you can't listen to what we are saying. So, if it's only five minutes, we always zoom out a little bit. If you look at it in your own screen, it's the font that you are adjusted in your browser. The font you're used to. You can zoom in, zoom out, it adjusts to your zoom rate.

Brandel Zachernuk: I'm curious what… It's Very interesting to think about the actual physical real estate, the real space and I think you're very apt to ask about the actual monitor that you expect to use it on. What would you do with more space? As in, a lot more space? Do you have a thought of, how you would use things like, the really big Microsoft Surfaces or a cave environment that give you an arbitrary, sort of range, for this kind of thing?

Fabian Wittel: It's a beautiful question because, it goes right in the core. We think, first something before answer the question, collecting thoughts should happen easily on a mobile screen. By collecting thoughts in your daily life, just typing something into your "Napkin," adding it to that ever growing, evolving, swarm of thoughts should happen easily. But, when you look at it, we either see people using a tablet, smallest size, big screen, like a big computer screen, and the bigger your screen gets, the more thoughts are displayed. So, you see thoughts that are readable, and you see those archipelagos, those islands, those tiny swarms, floating around the thoughts that you are looking at. And yeah, the bigger the screen gets, the more thoughts you see. And then, you can tap at any that you're interested in. Walk in front of it. I dream of doing it on a bigger screen that we can get.

Luc Beaudoin: Oh, hi. We developed an app called "Hook" that allows users to link arbitrary resources together, and notes, eBooks, PDFs, whatever. And one of the frequently asked requests is basically to have a visualization tool for that. So, basically people seem to want that. I've resisted because A, my team is small and B, it's not my area of expertise. But maybe we can connect about that, or anybody who's interested in visualization. So, we would make available on our side. We can make the data available in a format that's useful. We've had some suggestions but then, you'd be able to suggest what format would be useful for visualization folks. So, I would personally love to connect with visualization experts for that. Regarding that.

Bob Horn: Yes. I just wanted to offer any help I can with the visualization. I've done a great deal, as some people know, wrote a book called "Visual Language" and a whole chapter on. And quite a bit of research on visual diagrams of all kinds. And you'll hear more coming up.

Fabian Wittel: I think I even read that. I didn't know it's you. Wow. When I was starting data preservation, 10 years ago, I think, I… Wow. Thank you.

Bob Horn: Yeah, it's an old book.

Fabian Wittel: But it's very thrilling.

Bob Horn: I wouldn't change a word of it.

Fabian Wittel: No, you shouldn't. Thank you.

Bob Horn: We got it right. At that time.

Fabian Wittel: Wow. It's perfect.

Text Chat:

15:57:55 From Mark Carranza : A swarm of thoughts

15:59:38 From Dene Grigar : I would love to hear what insights you have gained from gathering this information—the thoughts in the swarm—and if it transformed the way you viewed the text the thoughts commented on.

15:59:59 From barbaratversky : Can't see your visuals, the examples in the boxes are too small and there is too much wasted blue background

16:01:06 From lesia tkacz : As long as I feel that nobody else is spying on my thoughts a la google and amazon

16:01:28 From John Hockenberry : But there is no way to assure that

16:01:32 From Eric Rangell : I think personal curation is key, with machine suggestions of connections secondary. Sharing of personal napkins in webs of trust is important for personal and group sense making.

16:02:52 From John Hockenberry : Text only works as open source…. Closed source is dialect… interesting but unavailable to the larger collective intelligence. Privacy is tribal.

16:02:53 From Gyuri Lajos : Can you add link to napkin please in the chat

16:03:10 From Alain Marsily / Quidzi.com : About note connections, many apps available based on http://zettelkasten.de (roam research…)

Bob Horn

Bob Horn [pre-recorded]: Hello, I'm Bob Horn. And this presentation is about diagrams. This all got started since I've been working a lot with visualization and text. And somebody sent me this quote. I will just quickly summarize the quote it says, basically the author says, I would rather have you not read the text of my other book, that I've just written, but only look at all the diagrams. And you'll learn what you need. The author says, for a 600-page book that he has written, don't read the text. Which is kind of an interesting thing. He really means, don't read part of the text, because as I've already said, I regard, the diagrams or what he calls graphics, as one kind of text. What was the book? It's a big book, 644 pages. When I looked at it, it had 538 diagrams, and 62 tables. Really is that what people do in medical school? So, I've been at Stanford for the last 27 years, and I went over and talked to some medical students. And they said, "well, yeah. We never read the texts. And every quarter, we get five, or six of those great big books, and we look at the graphics, we look at the text. And then, if we have to understand it a little bit better, we look at the writing around the text."

Now, you may wonder, what does these diagrams look like? Well, I've just… you'll note that, the text actually, in these diagrams, it's one of the forms, of one of the ways that diagrams are done. It's separated considerably from the text, and I will say that that's not the best way to make diagrams. But one of the better ways, I think, to arrange text is this. That is, to put the text, or the words in a diagram close to the visual elements.

The question for this talk, then becomes this massive use of diagramming part. Part, not all, of the "Future of Text." And I think we're doing that because, it's a quicker and faster way to use a good bit of written text when it's quite systematic. It also enables learners and people who are forgotten in our relearning, to scan and skip. I say that we have to scan and skip an awful lot more, in the modern world because we're creating more and more knowledge. And so, we need to devise methods like, better diagramming to accommodate our needs. This is all part of a larger project. How do we improve our thinking about the world around us? And I think, to do that, we have to improve our mental models, in the ways they interact with each other. And the way we do that, in very complicated situations is, with diagrams. For me, the next step is a massive integrated setup diagrams, and then, the development of a better theory about diagrams, and how to use them.

My proposal is that we launch a mega-diagramming project to diagram several

complete subject matters. In other words, we need a one million, integrated diagram project for that. And with the kind of computational capabilities that we now have, it can be supported. Although, it will require both, people who are very good at the creation of diagrams and know the research on how to make diagrams better, as well as the subjects that are being put together. And then, we can hyperlink the diagrams, which will be a very interesting research project in itself. And may (indistinct) eliminate, a number of kinds of gaps, and other kinds of opportunities in such a project. There are many benefits, and I've already described some of them. The next thing that we need are leaders for such a project. I don't think a million-diagram project necessarily has one leader. And I'm certainly willing to help out with such a project. And, of course, we need to look for what kinds of organization would fund it, sponsor it, put it all together. And, of course, you'll say, "you've just given up a five-minute talk on diagrams and haven't shown us any diagrams of what you're talking about. Well, I have created one, for the 1 million, standalone, diagram project. It's in the volume 2 of the "Future of Text." And, of course, I'd be happy to send you it as well.

Vint Cerf: I held this up earlier and I'm not sure how many people can see images, because they're five pages worth of imagery. But I'm holding up a 1,342 page book called, "Molecular Biology of the Cell." And, it is filled with diagrams, one of which, in the middle, looks a little bit like what Bob was saying. It's diagrams and texts together on the page, and it is essential to understanding this book, because the diagrams create a kind of abstraction for you. You may still need the text, to understand the meaning of the diagram. But the abstraction helps you organize the text, in some sense. And when and how you absorb it. So, I'm actually quite a big fan. I don't know if I'd go quite so far as Bob to throw away all the texts, or something. But I really believe that diagrams can be super helpful. Some people think very visually, and I'm one of them. Other people need text, other people need what do you call, serial rendering of the text. By having it read to them, if they're dyslexic, the audio channel is better than the visual channel. But I think it's a powerful notion.

Bob Horn: I agree with you, Vint, And I think you've extended my remarks a little bit beyond where I would go. In the sense that, I'm not recommending that, you don't read the text. That was stall. I think that there are different ways that different people absorb material. I just think that, for us in the modern world, to be able to diagram really well. Huge subject matters will give us an awful lot of interest things about epistemology, and also about just practical experience of dealing with the world. We still only have 24 hours a day.

Vint Cerf: There's something that Engelbart did, that I want to tie together with this as closely as I can. What Engelbart did with the text, is to say, "when you write the text, please organize it in such a way, for example, that the first sentence of this paragraph contains the

core of the paragraph. Or this paragraph contains the core of the chapter." That's an abstraction technique. Graphs and charts are abstractions. And you're doing visually, what Engelbart said we should do with words.

Bob Horn: Yes. And I think that, it's been shown very, very, carefully, that there are different structures of information, that many people can benefit from. For example, argumentation mapping. Great deal of what we deal is dispute. And Stephen Toulmin came up with a method of showing those kinds of disputes in a visual way. Other questions or comments?

Frode Hegland: There's a few. But just to throw one thing in here. I'm sure most of you remember Doug's '68 demo. The thing that I most often refer to back there is, that shopping list of going home. So, he drew a little map on the screen and put the different items. But they were instantly, then clickable, to open up more. So, what you're talking about here, having these diagrams linked, of course, we could use something like, image maps. And we could probably store it in the Exif or something like that. But I think it is really important what you're highlighting, because certain kinds of information, of course is more amenable to this, than other kinds of information. The authoring tools we have today are utterly lacking. When we had GoLive, back in the day, you could do some of this. You could draw on an image, put a link, boom, there it is. Can't do that, So, I think that what David and Fabian are doing is really important. It doesn't do the same thing at all. But it helps increase the literacy that, yes, information can be literal, more visually presented. And, on my side, I think interactivity is so hugely important. Lay it out once but allow people to completely mess about with it.

Luc Beaudoin: I mentioned Aaron Sloman earlier in the chat, and again basically, I guess there's a question I'm asking, and also a suggestion. The question is whether visualization folks have heard of the British Aaron Sloman, and whether they're using his work? And if not. it would be a recommendation. He was actually my PhD thesis advisor in COGS AI at Sussex in Birmingham, '90 to '94. And I'll drop a few references in the chat. But he's perhaps the first AI researcher to deeply look in, or classically look into the brain's visualization capabilities, in contrast to what was the original trend. Of course, was Fregean representations, or declarative representations. And this PhD thesis was on that. And then, he came back to this in 2012, when he was invited to write a paper for the Turing Centennial, and he's got the kind of bold conjecture that well, you know that Turing died young. His last paper was actually on morphogenesis, and he looked at chemical processes and spatial stuff, essentially. Ad Sloman's conjecture is that that was the direction in which Turing was heading, because it was obvious. Because Turing said something interesting about, in passing, I don't know if it was a thesis or a paper, where he mentioned that, computers can basically reason. They can, but they can't have insight. And Sloman's thinking that Turing was getting into this fundamental idea that, the computers weren't on the track with

essentially (indistinct) representations to basically map, to really, deeply understand, and replicate human thinking, something more chemical has to happen. So, Sloman basically launched a Meta-Morphogenesis project, which aims to understand how we understand things in visual terms. So, earlier I said, I'm not a graphing expert, but I'm actually personally, deeply interested in this visual spatial stuff. Which, I think traditional graphs are not... It's not about graphs there's other ways of representing information, geometric ways. So, I'm just throwing that out there. And I will mute myself and share the references in a moment.

Ismail Serageldin: I just want to say that there is a whole category of speech that is indeed imparting information that is acceptable to being mapped, and presented in diagrams and so on. But a lot of what we deal with, as humans and in society, in fact requires text to talk about things that are almost impossible to visualize or to graph in any way. I mean, you talk about things like empathy, like insight, like identity. I mean, these if you try to summarize them by saying these different things, create the identity of so on. You are, by definition, excluding much of the nuance, and the complexity, and the affinities that you're trying to reach between the writer and reader of the text. So, I would just I think there are many types of texts that are susceptible to being summarized graphically. But I think that, there is a significant part of our language that has been invented, in fact, to deal with things that we cannot even visualize in in any way. And we wouldn't want to lose these as being insignificant, or irrelevant.

Bob Horn: I certainly am not advocating, eliminating any of those. I appreciate certainly the empathy, and identity issues. It's just been my lifetime work, most of the time, to be involved with international task forces, and government projects, and business places that have to deal with the real complex issues of the world. And for example, the mural on the wall behind me is an information mural of nuclear waste disposal. And it covers a million years, because we have to think about a million years. And all the complexity of, not only geology and chemistry, but also the social, and political, and economic situations. And how you put all that together is a problem. That's the only thing I'm really advocating for the diagrams. I certainly am not suggesting at all, that diagrams take over poetry, and novels, and ordinary discourse around the table.

Frode Hegland: It would be fun though, if we did pretend that you guys did disagree. And have some kind of a smackdown session, where you would fight your corners, just to see what would happen. Even though I know you're both well, and I know you both completely understand that it's about how the different visualizations, whether a column was spread out can work. So, there's a comment here in the comments. From John Hockenberry says, "Text already excludes empathy, which grows out of affective interaction in face-to-face conversation." John, have you not read a good novel lately? Have you not felt for the

character more than somebody you might be standing next to at a bus stop? That's a strange comment coming from you, because you're such a great writer. So, I don't feel bad calling you out a bit.

John Hockenberry: Please, call me out. It's comparative though. I think novels have all of that. And you're absolutely right to point it out. But I think that, especially in the anxiety associated with screen-based communications, there's an increased consciousness of the ways in which, losing those affective channels denies a conveyance of empathy. Particularly at a time, in political speech, where there is so little face-to-face conversation.

Daniel Norman: Hello and thank you for having me. I have two questions that I don't know if they're practical to answer. But I want to put them out there. Number one, I'm curious as to the group's perspective on the boundary between, what is considered text, and just other symbolic gestalts in general. Notwithstanding the particulars of Unicode. It seems like somewhat of an arbitrary distinction to me. Especially in the context of various kinds of visualizations being mixed with text. The second pertains to representation of text, and other symbolics using graphs and some of the interesting possibilities with that. Thank you.

Frode Hegland: I'm going to give the word over to Sam. But, in comment on what you're saying Daniel, the reason I started the "Future of Text" is the answer is yes. Right, if we don't investigate pencil on paper poetry of the future, and also diagrams, and all that stuff. I think we're in deep, serious trouble. The one thing that I don't like is, those silly arguments about, "Oh, VR will be better." It's just so lazy. VR can add a lot, of course it can. Putting text on the wall, like a murder wall, like Chris Gutteridge calls it, can be very useful in some context. But what I'm really trying to foster community here, where we really, in fun ways, fight these things out. And the people in this community are so warm. I think we should be very honest, and push in all kinds of directions. And so, I think it's very appropriate that Sam may want to have the next comment.

Sam Winston: It's just a brief comment responding to Bob's invitation to make this large… The thing that strikes me is, what is the page in which that is drawn on. As in, obviously I'm speaking metaphorically here. Or am I? Is it the page that is drawn on? Is it the book? As in, if you've got the codex, and it's 500 pages long. Then that defines it. And then, if it's the tablet, if it's the screen. And I think one of the things that, is really hard to get our heads around is, basically the space in which everything is existing in. Which automatically decides how you navigate a multi-diagrammatic universe. I think the hyperlink is most probably the best we've got at the moment. Or is it? But I think it's incredibly, it's quite hard to get your head around, if we took that away, how could we do that? How could you navigate between multiple graphs, and multiple spaces? Where's the silence in it, and then that will define how big a thing you can map. How big that can be.

Bob Horn: Well, I work on the computer very often, and I would say most of the time. And then we have several choices for these, very large information murals. We can print them out on five-foot paper. And the mural behind me is a smaller version of the large one, which is on the wall, in the cafeteria of the United Kingdom's agency in charge of nuclear waste. It's printed out, and it's there. It can also be shown on huge screens. The biggest one I've seen has been six foot high by 26 foot wide, at the university of Illinois in Chicago. Where, with a click or with the same sort of gestures, that I use on my phone, I can bring up any one of a hundred different murals like this. And the people sitting in the audience, in front of that big screen, can also, from their laptops, add materials. So, this sort of flexibility is already in advanced, experimental states.

Sam Winston: With the nuclear waste, I remember reading about the difficulties of the half-life of nuclear waste is 10.000 years, isn't it? Which means that. We haven't got any, if you go to linear A and linear B, some of the earliest types of text. We haven't got any system of language that understands beyond a few thousand years. So, from what I've read around the conversations that people are having is, how do you make a sign that says, "don't touch this stuff." And that to me is fascinating. It's like, do you embed that in genetics? And I guess that's what I mean about the silence in the space around it. It's like, okay, can we say that language is genetics? Do you breed a creature that turns a certain colour when it goes near nuclear waste? Because genetics is a system that has passed on a language. The legacy of that is quite interesting. And then, I guess that I know that's kind of far too broad a thing but, if you are trying to write a sentence that gets passed on to the same half-life of a nuclear reactor then, how on earth do we do that? And from what, you must probably know a lot more about this myth. So, I'm on dodgy ground here but, from what I read it was like, people were looking into the history of theology. Some of the oldest systems that have been passed around down patterns, are a ritual. And that they're to me all interesting canvases. But yeah. So, I've gone off a piece of it.

Mark Anderson: I really just want to pull together some strengths of things I saw in the comments. First of all, was Mark Bernstein's comment about view specs. And I also picked up Brandel's comments about, how text can sometimes privilege things. It's just, I really like the presentation. I like this idea of the diagramming, and it's just a reminder of us all, to not be too mad in the physical print space. Yeah, this is natural to me to think, in terms of a book. But the view aspect of this, and it's something I'm used to, from using Mark's tools, is the ability to look at the same data, in a number of different ways. Because a lot of work needs to go into producing some of the wonderful user experiences we have, and diagramming tools, and things that we have. We often end up with a tool that, makes a form broadly, a form of diagram, and often what we need is a number of them, not necessary perhaps as polished, but

as different ways to put a lens onto the same underlying data. I'll shut up there because I'm really pulling strands together.

Bob Horn: I was just going to respond to Mark. And say that, there are very good beginnings of taxonomies of different kinds. And, what interests me is, not the either/or, that often we go to. But one of the questions is, how do we put words, and images, and visual elements that is shapes, and arrows and so forth, together in the most effective way? That's the book that I wrote 20 years ago. And it certainly needs a great deal of additional experiment. For example, I've collected arrows. Arrows are one of the most frequent elements in putting together words, and visual elements. I've got over a hundred meanings of arrows now. And I'm haven't published it because, I'm not quite sure how or where one would publish something like that. But it begins to be a database of those kind of things. And I'd be interested in working with others who get interested in that sort of thing.

Frode Hegland: That sounds like a beautiful subgroup of texts to discuss in depth. So, over to Rafael.

Text Chat:

16:03:15 From Mark Carranza : https://app.napkin.one/

16:03:52 From Vint Cerf/Google : background noise???

16:04:31 From John Hockenberry : Yay to Fabian, great stuff.

16:05:47 From Barrie Robinson : I'm very interested in collaborating with developers / computer scientists, I'm a designer and code, https://LinkedIn.com/in/uxrobinson

16:06:20 From Mark Carranza : A public napkin to look at:

16:06:36 From Mark Carranza : https://app.napkin.one/public/ M5oAoFAw0yVs42VmG6tNA76vRlE3

16:06:39 From Keith Martin : The examples of visual art created from text are very interesting, but for me they stray from the core point of text: the form purposely obscures the meaning. I have an interesting (to me) example of the halfway stage between text-for-reading and text-as-visual-art. The creator, a French design consultancy, calls this a 'bookster', and it is an entire novel typeset as a poster on one size of an A1 sheet. I have one framed here at home: Machiavelli's The Prince. It is utterly readable (as long as your eyes are good enough) while being graphically strong enough to justify space in a frame on my wall.

16:08:16 From Sam Winston : Thanks Kieth .. this address some of your comments .. https:// www.samwinston.com/books/child-of-books

16:08:29 From Sam Winston : Sorry …Keith

16:08:54 From David Lebow : See work of Chris north and the Gigapixel Lab at VTU on

large arrays.

16:09:00 From Jonathan Finn / Sibelius : Could try a VR headset – potentially an infinite screen

16:09:25 From Luc Beaudoin : Luc P. Beaudoin https://cogzest.com/about/founder/ lucb@cogsciapps.com @LucCogZest

16:09:27 From Eric Rangell : Very important to separate the data from the presentation to enable plug-in visualizations

16:09:39 From Gyuri Lajos : https://toolsforthought.rocks/

Rafael Nepô

Video: https://youtu.be/sL2j2Tbmudg?t=6172

Rafael Nepô [pre-recorded]: Hi. I'm Rafael and I'm the founder of "Mee," which is a platform used to organize information. But it's also more than a platform, it's also a tool, a library, and a methodology. So, I just wanted to showcase our vision for the "Future of Text" today, and how we fit in to the whole thinking behind text.

I want to start with this quote by Richard Saul Wurman that, we only understand something, relative to something we already understand. And I want to showcase the problems related to finding information. Basically, learning something new. So, when we go about learning something new, we tend to either ask somebody that knows about that subject, we tend to look for information in different places. And one of those places is "Google," obviously. We can also search for information using "YouTube" or "Wikipedia" or all these different platforms. And, as we go about searching for information, we start to open more, and more tabs.

If I want to find information about pixel art, I can type pixel art, and I can start to filter these websites to see what is interesting. I can also go on "YouTube" and search for pixel art and then, start filtering all of these contents related. And this is very troublesome, because the problem is that everybody begins searching from scratch, starts from zero.

If I were to start searching about pixel art today, I would start from zero. And then, tomorrow somebody else would start researching about pixel art, and they would also start from zero. The problem with that is that there's a lot of useless, starting from scratch, When we could basically, benefit from the people that came before us.

So, that we have curated content. This is the things we find, when we search for information. So, if I were to find information related to pixel art, I can find text, image, video, music, all of these different media types. And the way we go about it is that we tend to think of it as modular pieces of information.

Every one of these is a card, which is one unit, one medium. And then if you think in the horizontal way, this is one trail. And the whole board is all of the content related to that topic. And then, these cards are part of a card library, with different templates based on media types, or functionality. And, from these card libraries, we start to build these boards, where we can interact with the cards, so all of the cards they have a front, and the back. The front has the content, and the back has the metadata. And then, we can also go full screen with

these cards, and we can also have a table of contents that you can navigate quickly between these cards. If you want to filter information based on content type, or by date, or by creation. Any kind of filtering type we will support on the navigation, and filtering bar. And the card creation process is very straightforward, and then I'm going to jump to a quick demo, to showcase how it works.

So, here I'm in the platform. I have already curated a board related to pixel art. I can navigate horizontally and vertically. So, here I'm navigating between a trail, and I'm navigating between the trails, and the contents of the trails. Here, I can also click, and jump to a specific trail. And once I get to a trail that I want, if I want to know about what pixel art, I have a card that is a link to a "Wikipedia" page. I have some examples here, I have a gif. I have some articles that I'm able to access. I even have cards that are 3D objects that exist within one specific card. I can also have cards related to music here. I have "SoundCloud" or even "YouTube" cards. And this is interesting because I'm able to curate the narrative. I'm able to organize the content, based on the story I want to tell. And then from there, I can all I can share this link to the board. And whenever somebody is going to learn about pixel art, they can start from a curated area of content, that is organized based on their needs, or based on difficulty level.

And with this, I'm able to organize the whole web, in one single place.

Bob Horn: This is very interesting, Rafael. And I want to say that I want to get together with you, as well as the others. Something like 40 years ago, I developed something which we called, Information Mapping. Which was how to chunk information into small spaces. And I developed a company that taught technical writers in industry. We taught, in the 20 years that I ran the company, we taught 400.000 of them. Because the method was so important to them. So, there is a whole taxonomy, and structuring of the kind of cards that you put together. The method that I've talked about, Information Mapping, was based on small chunks of information of different kinds. And there are 12 to 15 PhD dissertations that have been done on the work, and so forth. So, and companies paid an awful lot of money over those 20 years to learn how to do it. So, you're really on to something. And you can catch up with 40 years ago, by talking with me, and I'll help you.

Rafael Nepô: Thank you so much, Bob. And I just wanted to say as well, both Vint and Wendy Hall mentioned HyperCard. But, it was only until later, that I found out about HyperCard. And when I did find out about it, I was like, this was developed a long time ago, and before I was born. So then, it was nice to discover that. And to get those references, and to get those manuals, and everything. But I'm happy that Ismail is here because, the whole project is actually based on the work by Poet Le and Henri La Fontaine and also Arthur Mee,

which was an encyclopaedist. So, everything is based on information sciences, and library sciences, instead of some other starting points. So, libraries are the future for me.

Bob Horn: I will say that the important thing for people is to structure the information. And that's what I'm offering to you. You don't have to use it, or somebody else will. Somewhere along the line.

Rafael Nepô: Of course. I'd love to talk to you about everything the past. Everything related to this is of interest. And you know, living legends are amongst us. So, I would love to catch up later, of course.

Christopher Gutteridge: When I first started learning about hypertext, because I was at Southampton and everyone at lunch kept going on about it. And I read the Vannevar Bush's classic text that, everyone shouted at me till I read some off. And it had a phrase in that about people browsing a network of information across lots of systems, and the trails do not fade. Yes, they do. They haven't done that bit yet. And we do get people who bought this product, also bought this product. But we really don't get people who were researching this on Wikipedia, are also looking at this, except in the context of trying to sell us things. So, I'm really pleased that we're sort of starting to try and get some of this happening.

Wendy Hall: When I heard Rafael speak, like Vint. I was like, "oh, this is a modern version of HyperCard." And there's nothing wrong with that, Rafael. Absolutely, it's exciting to see it. And Chris talked about, as we may think Chris is the paper, just so you couldn't… But I'm sure everyone knows that. We still don't really do what he talked about in that paper. And the thing for me is, that these memes run through for years. Before any of us were alive, people talk about these things. We've had the privilege of having the technology to realize them, and that technology changes all the time. And as the technology matures, and gets more sophisticated, we can build more than two or more sophisticated systems. But they're actually all built on the same principles. And I'm trying next year, I'm just what I finished by saying, and I don't know who I'm going to work with to do this yet. But I've got this huge multimedia archive in Southampton. Of pictures of the systems, we developed back in the 80s, and 90s, with HyperCard, and microcosm, and then the web. And I want to be able to follow all these memes through to what's happening today. And you're what's happening today. So, I hope you'll be in this book or whatever it is. I can't work out what I'm trying to do here, but I've got to do something to capture everything I did back then. And relate it to what's happening now. I've talked to Vint about this, but I haven't worked out how I'm going to do it, but I will. And I love the way you said, "my future is libraries." Libraries are a lot of our past, as well. I remember when Ted Nelson said to the Web Conference, "your future is my past." And that it's so important for me to follow these trails of endeavour. And, if you've reinvented something, there's nothing bad about it. It means the first idea was a good one, but

it was developed in a different time. I'll shut up, sorry.

Frode Hegland: Wendy, thank you for highlighting the importance of, well for me, it's not just the "Future of Text," it's also the current state of text. Even researching the amazing work that you did, as my supervisor, at my university, microcosm. There's the one book you guys made. There's not that much there, and it is crucial that we get what has been done, and also what we are doing now, to be recorded. So, yeah. That perfect point, thank you. Brandel, sorry about going all over the place.

Brandel Zachernuk: Not at all. I'm happy to cede the floor to the to the titans in the room. I love the work, and two things sort of jump out at me. One is that some people do have this information already. In the in the sense that, "Google" and others that are responsible for the routing, and the navigation that people undertake over the internet. In fact, as I understand it, many times when people bounce back out of pages and that's a black mark against the validity of that, as a step along the trail. And so, it is being sort of, leveraged but fairly opaquely, as I understand it, for the way that those trails are being currently made. I think that your call to render those things as more tangible. As artifacts for people to be able to follow themselves is very apt, and it's something that I've played with in the past. And the other question I have is, in terms of the authoring. What is the sort of mechanisms through which you make it easy, and how do you feel like that, sort of, impacts the number, and the quality of the trails, that sort of flow, as a consequence?

Rafael Nepô: Great question, Brandel. We tend to think of curation as three levels. In the first level, there's the personal curation, where you're able to compile your own point of view on that content. A second point of view would be specialists in that area. So, somebody of reference, a professional. I would be able to compile, and then obviously, influencers and all of those sorts, would be able to share their point of view on it. And then, the third point, which is where we'd love to reach someday, would be our personal curation as a platform. And that involves a little bit of every curation. Because one of the issues that, when we start to think about, is that, if a company, that does pixel art, if they curate pixel are, they're going to curate it based on trying to have it more related to the work that they're doing. So, if we have competing companies, then we're going to have competing curations. And one will not talk about the other. And then, what we'd love to do is to have curated boards, where we contemplate pretty much every facet, both the pros, and the cons, and the different ways of doing it as well. And the quick idea that I present is that, if we talk about for example, rice and beans. Here in Brazil, we use rice and beans for basic lunch. But, if we talk about rice and beans in Japan, they use it for pastries and sweets. It's not wrong to use rice and beans for pastries, or traditional meals, it's just completely different, and completely ends of the spectrum. So, we'd love to showcase how we would go about presenting rice and beans, in

different cultures, in different ways, in different points of view. We don't view things as right or wrong. We just present different points of view, so that people can base their necessity, on the information that they see.

Frode Hegland: Thanks, Rafael. We're now going to go to Dave Lebow, who's going to do five minutes live. I will keep it to the time. But I just wanted to repeat in a different way, what I said earlier, about the chat. If you'd like to, there are some new people here, which is just truly wonderful. If you want to introduce yourself, please do so in the chat. This will go in the book. So, it'll help us with our internal networking. If you want to write what you're doing, or what you're interested in, that would be super lovely. This chat will not be thrown away. We also have the "Google Doc," which we aren't using as much today. And I think that's fine. If you prefer to use the chat, it's really personal preference.

Vint Cerf: I wanted to mention to everybody that, while I was at the Super Computing Conference, I played a six-minute video that you prepared, describing "Reader," "Author," and "Visual- Meta." That would be useful for everyone on this call to see, if they haven't already seen it, or maybe you're going to show it anyway. But it was very useful summary of the functionality that I think everyone would appreciate.

Text Chat:

16:09:46 From Luc Beaudoin : (also am https://CogZest.com)

16:12:13 From David Felsmann : Great Luc, let's stick our heads together soon…

16:12:30 From David Felsmann : https://www.napkin.one/

16:13:15 From Peter Wasilko : I hope we can get each speaker's slide deck after!

16:14:18 From Waliya Yohanna : Hello everyone! I am Nigerian

16:14:39 From Peter Wasilko : We need Purple Numbers *in* our Diagrams!

16:15:34 From Gyuri Lajos : should not it be META-Diagramming?

16:15:51 From Gyuri Lajos : Bootstrap a self-improvement process

16:16:01 From Brandel Zachernuk : It's also a large project, so a MegaMeta-diagram project at the least

16:16:38 From Gyuri Lajos : diagrams are but Viewspecs

16:16:45 From Daniel Norman : A diagram is a particular kind of graph projection mindful of certain elements of gestalt psychology.

16:17:43 From Bob Horn : hornbob@earthlink.net

16:20:01 From Daniel Norman : All knowledge and conveyance thereof is about adjacencies in that graph. It logically follows that visual adjacencies should represent semantic

adjacencies.

16:20:01 From Mark Carranza : Author Erik Davis (currently https://techgnosis.com/) in the past highlighted the integration of text and image in medieval and alchemical texts

16:20:12 From Rafael Nepô : Reminds me of the work of Fritz Kahn

16:20:17 From Rafael Nepô : https://www.fritz-kahn.com/book/

16:20:24 From Eric Rangell : 100000 groups of 10 people, 1000 people organizing the output of 100 groups…?

16:20:26 From Mark Bernstein : Are diagrams viewspecs? Or do view specs describe a desired diagram?

16:21:03 From Duke : diagram zoom out to simple, zoom into detail/complexity

16:21:12 From Gyuri Lajos : @Daniel Norman yes it's all about adjacency and Symmathesy Mutual Learning

16:21:33 From Gyuri Lajos : And when you ad just one link the entire world changes

16:22:19 From Karl Hebenstreit Jr : Argumentation mapping: http://www.cognexus.org/issue_mapping_faqs.htm

16:22:45 From Mark Carranza : An older term for images with text: "Illuminated manuscripts"

16:23:01 From John Hockenberry : nice

16:23:30 From Brandel Zachernuk : I would say that the authoring is essential, but would lay the blame much earlier than most – that movable type privileges the textual form in a way that is pretty hostile to the integration of diagrams. Having a fluid authoring environment that allows people to comfortably produce

16:23:36 From Fabian Wittel : Nice, thanks, looking at that one!

16:24:04 From Brandel Zachernuk : Text that can be read and parsed at the same time as drawings that can mean things is a necessary precondition for proper parity.

16:24:15 From Jack Park : argument mapping is distinct from both issue mapping and dialogue mapping.

16:24:26 From Frode Hegland : Indeed Jack

16:24:57 From Luc Beaudoin : There's an AI researcher who was perhaps the first and still most dedicated classical AI researcher on diagrammatic/visual reasoning, which he unfortunately first referred to in terms of "ANALOGICAL REPRESENTATIONS") : Aaron Sloman at U of Birmingham that I mentioned earlier. He was my thesis supervisor (1990-94, originally at Sussex).

[Sloman – Diagrams in the Mind?](https://www.cs.bham.ac.uk/research/projects/cogaff/

sloman.diagbook.pdf)

[Sloman

AFTERTHOUGHTS ON ANALOGICAL

REPRESENTATIONS

](https://www.cs.bham.ac.uk/research/projects/cogaff/sloman-afterthoughts.pdf)

https://www.cs.bham.ac.uk/research/projects/cogaff/misc/meta-morphogenesis.html

16:25:31 From Luc Beaudoin : so question is: is his work being consulted in this field?

16:26:22 From Daniel Norman : I would be curious to understand the group's perspective on the boundary between "text" and other symbolic gestalts. Notwithstanding the particulars of Unicode, it seems an arbitrary distinction to me.

16:26:22 From Peter Wasilko : Feel free to connect with me in LinkedIn: https://www.linkedin.com/in/peterwasilko/

16:26:24 From John Hockenberry : Text already excludes empathy which grows out of affective interaction in face to face conversations

16:26:43 From Jonathan Finn / Sibelius : Re Turing's last paper on morphogenesis, I was told about it by a biophysicist at Cambridge (Corpus Christi) the other day. He said it's a masterpiece that hasn't yet been fully appreciated & absorbed by his field.

16:26:53 From Karl Hebenstreit Jr : Thanks @Jack. I was just thinking I'd want to follow-up with you as I was hearing them mention argumentation mapping, and you appeared!   Need to follow-up with you on the distinctions as well as an update on my dissertation

16:26:58 From Jonathan Finn / Sibelius : He said it's also unusually long for a paper

16:27:04 From Vint Cerf/Google : note popularity of infographics

16:27:33 From Mark Bernstein : https://www.dna.caltech.edu/courses/cs191/papaerscs191/turing.pdf

16:28:14 From Vint Cerf/Google : but, Bob – there is the popularity of graphic novels

16:28:16 From Luc Beaudoin : a good review of it [The Chemical Basis of Morphogenesis on JSTOR](https://www.jstor.org/stable/92463?seq=1)

16:28:16 From Jack Park : +1 @Mark

16:29:08 From Vint Cerf/Google : bob, where can I get the nuclear waste disposal diagram,?

16:29:46 From Frode Hegland : Why Vint, do you have nukes to dispose of?

16:29:49 From Frode Hegland : :-)

16:29:55 From Vint Cerf/Google : yes

16:29:55 From Eric Rangell : If we encourage consumers to contribute diagrams in their own personal/shared spaces with process for pulling in community contributions over time to

extend a work and offer alternative visualizations of concepts

16:31:02 From Luc Beaudoin : The difficulty of understanding how we reason visually is underestimated

16:31:02 From Jonathan Finn / Sibelius : These days 'text' just means something you can easily type. Making the distinction from graphics fairly arbitrary.

16:31:04 From John Hockenberry : Well said

16:31:10 From Luc Beaudoin : text is a lot easier to reason with.

16:31:20 From Vint Cerf/Google : what to make of the popularity of short text (tweet) and short videos?

16:31:23 From Luc Beaudoin : but visual reasoning is much more challenging and hence fascinating

16:31:25 From Vint Cerf/Google : lack of time, mayhbe?

16:31:48 From Eric Rangell : Thinking about Ted Nelson's slabs in Xanadu Space where text on slabs connected to other slabs using tetroids

16:31:58 From Mark Carranza : An arrow picture points better then the word arrow

16:32:00 From Luc Beaudoin : again : not all visual reasoning is *graphs*. Think : geometry

16:32:08 From Mark Bernstein : Very interesting account of early thought on text and image: THE RIDDLE OF THE ROSETTA https://amzn.to/3nw8ZuF

16:32:37 From Luc Beaudoin : ta: Mark: that's very interesting

16:32:43 From lesia tkacz : Sorry I have to dash now. Really enjoyed this – thanks everyone and thanks Frode!

16:33:13 From Frode Hegland : Later!

16:33:39 From Gyuri Lajos : Great "Symposium" sorry I have to leave, looking forward to the recording, and be joining the session tomorrow. Thankyou all.

16:33:59 From Mark Bernstein : Lots of serious discussion, for example, of whether abstraction is possible in pictographic language. Also whether monosyllabic language could accommodate contingency.

16:34:00 From Brandel Zachernuk : I would argue the question of the difference between text and other symbols is only meaningful because of the technical implementation aspect we're saddled with, just like the previously pivotal distinction between black and red text when physical ink mattered

16:34:09 From Eric Rangell : Murals as depictions one point of view of history by are explored in Apple TV's Foundation – comments about choice of colors as a means of expression of subtle points by the painter

16:34:17 From Luc Beaudoin : re : THE RIDDLE OF THE ROSETTA, there's a huge memetic / evolutionary angle here, which I think has practical implications

16:34:25 From Luc Beaudoin : (& gesture)

16:34:29 From Frode Hegland : Foundations is a great poetic example

16:34:38 From Karl Hebenstreit Jr : Engelbart Mural: https://www.visualinsight.net/portfolio/

16:35:02 From Peter Wasilko : I once read that SpiderWart blooms will change color in the presence of elevated background radiation.

16:36:03 From Panda Mery : https://web.archive.org/web/20210126030051/https://urbigenous.net/library/WIPP/

16:36:03 From Frode Hegland To Wendy Hall(privately) : Can I call on you to speak soon?

16:36:13 From Frode Hegland To Pip Willcox (she/her)(privately) : Are you here can I call on you?

16:36:20 From Pip Willcox (she/her) To Frode Hegland(privately) : Hello. I'm here and fascinated but not able to join via audio.

16:36:27 From Frode Hegland To Pip Willcox (she/her)(privately) : Ok :-)

16:36:45 From Peter Wasilko : So many new books to hunt down. Thanks for all the pointers.

16:36:56 From Jonathan Finn / Sibelius : We regard emojis as text currently, but not logos. But what about the Apple logo? It's in Unicode so now it's text

16:37:15 From Jonathan Finn / Sibelius : But not the Intel logo!

16:38:06 From Alain Marsily / Quidzi.com To Frode Hegland(privately) : Frode, if you have some moments, I might present quickly Quidzi (to you) because we are giving some answers to some today topics. Many potentials even if we are just at the beginning with Quidzi. Just tell me

16:38:21 From Luc Beaudoin : I'd love to see that, Bob!

16:39:24 From Keith Martin : I guess the Apple logo in Unicode makes it a glyph, a text element of sorts. But is it actually text?

16:39:52 From Daniel Norman : Shared experience ~ Analogy -> Cognition

16:40:49 From Jonathan Finn / Sibelius : I think Unicode characters correspond pretty closely to text in the popular imagination. Partly because there's a certain uniformity of size/shape

16:41:13 From Jack Park : The original Yahoo! search was a kind of curated folksonomy

16:41:51 From Keith Martin : But is a single glyph 'text'? Even when it is a representation of a graphic, not even a textual element that makes up part of words?

16:42:14 From Mark Bernstein : !

16:42:45 From Vint Cerf/Google : this makes me think of hypercards….

16:42:58 From Rafael Nepô : It's the new version of Hypercards Vint~ ;)

16:42:59 From Rafael Nepô : Hahaha

16:43:30 From Mark Bernstein : Also recalls ZigZag.

16:43:31 From Wendy Hall : I was just gong to say that.

16:43:39 From Luc Beaudoin : curated starting point. cool

16:44:34 From Peter Wasilko : Is there an embedding story for injecting cards into existing web sites?

16:44:47 From Rafael Nepô : Not yet Peter

16:44:57 From Rafael Nepô : But we have it on our list

16:45:18 From Peter Wasilko : Loop me in when you need a test user for that!

16:45:26 From Frode Hegland To Vint Cerf/Google(privately) : If we go over 15 mins can you stay?

16:45:36 From Duke : yes rafael i'd love to test: duke@th.ai

16:45:41 From Frode Hegland To Vint Cerf/Google(privately) : Format changed to be more presentation and dialog

16:46:11 From Peter Wasilko : What I liked best about Hypercard was its notion of different interaction levels.

16:46:13 From Luc Beaudoin : I used Hypercard in 1989 as part of my honours thesis (along with Pascal). was on evolution of vision http://summit.sfu.ca/item/10794

16:46:48 From Jack Park : https://hypercard.org/

16:46:55 From Peter Wasilko : I remember Object Pascal, that was a neat language.

16:47:25 From Eric Rangell : Notice the perspectives of a person with 40 years of study in a field and young people starting to work in the field. Effective mentoring across generations presents unique communication issues and perceptual framework differences.

16:47:38 From Frode Hegland : Right ton Eric

16:48:18 From Mark Bernstein : In 1987, I was sitting at the first ACM hypertext conference and realized that the fellow inn the next seat was the legendary Bob Horn!

16:48:59 From Peter Wasilko : Where could I learn about the Research Excellence Framework, Wendy? It sounds intriguing.

16:49:26 From Frode Hegland : It's not Peter! (Wendy feel free to reply if you like…)

16:49:56 From David De Roure : https://www.ref.ac.uk/

16:50:05 From Eric Rangell : Sounds like you want Ted Nelson's Xanadu, Wendy.

16:50:23 From David De Roure : I remember that! It was the panel about the 404

16:50:30 From Peter Wasilko : Thanks for the link, David!

16:50:35 From Pol Baladas/Fermat.ws : Wish we could have Ted here with us today

16:50:38 From Rafael Nepô : nepo@mee.cc if anybody wants to reach out.

16:51:24 From Frode Hegland To David Lebow(privately) : Ready for a 5 min presentation?

16:51:25 From Luc Beaudoin : true. reinventing. Mark Bernstein mentioned a paper I had not read, 1989, by Amy Pearl , that' ssuper pertinent to what I've been doing since 2001

16:51:45 From Peter Wasilko : What ever became of Hyper-G?

16:52:17 From Barrie Robinson : Does anyone have any thought on the rigidity of text? For example, as a creative director, I am often presented reports as fact with very little interpretation. This usually presents a challenge whereby I have to help a client walk back and rethink.

16:52:28 From Mark Anderson : <cough> Microcosm isn't entirely dead: https://eprints.soton.ac.uk/427048/

16:53:28 From Wendy Hall : Amy Pearl's work on "open hypermedia systems" was one of our key inspirations for Microcosm.

16:53:50 From Wendy Hall : I think there is a version of Hyper-G still running at Graz

16:54:05 From Eric Rangell : Ted just wanted to build what he wanted. He had a specific vision that came out of his experiences. All his writings are seeds for us to sow if we want to.

16:54:08 From Mark Anderson : I'm hoping to try and design some teaching content for the above to allow learning/resaerach /exploration in a non-Web space. Not a binary good/bad, but hypertext done differently (Of course Microcosm pre-dates current networked working).

16:54:15 From Wendy Hall : And we definitely still have a working version of Microcosm thanks to Mark and others at Southampton

16:54:16 From Barrie Robinson : Could the person who was talking about creating a book (from Southampton) please send me a linked in request /uxrobinson, I'd be keen to help with your book

16:54:36 From Frode Hegland : Please feel free to introduce yourself here in chat, who you are, what you are working on and what you are interested in. It will go into the book.

16:54:42 From Duke : rafael, re hypercard, stacking looked cool (prioritizing high value cards on "top" of "3d" stack

16:55:12 From Rafael Nepô : We plan to use the Z axis for History and Changelog

16:55:13 From Luc Beaudoin : @Raffel , I know someone who is starting a company in personalized search. I can connect you.

16:55:21 From Daniel Norman : Daniel Norman here.

16:55:34 From Mark Bernstein : Keep in mind: you can reimplement any of the pioneering systems by reading the manuals, in remarkably little time. A summer project!

16:55:40 From Rafael Nepô : I'd love to Luc, please nepo@mee.cc

16:55:45 From Daniel Norman : Lol. No carriage returns here. Disregard ^

16:55:52 From Vint Cerf/Google : I need to drop off for another meeting in a few moments

16:57:08 From Eric Rangell : Eric Rangell, Pennsylvania, researching how Ted Nelson's ideas/data structures can be carried forward to decentralized web technologies.

16:57:45 From Vint Cerf/Google : departing – thanks for a great discussion – took many notes.

David Lebow

Video: https://youtu.be/sL2j2Tbmudg?t=7292

David Lebow [live presentation]: The last 10 years, I've been working on a solution to somewhat ubiquitous problem, which is, "how can an individual, or group of people combine pieces of information, from multiple online sources, to produce something of value, solve a complex problem, or generate new knowledge" and what we have developed is, a social reading and multi-document sense making platform called "HyLighter."

The origins of "HyLighter" go back to when I was a graduate student, trying to write my first paper, in 1992. And, I think everyone has some version of what you're seeing here. As I'm trying to cope with all these snippets of information. How do they fit together and link to what I already know? So, when I was invited to write an essay for "The Future of Text" and then, got the book I thought, "oh, here's an opportunity to do sort of a crowd sourcing of a forecasting exercise. What does the future of text look like?" And so, this would take much longer to actually illustrate everything. But essentially, I imported the essays into "HyLighter." I annotated the high value fragments, added comments, in some cases, added frag excerpts from other documents, and then, we do this thing where, you move HyLights into this application we call the HyBoard, hypertext clipboard to create what's called, a HyTrail. And then, tag each HyLight.

So, what that looks like is, you've captured some text, add a comment, and then, if you did it with other people, you have this mapping, where yellow is the logged in user, blue is other people, and green is overlap, and each section is related to a comment. And then what you can do is, you go through the 170 essays that I've marked up, add a set of tags, which turned out to be about 20 different tags, and then copy to the HyBoard. You see how, as I go down through the list, I can move things over to this other application. In fact, if I want to I can say, copy all. So, everything in a particular document moves over, and you have immediate links back to the exact location, in the document where it came from. And so, this is what I came up with, this list of tags, and then "HyLighter" has some sorting capabilities. So, I arranged the list into an initial narrative structure. So, there were comments about the purpose of the book, and then extended mind, and text definition, and evolution. And so, all of these tagged, all the HyLights that had the same tags, were grouped together. And in this order that, has sort of a narrative structure. And then, what I did was, using "HyLighter" I exported the contents, and printed them. I had 600 snippets, from the 170 essays. Printed

them out on heavy stock, cut them up into snippets, and then, re-arrange them into categories, which turned into nine sub topics, or chapter heads, and this became the structure of a narrative. So, this relates back to Fabian and Rafael's work which is, how do you take all this information and put it into a more memorable form. And so, this becomes a narrative structure that looks like this. So, over here on the right are 546 highlights, arranged in an order with, sometimes I can add notes that aren't linked to a particular thing, headings, and then, each of the fragments, and the related comment in an order that makes sense, and tells a story. And then. just very quickly to finish up. I then went through. I imported the results the contents of the HyTrail, and highlighted every key term that I thought would be of interest. And then, I dropped the key terms into "Google Scholar" and other places, and started collecting documents. I now have over five thousand documents, many of which are directly related to the "Future of Text" and what I did was, I took, printed out the entities, and I'm actually in the process now of arranging them into categories. And the idea is, looking at this screen I'm talking to a variety of people, some of you are on the call now, where an intelligent machine would make a model of the reasoning process of the assembler. That is me, in this case.

In creating the HyTrail where each of these HyLights has coherence. One to the next. Local coherence. And then the chapters give a kind of, global coherence. The machine makes a model of that, points at my repository of 5.000 plus documents, and brings back, not just relevant documents, but curated fragments with suggestions about what slot they go into. So, the machine is essentially delivering the same thing that's over on this side. A search result that has immediate, instant, links to the location of curated fragments, across all these documents, with a suggestion, "oh, this looks like it fits in slot three or four." And then, final slide.

Anyone that's interested in participating in a pilot study, we have a brand-new version of "HyLight," what I just was showing you is a prototype. Our work with the data that has come out of the "Future of Text" project, please get in touch with me, as we're recruiting at this time. Thank you.

Frode Hegland: Thanks, David. Thank you very much. In particularly, printing it out. Just really illustrates the different kinds of technologies, and not being prejudiced in one direction, or another. If you can un-share screen, please. Then I can more easily see who have some comments. There's got to be comments and questions after that. I'm going to talk about Linnaeus, until someone puts their hand up, and how he, kind of invented the index card. Just to see this come back in such a way, it's just quite wonderfully fascinating. Luc?

Luc Beaudoin: Does your software have an API to get the links? The reason I'm asking is,

that makes it very helpful. We've got a little manifesto going. Actually, was in the "Future of Text" originally. The first volume, or the last volume of the "Future of Text." Yeah, I guess was volume one. I wrote with somebody else a manifesto for ubiquitous hyperlinking. So, that's the question, can I get the "HyLighter" being API?

David Lebow: First of all, we have the ability to pass data back and forth between applications, from "HyLighter" out and then in. And we have something like, I think what you're talking about, every fragment and related comment, you can create a two-way link to any other fragment comment, in any other document in the set. And we're actually bringing in a kind of transclusion, where you see the link, it'll say there's a link here, but when you mouse over it, will pop up that section of text. But, as far as integrating with other applications, that's a big part of the architectures designed for that kind of plasticity.

Mark Bernstein: I just really want to say a big thing today because, one other thing that's sort of been discussion for the small group, we've been in there doing the regular Future of Text, Office Hours, we've been talking about ways to do some visualization of what is in the current corpus of Future of Text. And, actually have talked about, "well, how do we get some thematic mapping of what we have so far? And what's arriving?" And I've been consciously doing this, been really, really, interesting to see what you've done, because I know it wasn't a small amount of work to get this far. And I think that'd be really interesting to take some of what you've done and use effectively in some of the topics. And things you pull out as a means to do some thematic exploration visualization as well. Because one of the ideas is for instance, we have a very broad church here, all sorts of interests. So, if say, "you come to the 'Future of Text,' and you're interested in. I don't know you know typography, or something." Well, what else is there around that you know? It's one way of diving into a wide corpus. To start with the things you're more familiar with, and it's somehow easy to get more traction that way, often. And then you can spread out to other exciting stuff. But, I just want to say, thanks for what you've done. Because I think it has a usefulness even beyond what you've been doing. Obviously, with a development ongoing, with your own tool. So, that's super. Thanks very much.

Brandel Zachernuk: This is really cool work. I've sort of dove in and looked at it last night, as well. So, some of the deeper dive that you mentioned, taking an hour for. I'm curious, it strikes me that, some of the numbers that you were throwing out about the number of tags, the number of cards, and things like that. Sort of, strongly implies that, there is an expected scale of data. And sort of complexity of representation. Do you have any thoughts as to, the sort of the way in which your system can be amenable to multiple layers of abstraction? Levels of detail to be able to understand things from different sort of distances as it is.

David Lebow: Yeah, that's a good question. So, a HyTrail is kind of a conversation. And so,

we have this idea of multiple conversations, and those conversations can exist, at different levels in the system. You could also combine HyTrails, right? And actually, somebody asked, "well, how do you get to the unexpected?" Well, you can also, with all of the different terminology that, when you're doing this kind of work, you can look at, homonyms, and synonyms, and different parts of speech, and get the computer to go out, and say, "well, here's something that seems to be related to what you're working, at some level of abstraction. But it's not in your HyTrail." And then, this really is partly a solution to you. Information overload and being able to tap into the ever growing landscape of information. I wanted to mention one other thing that, I think is one of the more fascinating aspects in creating the HyTrail. Because of the immediacy of the response to the system, it really it helps to induce the flow state. So, I'm finding myself feeling like, "wow, I'm just learning at a faster rate or somehow the whole experience is more pleasant." I think, what HyLighter is doing is, combining deep reading when you're highlighting, with the dopamine hit of surfing. Which is when you're going down through the HyTrail, and reviewing, and when you review your reviewing from multiple perspectives, sort of related to your question, at different levels of detail, and abstraction. And, if you let your curiosity go, you can just end up stumbling on all kinds of things that you would have never gotten to. But the system kind of facilitates serendipity. We call it a serendipity trapper, in fact.

Daniel Norman: Yes, thank you. Really fascinating stuff. I'm curious, in addition to high quality user interfaces like this, and workflows. I'm curious as to, how you represent this data in the back end? And how you envision data interchange, working facilitating these kinds of things? how central or not is data interchange?

David Lebow: I'm not the right, from a technical standpoint, I'm not the guy to answer that question. But I can tell you that, the idea is to enable all types of files, and all types of media to be brought into the system. We actually piloted marking up images, which is really fascinating. And also, video. So now, one thing I didn't show you is that, you can move, drag and drop the HyLights within that column to different locations. And so, it's almost like a film editing system to refine your narrative. And the secret sauce is that the user is engaging in coherence monitoring. How much sense is this making? Am I telling the story I want to tell? From a global standpoint, have I covered everything? Do I have the right chapter headings? And then, within each chapter are the pieces of information, telling a story in a coherent fashion. And that might involve going to a video, or to an image. And the whole idea is, to be able to take in many different sources. And not necessarily have access, because of copyright, and so forth. But you can have the snippet in there. And in some instances, you won't have the link back to its exact location. And that's okay too. It's just less context for you, right?

Daniel Norman: And, to put a finer point on my question. How do you imagine multiplayer mode or interacting with other workflows?

David Lebow: I'm glad you asked. This is the other fascinating thing. And some of this stuff emerged for me in using the system. People maybe are familiar with the concept of stigmergy. The idea that, the structure provides all the information that participants need to know what to do next. So, this comes from the study of insects. How do termites build these colossal structures? Well, once you have the initial structure of the HyTrail, the chapters, and some coherence in the slots, then anyone and come in and say, "oh, I've got this little piece of information. It fits in slot 23, right?" Because the structure is guiding that. So, we are not done, we're just starting to do some research on this idea of collaborative HyTrails, and what that looks like, when you bring many people together, to create that narrative structure. But you don't need a centralized authority, because the HyTrail itself provides the information that people need to know. What's relevant and where things fit, within the emerging storyline.

Text Chat:

16:57:46 From Daniel Norman : daniel@danielnorman.net – Working on symbolic analogical hypergraph knowledge representations, graph drawing (text/visual rendering) and Interpersonal knowledge management.

16:59:44 From Jack Park : https://www.hylighter.com/

17:00:44 From Fabian Wittel : Got to run on time – thanks everyone, see you soon!

17:00:55 From Jean-Francois Vallee : Jean-François Vallée. Just a comp lit PhD and prof interested in the future of text. I've done some digital editing (e. g. of a French Renaissance satirical dialogue: a TEI/XML encoded edition and a web WP version with notes and potential interaction with hypothes.is). Looking for ways of making writing/reading more dialogical. Honored to be listening to such luminaries…

17:01:29 From Wendy Hall : @Barrie I'm Wendy Hall from Southampton thinking about using my multimedia archive of my work at Southampton over the years as the basis for a "book" but it can't be a traditional book. Maybe I can produce it using Visual-Meta. I don't really do Linked-In. You could email me wh@ecs.soton.ac.uk

17:01:33 From Rafael Nepô : This is amazing hahaha

17:02:07 From Frode Hegland : I love this Dave, all the way back to Linnaeus!

17:03:32 From Brandel Zachernuk : Brandel@Zachernuk.com, I mostly use Twitter to list my work https://twitter.com/zachernuk – I'm exploring how to express and consume information based on the new and emerging capabilities of technology, and trying to integrate more of how we understand what we know about human perception and cognition, particularly

through Extended Mind Theory.

17:04:05 From Mark Bernstein : Pertinent to this problem (and an entertaining read): McPhee, J. 2013. "Structure: beyond the picnic table crisis". The New Yorker. January 14, 2013. Reprinted in McPhee, J. 2017 Draft no. 4 : on the writing process. Farrar, Straus and Giroux.

17:04:24 From Mark Anderson : Currently reading about early historical attempts at indexing. Nice to see paper cut and paste is *still* not obsolete.

17:04:28 From Mark Carranza : Got to go as well. I'll see if I can get out of bed at 2am…

17:04:37 From Alain Marsily / Quidzi.com : Alain Marsily, Belgium. Working a new app (Quidzi.com – The all-in-one communication tool for your notes, files, presentations and media). A new way to (co)create, publish and update your content to your audience (in a few words). Beta will be available in a few weeks/early next year. contact : amarsily@quidzi.com. Private demo on request.

17:04:52 From Mark Carranza : mc2@archive.org, mark.carranza@gmail.com

17:06:17 From Peter Wasilko : Peter J. Wasilko <peter@wasilko.info> <https://www.linkedin.com/in/peterwasilko/> — Researching University Futures <https://founders.quadrangle.info> World's Fairs, and Prototype Communities of Tomorrow; also deeply into End User Programming, Tools for Thought, and Collaborative OPACs.

17:07:38 From Peter Wasilko : I am particularly interested in tooling for Literate Programming as well.

17:09:16 From David Felsmann : Have to run as well: Thanks everyone! Contact and playing with the Napkin prototype https://napkin.one/

17:09:24 From Frode Hegland : Later! :-)

17:09:51 From Mark Bernstein : Mark Bernstein (bernstein@eastgate.com). Hypertext research, designer of Tinderbox https://www.eastgate.com/Tinderbox/, and working on the intellectual history of hypertext.

17:10:40 From Peter Wasilko : I swear by Tinderbox as the ultimate meta-structured-content-editor.

17:10:55 From Alain Marsily / Quidzi.com : I suggest to take a look to Liquidtext

17:10:58 From Pol Baladas/Fermat.ws : Pol Baladas, founder at Batou.xyz where we rethink how people interact with tools, computers and ideas. A Lab + Product company combining Engelbart's ACR + PARC philosophies.

17:11:09 From Mark Anderson : FWIW, I'm also a long-time Tinderbox user.

17:11:25 From Frode Hegland : Yes LiquidText is brilliant work by Craig Tashman, really interesting

17:11:28 From Brandel Zachernuk : Thank you, this is an amazing symposium and I'll be joining tomorrow and future office hours. I look forward to continuing all of these threads!

17:11:35 From Frode Hegland : :-)

17:11:43 From Rafael Nepô : Cheers!

17:12:26 From Pol Baladas/Fermat.ws : At Batou.xyz we recently released Fermat, a computational space to organize your thoughts & create composable tools without technical knowledge (modern hypercard with end-user programming). Try it: fermat.ws

17:14:02 From Rafael Nepô : I love how David modularised the whole book.

17:14:10 From Peter Wasilko : fermat.ws points to a page trying to sell the domain

17:14:23 From Eric Rangell : Ted Nelson believed ZZstructures (orthogonal connected dimensions) could subsume all other structures. I'm trying to envision if it could be an interoperability layer while exploring other tech like GraphML

17:14:35 From Peter Wasilko : Oops, my bad, I had a typo in it

17:14:42 From Peter Wasilko : The link works.

Frode Hegland

Frode Hegland: Thank you very much, Dave. We've talked about this a lot, in our weekly meetings. And to see it come together, and for you to present it that clearly, was really, really, nice. So, we have one presentation left, and it's mine. After that, we'll discuss that as normal and then, since we're already way over, which has never happened at "The Future of Text." But I'm actually very pleased that, today we took it a bit more casual. Nobody has to catch any taxis to get home, and people who can make it, can make it, and cannot, cannot. So, after that we will discuss a little bit how to continue the dialogue. But here I will share a screen, for the last time.

I said in my introduction poem, we can write our way out. For those of you who do not know, that's a line from "Hamilton." And for those of you who don't know, what in the world have you not seen "Hamilton" yet? It is a love story to the power of writing. It is the most incredible thing, and if you ever want to have coffee with me, that'll be at least, half the discussion. Anyway, here's five minutes on "Visual-Meta" and how it's implemented in "Reader" and "Author":

Frode Hegland [pre-recorded]: I'd like to show you the PDF viewer, "Reader," followed by the authoring tool, "Author." But first, I'd like to introduce you to "Visual-Meta," which is our approach for embedding metadata in PDF documents robustly. And which "Author," and "Reader" supports. This is what paper meta looks like. In most books, on the first page, there's information about the book. This is metadata for PDF, not much metadata at all. So, back to the metadata in the book, it's on the first page. So, what we've done is, essentially to take that kind of metadata, and put it at the back of the document. In this case "Visual-Meta" appended to the ACM Hypertext Proceedings in a pilot. It's on a new page, after the normal contents of the document. The formatting is inspired by the academic standard "BibTex." And this bit, is actual "BibTex." There's much more "Visual-Meta" can contain, which I can't go into today. But you can see more on our website, I'll put a link up at the end. I think it's really important to highlight that, "Visual-Meta" is appended to the back of the document visually. It's on the same level as the contents of the document. It's not in some external data resource. This means that a document with "Visual-Meta" can even be printed, and no metadata is lost. This is important, since we expect these documents to be readable with full

metadata in a thousand years, at least. Here's a core benefit, citing through just copy and paste. When I copy from "Reader" and paste into "Author," the result is not plain text, it's a full citation. This is because the full "Visual-Meta" was added to the copied text on the clipboard, and both knows how to parse it. Thus, making it a citation, robustly, with no manual work done to introduce errors. In "Author" I can use escape to go in and out of full screen. I have a focus mode which fades all text outside the paragraph with my cursor. And a bold view, which fades everything which is not bold, while also retaining the headings. To make a heading, I Control click on the text I want to turn into a heading and choose the level of heading I want to assign. Here, I can see the keyboard shortcuts, making them quick and easy to learn. With a real heading, not just big text, I can fold the document. I can also select text and do Command-F for find, to find all the occurrences of that text in the document. Then click on an occurrence to jump to it, or Command-F again to exit this view. Notice the headings also appear in this view, as they do in the view of the named entities of the document. I can double click in the margin to write a note to myself. If I double click on this text, the result is a search in the document same as Command-F. If I need to add a note to a specific section, I can Command Click on a heading. when I fold the document now, that section has an asterisk to remind me that there is a note there. To cite, I can quickly search for a book by its author, or title. You can even take a picture of a page of a book I'm reading, copy the text from that picture in photos, and use that, since this search is for books by body text as well. Thank you, "Google" for "Google Books." And thank you, "Apple" for live text. At the bottom of the screen it says, write slash map. This allows me to toggle between the right and map views. Or I can do Command-M. The text here is the same text as in the right view. If I double click on any text, I perform a find command.

The last thing I'd like to show you in "Author" is, augmenting how a student can define by writing. To learn how the concepts, they're dealing with fit together. All right, some of this work was inspired by the musical "Hamilton." Select the text "Hamilton" and do Command D to define this concept simply by writing, it's a musical by Lin-Manuel Miranda. Then I'll save, go to the map view again, double click on the screen and type "Hamilton" here as well. Notice that there are no lines connecting "Hamilton" to anything. Then I'll click on my name, and a line to "Hamilton" appears. I Command-D to see my definition, and I can see that there is a sentence with "Hamilton" in it. When I click back out, I can see this sentence when I point to the line. When you click on "Hamilton," there is no line going from "Hamilton" to my name. Because unfortunately, the musical is entirely unaware of my existence. Whereas I am a fan of the musical, therefore there is a line from me to the musical. The lines always appear when selecting a defined concept going outward to the text on the screen, which the definition contains. This helps the user develop a mental map, not just have a computer do it

for them.

So now, export to PDF leaving all the options, including "Visual-Meta" of course, and open the document in "Reader." So here we are back in "Reader" with a document we just authored, which has full "Visual-Meta." This means, we can fold the documents, like we could do in "Author," as well as find in the same way. You can even choose to see only names on the document. You can click on a citation to get the reference information in a pop-up. The final thing I really want to show you today in our software is, that the defined concepts are exported as glossary. Because of "Visual-Meta," this is an interactive glossary. As you saw earlier, if you select text in a document and do Command F, you get all the occurrences of that text. That text is a defined concept, in other words, it's in the glossary. You also get the definition at the top of the screen. Any other terms show up in bold, so you can click on them and navigate to them. Same as following the lines in the map view in "Author."

Thank you. That was actually the video that Vint mentioned. I built that for his supecomputing and humanities presentation that he had earlier in the week.

Wendy Hall: I really think I should be able to use "Visual-Meta" to help me manage, and write about my multimedia archive.

Frode Hegland: That would be wonderful. And one thing you said to me, in one of our very first supervisor sessions, was that you don't have time to write, which is completely understandable. What you'd like to do, and I think you used your hands, type something on twitter and take something from here and kind of construct a document. I think that is very evocative, it's really helped my thinking, the notion of glossaries. At the beginning today I mentioned how my father never used the word, "you are wrong." He was very soft like that, he said, "I would characterize it differently." And I said that a glossary is somebody's characterization of something. It's not a pretending of truth. So, once we start being able to express in more hypertextual form, glossary is a hypertextual form in a way, right? Because it's small, and it's inherently connected. So, I wanted to thank you for that.

Wendy Hall: Well, can I just say two things. One, we were friends before I was your PhD supervisor. And I'll tell the world here, the first is easier than the second.

Frode Hegland: Wait. So, we were friends, then supervisor. And then what comes after that?

Wendy Hall: I'm having as little to do with this supervision as possible. But Dave is on the call, I think. That aside, you see, my history goes back to, I mean my research, I'm a mathematician originally. But, my computing research goes back when I started looking at Bush and Nelson and Doug, of course. Mutually, we met, of course with Doug. I have memories, I don't have a lot of recordings of that. But that's where my story starts. Then it

goes into the multimedia, the HyperCard, the microcosm years, and then, of course the web, and the distributed link service, and the semantic web, and then web science, and all the places I'm going today. And I've got an archive, with all those stories in pictures, videos, slides, and my papers. And I want to tell that story with everything linked together. And linking to other people's work, like the stuff we had from… Is that Dave I see grinning there? You'll be in it.

David De Roure: It is. No, I was just thinking Wendy. What you need is generic links.

Wendy Hall: Funnily enough, I do need generic links. I do need generic links. I need microcosm. But also, I think and I you know, I think I need "Visual-Meta."

Frode Hegland: I think you do. But the issue, I think you won't bring up, Wendy is addressability. And I am really, really, pushing the issue of addressability. In the normal world, we can say, "go down the road, and take the second left." Hypertext links break. Citations are wonderful because, they just give you a way to find something. "Hey, this document was written by, so-and-so at such a place," these things have not sufficiently been brought together, I think, yet. But if we have addressable spaces, then we can start doing exactly what we've talked about, Wendy. And I know, I'm preaching, to not only the choir, but to the choir master on this.

Wendy Hall: Yeah, my problem is, I have less time than anybody else, other than Vint Cerf, on the planet. So anyway, we'll see. I want next year to be the start of my doing this, before I'm too old to do it, so.

Sam Winston: I think, just looking at it, reminded me of… Have you come across a book called "The Elements of Typographic Style" by Robert Bringhurst? So this thing is almost when we're at this point visually, we sort of forgetting the relationship between an italic and a bold. And I can read your presentation very clearly because we pop into bold, and that's the thing that happens. But then, it was also just responding to maybe what David and his cutting out of all of the text. It's just kind of that refresh, that comes into that. And the relationship, again of the page as in the page of dropping it into "Adobe" or PDF reader, and things like that. So, I'm still working out what this means, but it's just kind of like, I think that the element of typography is so unconscious most of the time. And just kind of expanding that. Yeah, I'm sorry for not fully articulating what's going on in my mind, at the moment. But there's something there, Frode. And I'll put it in an email, sorry.

Frode Hegland: Sam, don't need to articulate. Questions and vagueness is also very worthwhile. I'm going to segue now a little bit. The last five minutes of my little bit here into highlighting what I really, really, want. And what I really, really, want joins in the last bit of this conversation, which is, how to have our own conversation. I want to be able to produce a PDF, like I will do of the book. The book will primarily be a PDF. I want you to be able to

read that in any software you like. But obviously we are experimenting what we can do in "Reader," which was updated literally 30 minutes ago, by the way. And you can do whatever you want. But, the key thing is that, let's say, someone like Wendy, one of the things you said that Judy has been going on, and on, about. "You think a link". It's so quotable, right? I want to make it, you said it at one of the….

Wendy Hall: That was Dave De Roure first said that, I think. I think he said that in the 90s.

Frode Hegland: Well, exactly. This is the point. So, when someone cites that, obviously in academia. We all know about, you know, following citations, and we all know about links. But if you have a PDF, a normal PDF, and I love PDF for the same reason that I used to hate it. It is a frozen artifact of something that was presented to the world. When you cite that, you should be able to, not just jump… You should be able to open the document that you cite. So, the idea is that, all the PDFs that you've gathered into your hard drive or whatever storage you have. If you have them, you shouldn't have to go to ACM digital library to download it, by following a DOI again. It should find it on your system. So, this is one of the things that "Visual-Meta" tries to do. We have a notion of a VM-ID, and there are millions of kinds of IDs in the world. And it really doesn't matter, as long as they have a reasonable chance of being unique.

Wendy Hall: What I want to do is, when I talk about thinking links, I want to be able to, someone to click on the link, and go to Dave De Roure giving a presentation about thinking links. Because he puts all these slides up on the web. All these talks talk up on the web. We must have done a talk with that in Dave. And then, the idea would be people keep adding to it. So it's not a static book about just my work. It's a book that everyone can add to, or a piece of work. Am I being too ambitious here?

Text Chat:

17:15:26 From Rafael Nepô : I watched it because of Frode's weekly mentioning. :)

17:16:01 From Daniel Norman : I think it's critically important to think about data locality and freedom of exchange. A significant fraction of our sensemaking difficulties follow from siloization of data.

17:16:26 From Luc Beaudoin : @daniel, that's the major problem I'm addressing too

17:17:10 From Daniel Norman : @luc how so?

17:17:22 From Luc Beaudoin : https://hookproductivity.com

17:17:45 From Luc Beaudoin : also https://www.researchgate.net/publication/346734020_A_Manifesto_for_User_and_Automation_Interfaces_for_Hyperlinking

17:17:47 From Daniel Norman : Will check it out.

17:17:52 From Luc Beaudoin : last year's FoT volume

17:18:48 From Karl Hebenstreit Jr : Francis Heylighen: Stigmergy & … |. https://scholar.google.com/citations?user=jt7BHBUAAAAJ&hl=en

17:18:50 From Daniel Norman : (I'm eager to engage with folks on semantic and data locality fragmentation)

17:19:35 From Alain Marsily / Quidzi.com : @Daniel… in Quidzi, we have a Spotify philosophy… anyone can pick part(s) of anyone content (if authorized) and add it to his playlist.

17:20:46 From Luc Beaudoin : URL of that video

17:20:49 From Luc Beaudoin : ?

17:21:17 From Eric Rangell : Decentralized web tech automatically replicates changes between publishers and subscribers and allows subscribers to seed chosen data.

17:24:28 From Eric Rangell : Dweb addresses are permanent links to content, wherever it lives

17:25:44 From Alain Marsily / Quidzi.com : @wendy… please contact me. Would be pleased to solve your « story » of researches … that's exactly what Quidzi is doing

17:26:12 From Eric Rangell : I envision Wendy having a virtual museum where people navigate their own paths through all the historical material.

17:26:15 From Barrie Robinson : Super interested in exploring the potential of some of the projects discussed today working for specific (and narrower) use cases and clients.

17:26:42 From Barrie Robinson : barrie@futurebasics.com

17:27:01 From Eric Rangell : Combined with curated tours of the material as starting points for exploration

17:27:35 From Sam Winston : https://www.amazon.co.uk/Elements-Typographic-Style-Version-4-0/dp/0881792128

17:28:20 From Eric Rangell : Dweb enables local browsing of your replicated copies

17:29:26 From David De Roure : A hypertext of hypertext?

Discussions

Frode Hegland: No. If you have more time, Wendy. This is exactly what we talk about on our Monday and Friday talks.

Wendy Hall: I haven't. You know me, I don't. I'm very happy, in a new year to be part of a workshop to discuss it.

Frode Hegland: Excellent, so I say David and Luke have their hands up. But just to explain, we've been talking about the notion of binding. For instance, we have "The Future of Text" one, we have "The Future of Text" two. Should we make it onto one book, or should we keep it two? These are interesting questions. If we have a newsletter or journal, should that magically be a document? And I'm going to refer to PDF even though it's very old-fashioned. Should it keep growing? One of the other ideas, and so many people have reflected something related to it is, if you open up 20 or 20.000 PDFs of what is, in some journal. You should be able to manipulate them, and view them as one whole. So one of the fun, little ideas we have, as I showed earlier. Select text, do Command F to see all the occurrences. That's really useful in a book. Who else is talking about this specific text? It's very mechanical, it's simple. But what if you open all these documents, "Future of Text" one, Future of Text" two, or newsletter. All that stuff that's related. You come across something, you select it, you do something like Command F, and then you hit Tab. And it does the same search in the next document, right? So, it's not fancy, but it is an interaction. And this is the kind of thing we're looking at. Where, what you're saying Wendy is, when we're talking about making a hole, what does that mean? What are the edges, does the author or the reader make the edges? Very Ted Nelson, you know?

Wendy Hall: Everything is deeply into twinkled, Frode.

Frode Hegland: It is.

David Lebow: Just to mention the elephant in the room. In going through the collection of essays, one of the things that emerged as an insight was, you could call the book the "Future of Text" and everything else. Because so much of the future of the whole planet is tied to text. And what I'm thinking of in particular is, we're on the road to global ecocide and we're having to learn to do transdisciplinary, cross-disciplinary research, on a scale for the purposes of sustainability and survival, that human beings have never had to do before. And I'm wondering, Frode. It seems to me that, you have the beginning of a cross-disciplinary

glossary. So, that if I'm reading something from a different field, I can see exemplars of that term as the concept in use in different concepts that are exemplars. So that, because I'm working with somebody that does workshops for NIH teams, doing large-scale, global, transdisciplinary research. And the biggest problem is, the language barriers, right? We don't do well with this kind of research. And there's something in what you're doing, I think that, could be developed into a solution to that, really major problem, and it's a survival issue as well for the species.

Bob Horn: One of the Physicists at MIT has a taxonomy of the meanings of the word complexity. He has 50 meanings of the word complexity.

Frode Hegland: Thanks both David and Bob. The point of this is actually the opposite. It is in honour of my father, who fortunately passed away during this work. It is, I hate this notion of truth, it is so tiring, right? And very few things are true. It's such a childish term, and it comes up again, and again, with connections. So, yes. The whole notion of glossaries is to say, this is how I see it. The reason we have developed it like this in "Author" is, for a student to present to a teacher. I constantly think of my teachers when I write, this is something, and then I see the connections grow. That's really important. What you're talking about, David is absolutely crucial.

How we can provide the means, when you're reading something by a specific author, or in specific field, to see how it's connected. I see so much of that work going on with, what different people are presenting today. So, in going forward, one thing that the fort you know that the stake in the ground I'm holding is that, so much software dies. Flash died. HyperCard can't be used. Microcosm isn't available outside a very specific setting that we have at Southampton. So, that's why PDFs are so gosh darn, important. Because there's so many of them. I think that, in a couple hundred years, you'll be able to read PDFs. There'll always be a reader for it, or print it out. So, we've got to develop ways where documents can become self-aware, in the sense that, they at least know who authored them, and what the structure is, and they can communicate this. Dene Grigar, who was here earlier, when I talked to her earlier in the week she said that, what "Visual-Meta" allows you to do is, not just go from analogue to digital, but to go from digital to analogue and back.

Text Chat:

17:29:59 From Eric Rangell : Multi writer tech allows people other than the author to edit their copies and use rebasing to merge their changes

17:30:35 From Daniel Norman : A book/document is an artisanally crafted message broadcast to recipients as yet unknown within a larger knowledge graph rooted in meatspace

17:30:57 From Duke Crawford : thanks all! :) hasta manana

17:31:38 From Ismail Serageldin To Frode Hegland(privately) : Sorry to leave this very interesting conversation, but it is now 21/2 hours since the start and i really have to go. Bravo and congratulations Frode… Really gets better and better! Ismail Serageldin

17:31:50 From Frode Hegland To Ismail Serageldin(privately) : Thanks and send the intro!!!!

17:31:51 From Frode Hegland To Ismail Serageldin(privately) : :-)

17:32:34 From Eric Rangell : Translation of transcopyright materials

17:32:54 From Mark Anderson : Here are some exploratory visualisations arising out of the weekly FoT meetings. This relates to some of what Frode was just described. https://www.shoantel.com/proj/acm-ht/visualisations/index.html

17:33:41 From Luc Beaudoin : beyond truth: [CUP'A and The Future of Text: On Assessing and Selecting Information – CogZest](https://cogzest.com/2021/09/cupa-and-the-future-of-text-on-assessing-and-selecting-information/) (My chapter in v.2)

17:33:42 From Daniel Norman : Truth: A continuously convergent ontological construct moderated by civilization.

17:33:48 From Luc Beaudoin : (but I'm a realist.)

17:34:07 From Eric Rangell : Emulators save old docs

17:34:30 From Daniel Norman : (Or divergent)

Closing

Frode Hegland: So, we're way over time today. Which is such a pleasure with these amazing people. I think we should finish. But also, Mondays and Fridays, three to five UK time, we meet, and we hash out these issues, and we try to build. As Mark Anderson put in the chat, there's been some great work by Adam Wern, who's also here. And Adam and Mark on showing visualization trees, which is fantastically useful. So, whoever wants to join in creating the means to have our own record, or eat our own dog food as some people say, it would be really, really, lovely to have you. Just a quick one from Daniel, and David. If there is anything quick from you, and then see if there's anyone else.

Daniel Norman: I mentioned in the comments. I really appreciate the thought process on truth. I would consider it a continuously, convergent, ontological construct, moderated by a civilization.

Frode Hegland: What you said. Well it's really interesting. I have a laboratory downstairs for the evolving human mind, my son Edgar, who's now four and a half. He's sitting downstairs for second half of this meeting, he's been doing his homework, reading and writing, as a four and a half year old. Education system here in Britain is not the same as it is in Norway. It's so much more advanced here. But to try to teach him some of these things, like for instance, today's Mufti Day, he could wear anything. Yesterday, he was a bit concerned because he likes a lot of things. He likes pink, and he says, "some people say that pink is just for boys." Exactly as you're saying, Daniel. That is true for some, not true for others. So, to have it, to see this child growing, is such a help to try to understand how we build our own knowledge bases. Or how to deal with our own thoughts. And on that note, some of you will join again in, not too many hours tomorrow. I'll put that slide up for a few seconds, actually.

Wendy Hall: I can't join tomorrow, I'm afraid. But I really would like to talk to you about arranging, if people are interested, I haven't got time to reply to everybody who said they want to help. I just haven't got time at the moment. But I've happily worked with Fred to arrange a sort of a longer one of his meetings to discuss.

Frode Hegland: Good point, and Barbara are you still here? Barbara Tversky. Yes, you are here. Are you listening? Or have I put you to sleep? I hope you're here. Okay, I'm hoping Barbara's coming to the mic. You see Wendy, what we have decided to do. Alan Laidlaw who couldn't be here today, annoyingly. He's been pushing something that Rafael has already

started, which is the community. So, what we're going to do is, every month we will have one organized day, that'll be one topic. Barbara Tversky will be the first person to do that. I will be honoured, Wendy for you to do that. And it can either be talking about your work, your perspective, or you can set the agenda for anything else. But it will be part of our evolving journal, and that's why it's so important that, we both record on video, and we put it in a format that's usable. And, there's so many of you here, you know you're going to be invited to, please, come and present. But also, please join as often as you can. This thing we have every Monday and Friday, it's so casual. Come in late, come in early, doesn't matter. Come in one day, come in another, whatever you prefer.

Bob Horn: How do we get in touch with others here on easily? We've been talking about nice glossaries and so forth. How do we get in touch with some of the people who just talked? We've just talked with?

Rafael Nepô: Do you have the future of text community on "Circle." That's a place that we can get people together to share. And also, to whoever is here, I'm gonna put the link on the chat. We also have "Twitter" and "Instagram," that people can use to get connected with.

Frode Hegland: The key thing is, the Monday and Friday, four to five usually go a bit longer. Just come in, it's the same URL "Zoom" link, as we use today. Again, I'll keep repeating how casual is, whether you're there or not, it's no commitment. Also, if there is something you want me to send to the group, I try not to spam people. But I know I've been spamming you all quite a lot lately. Send it to me, I will send it out. But also, write, the book is done. You have a draft. that you got a link to earlier today. There will be a few editions, including the transcript of today. I will try to do it that way. Because it is kind of ridiculous how much similarity there is. David's work, in Rafael's work, and so on. It relates, it's absolutely not the same but it relates. So, we need to learn better, right? From each other.

Thank you all and I hope you have a good weekend, including the ones who, hopefully will meet up tomorrow, 10 UK time. Thank you very, very, much for today. It was wonderful and I'll probably have a glass of some kind of bubbles, I don't know, maybe even some something interesting. Anyway, again thank you everyone. Bye for today!

Text Chat:

17:35:04 From Luc Beaudoin : a thought on visual meta: another approach is to have one's own annotation schemas

17:35:13 From Barrie Robinson : Who is the individual with the brilliant hieroglyphic background? David?

17:35:23 From Jack Park : https://dspace.mit.edu/handle/1721.1/102730

17:35:39 From Bob Horn : contact…hornbob@earthlink.net

17:35:58 From Wendy Hall : My husband has been wine buying today. We're Wie tasting tonight :-)

17:36:04 From Rafael Nepô : You can also follow updates from the Future of Text Community on Instagram and Twitter

17:36:05 From Rafael Nepô : https://www.instagram.com/thefutureoftext_/

17:36:10 From Luc Beaudoin : i.e., rather than wait for new standards, do it oneself. I articulated that in Cognitive Productivity books

17:36:11 From Rafael Nepô : https://twitter.com/TheFutureofText

17:37:02 From Luc Beaudoin : rather than "rather than" , "in addition to"

17:37:44 From Barrie Robinson : This is great, and future of text "and everything" is a great idea, but where this really matters is in fields which are not inherently tech savvy. Local gov for example. How do we get good tech into use?

17:38:14 From Daniel Norman : Link?

17:38:43 From Peter Wasilko : We can roll our own!

17:39:07 From Peter Wasilko : There is nothing wrong with a little Yak Shaving.

17:39:12 From Jean-Francois Vallee : Thank you for these enlightening conversations!

17:39:14 From Luc Beaudoin : great meeting, thank you all!

17:39:33 From Sam Winston : That you all.. really interesting …

17:39:37 From Rafael Nepô : nepo@mee.cc

17:39:47 From Peter Wasilko : Thanks all, for the presentations and side chat!

17:39:52 From Luc Beaudoin : format of tomorrow's meeting?

17:39:52 From Eric Rangell : There are opportunities for local community/neighborhood knowledge sharing, preservation, sense making.

17:39:58 From Sam Winston : studio@samwinston.com

17:40:04 From Mark Anderson : Mark Anderson : mwra@mac.com

17:40:05 From Jonathan Finn / Sibelius : Re Frode's father's ideas on truth/arguments. Ludwig Wittgenstein's advice to a colleague who'd got caught up in a frustrating philosophical argument with someone: "Perhasp you made the mistake of disagreeing with what he said." i.e. then they'd be forced to do something deeper, find out where their assumptions diverged.

17:40:08 From Keith Martin : A list of attendees, for those who are happy sharing this? I'm thatkeith@mac.com

17:40:19 From Wendy Hall : Lovely to see so many old friends on the call today

17:40:22 From David De Roure : David De Roure <david.deroure@oerc.ox.ac.uk>

17:40:44 From David Price : Thank you, everyone!

17:40:49 From Barrie Robinson : Thanks all

17:40:54 From Alain Marsily / Quidzi.com : amarsily@quidzi.com

17:41:01 From Eric Rangell : Thanks all for this great event

17:41:03 From Conor : Thank you!

17:41:06 From David De Roure : Thanks everyone! Great to see you.

17:41:07 From Luc Beaudoin : please feel anyone to get in touch lucb@cogsciapps.com

17:41:09 From Brendan Langen : a wonderful time today. will be reaching out to many of you as it ties to my own research in individual <> collective synthesis.

brendan.langen@gmail.com

cheers!

17:41:12 From Alain Marsily / Quidzi.com : Great event ? Tks

17:41:12 From Luc Beaudoin : (BC, Canada, wet place)

The 10th Annual Future of Text Symposium Day 2

Video: https://youtu.be/G4OXI1yFj1U

Adam Wern: Hello.

Frode Hegland: Hello.

Rafael Nepô: Hello. Good Morning.

Alain Marsily: Good Morning. Nice event yesterday. It was nice.

Frode Hegland: Thank you. Thank you very much. So glad you were there. Adam, are you joining us with anything other than not being here? Like, video or audio?

Alain Marsily: If I'll do something else? Is that what is your question?

Frode Hegland: No. I was saying to our other friend, Adam that he's here. but no video, or audio. Oh, the audio is here.

Adam Wern: Okay, yeah. Good morning. I have two kids in the background here, and I'm alone with them. So, I just want to listen in, and maybe sneak away if it's something that I have to say.

Frode Hegland: Yeah, that's fine. It's now exactly the time. So, I will delete everything in the recording before now and say, "good morning." And thank you guys for yesterday. It was quite relaxing, wasn't it? It wasn't too stressful or I don't know. What were the interpretations of the people in the room where it happened?

Rafael Nepô: Yeah, I had a nice time. I enjoyed listening to the conversations. And the first one, I forgot his name already, but I have a tab open, which is the artwork generative, not generative but, with text. It just looked so beautiful. The layouts and everything.

Frode Hegland: Yes, Sam is really interesting on "Twitter." And then, we had lunch at my club, and he brought a book for Edgar, which was super sweet. So, to see it in the flesh as it were was a really interesting experience, yeah.

Mark Anderson: Yes. I only bought two books yesterday, and they were both his.

Rafael Nepô: Nice.

Frode Hegland: And Brandel, thank you for coming back. What was your impression of yesterday?

Brandel Zachernuk: I was very excited to find a community of people who have an interest in constructing tools around text, and who are aware of what opportunities there are to reimagine the context around what we do with computers on text, because as you all have come to realize, it's not as common a frame of reference, as one would hope.

Frode Hegland: Yeah, that's my life in a sentence. So, thanks. Alain, thank you for coming back. You were happy with yesterday, as well?

Alain Marsily: Yeah, sure. It was interesting and my passion for text it's a long journey. I started early, in the "Macintosh" world. Two applications, Think and Time, and also Marco Polo. And they were in the field of groupware. This, playing with texts and documents, was always a passion for me, and as you know, we are working on new tools now. A new tool and we plan to be a real new tool in this field. It's really interesting because we have so many new tools for thinking and also for taking notes. And also, to bring content and knowledge to others. I think it's the right moment. The momentum is really nice. And you do a good job making people aware that, text is always valuable because video is a big trend. But text is supporting video. And, I'm sure that it's a good moment. So, I like your work and I think everyone involved in this, is filled know that there were many people in the past like Doug Engelbart, or (INDISTINCT1 4:23), or many coming from the, let's say 50 or 40 years. You're also working with a good vision. And the vision is now becoming true, I'd say. It's nice.

Frode Hegland: Do you want to tell us a little bit about what your software does? I know about it, but not everyone.

Alain Marsily: The name of it is "Quidzi." The purpose of the software is, letting people create stories around their document and their text. That means you can create many documents on your PC, or your Mac. But, it's sometimes difficult to explain the sequence of your story. And when you drop a document in "Dropbox" or in your folders, you have nothing that explains the link between your document. What we provide with "Quidzi" is a tool that creates a story, and that let people create their own text. And they can also add media files and many other stuff. And they can encapsulate all of their document inside a playlist, where people can share with others. And also let people co-authoring a playlist. That means if you want to share something about a new topic, and you are working with two or three members of your group, everyone can add their document, and create their playlist, and can add value to the playlist by, adding text, adding many other media files. And, the idea is, to let people share their content, share their knowledge. And also the authors, because it can be (INDISTINCT2 6:10). It can track the progress of learning, and also track approvals. And we will add also the dimension of adding comments. That means people, can really interact with their story, the document story. The software, the application, we went from "SkillPass" to "Quidzi," in fact, in the past week, we were working during this year on the project called "SkillPass." But we thought that going only for learning was perhaps a mistake because there are so many tools. Even if "Quidzi" is, let's say, innovative, we decide to extend the world of this kind of architecture. That means, not only learning, but also broadcasting any content,

any knowledge, any sort of content that must be shared amongst a group, amongst a team, enterprise or internet. Internet will be coming later, it will be mostly a group, a team work tool. And we are just closing the final feature for beta. We plan to release it during December, or early 2022. And the idea now is, to have people involved, and add other comments, and add value during this better period. Sorry for my English. It's a French-speaking.

Frode Hegland: Oh, no problem at all. I'm sure the transcription software may have an issue. Just before, Gyuri would be nice if you also comment and introduce yourself. But I'm looking at what Adam said here, "I really like the format with short recorded presentations, and discussions after. Would be perfect for themed meetings." Adam, all the future of text prior have been exactly that. Bam, bam, bam. But really hardcore on the clock. Yesterday, I decided to be completely soft, just to see how it worked, and that was fine. So, for our monthly meetings, I think, probably, we would start with a five or ten-minute presentation by a person, of their book, their software, whatever it is. And then, have the conversation go roughly within that realm. We all agree that that's probably a good route forward, right?

Rafael Nepô: Yeah, I liked the form with short presentations. But sometimes, if for example, thinking about, if we're going to do this every month, for a guest speaker, since it's going to be a more focused presentation, maybe the presentation can be even a little bit longer. And that would be totally fine depending on how long we're going to stay discussing. If we're going to be here for an hour, then the presentation can be a little bit longer as well. Because there are so many interesting things, and I would love to hear more from people, and their ideas, and their projects.

Frode Hegland: Adam is saying the opposite, "one key is having multiple ones on the same topic." I can kind of see that, like yesterday. But that's a huge amount of work, to have more than one presentation a month, to organize this. I'm thinking if we look at this in the longer term so that we do this every month. That means, in a year we will have 12 of these, plus the normal meetings. If we look at it like your podcast formats, which is what you've been talking about for forever with Rafael, and I agree. We will release them on "YouTube," but also in some kind of an RSS. So people can tune in, and just listen to the presentation, and stop. But if they want to, they can listen to the dialogue afterwards, right? So, that makes sense. And they listen as long or as deep as they want.

Rafael Nepô: And they can even jump between time codes, I guess.

Frode Hegland: Yeah, that becomes very interesting. Gyuri, would you like to comment on yesterday, and introduce yourself briefly, please?

Gyuri Lajos: Well, thank you. That was really interesting. I think this short presentation, indeed work very well. And it's good, the discussion, whether I'm sorry, I had to leave early but, I did manage to catch up with the recording. So, that's great that didn't miss Dave

Lebow's demo. I was able to watch it today. I think that was really good. And to introduce myself, I really think that, I'm off course, (INDISTINCT3 11:15) born again Engelbartian much later. I just about discovered Engelbart about ten years ago. It took me a couple of years to find your stuff. But actually, I got most of my introduction from your "Invisible Revolution" and all that stuff. I'm not sure people are aware of that. I mean, you're not advertising enough. I think that really needs to be advertised more to the world. In fact, in PhD thesis, which was a language programming method, I effectively rediscovered, reinvented the command language interpreter idea that actually made "The Mother of All Demos" possible. I just learned the other day, which is very interesting, that Alan Kay's 1960, 1969 thesis is about reactive engines and syntax-directed computing. In fact, that was really in the air at the time. So, I just learned about it later. But I'm basically interested in obviously "Tools for Thought," whatever you'd like to call them. But, I'm interested in that theme. So, I'm really pushing for a new way of doing things, which is, I don't know if anybody is aware of this, but the interpretative file system basically gives you something that Alan Morrison called the anti-database which is, what if the entire network becomes the database? That changes everything. Because then, that really means you can actually create a global giant interpersonal graph of knowledge. Because everything is just one hash away. So, I'm really experiencing this revolution I call it "IndyVerse" and you can find me on "Twitter" at @TrailMarks. But I want to point you to this "Tools for Thought Rocks" or this this this community which started about six months ago. Which is actually Ryan Fisher, who is one of the most empowering players in this space. They really are constellation providers for web-native applications. I'll go with that and my goal is to really be a constellation provider for intentional software and semantic mutual learning, so that's where I am. And my main concern is indeed interoperability. The whole point is that the essence of this new Web 3 world is ambition, web-native, that's why I'm supporting them. But it changes the game because, it means the application comes to you, to work on your data. Instead of you going somewhere, someplace, where you leave your data. Now, that's just wrong. I'm not the only one who is doing this, but it really I urge everybody interested in Tools for Thoughts or whatever, stop creating new silos. It's trivial to make it a really common space and in fact, one of the technologies that are developing called "TrailHub" or "IndyHub" will be open source. The whole point is that it takes you nothing to take your existing centralized tool, to become a common space. So, I hope one next time I will be able to present this project because the actual core of it is very simple. It's easy, the first thing that we're shipping is VR, actually. "IndyWiki," which is basically realizing that I really would like to do for Web 3 what Cunningham did for Web 2. Because the Wiki being created was really the maker app for Web 2. And I really want to make it a maker precisely because I'm not selling a product I'm selling stones for everybody's stone soup. That's the idea. This is what Jerry said and

finish on this. I really want this to be easy to emulate, compelling to do. Just the same way as Ward Cunningham, he didn't sit on his idea, "oh, isn't it nice? We can do some collaborative editing." Just by showing an example, inspired a thousand wikis. So, I'm really approaching these things from this same angle.

Frode Hegland: Thank you, Gyuri. So, there are two things. First of all, Mark is asking what is the Doug piece you referred to? Doug Engelbart?

Gyuri Lajos: The command line interpreter. If you go and research it, that's what Jeff Rulifson invented if you like on the fly. But what their problem was that they got one couple of million-dollar machine, every six months. Because they grow it out. We're talking about 128k or something. Some ridiculous, tiny capabilities. So, they had to build a system the way it should be done. This is the way that I'm trying to do, is bootstrapping in the technical sense. Is to have a tiny little kernel, a 10.000 line program. And that's really a language direct syntax direct program, which basically cut the routines. So, the actual thing is that the event handling is one and you can take it as is, from one machine to the other, and just have to recode the low-level communities. That's the command language interpreter. It combines two things. It combines the idea of bootstrapping and also combines the idea of, "is really language-oriented programming in the sense that, software design or program design really can be reduced to language design?" So, all those clicks, all those interactions, all those characters had a kind of language. And that was mapped into the right combination of procedures. And that's Engelbart. I think I should have an annotation on that which should link me to I will dig it out but not now so that's that really is and it's amazing what they've done it really is. And it's the same that Alan Kay did with "Smalltalk." It was completely bootstrapped. The entire system is 10.000 lines of code. In fact, in 2016 Alan Kay, with many others, built an operating system, an entire system that is as good, does everything that windows does and better. Literally with thousands less code. And nobody was interested. Threw no money in there.

Frode Hegland: I see Mark, you have your hand up. And also, Brandel, it would be really nice if you could talk about your work. But at this point, I think it would be really useful to just stop and go meta. Because we're trying to build a record here and so much of what we're doing now will just be kind of lost. We'll have it transcribed. It will be lots of "ums" and "ahs" and awful. And we don't actually have the money to have someone human go in and edit it, so I'm wondering a few things. First of all, can we like, we looked at a little bit yesterday, add more to the chat? And should we maybe hire someone, maybe a student interested in this, to join us? Whose primary job is to just write notes. Because if you have the chat connected to the video, connected to the transcript, it's a lot easier to go through. Because what Gyuri just said is really worthwhile, and it's really citable. Someone should be

able to cite in a paper. Gyuri said this about Doug, this is interesting. But our current means don't really allow that to happen. So, yeah. Let's just think about that a bit. And Mark, let's continue with you, actually. Because reflection on yesterday is useful. I would like to spend more time on Brandel properly.

Mark Anderson: Yeah, that's fine, help for new faces. I rattled through a couple of things. A thought that was in my mind after Adam's comment about you know a number of intros. One thing is, perhaps when we do a presentation, have just a bit more context-setting. Because the presenter, unless they're a regular part of the conclave, will arrive with a presentation, and obviously they'll be presenting about their thing, and they'll have a close relationship with it. And I think it's useful to just have a little scaffolding, especially for the later listeners as to how and why this relates to the "Future of Text." I know the "Future of Text" is a broad church but nonetheless, I think it's quite useful, "so okay, today someone is going to show x. Where x fits in this overall picture. In this sort of area." And I think that actually makes it that more accessible, especially for those watching it in some asynchronous time later. Passing thought. I really, actually...

Frode Hegland: Hang on. Just on that point. You're all watching the foundation, right? Did you see the season finale last night? If you didn't close your ears for a second.

Rafael Nepô: No spoilers!

Frode Hegland: Okay. Close your ears. When what's his face says, "I don't curate knowledge. I curate people." The reason for it, I made a throwaway comment about this. I haven't wanted to put too much of my own stamp on this. That's why I've been really only saying that these are the right people to be in the book. But I think Alain's thing about a playlist for documents. I know you're doing more, but that actual aspect is really fascinating. Because Mark, yes, we do need ways to provide context. So, I don't mind if we... I'm not saying that necessarily I should provide an introduction and say who this is.

Mark Anderson: Oh, absolutely. I think that even if it's just some brief conversation before the presentation.

Frode Hegland: No, but hang on. What we can do is, ask the people doing the presentation saying, this is the format. For the first 30 seconds you have to say who you are, and how you see how this work fits, right? I think is really useful. What's the best way to make that happen? Because, yes, we want new people to come in. Do you guys have any ideas for, how we should do that kind of formatting?

Mark Anderson: I'd be tempted, actually, to do. It doesn't need to be you. I take your point about having too much of a parental, authorial voice. Because also it can be hard, as the presenter, because someone says, "explain where you fit in this." Well, you may not necessarily be sure, and especially if your mind is deep in a project, and what you'll tend to

naturally do is to try and situate your product in the wider thing. In a reverse way to where we want. Which is, for the audience, "all right. Here in our very broad expanding thing. Roughly in this area, all these areas." It's not to pigeonhole things, it's just to say, "okay, so the thing we're about to listen to, relates to this and think, 'oh, right. And that means, that thing we listened to two weeks ago, that sort of fits there.'" It's doing that scaffolding which probably those closer to the ongoing conversation are better able to do. And there's no detriment to the presenters and also, it leaves them more time to present what they know well. So they don't have this burden in thinking, "oh, there's gonna be a car crash for the first 30 seconds, because I'll probably describe it all wrong." Anyway, it's not a hard point. It's just an observation.

Frode Hegland: I think it's a really important point, Mark. But also, some people will be new. We have a guinea pig here, Brandel is going to tell us about his work in a minute. So, it may be interesting if I ask you, Brandel, to say... Okay, I'll give you the context for even what I'm going to say. I have had the problem over the last 20 years of struggling with, I believe, "Future of Text." Big deal. If we don't deal with it, as a species, we're kind of screwed. Everybody here shares some degree of that feeling. So then, when I write a big flowery thing, a poetic thing, and inspire people, and people love my writing, that's very nice, they say, "oh yeah, that's verbiage." But then, when I build software they say, "oh, you're just trying to make money. These two things have been fought, and fought. And I've been lucky enough to have some nice lunches with Alan Kay, and he says to me, "yeah, but you can do it." It's not like "Nike," "you can do it." It's not like, "Yes, you can," Obama. But it's almost like I'm being a pathetic child, who doesn't realize that we do have the tools, and libraries, and APIs like Gyuri were saying. "Yeah, we can actually do this," that's all he's saying. He has never given me a huge compliment for being a genius. However, he has said I have enthusiasm. All of us here, that's all we need, is enthusiasm, right? Doug himself was worried about someone saying, "well, who the hell are you?" We don't need to worry about that. But the reason I'm mentioning Alan Kay is primarily his sentence, "the best way to predict the future is to invent it." That's how I justify having spent my family money on the software. All of that stuff was to say, Brandel, when you introduce yourself and your work now, I would really like to know what you're selling, right? And I mean selling in every sense.

Gyuri Lajos: Mind share, what's your value proposition.

Frode Hegland: I actually think selling it's a bit provocative, as I can see from the reaction here. But I remember, even when I was pre-software, doing my "Liquid" information philosophy a few people said, "what are you selling?" I got so offended. I'm not selling. I'm just sharing my philosophy. But, okay. We're learning here. I'm seeing head shakes. How about we ask Brandel to say in the very beginning, what he feels that the key takeaway

should be. What is the one thing you really want us to understand from your perspective? Is that a more useful way of doing it?

Gyuri Lajos: Okay, can I just interrupt very briefly to go back to the question about, how they're gonna make these videos resources? I would like to make a suggestion. There is this amazing tool called "DocDrop." I put in the link. Which basically, if you got to view a video, which is on "YouTube," and it got machine-generated crap subtitles, with annotations, people can crowdsource, pick the bit that is relevant to them, correct the text in the annotation, if you like. And next time, they could actually put a link to a conversation that is related to that. That's possible. But even without that next step, that would be valuable. And also, the annotations can be curated. So you end up with the text converted by the people when they watch and find something useful. With all the videos I watch now I do that. And I will do this to yesterday's, as soon as it gets the text. And I just annotate the debate that I resonate with. And if anybody goes in and does that, we will end up with a crowdsourced version. That was just a technical issue, so I wanted to share.

Frode Hegland: Okay, that's great. And we'll have a look at that. We're also using the script right now to do a basic version as well. But that is exactly the kind of thing we need to look at, but yeah. Brandel, center stage, you haven't been asked to present anything. But would you please, do as you feel like.

Brandel Zachernuk: Sure. This is really exciting. Thank you for the opportunity to be able to explain my thesis in a soft sense. Early on, in terms of my introduction to the community, one of the first things that sort of triggered my interest is, in terms of text, I will start by talking about another basic and fundamental apps, a calculator. Many, many years ago, I had an interview at a company. And because they use a bespoke language, they wrote it from the ground up, because they thought it would be better. They were wrong. But that was done because, in order to make sure that people could actually work there, they had to build a calculator within the language. And so I did. I wrote the basic calculator that we all understand to be the way that the calculator should work. And once I was finished with all of the basic functionality I said, "what else do you want me to write? What do you want me to make the calculator do?" And they said, "I don't know. What do you think the calculator should do?" I then proceeded to write a design document for, why do we have a calculator? To what benefit is it? What are the mental models it's supposed to be supporting? What are the typical contexts in which we use it? And, lo and behold, for the next 18 months, the company decided to pursue that as an application. Because they were so excited by the idea that somebody would go back to what the first principles of what a calculator actually achieved to people. Focusing on that, and that was a really interesting reminder that, just because we have a well-formed notion of what a particular solution domain is to a

fundamental problem, like calculation, that is very different to, well, now that we know a little bit more about what people want to do with it. Why they make use of this tool, we can solve it a little better. And with that in mind, once I started thinking seriously about virtual reality, in about 2013, 2014, I was really compelled to think somewhat obtusely about the notionally, most boring application you could apply to it, which was, word processing. What would word processing be like in virtual reality? And in the long exploration of that, I started to realize that word, as everybody else here has discovered, is the manipulation of symbols and ideas, is the most fundamental and central sort of thing, that a computer can do, can be used for. And if you have the ability to improve some aspect of that, even in some small way, then you've improved computing, and you've improved human comprehension in the most substantial way that it probably can be done. But also, through that, I realized that it wasn't necessary to exclusively target virtual reality. But that, if you simply take a mind to, what it is that people experience, how they think, based on the many decades now of neuroscience, and behavioural psychology that we now have the benefit of, since the initial inception of the "Bravo" interface and the hypertext demos that were coming out of "SRI" and "PARC," that we could probably do a lot better. That's what I've been pursuing personally. And my professional experience is as an interactive graphics engineer, primarily involved in advertising and marketing. I work for advertising campaigns, for folks like, "PlayStation," "Coca-Cola" and for the last seven years I've been at "Apple." So I've had the benefit of being able to work very closely with folks in "Safari" and other places, where hopefully, I'll be able to make a dent in some of these people's thinking. But the passion is really separate from that, in how we can change what we do with computers, based on a better understanding of what we are as people. And to that end, I've been making a number of fairly uninvested, unopinionated demos, and explorations of various aspects of that. In 2017, I built a virtual-reality-based word processor where, rather than having a single, canonical document, you dealt with disconnected text fragments, in the same way, that a lot of authors move small pieces of paper around, to assemble, and edit. And that was very interesting. I attacked the question of the modality of writing because, I think that, we have over-indexed the concept of writing as being a mechanical input technique. And so, by leveraging things, like speech and other gestural actions, we can potentially find ways that can come up with. We can come up with modalities that are a little bit more fluid, in terms of the writing, editing divide. And most recently I've been, for example, building visual representations, compelling high fidelity representations of text artifacts, in the form of books, and other things that we can see, manipulate, and use to reflect on our responses to our artifacts, as they're presented in different ways. So how, for example, a "Wikipedia" article appears to us if it's presented as though it's a museum, or an art gallery exhibit because you have the ability to do that in virtual reality. What is the significance of that, and what's the significance of being able to

make something look like a hardbound book when it's just somebody's tweet, or a thread, or your browser history. So, yeah. That's me and where I am, what I'm doing with it. And I'm really excited to be able to present some of these things in a little bit more detail, but also, I'm really excited to listen to the community of people who are building these things. I was very excited to see Barbara Tversky in the audience. And I'm very excited to hear her, and that she will be presenting in one of your next monthlies. Because I really enjoyed her book, "Mind in Motion" and her presentation when she came to (INDISTINCT). I'm in the bay area in California and have been surprised at the lack of interest in these kinds of subjects. Even if I have to connect with people at 7 am, and in the Pacific, I'm happy to do so. Because it's really good to join a community. That's me. Thank you very much.

Frode Hegland: Thank you very much and welcome aboard. That was very fascinating.

Gyuri Lajos: What was the word you used? Something "delic?" Body visual presentation?

Brandel Zachernuk: I write it by hand. So, I use WebGL.

Gyuri Lajos: Yeah, but you said something like, not psychedelic, but something "delic." What was that word you used when you describe these new modalities for text to be presented in VR? You used a word for it, which I didn't quite catch. "Happydelic," or "hapticdelic," I don't know, something "delic." I don't know what was that word you used. Okay, we can go back in the recording, but... I just didn't catch the word. Okay, that's fine.

Frode Hegland: It's so interesting to hear what you're saying because I have been locked into specific aspects of text because I think they need to be solved. I have shied away from VR, and AR like crazy. But I feel that we're at a stage where we have to look at this. And last night my son Edgar, whom we all met a little bit yesterday, four and a half, we were watching a bit of music video thing on the big projector downstairs, in the living room. And he said, "what website is this?" I've never mentioned that word to him. "It's not a website. Why?" "I want to help the children." So, we now have something called "Children in Need." It's a charity here in England. They need money at school, and so on. So, I had to explain to him, "no, we have to go to the website, the computer upstairs." It's so nice, in this context, that his mind is comprehending the possibilities, obviously, completely different from us, old people. So, to really listen, "could there be a website on the TV?" Yeah, of course, there could be. And that has been done. But what would that mean? And so, Brandel, the bigger issues you're talking about, is phenomenally interesting. Yes, I think we should have you present, maybe the one after Barbara, because it builds on it in a way. What do you think?

Brandel Zachernuk: Yeah, I would be perfectly thrilled to star in wherever it feels appropriate. I'm happy to go through some of these things in more detail, one-on-one just for you to decide what kind of appropriate fit, or just launch into it if you're comfortable with that too. Yeah, that would be really cool.

Frode Hegland: Yeah, it just seems very related. Barbara Tversky, I also just got her book and loved it. Found context, contacted and now she's in our book. It's amazing how that works, you know? I don't know if you guys have felt the same about, looking back in history, scientists, or literature people. They were connected. So, we should touch on and be connected too, right? It's exciting.

Mark Anderson: I like some of Brandel's... Something that sparked my mind was this idea of doing some visualization of something like, "Wikipedia" as a room. It's hard to my mind because my recent thesis work was all based on "Wikipedia" in a completely different, unrelated area. But, suffice to say, I spent more time than perhaps I should have, looking at "Wikipedia." Why it piqued my interest is that, for someone so interested in hypertext, I'm often in a sort of knowledge relationship. I'm often as interested in, it's the problem of the unknown, unknowns. Looking for the links that aren't there. Why are these, I would say. In my mind's eyes, you were saying that. It's another way to visualize that what we see presented, in its main presentational form, as a long-form, continuous text may actually be, very disjointed, and either full of holes, or basically, entirely consisting of portals to somewhere else. That visualization aspect is an interesting way of bringing that out. Which I find far more compelling than... And there is a great fascination with 3D because, somehow, well, people keep saying it to me, but every time, I don't quite get what the extra D does for me. And It always makes me think of those sort of early wireframe things used in sci-fi movies, when they go, "woo." And yet, you're pointing to a much more subtle, and really interesting way of using that extra dimension to help bring things to force. I found that very interesting, yeah.

Brandel Zachernuk: So, the museum piece was just to reproduce, I went to a Stanley Kubrick exhibition in the bay area, many years ago. And I was struck by it. It was great. But also struck by the fact that it could essentially be regarded as a printout and the typographic treatment equivalent of just getting a "Wikipedia" article. And, as well as, rendering the real artifacts. They had "HAL 9000" and stuff like that. But to your point about, what does one do with the extra D, a subsequent thing I linked it to Frode already but is a "Wikipedia" browser, virtual reality thing. Which is already happening, and possible to look at. And what that does with the extra D, explicitly is, rather than merely being a "Wikipedia" equivalent or analog. It takes all of the dates in a "Wikipedia" article and linearizes them into a list, where you have 1910, 1920, 1930. And so, you put those things, at those times, and it does it per paragraph, or per sentence, where a date appears. It's probably not perfect, but it's really meant as a provocation of, "what is it that we would do with these Ds?" What I then do with those things is, I put multiple articles next to each other. So, you have hypertext, you have the cold war, you have the internet, and you can see all of those things next to each other. Look at the

article on "Project Xanadu," and so that you can see what happens in 1957, with the Sputnik moment. If anybody's read Brian Dear's great book, "The Friendly Orange Glow" on the "PLATO" project at the University of Illinois. And see that it's very, very, clear that these are the prevailing events. And one of the things that I really enjoy about that, the way I explain it, more generally, Mark, is that what the extra D gives you is space. It's real estate. When we have computer screens we have such a limited capacity to place things in the field of view, into the sort of conceptual awareness of the user, or the viewer. Virtual reality, immersive computing generally, just gives you the ability to be a little bit more even-handed with, how you present those things that the context, in which they can be, and so that they can be simply just a little bit more ambiently available. And that's the thing that I'm most excited about. And what carries through most of my work.

Mark Anderson: That's a lovely exposition. I like the fact that, in a sense, is a deliberate use of the extra dimension. Because if I sounded slightly so pejorative early, it's just that, all too often I see someone saying, "oh, let's turn it up to 11." No, it hasn't worked. But I really like that. And the other thing I think will interest those who are here a lot is this mention actually of the timeline. Which is, the temporal access is generally, massively, underdeveloped in a lot of presentations. And probably to our cost, in terms of trying to make sense of things, anyway. Unless someone's got a word of interest.

Frode Hegland: Yeah, I've got three words to get an edge face. Three sentences. Number one, yesterday was also the launch of "Battlefield 2042." So if you want to look at it, games are hugely inspirational. It's so gosh, darn, massive. You can actually get lost. It's huge. And you have the interactions that are so crazy. But it's for a specific kind of thing. A little thing, Bandel, on the whole, extra real estate. Foveal vision, I think is really important. I use a 13-inch machine now. I used to use bigger ones. But most of my customers use small ones because they're students. And also, I find it easier and more comfortable to have just this space to work on when I'm writing. But of course, you're doing something else. When I was doing graphic design, I used to work at "CKS" down the valley from where you are. They became "MarchFirst." And doing graphic design would be monitors absolutely everywhere. So we do share a common first in a way. But yes, timeline. So, Brandel, you saw my presentation on "Visual-Meta" yesterday, and I hope you liked it. But before I ask you for your opinion, the way "Visual- Meta" works, in a bit extended way, is that, at the end of the document, it has glossary terms in "Visual-Meta." So the thing is, we all agree that organizing information is important, categorizing and tagging is important. But we also agree that it's really boring, and expensive to do. That's why, in this software, as a student, you define stuff, you characterize it, and "oh, my gosh. I got a glossary for free." Right? In our "Future of Text" volume 1 and volume 2, there's also a timeline. Which was generally edited by me, and

I have lots of lovely people helping. It's formatted very simply. But if we could maybe, natively with that, or through "Visual- Meta" intervention for extra markup. To be able to explode a timeline like that, plus any time-related information in the book itself, into the kind of space you're talking about would be really interesting, don't you think?

Brandel Zachernuk: Absolutely. And actually, one of the projects that I haven't mentioned, because I don't have a good quality artifact of it at this point. But I need to build it because I owe it to the "Safari" team, as well. To the point of the onerousness of the construction of that information is a visual tab-centric or activity-centric, history-based, browser history representation. That I think it may not do the job that's a requisite in "Visual-Meta." But it is a very useful piece of sidecar information which is, rather than representing browser history as just a series of... Right now, it's terrible. It's just when you open a tab. But there are at least two very important times in a tabs life: when you open it, and when you close it. But there is also which tab you opened up from which document, as well as, what you did in it. And those things can, and probably should all be encodable. I wrote a browser plugin for "Firefox" 2.4 many years ago, that encoded and recorded all of these things. So you had the ability to recognize that the entire series of trees of browser history. And so, I was really excited to see the cards concept, and why I was curious about the authorship aspect of that. Because, it is interesting to think about, the way in which some of that information can be encoded incidentally as a consequence of people's natural behaviour element.

Frode Hegland: So, you're basically thinking about (indistinct) Bush's?

Brandel Zachernuk: Yes. Yes.

Gyuri Lajos: Yeah. I think I brought web creators exactly that for "Chrome." And this is why what I'm doing is called "TrailMarks." Precisely. And the fact that I turned it into a graph, and I still got it. But that's what led to "TrailMarks" because that's good, even if you've got this whole history of your trails. What you need is, really at every point, to add some content. So, to contextualize. That's really what led to "TrailMarks." Which eventually unites. It's everything, it's the annotations, your history, and your real connections that are emerging. Whether you put it in explicitly or actually discovered it. And you end up with it, as you just said, I think it's very important the tabs. I focus on tabs, but basically using this (indistinct) is so important where you come from. In fact in my work, the most important thing that I put is, where did I get here from? That's by far the most important information. How did you get here? Because if you build it, you really have to change.

Brandel Zachernuk: Have a general index. And then, the next important thing is, what happens next.

Gyuri Lajos: Yes. Okay, thank you. It's nice to see somebody else doing the same thing. Because problems define their own solution, that's what I believe. Yeah, thank you.

Frode Hegland: So, a wonderful case study for that might be, any kind of a researcher, student, or professional, or business, or whatever. I know I'm talking the stuff you know, Brandel, I'm just thinking out loud. Having a specific session saying, "I'm doing work now." And at the end of that session, they found something useful. To go back to see what you have would be really wonderful. But then, as we also talked about sharing, earlier I believe, or the kind of openness, in some sort. If they could then, put that into a document in a usable form. And of course, I'm thinking about "Visual-Meta." Where they copy that session, put it in a word processor, either as a chart, or as plain text, or whatever, in a way you can do exactly what you already said. Annotate it saying, so instantly it fills it in. This is where I went wrong. I have to backtrack. That could be phenomenally useful, and time-saving, and helping a teacher understand how the student got there, and another researcher understanding it. I know I'm repeating, I just want to say that's really interesting.

Brandel Zachernuk: Yes, absolutely. There was a paper at, I think it was at "UIST" recently called "tabs.do" that had a task-centric perspective on the preservation of tab groups. I know "Chrome," "Safari," all browsers, at this point have also included tab groups. But I would argue that they haven't gone as far as they could. This paper, sort of presents the possible frame of reference for it in that way. But I also believe and agree that the idea of having a semantic classification, and potentially clustering representation, like "Visual-Meta," could be a really valuable addition to encoding those things.

Gyuri Lajos: Links, please, Brandel. Could you please put a link for this? It sounds so interesting, yeah. So I can annotate it. And we can have conversations on the annotations. On the margins.

Frode Hegland: Mr. Anderson. Yeah, absolutely. Single UI, any software developer, such as myself, should try to make a single UI for everything. But the information and API should allow everybody to compete.

Mark Anderson: Yeah, I mean, it's terribly easy to sound sort of negative in saying what I said. Which isn't the thing. It's not to say that, if something only has one UI, then it's rubbish. Far from it. I think it's just that, in truth, it's shown in the various protestation we had an awful lot of work. A lot of work goes into just making even one thing. So to globally say, "we must have more" and paradoxically you might said it was easier in the old days because no one gave two hoots to how cranky it looked. Because the fact that was on the screen, was a marvel. Now we get really worried about whether things have dropped shadows, and round corners, or square corners, or something. And that's part of the problem, actually. We are drawn in, and seduced by the visuals, and it's really quite interesting. Pausing to think on some of the tools we've seen presented recently, in some "Future of Text's" is that, that's not where the depth is. So, I sort of loved the point at the end of Rafael's presentation, just

making the point about the thought about librarianship, and that approach to things. Which you wouldn't necessarily see. You could watch that whole thing, and if you didn't know, you wouldn't see that was there, behind it. To those who know, to know it's there, that's now more enticing, because there's a depth to go for. And that's interesting, I mean, I don't know the answer, but there's an interesting design challenge there. And in the same way that, because David Lebow wanted some help with his tool, I spent some time with it. It turns out that I was quite the wrong person to do that because I'm just not a "HyLighter" type of person. But it's only now when I've seen what he's brought out of the work he's done, I'm minded to go back and get involved now. Because I think I can do more with it. It's just that, when he presented it to me I was stuck at level one, is when you highlight something, am I thinking, "well, I never draw on things so, what am I highlighting and why?" There was interest in there, but I didn't get to the richer stuff beyond it. What drew me in was sensing that it might be there, but hearing him talk about it, left me out for much more excited.

Frode Hegland: I see you have your hand, Rafael, but just briefly. Mark, this whole thing about being seduced by the visual is an absolute bunch of nonsense. And the reason I say that is, coming from a gaming background, there are some games that look amazing, and of course, the graphics have a level one sales aspect, there's no question. But it always comes down to playability, which we would call UX interaction and all that stuff. It always comes down to that. The way that you actually move around in the space, in this case, it's a fun play space. But it's the same as if you move around in a workspace.

Mark Anderson: That's for the long term. People stay for that. What I'm talking about is, when you see something, I just noticed it along the way in which people will walk... Well, it's the truth. You may not like it but what I'm saying is, you see it happening. I'm not trying to make an absolute point, but you can't ignore the fact that, when you see people, and their reaction to it is overly strong on the visual. They stay for the depth. And it doesn't mean that visuals are not important.

Frode Hegland: It's not a black and white thing. Of course, we see the visual. That is what we see. There's no question there. But what I'm saying, what I'm suggesting is that, it's much thinner in people's experience. Yes, they may pick up the good looking game, but it doesn't take them that many minutes to feel how the rifle feels, and the walking feels. The actual interaction comes so quickly. I think that, if we take that as inspiration...

Mark Anderson: You're talking about games. I'm thinking knowledge tools. I accepted games it's a far closer dopamine rush. But in knowledge tools, where I spent a long time working, I might have the experience to argue that it's not so immediate as a game. I'm not a great gamer. I can see how it works but, I have experience in a different field. And I don't think your point about games transfers as easy as you presume.

Frode Hegland: What I'm trying to say is that games have progressed. Knowledge tools, and generally have not. "Tinderbox" which is very advanced compared to other tools, haven't really changed that much in the last 10 years, has it?

Mark Anderson: Yeah, quite a lot actually. Well, it's been completely redesigned once. And it has continued to evolve. For those who don't know, I spend a lot of time using "Eastgate's" "Tinderbox" tool, but I've used lots of other things, because, in the course of that, I'm constantly being dragged by people into other tools that they're using, in consulting work and things. And I speak with conviction, because I've just seen it up close. Often, trying to work out what's going on is unpicking people's interaction happening through the visuals of it. This is where the gaming metaphor doesn't quite work for me. But because people sense of something deeper underneath, they sort of want it. But they can't get to the point where they fully see the value, to make them make the commitment to do the learning they need to make the thing stand up and shine. And funnily enough it's just odd. Part of it is, that the visuals get in the way. But I think it's in part because we like things that are pleasing to the eye.

Frode Hegland: Okay. So let's go over to Rafael. All I was trying to say is that, games have moved on. We can learn from them. That's all I'm saying.

Brandel Zachernuk: I would love to reply to that after Rafael as well. Because, I would say, the games have not moved on.

Frode Hegland: There are different aspects, and I look forward to hearing that very much. Okay, Rafael, for your brief, comic, interlude.

Rafael Nepô: Yeah, there's a couple of things involved. First, commenting on both of those things. I think both sides are true. I think there's an aspect of the, over-the-shoulder appeal, when you're using a tool, or playing a game. Somebody passes by you and they glance over. If they find it interesting, then they go the extra step to know more about it, right? And that goes both for tools and games. And then, what I was going to say regarding Mark's mention of "Mee," the platform, is that we're doing a lot of research on information and library sciences. Because when you go to a library, usually the librarian, or somebody was a steward of information. They basically take you by the hand and guide you to where, at least, the aisle that you were looking for, the books you are looking for is located at. And that kind of stewardship has gotten lost in digital research, pretty much. We're left to our own devices, looking for information. And research is a job, it's a profession, it's a serious thing. And there's a lot of things involved in research that, regular people searching google, simply don't have the skills to do. And I'm not talking about academic work, I'm just talking about, "how can I find out everything I need to know about this specific topic?" Right? So the current state of information, and finding things, either online, or in different platforms, I find that it's quite a mess. When I mentioned that I think the future is in libraries, it's because, once the

world finds out how librarians are important, we're going to run out of librarians. Because they can fit in basically every single business, every single function, every single environment. They just make things better. Because the underlying structure is text. And the profession that has had the most impact on text is librarians, period. No other profession has come closer to unveiling the possibilities of text. And that's why the work of both Paul Otlet and Arthur Mii and La Fontaine has been extremely important in this area. So I think, the more we look to the past, and the more we develop that, like Wendy Hall said yesterday, "these memes go on for years, and years." But we never end up developing them in our timeline. We're always developing things that came before us. And that's completely fine. We're just part of the timeline, making it go forward and forward. That's my two cents on that area.

Frode Hegland: I think that the proof of what you're saying, Rafael is, "YouTube" plays DJ sets for an hour and a half. I don't download music on iTunes anymore. I don't look for the individual songs, I trust the DJ. A librarian is a DJ of knowledge. Curators of different museums. They're curators and that is important. I think you're dead right. Brandel, I look forward to what you're having to say. But just really briefly, in my defense, games should go much further, they're still running around with a gun, no question. My only real point was that, when you start playing, if the movement and mechanics don't... If the gameplay isn't good, you don't play the game. Versus the visual. That was my only point, but I would love to hear what you have to say on that aspect. Because of your perspective.

Rafael Nepô: I also disagree with that. And I would like to comment a little bit more about games, based on my past experience.

Frode Hegland: Yeah. Brandel, you first.

Brandel Zachernuk: So, my first foray into professional life was, I'm from New Zealand, and a number of my friends and I started a game start-up. My interests in what games were quickly waned as I realized that I've enjoyed the concept of the tools, and the interaction aspect of it, more than I enjoyed this with the ludic play elements of it. But they've gone into "Blizzard" and "thatgamecompany" and places like that. So, it's been interesting carrying on conversations about, what games are, with them as well. I would say that, the actual interface mechanism, the terms on which you actually experience a video game have utterly stagnated in the last, I would argue, 20 years. And that's largely because of the expansion of the market, to do with the crystallization of the explicit input modalities. The few exceptions are things like, I've been really blown away by things like, "Super-Hot VR" in "Oculus Quest" and others. Less interested and excited by "Half-Life Alyx," because I think "Valve" has done an amazing job of translating a game into a new mode. But I don't think they've done that much with it in terms of the specific benefits you get out of the platform. But I would say that,

because tools for that are primarily about that input modality, and that their experience through those it's a lot harder. Because people falsely believe that, that aspect of computing is done. That "Windows" and "Windows" interfaces, with mouse pointers, and things like that, and menus is the thing to do with computers. And they're wrong. It's not essential to go into a new platform, and VR, and voice recognition, and stuff. But it definitely helps. And more to the point, it also renders it inevitably, that you have to move past those things. It's just really difficult for people to see those things, because the software isn't those input modalities. But it's experienced through those and I would also say that the frame rate, the responsiveness, these are also just understood to be, at this point, table stakes for applications. Because at that, sort of, mechanical level, a lot of people have managed to make things work really well. So the hoops that we jumped through, I've built "apple.com" for many years, the hoops that we and the folks who build "iCloud" jump through to make sure that all of your many, thousands of photographs are ready within milliseconds of scrolling down the page are very hard to beat. And so, when somebody experiences a new tool that has a transformative perspective on, what it is that a photograph is, but then it doesn't have the same latency characteristics, they're repulsed by it understandably. But it means that, they never get to experience what the thesis is behind those things, because it hasn't succeeded in delivering on the table stakes.

Frode Hegland: I think that should be your article for "Future of Text" Volume 3. I'm not kidding. Let me highlight how much importance I think that is. Because, when I was arguing with Mark just now, I was basically saying that, the visuals matter, the movement matter. Yes, they've been the same for decades. Absolutely. But if you introduce an entirely new way of working, if you don't have that movement interaction smoothness, as you're pointing out, it's such a barrier in how we, as a community, can build things, that really will help. But we don't have the millions to do that last bit of polishing is a huge impediment. That's something I haven't thought about. I'm very grateful for that. And I can see Gyuri itching with a comment.

Gyuri Lajos: Yeah. Rafael, thank you for phrasing the librarians. I quite agree with you. But on the other hand, you triggered this, that actually, what we need is constellations, and technology. That first will let each individual to be a real trailblazer. Exactly as Bush envisioned. And not only that they should be able to share theirs, as Mark said yesterday, those trails, not only that they never fade, but with it decentralized you can actually make it so that you will discover, you'll be able to discover the person who is knowledgeable about what you want to find out about. In a kind of crowdsourcing of librarian skills. You are quite right. There'll never be enough librarians. Even if people are wise enough that they need it. They really need to be empowered to be their own librarians for the thing that they care

about. Anyway, thank you. That's a good angle.

Rafael Nepô: Just a quick comment after the Gyuri. Connected to Frode's mention at the beginning of, what it is that you're selling. According to Vint Cerf and Wendy Hall, I'm just selling a new version of "HyperCard" and that's completely fine.

Gyuri Lajos: That's completely good, exactly. And make it interactive, please.

Frode Hegland: Hang on. Just a quick moment. I don't think that's what they were saying. Because things have to get reinvented. The article that Vint wrote about my work in "ACM" in the last month's issue. At the end of it he says, "well, that sounds like he's just trying to reinvent the web." And then he goes into the reasons not. So, both Vint and Wendy are extremely open to new ideas. But of course, it's charming for them, because of their history, to see how it relates. That was not, in any way, intended as it's just a blah, blah, blah, a "HyperCard." It really wasn't. But that's a whole...

Rafael Nepô: No. But I enjoyed that either way. Because we did find out about "HyperCard" later on. But I would love to get in touch with Bill Atkinson to present it to him, and to hear his thoughts on it, as well. So, if any of you have contact with Bill, I would love to connect with him too. To know how we've been going through it.

Frode Hegland: It's difficult to get to him. Bruce Horn is one of my close friends, he worked on the "Finder" of the first Mac. And he knows Bill Atkinson, of course, well. But Bill is in a different life now. I've desperately tried to get him both, to the symposium, and to the book, and it's just not happening, unfortunately. But if we can manage it, that would be a great reason. Yeah, sorry. Alain, I can't pronounce a name in French, how do you prefer that a non-French people pronounce your name?

Alain Marsily: You can say Alan, because it's difficult for English people to say Alain in French. But everyone can say Alain if it's French. But Alan is okay for me. Just go ahead for Alan. My point is, Bill Atkinson, I met him around the 90s, when "Apple" was promoting the "HyperCard." And now, as far I know, he's just promoting e-cards. Doesn't change completely, but he knows that he has changed the world at that time. Because if you look, "HyperCard" is just not "HyperCard." It's also a language behind. And behind you have a structural way to display, or to broadcast information, because it's just not card, after card, it's also behind each card some intelligence. It's important to know that. Second point is just, I provided my feedback about the meeting. I start my first company at around the 90s called "FunSoft." I started with games. And I switched to application software where we designed many visuals tools. And I went to the PARC design in Cambridge. Where Xerox has a research center. That was around the 90s and we demonstrate what we have created. We have created "VIP," Visual Interactive Programming. Just to go along with Frode, for me, the interface part of games, means that, if it's not enjoyable to play with, people will not use it.

And if we see the evolution of the design of the OS, and also the computer environment, we are just going more and more forward to animation. If we look what are now inside the design, I'm sure that we cannot go back. Except, perhaps some research person that can still work with those CPM. But now we have great tools that can map the old interface. And what we have today is, just something on top of text. This for me, games, animation, it's something that it's inside the human, and they love to play with something, they enjoy to play all the time with some nice tool. That's my feeling. Also, about the timeline. There are some research from "Yahoo," during the early internet, where they try to promote XML. And with the XML they want to let people use part of the text, and "Wikipedia" is the first platform where most of the text, as far as I know, is saved in XML format that leds to this research. But also making another view of the "Wikipedia" information. And going to timeline, it's an easy task, because everything is normally designed to let people view information with other aspect, or other angle. Today what I think it's important to understand, and I have also background in the business, and "Quidzi" it's also something that I want to make as a nice tool to use, and when I say tool and not just an app, is because we want the user playing with something to have result. And when I went to the academia, and I have many friends in the academia, they look for research and they want always more and more and more and making the stuff even bigger and they can be lost in some aspect. And when I see behind your GUI, you have through your library, and behind your library, I'm sure you don't know what are inside each page. But what the people want when they do research, is that the computer aggregate everything about the history, and the legacy, but as we say that, is the legacy really interesting for the future? Yes. If there are some link with that you have inside your past. And I think, if we can share only the history of order on navigation, and if I can share my story with a story of yours, I'm sure that we can cross and see some stuff that can let the user and everyone understanding more, and more about some topic. Because you went somewhere where I didn't went. That's that's my idea. It's not just sharing the content, but sharing also the way you search, and what you have. If you have spent sometime on some aspect, you have to highlight something. If we can just use this strip of information, I'm sure we will make a giant jump.

Gyuri Lajos: Can I just quickly respond to that? This is the whole thing, this is why the commons-based IPFS, Web-C makes all the difference. Because that means that, all the interactions, all the development of any idea, whether it's yours or collaborative, it can have full provenance, trusted, verifiable provenance, not only of the authorship, but the engagement. That really is is the real game, because there's just so much value that could be derived from just that, exactly. I really appreciate that you emphasize that bit. Because it's not just the result that is interesting. The path. Because that path, that history, actually gives you

the rich linking into where it actually, the museum, where it all came from. So, that is the most significant change, really. Is to don't have this, "oh, we don't know what it is, because it's presented. But can I believe it?" It makes that actually, full of betrayal. That is important. Thank you.

Frode Hegland: On that point, I just wanted to say that, in this community, on and off over the years, so often it comes back to timelines. And the basic notion is that, if "Apple" and "Google," with respect, spy on us. Why can we not spy on ourselves? The benefit of recording everything we say, every browser tab we go to, every link, every word we write, plus all the recordings of these meetings, plus everything else. Because I have a professor from, when I studied in Syracuse, New York, Ed Lady, who was a bit of a genius. And he came into our group about two years ago here. And he started saying the stupidest thing, and he's not a stupid man. So I wondered what he was on about. He was saying, we need something like GPS for knowledge. And that makes no sense. And then I realized that, we do have one thing, and that is time. A lot of knowledge has some kind of a time element. If we can put the time on to it, it would be so valuable. And one of the things, for instance would be, let's say, today, we have a breakthrough here. How interesting would it be to see what the weather was like the previous week for us? All kinds of information that is time based, so what came together for these people to have this breakthrough? If we can collaborate on that, somehow I think that, would be absolutely wonderful. Rafael, you were next on the actual queue. Sorry about that.

Rafael Nepô: Sure. I want to jump back a little bit on the gaming, and then connect it to text. I think it's going to be a nice parallel. In video games, there's this guy who created the Bartle taxonomy of player, I'm not sure if you're familiar with it. He basically separates player types into four categories. There's the killers, the achievers, the socializers and the explorers. Basically, killers, they want to be first in leaderboards, and ranks. They want to be getting the first place. Achievers, they want to complete everything that the game has to provide. All the experiences that the game has, the list of achievements they want to complete everything. The socializers, use the games as a social platform. So they just go into the game, and they talk to other people. And the explorers, they want to see the visuals, the environment, and explore the terrains, the world, and things like that. And out of those four categories, three of them are based on, for example, if we take "Blizzard Entertainment" and their games, basically everything related to soundtrack, to artwork, to animation and to environment, those are always praised very highly. But everything that comes to gameplay is criticized every single time. So gameplay is never going to be perfect, and it's never going to be one size fits all. But everything related to the art side of games, are experienced as art. So I think, if we had a taxonomy for the way people write, and experience text, we would have, the calligraphers,

the marginalia the notetakers the citationists. We would have all of these different people that fit into different contexts. And they're all part of the ecosystem of writing. And I find that some people are going to be more artsy, some people are going to be more documentalists, but it always ends up as this part of the whole ecosystem. And I think that's important to know, and to organize, and structure, because it connects to, how we can explore the "Future of Text." Both the community, but also how we can end up showcasing different kinds of people, from different areas that are also related to text. Because there's completely different experiences that relate to this one topic.

Frode Hegland: Wonderful. Look at the notes. This is your next article, but you've got to do PhD level research on it. Mark, you're sequentially up.

Mark Anderson: Okay. Frode, quickly. It was just something I was sparked by, well, first of all, I really enjoyed it Alain's backstory and summary and filled some nice gaps and things. Passing reference of XML, "Wikipedia" and timelines is, one of the things that is interesting is, certainly in the context of "Wikipedia" is actually, how unuseful the timeline is. Certainly as a researcher. It tells me what happens at a certain stage. So I can take a document, I can, as well with the scrubber, I can scrub from character one, to character N. But unless a human has bothered to say why they pressed the button at that point, it tells me nothing. Nothing at all. And that is that you see the same now in "Google Cloud" docs, and "Microsoft" cloud docs. The digital dark age is upon us. Is there because, of course, we assume that, somebody else is writing that important stuff down, and evidence would suggest that we aren't. There's an interesting point there. Another aspect to timeline though coming out of that is, I can't recall the the URL of it now, but there was somebody in 2019, somebody had made a wiki data. Basically, it's a spreadsheet, "Wikidata" query, that actually is a history of hypertext. And wants to fill it out. That's quite interesting. The problem with Wikidata is that, it's probably a little more hard-edged in terms of the provenance of the data you put into it. So half the problem in using these tools is, if you're trying to restore history, if you're trying to put metadata in, you're unsell by people saying, "well, what is your right to put this in?" Because at some point, you've got to put the first thing in the ground. And there's that's another interesting problem collaborative systems. Anyway, I'm interested to see what Brandel has to say.

Brandel Zachernuk: I was gonna talk about a couple of points on it. I'm fascinated by this recognition that there are distinct functions within text. And it reminds me of, my wife has recently been reading, "How to Read a Book" by Mortimer J. Adler and Charles Van Doren. For anybody who hasn't read it already, it's phenomenal, as well as a bunch of insights from Walter Ong about, what it is that reading is, and all the different things that reading has been, the way that it's sped up massively, and the impact that has on what our cognitive,

psychological expectations of text are. It iss really important for understanding what we maybe want to do to support the different modalities that text probably needs to be kind of understood in terms of. That's why I actually have the next week off, and one of the things I'm planning to do is, build a virtual reality, text reading system, which is more devoted to being able to read things that are like Marshall McLuhan. These very dense known proclamations that are very interesting, but need time to settle rather than focusing on speed and velocity. So yeah, I absolutely agree with that sort of taxonomic detail is very much needed, and I would love to see the way in which some of those varying needs are, then consequently addressed, by the design of the systems that come out of it. The other point that I wanted to talk about was this idea of, within the context of things like, timelines, within the context of people sharing information. One of the things that's been really eye-opening, and frankly humbling for me is, in my interaction of dealing with "Safari" as other parts of the the company inside "Apple" is that, this monomaniacal obsession with security and privacy is not just a sales pitch. It's something that is carried through. The reason why people aren't allowed to put their browsers onto an "iPhone," for example, is because the "Safari," in order to work properly at all, it's an incredibly privileged application and "Apple" is not comfortable with giving people the keys to the castle, in that way. Because most of the exploits come through "Safari," actually, in one way or another. And one of the challenges, when people are sharing information is, the risks for disclosure that come as a consequence of being the internet, the sort of the wild network of networks, of things like that is such a vitally untrusted space, in terms of the things that people can do to each other, through the various nozzles and funnels that are made available for the best of intentions. There's no reason not to do it, it's not a reason not to try, but it's an interesting thing to consider, in the context of what kinds of things can go wrong as a consequence of people recording, and passing this data around to each other. And to that end as well, it's been really interesting recognizing that, the vast disconnect between what "Safari" thinks pages are, and what I, as a person who makes pages even for "Apple" itself, think pages are. And that's reflected in the taxonomic density of the HTML specification around things. That seem like they're to do with academic publications, versus what commercial websites are actually often comprised of at this point. Which people refer to as "divsu." So, yeah. Sorry, I'm done.

Frode Hegland: No, you're not done. Many things, first of all, what you said there was another really good chunk of something, right? We should have the means that, where the stuff you just said, is privileged in a transcript. Because that was useful. A lot of what I say is semi-moderators waffle. It shouldn't have the same level of transcription. But also, I have to say, yesterday, when you saw the brief run-through of the "Author" and "Reader" software, you saw the map thing, right? So, on one level it's just text on a page, anywhere, super

simple. But it has this characteristic that, if the text that is in the definition, is in another node, then it draws a line. To have that via "Visual-Meta," in your VR environment, would be the most, insanely, interesting thing, at least from my perspective. If we could come up with, some kind of commonality, not for graphs that say the truth. But grafts that say, glossaries. Which are clearly subjective. That would be really, really fun. Over.

Brandel Zachernuk: Yes. It reminds me of James Burke's, "Knowledge Web." Which I think is fascinating, in particular because of the way that it's so explicitly qualitative, and subjective, and it makes me want to do more, because, one of the problems is that, when you have a subjective, but relatively scarce presentation, then it is given the veneer of objectivity. One of the things that I would really like, is to be able to show enough potentially, conflicting, information in that way that it renders that subjectivity clear. So, yeah. Super exciting.

Frode Hegland: Alain's notion of a playlist of documents, a little bit comes into this. Rafael's point about librarians comes into this. Because, if we can have these chunks of spaces of, this is what I think, James Burke's connections, he was probably the only one who said, no to be interviewed for Doug's thing. Not because he was being difficult, he was just super busy. Super interesting work that he does. With "Visual-Meta," what I'm trying to do is two things. One, when it comes to documents, put it visibly at the back of the book if it's important. Don't hide it, right? Just don't do that. Secondly, it has to be so super easy for human and machine to read.We're also looking at, how to do "Visual-Meta" for the web. Which is a very bizarrely, different, challenge. The really key thing is, the copy and paste operation. When you copy, of course, the clipboard contains all kinds of stuff, and it's actually hard as a developer to know what it is. But that's another long discussion. But to be able to take something from different environments, so we have these opportunities for the different interactions. Gyuri's notion of a knowledge graph, is very different from my notion of a defined concept graph. But they should be able to talk to each other. And even in the map view that we have, you can have citations. So each definition can have a citation, or many if you want to. And that is yet another way, where people can start playing. Interaction wise, my dream is, and I think "Facebook" has done the most amazing job of educating the general public to use computers more, especially with pictures. People actually like to tag their pictures from a party with things. If we can provide, equally fun interactions, to tag their knowledge, in a useful, connected way, and that can go anywhere, that'll be amazing. Rafael.

Rafael Nepô: Yes. I wanted to quickly jump back to the topic of augmented reality and virtual reality. I think they're both extremely different, and how we engage with the environments for VR, I've heard some friends, they want to create a safe room in their house, where it's for VR only. And a safe room is a room that is empty. And you have cushions

around as well. So when you move, when you put the VR glasses in, you're in a different universe, right? So you have to be able to experience that place in the most possible way. And you're completely disconnected from reality when you go into VR. And that makes a lot of possibilities. That makes it possible to do a lot of different things, because our brain is easily fooled to think that, you are really experiencing that, and VR provides that experience. But I'm more interested in AR. I think AR has the most possibilities of real world use, as an augmentation engine for the things that we experience on a day-to-day basis. So even though I'm making a digital platform, we have always thought about how it would work in a physical environment, using physical things. A lot of the ideas for me, and for the cards, came from index cards. That's why they flip front and back, that have information. And basically, if we have, like Frode was saying, if we can tag things in the real world, AR makes it so we can extract more information from the things that we are experiencing. Even though we might need some sort of, glasses at the moment. But who knows, eventually, every object will be possible to do some, either holographic text thingy, or maybe it's going to be in our retina. I don't know but if we get the interface, either right or out of the way. If we have no interface at all, and we have you know argumented...

Frode Hegland: No such thing has no interface. Even in your own brain there's an interface.

Rafael Nepô: I understand. But there's a book called no interface, which is really fun because, it's a blank book, and it talks about, how interfaces are horrible.

Frode Hegland: How do you open the book? Interface. Alain, I see you have your hand up. But just really quickly, I want to profess my absolute, complete, stupidity. And that is with the whole VR thing. I just realized now, sitting in front of you guys, because I'm a Mac freak. There's an "iPad," there's an "iPhone" here, and you guys are on my 13 inch. With "Apple Glasses," clearly, the glasses will know when I'm looking at an "Apple" device. And it will privilege that, and it won't put any crap on it. That means that, with my normal "Apple" AR glasses, I'll be able to see you guys, and interact with text, everything crisp. But then, the stuff that is away will be from that. I think that's going to be an absolute killer. Where it's not either-or, you can do your real work, but you've got something on the wall as well. Never thought of it. That's how stupid I am. Alain, please.

Alain Marsily: Yes, I have two points. First of all, the meta. Just wondering if we could see that, as we let user take snippets, and create a story with documents, but also some text. And that can be valuable text, and that we are thinking about adding the NFT for some text. And I think something that is not really extensively discussed is, how we can add NFT to text? Because there are some valuable information that would be close to Ted Nelson's vision, to let all snippets belonging to the authors, and then, the text can be going everywhere on the internet, or any place. But we know that, there are someone behind the text. And I think, meta

is for me more of a technological aspect to try to organize information for some others. But I think the copyright is also something important. I think, if you add the NFT or something close to the NFT, the value to tag, or to add meta, but also to let the user, being the real author or something, will that perhaps help you to expand the use of meta. That's a feedback to so, we are thinking about adding part of the NFT in inside "Quidzi" because, if you share, or if you transfer, if you broadcast knowledge, it's perhaps, normal that people can also have the copyrights associated to the content. First Point. Also in "Quidzi," you will have something like Spotify. That means, you can take part of the text inside a playlist, and create a new playlist. And then, it's important to bring in to the new playlist, or the source, and also the author copyrights. That's something that we think that would be, perhaps important to make something going further in the text world. Second point I want to add is, all the AR and VR, I'm really interested in that. I love to see what is coming. But I've also experienced the release of the 3D on the the TV. And everyone said that 3D was the future, and so on. And the market didn't follow. For me, meta is perhaps on the position where it can succeed, but also can be a total mess, because there are so much money that will be in this world. There are so many experiences, that people will not understand the value, the experience, and also the benefits. And the value is just to understand. But the benefit it's for them. And just integrate that in their everyday environment. That's, for me, a question. And I will watch everything about meta, and metaverse, or whatever could be the name. This will be perhaps, a new technological layer. But I'm not sure that, the public will follow easily and rapidly.

Frode Hegland: Yeah, that's interesting. And Brandel, please respond to that. I just want to say, I put in a link to "The Onion" article, where "Microsoft" patents zeros and ones. It jokingly reminded me of what you were saying with NFTs of text. But of course, you're talking about a bigger piece of knowledge. It just reminded me of that, on "The Onion" from many years ago.

Brandel Zachernuk: On that subject. Something that I was really fascinated by was, the realization that, Borges' Celestial Categorization Scheme was actually a satirical response to Utley and Fontaine's work. Which was also the same motivation for Bush, as we may think, he was definitely motivated by seeing the (INDISTINCT) and all of the work that was happening over there. And it was really funny just to realize that Borges' went in one direction and Bush went on the other. So, to understand and interpret some categorization and disambiguation to add absurdum levels, as well as seeing the good in it, and trying to make use of it from the inside track of Silicon Valley. And also, my work within "Apple" is related to some of this stuff as well. I would say that, in the context of other companies that have attempted to do VR. I spoke with a number of, and actually interviewed at "Google VR." At the time when that was happening last. And the reason why it imploded to my mind, and to

many of the people who left in frustration and disgust was that, "Google" was trying to build a market before it was building a value proposition for, why people would be in it. And that was very much the same thing with 3D television as well. If people were piling on their values like we want to make this stuff, rather than thinking about, why anybody would want to have it. Whether you want to call what they would do with it, consuming or not. And one of the things that I'm really conscious of, in terms of things like, AR, VR, and one of the reasons why I'm really interested in text, as I go into in my video about my word processor is that, you need to have reasons to use it. And those reasons can't just be solved in pre-crime "Minority Report" style. They actually have to be the mundane things that most of us do with computers, most of the time. And that means that, there needs to be a response to what text processing, both in terms of output of producing it, as well as input. And understanding, and comprehending bodies of text, there has to be a benefit there for people to get. And I actually don't think that meta, definitely has not enunciated that, in a way that's actually, adequately compelling. It's again this sort of, communication of the organizational values, and priorities. We need to get you into this for our reasons, rather than having successfully communicated, why that's actually attractive for the people, who they would need to draw in. Hopefully, if other companies join that race into these platforms, they will have a better value proposition. But I think, organizationally, it's a challenge for big companies to realize, how big of an ask it is. To ask, to pull people into what VR is. In large part actually, because there are lots of aspects of it that are simply worse, and you were talking about whether an "Apple" device would prioritize the stuff happening around it. This it's potentially true. But it depends a lot on the mechanics of what those things do. This kind of device does not deal with clips. It doesn't have the pixel pitch, it doesn't have the resolution. That would mean that, that pass-through view of the real world would be adequate. You can build things that are augmented reality that way, but the practical consequences of it, and what you can do with it, depend immensely on how well a job of implementation you do of, either having passed through video, or other things like that. And we're probably 10 years away from everybody getting those things good enough, not to be immensely important, in terms of, people's subjective experience of any platform like that.

Frode Hegland: Yeah, on that last tiny little detail. I was more saying that, if there's an "Apple" device, no AR stuff will be there. So we have that quality, so we have stuff in the background. That's all. But on your bigger point, just to be very personal. That is exactly why I invented "Visual-Meta." I'm not a big person, doing a big thing. But the reasoning is what you said. First of all, my two dear friends, Doug and Ted, both geniuses, much bigger than I'll ever be. They didn't have an input and output. Ted's work never had an output. It didn't connect to the world. He wanted a new world. Secondly, you need to have something that is

demonstrably useful. When all the years, and many dialogues, particularly with Mark Anderson, in the beginning hating PDF, because it's frozen, then realizing, it is actually what's used in academia. That is the workflow. And let's make the frozeness a benefit. I can imagine meta being a great lobby. But why do we even need a great lobby? I mean the way that I'm seeing you guys now is a bit boring, you're just rectangles. But what would be the actual benefit for me to put on a headset to see you in a larger shape? There just wouldn't be any. Because your bodies would be wrong, or they would be weird. Because you're all sitting in different kinds of chairs, in different kind of ways. So it'll be very, very, odd. It'd be very fake. It's like "Second Life" kind of a thing.

Rafael Nepô: I was about to say that, every MMORPG has been a metaverse. Like gaming has done meta for a long, long, time.

Frode Hegland: The thing that everybody here keeps saying, things have to be open and connected, it's just ridiculous. And when I'm pushing on the "Visual-Meta" it is not the fact that it's based on "BibTex." It is anything. It can be on there. Please just write it down and let it be moved around. The whole idea of "Visual-Meta" is that, in a thousand years, someone comes across some sort of online media, or a print out, and they have this stuff, and at the top, I don't know if you know this, some of you do. It actually says on normal-sized font, in plain English, "hi, this is "Visual-Meta," it's intended to do this, it's basically a thing, and what that thing equals." Language will change over time but, it's not compressed for "cody" stuff. Sorry, you just made me go off on a complete...

Mark Anderson: Well, I think it's a good point you make there. But in the same way as PDF is just where we're stuck at the moment. What it is, is a PDF or a "Word" doc. "BibTex" was a choice between "BibTex" and RIS, one of the two. "BibTex" probably is better used and understood of the two interchange formats. Is it good? No. But another thing that I was thinking on actually the talk yesterday is that, often from the technical perspective, we look at "Visual-Meta" as a metadata thing. But when working on it, was very conscious of the fact that, one of the next things is, for instance, to get "Visual-Meta" into something like an arts journal. Where technology is just of tool that stands between you, and what you do, not something which you're so closely associated. Just having something, that someone actually can read, whether it's in the PDF, or also extracted, or printed out on paper, I think is is terribly important. For the long term, who cares? One of the things about "BibTex" is and you could say, it's such a hot mess. That hopefully it will upset someone, so much, they will write a far better storage system, for that sort of data. But we're not there now.

Frode Hegland: That's true. So, in the last 15 minutes we have here today, I guess we should talk about, how to move forward. But I think we have good agreements. We still have our Monday and Friday meetings, which is really lovely, and very flexible. And then, we're going

to try to organize having the monthly meetings. We also need different kinds of journals. I'll be pushing, of course, on writing it at my own "Author" and exporting it as a PDF. But if we want to use different media too, I think that is very worthwhile. I don't own this community, I'm very happy to have started it. But we all need to own it. So if someone wants to put it in a different thing, that should absolutely be done. The only requirements I would beg for is, inter-relation linking, interoperability, whatever. Some way to refer to things. And that's why, yesterday towards the end, I was talking about the whole addressability point. You can't address something, if you can't give it an address. So, yeah. Let's keep talking. Let's keep recording. And let's try to do some level of building. Adam was here today. He took Mark Anderson's cleaned up version of all the papers of the hypertext "ACM" proceedings. Put it into a really, lovely, timeline. One of them was based on my design. But then, he did one that was significantly better. But the really cool thing is, when you view it, you hit the Tab key on the keyboard, and it toggles between them. And you have the same item selected. I just think that's just, such a powerful thing. So, there are things we can build together, things we can test together. But I really, really, think we're now at the point, after 10 years of this symposium. Let's really value our record. Anyone else can agree? Brandel, you said you work at "Apple" and obviously, we're all in awe of someone working at "Apple" because it's such a fortress. It's really hard to reach in and out. Vint Cerf has emailed Jim Cook twice about "Visual-Meta" with the hope that he would send it to someone internally, and it would land somewhere in the "Pages" team. But both "Pages" and "Word," because now I have an insider at "Microsoft" looking at the "Word" people. They can't actually deal with "Visual-Meta" inputs, because you cannot paste an intelligent object, you cannot paste a citation, citations are treated as some extra side thing. That's very interesting. But also, if you export to PDF from "Pages" or "Word," even if you use the styles that are headings, the headings are not there in the PDF. It's really, really bizarre. PDF is awful, but it's also potentially very powerful. So, Brandel, what I want to do with you is, to give you this community of support for your ideas to talk about. So you have more ammunition with the people you work with, who actually make a difference.

Brandel Zachernuk: Yes, thank you. I look forward to the extent that I can be a conduit. I actually speak, I wouldn't say regularly, but I have been in contact with the "Pages" team. In the past, one of the things that I built, for the benefit of building the "Wikipedia" ads gallery, was something I call the "WebGLiser," which takes a the rendered DOM element, and turns it into a 3D transform hierarchy, that can turned Into a series of objects that you were able to manipulate and turn around. And as it transpires, on the "Pages" team rebuilt their own text rendering system, from the ground up, in that same way. Not for any interesting purposes, but just so they could get the kerning better. Which is fine. So, yeah. I'd be happy to see what I

can do to find out where people are thinking about these things, and to the extent that, I can communicate back the sentiments, and preferences. One of the things that's really interesting, and it occurs to me, as you were mentioning, that is the value system of these applications is something that is intensely important, but often ignored, even by the people implementing them, themselves. They are so impressed, and meshed in the value system of what a document, for example, constitutes that, they don't really have the ability to shift it because they say, "oh, the the code base doesn't support it." What that means is, that the value system that the code base is in support of, is unable to accommodate it. And that's a really fascinating distinction. But that's not to say that it can be possible, to nudge people in the direction of understanding, and recognizing these distinct purposes, and artifacts, as being important goals, for either substantial rewrites, or or subsequent successors to that same kind of application, or context.

Frode Hegland: By the way, and this is a secret. The book is coming out on the 9th of December. Brandel, if you want to write something, if you can do it in the next week, I'll sneak you in. Just don't tell anyone if it's not possible.

Brandel Zachernuk: Oh, wow. Thank you. Yeah, my wife was jokingly suggesting that I try to sneak something, and I'll definitely give that serious thought. Thank you very much.

Frode Hegland: That could be her punchline to the joke. Mark.

Mark Anderson: Yeah, just a quick reflection as I was smiling at this somewhat issues, describing this thing about "Word," or "Pages," or either, or both not being able to basically not exporting to PDF for the headings. I thought, "crankey, this is like the early days of web 1.0." And people say, "no, really. You should use headings. It has a purpose." And at the time we were struggling as to, whether the tags were supposed to be uppercase or lowercase. And eventually, sanity arrived. And the fact that, in most modern browsers, if you go, and look at the code. The thing it actually shows you isn't what the original machine, or person wrote, but a tidied up version, based on extracting all that semantic. And that's a wonderful thing. Perhaps, if word processes could get with the movement, and we could get to that level of structure. That would be marvelous.

Frode Hegland: Brandel, before I forget. Do you know Will Thimbleby?

Brandel Zachernuk: Will Thimbleby?

Frode Hegland: He's at "Apple." He worked on the, pull up from the side to do a note thing. His dad was my advisor for my masters. So that's quite cute. Just in case. I know it's a big company. Anyway.

Brandel Zachernuk: Yeah, there's a directory. I can look them up.

Frode Hegland: All right. Yeah, it's just funny. In case you happen to run across him. Well, I

look forward to seeing some of you in monthly, some of you in weekly, whatever suits. And please, also keep thinking about this thing I go on, and on about. Some kind of a journal thing.

Rafael Nepô: Frode, are we going to have the first monthly in December or January?

Frode Hegland: January. I think that we should try to plan it for the 9th of December, because 9th of December, of course is, Doug's 50th anniversary, demo thing. And also, Vint Cerf and Ismail are doing a presentation. I can't remember what it is. So that's the official launch of the book. Then we can say, "we're launching the book." And we have this series. And before that, I think we will have a "Google Docs" sheet with, who is lined up, or what sessions. And we're a bit organized. And we need to really think about, how to do the newsletter. I currently think it will be something quite simple. But if anyone has more exciting ideas, let's use it. And I think we can productize it. Probably as a free product. But if we create some kind of a workflow, to create a useful journal, that has a real expandability, linkability, all that good stuff. There's a real need for that. And a company couldn't do it, because it's so simple. There aren't any competitive advantages of IP or any of that stuff. But I think, we, as a community, couple something together that is super simple, super connected and useful.

Mark Anderson: Yeah, if you manage to rummage up someone who has the time and interest to being an archivist, I think that would be interesting. For instance, a useful thing I can see is, actually, just for instance, to comb through, listen through the recordings, and actually, effectively, just do a bit of curation on the chat. Because often, someone's speaking enough, they've spoken, they'll put something in, that actually relates to what they spoke about. So that the two aren't aligned, and an automatic extraction is not going to make that. Or it may be someone who's familiar with the conversation that's going on just being able to, perhaps add a little extra meta-comment to make it (indistinct).

Frode Hegland: Mark, you're hired.

Gyuri Lajos: That's why I wrote that "docdrop" thing. Because that could actually make it co-creatable. And I'm very happy to be involved into that, because that's what I'm doing. That's one of the most tangible things is how to integrate it with a hypothesis. And how to actually make use of this.

Frode Hegland: I think that's great. I think we should try that. Just this whole thing about coming together, to make a really easy journaling system. The first piece of software that I made, that is still available is "Liquid." Some of you may know, it's super simple. Select text, you get options, you do something. The reason I'm mentioning it now is, no company can do that. Because it's too damn simple. The first one we had, called "HyperWords," worked as a web plug-in. It was on "Firefox." And then, a few years later, "Microsoft" came out with their

rectangular blue dots. We had a round, silver, dot, they had a blue one. They did something similar. But it was a bit clunky. "Yahoo" tried something, it was a bit funky. And I don't think that's because I'm a design genius. I am definitely not that. I think it is because, we didn't have any bosses. So, there wasn't that layer of management, of everybody having to add value to the product. I think that's the same thing here, we do something super simple. No points to prove, no extra stuff, with people needing to put their fingers in, we may do something useful. And it is kind of amazing that, we are in a point in time, 2021, where the world needs a simple journaling system that is robust, that isn't our computers, it's not on a blog, it's not locked away in somebody's database. It's literally...

Rafael Nepô: it's called paper.

Frode Hegland: Exactly. We're talking about magical paper, Rafael. We have lost so much in the transition to digital. Now we need to collect it back.

Mark Anderson: I love David Lebow showing us, actually, just cracked me up, completely. He showed me. He'd done all this work in his system, then he printed that disc.

Rafael Nepô: I loved what he did that. That's how I think when I see any kind of book. I want to be able to do that. Instantly.

Gyuri Lajos: You don't want to actually print it out.

Rafael Nepô: That's where digital comes in. That's where VR maybe comes in, and you see everything around you.

Brandel Zachernuk: Well, it's either VR or you becom. It's what Mark Weiser was talking about. Pads and tabs, and the fact that you need these things to be cheap enough not to matter. Something that try to tell people at "Apple" all the time is, these are not tabs. Because they cost a thousand dollars each. You can't treat them like the way that you would wisely treat those things. Because they need to be cheap enough not to matter. And the relationship that sort of flows from it. So yeah, I totally agree.

Frode Hegland: Yeah, interesting. I think, you mentioned "Apple" and "iPhone." I just have to say, the "AirPods Pro," with this spatial audio is such a revelation. I often work at my club, and I need headphones, and the fact that the audio is here and not everywhere, it means it's more relaxing. But it's so well done that, if I, sometimes look away, I was "oh, they're not on." It's on the actual machine. Everybody is hearing what I'm doing. It happens so often. So that situated in spaceness, just auditory, not even all the great stuff you're talking about, Brandel. It was such a revelation, and it's almost science fiction. We live in a world where that's possible? Wow. What next things are we going to see?

Mark Anderson: Well, I'm still waiting for my flying car.

Gyuri Lajos: Oh, you've got "Twitter" instead. Well, the old saying, "we were dreaming of

flying cars." And ended up with "Twitter." I think it's, what's his name, the "PayPal" founder.

Frode Hegland: I think that's an actual, interesting, point. Because I drive a "Tesla." Very lucky to drive a "Tesla." And yeah, it doesn't fly, that's a matter of energy and lots of other things, whether it could do that. But when I drive to Southampton, part of the drive I'm checking emails, the car's driving itself. Why were self-driving cars not as thought through? Was it just not as sexy as the ones up in the sky?

Rafael Nepô: I have a thought on that. So, self-driving shouldn't have been done for cars. It should have been done for buses. Because buses, they have timesheets, they have correct routes, they have structure, they have a parking location. But you don't have a business with buses, you have a business with cars. But it doesn't make sense to have self-driving on cars, because people are unpredictable. And the routes they go about are unpredictable. But everything about buses, and public transport is predictable to the second. So, self-driving makes sense for public transport, but it doesn't make sense for cars. But as a business, it makes sense for cars, but it doesn't make sense for public transport.

Frode Hegland: A friend, Tom (indistinct) on the history of transportation. I will talk to him about exactly what you said. That's interesting.

Gyuri Lajos: But through that, those flying cars were of course self-driving. That's the whole point.

Frode Hegland: Yeah. Well, it will happen. My family is Norwegian, and we looked at boats, and all that stuff. And we looked at electric boats. You can buy an electric boat now, but they're very slow, and they're very expensive. So, it's exciting to see the beginning of that, and there are some friends of interest in aircraft. Electric planes are coming. We're at that transition point. And yes, some of them will be self-driving, it will. We can sit here and joke, but then again, how many years ago could we have joked about having these devices, right? It's all happening. It's all good. But all with time. And I'm so grateful for you guys.

Mark Anderson: Also, if I had a flying car, I'd go into Southampton. I'd still be stuck in an air lane. I'd just be stuck in a different queue. I'm not sure if that actually solves everything.

Brandel Zachernuk: The ship was also the invention of the shipwreck.

Frode Hegland: On that bombshell. Okay, all right, fine. Back to reality. Did you know that the elevator shaft was invented four years before the elevator? The "Otis" elevator was invented, as the first safety elevator for humans. It had a mechanism so it wouldn't crash. Physical lifting of materials, such as goods was done many years earlier. When they built the Cooper Union building in new York. I can't remember who was first now, I think it's Peter or something boring. He said, "there will be a lift, because buildings have to get taller in New York. So we're going to put in a shaft, in the middle of the building, with the expectation that someone will build a lift shaft." He was slightly wrong, because he made it round, and of

course, there are not round lifts today. But in terms of us trying to do foundational infrastructures. It's a little bit of, build it and they will come. Shall we end it on that note?

Mark Anderson: Well, yeah. And the guy that invented the hologram, invented it before the laser was invented, that made the hologram possible.

Brandel Zachernuk: And virtual reality was invented before photography. The first stereo pair was before the photo camera. The first photo camera to sort of record.

Frode Hegland: That will have to be part of your monthly presentation. Maybe you start with that.

Gyuri Lajos: And remember the "memex." The "memex" was invented before the computer.

Rafael Nepô: Remember libraries. They came before everybody.

Frode Hegland: Remember that the can opener was invented many, many, years after the tin can. In 10 years, we'll look at this recording, and look at what was invented in the meantime, in the wrong order. Have a good weekend everybody, thanks for today.

Notes on Transcription by Danillo de Medeiros Costa

Transcription is defined as "a visual representation of speech sounds by means of text." But transcribing an event, such as The Future of Text Symposium goes beyond that.

As part of the process of creating this text, I, as a transcriptionist, had the job to not only write but inject it with life. To passively, indirectly be involved in the conversation, as an invisible guest.

For that moment, I had to be completely involved, feel what the participants were feeling, experiencing during every presentation, every discussion.

In order to translate this into text, I had to get to know every speaker, every participant on an intimate level, researching their past, present and future. Their achievements, hopes, dreams, and goals. At least for that moment, I had to transport my mind into their minds, as if I was the one sitting there, listening, formulating ideas, brainstorming. I had to feel that I was one of them, one of those brilliant minds participating in this gathering, this reunion of people whose contributions and accomplishments will transcend life itself and be immortalized in our history books.

It is a fact that transcription nowadays can be achieved in a matter of seconds by a computer, matching speech recognition with a massive database of known words and structuring in a, somewhat satisfying way. But what an auto-generated transcription will always lack and what my part, as a transcriptionist is, is to give life, humanity to text, so that you, the reader, can experience and feel like you were also a part of The Future of Text.

History of Text Timeline

This will never be, nor aims to be, a complete and accurate history of text. There will be errors in omission, facts and dates will only be solid for the most recent events. The timeline format is ill suited for non-sharply delineated periods of time so we have tried to address that with language, such as liberal use of 'ca' and date ranges. The history of ideas is especially fraught and there will be issues we have not even thought about. What this aims to be however, is a useful guide for at least some of the major events and sequences which has brought us where we are, and which may help guide us to where we want to be with text. Since the format is so simple we aim that it should at least be useful to students to get a lay of the temporal land.

For any suggestions or issues, please email the editor Frode Alexander Hegland at frode@hegland.com and you will be credited as a Contributor in the next Edition. It would be great if you could use this format: **Year** (even if you have to use 'ca' or other terms) **Event/ thing** by **person** at **organisation** (if applicable)

13,8 Billion Years Ago

ca 13,800,000,000 years ago the universe comes into being. There was no 'instant' of creation. The universe didn't flash into existence, it came into being as an all-encompassing, interactive, quantum wave. There is no going back. From pure energy to all there is today, the universe gets more complicated and more interactive one Planck moment at a time

ca 4,540,000,000 years ago the earth and the solar system is formed

ca 4,400,000,000 years ago oceans form, providing a substrate for life with rich potential for interactions

Let's pause before we continue the journey into the next, great step (that of life itself). Look at these dates - the solar system has been around for roughly 1⁄3 of the universe's existence. That is something to marvel at. It's easy to imagine vast intergalactic civilizations having come and gone over the life of the universe, but it turns out that there actually isn't that much time in the past. We're pretty early inhabitants. There may have been one generation of stars similar to our own before us —maximum. So, maybe there hasn't been enough time for advanced civilizations to evolve. That we might be one of the most advanced consciousness in creation (or perhaps the only one) is a sobering thought. Can we handle this responsibility?

ca 4,000,000,000 Self-replicating molecules appear. Life is happening. It's pretty basic, but it's happening
ca 3,500,000,000 Single-celled organisms
ca 3,000,000,000 Viruses, though they may be much older
ca 580,000,000 Complex multicellular life
ca 250,000,000 or less–it is hard to be sure, DNA, with complex 'letters' of interaction takes life to a whole new level

250 Million-3,6 Million

2,7-2,5, 1,9-1,7 and 1,1-0.9 million years ago, the earth sees rapid climate change (on the scale of lifetimes of individuals, not species) spurring on hominid evolution in the Rift Valley in Africa, with each period coinciding with brain development. During the period 1,9-1,7 the

number of hominid species reached its peak and Homo Erectus appeared. Tool development also coincided with these cycles of rapid climate change, including Oldowan, Acheulean and Mousterian. For more on this topic, and how the planet shaped us in general refer to *Origins* by Lewis Dartnell

ca 3,600,000 Our ancestors walk upright and they loose body hair

ca 2,300,000 Homo Habilis, the tool user, is our oldest ancestor to use tools

ca 2,000,000 Olduwan tool Culture begins. Its key feature was the method of chipping stones to create a chopping or cutting edge.

2,000,000-50,000 BCE

ca 500,000 Earliest evidence of purpose-built shelters, found near Chichibu, Japan

ca 400,000 Early humans begin to hunt with spears

ca 280,000 First complex stone blades and grinding stones

ca 150,000 Humans possibly capable of speech

ca 100,000-200,000 Modern Humans

50,000-3,000 BCE

ca 50000 Our **'Great leap forward'**. Human culture starts to change more rapidly (burying our dead ritually, clothes from animal hides, complex hunting techniques)

ca 44000 Oldest known cave painting, found in the Franco-Cantabrian region in western Europe and Sulawesi, Indonesia

ca 35400 Oldest-known example of figurative art, in Sulawesi, Indonesia

ca 11000 Cave art by young children in the Rouffignac Cave

ca 7500 Near Eastern counters 'Tokens' to keep track of goods are the earliest known antecedents of the Mesopotamian Cuneiform script

ca 6600 Eleven isolated symbols carved on tortoise shells were found at Jiahu, an archaeological site in the Henan province of China, some bearing a striking resemblance to certain modern characters but the connection is not established

ca 4500 Proto-Indo-European language developed, probably somewhere near the Black Sea, and probably spreading because its speakers invented horse riding. Today 60% of modern humans speak a daughter language, 27% as their mother tongue

ca 4000 Possible preliterate images which may have been symbols (such as Gerzean pottery) which could have been precursors to Egyptian hieroglyphic writing

ca 3500 Egyptian Proto-hieroglyphic symbol systems

ca 3300 Reduction of three-dimensional Near Eastern tokens into two-dimensional signs on envelopes holding tokens

ca 3200 First logographic Near Eastern accounting lists written on clay tablets by impressing tokens

ca 3100 First logographic proto-cuneiform signs traced with a stylus on accounting tablets

ca 3000 First proto-cuneiform phonetic signs to represent personal names on economic tablets

ca 3000 First known use of papyrus for writing. Previously Egyptians had been writing on stone and pottery

ca 3000-1000 Hieratic ('priestly') cursive writing system used for Egyptian until the rise of Demotic. Primarily written in ink with a reed pen on papyrus.

3000 BCE

2900 First known air mail. Egyptian sailors released carrier pigeons from ships to pre-announce their arrival

ca 2800 First full sentence written in mature Egyptian hieroglyphs so far discovered. Found on a seal impression in the tomb of Seth-Peribsen at Umm el-Qa'ab

ca 2700 First cuneiform texts which departs from accounting: funerary texts

ca 2600 Sumerian language develops

ca 2600 Egyptian language develops

ca 2400 Akkadian language develops

ca 2400 First cuneiform tablet dealing with trade

ca 2300 First written sentences. These texts were inscribed on worshippers' votive statues dedicated to a god and requesting immortality

ca 2300 First named author, Enheduanna, daughter of Sargon the Great

ca 2300 Oldest known dictionaries of cuneiform tablets with bilingual Sumerian–Akkadian wordlists, discovered in Ebla (modern Syria)

ca 2000 Classical period of the Sumerian Cuneiform Script

ca 2000 First known library catalog in the Sumerian city of Nippur

ca 2000 Abacus (from Greek meaning "board strewn with sand or dust used for drawing geometric figures or calculating"), the first known calculator, is invented in Babylonia (Iraq)

ca 2100 Elamite language develops

ca 2100–1500 Proto-Sinaitic script, the earliest trace of alphabetic writing known, in the Egyptian Pharaoh's turquoise mines at Serabit el-Khadim in the Sinai Peninsula

2000 BCE

ca 1900 First known cipher (not yet decoded), in tomb of Khnumhotep II

ca 1750 Hammurabi's Code, by Hammurabi, ruler of Babylon

ca 1700 Hittite language develops

ca 1600 Earliest known medical document, the *Edwin Smith Medical Papyrus,* thought based on material from 3000 BCE, including the first reference to the human brain

ca 1500 Phoenician alphabet of 22 consonants was among the early mature alphabets. It spread over the Mediterranean and led to the Greek, Hebrew, Roman, Arabic and modern alphabets

ca 1450 Greek language develops

ca 1500 Earliest book known, the Ebers papyrus, a 20 meter scroll

ca 1500 First known use of movable type (stamps reused to repeat symbols identically), the Phaistos Disc, and first font

ca 1300 First known inclusion of words on a map, in Mesopotamia

ca. 1300–1190 The Ugaritic writing system a cuneiform augmented abjad (consonantal alphabet) for Ugaritic, an extinct Northwest Semitic language

ca 1300s Wax tablet with stylus: origins are uncertain but known to have been used at least until the 1860s CE, for example in the fish market in Rouen, France

1200s Late Bronze Age collapse

ca 1250–1192 Earliest confirmed evidence of Chinese script, Oracle bones script

ca 1200 Torah was copied onto a scroll by Moses according to the Hebrew tradition (date disputed)

ca 1200 Old Chinese language develops

ca 1100 BC – 256 Chinese Jinwen (Bronzeware Script)

1000-300 Chinese bronze inscriptions/script

1000s the Gezer Calendar, first vertically-formatted list

ca 1000 Hebrew language develops

1000 BCE

1000 Chinese Seal script evolved organically out of the bronze script

900–400 The Greek Alphabet emerged around the ninth or eight century BCE which had distinct letters for vowels, not only consonants. Many versions of the Greek alphabet existed but by the fourth century it had been standardised into twenty-four letters, ordered from alpha to omega

ca 700 Latin language develops

700s Alphabetic writing entered the Greek world from the Levant

650-400s CE Demotic Egyptian script following Late Egyptian and preceding Coptic. The term was first used by the Greek historian Herodotus to distinguish it from hieratic and hieroglyphic scripts

500s First known curated museum. Mesopotamian artifacts spanning 1,500 years, by Princess Ennigaldi, daughter of King Nabonidus

ca 500 Sanskrit language develops

ca 550 First official mail service, by Cyrus the Great, stretching from Post, Iran to Hakha, Myanmar

ca 500 Aṣṭādhyāyī by Pāṇini, quasi-generative grammar of Sanskrit, anticipating Chomsky

300s The basic form of the Codex invented in Pergamon

ca 300 Tamil language develops

300s Reed pens for writing on papyrus

310/305–240 The Pinakes, the first library catalog at the Library of Alexandria

285–246 Alexandria founded by Alexander the Great

283 Library of Alexandria founded by Ptolemy I and II

257–180 Punctuation is invented at the Library of Alexandria by Aristophanes of Byzantium

256-206 Chinese Zhuanshu (Seal Script).

206 BC–220 AD Chinese Zhuanshu simplified to Lishu (Clerical script)

250 Parchment Scrolls

ca. 230 The letter 'G', by Spurius Carvilius Ruga, the first known inventor of a letter

200s Quill used until about the 19th century CE, when replaced by the pen

200s Alphabetization developed, probably in Alexandria by Callimachus to catalog the Great

Library

200s Erya, first known dictionary

ca131-59 Acta diurna, daily news by government, published in Rome

179–141 Earliest extant paper fragment in Fangmatan in Gansu province, China

before 134 First character encoding, by Cleoxenus and Democleitus, described by Polybius. Each Greek letter was converted to 2 digits (1 to 5), then to smoke or fire signals

63 & 'ampersand' proposed by Marcus Tiro

ca 55 The book in the form of folded sheets, not just a stack of sheets, by Julius Caesar, in his reports on the Gallic Wars

BCE – CE

ca 50 Earliest surviving example of Old Roman Cursive script: a speech by Claudius

79 Earliest tables of contents by Pliny the Elder in Naturalis Historia (Natural History)

79 Earliest known marketing pun and portmanteau word: wine jars in Pompeii marked 'Vesuvinum' (Vesuvius wine)

79 Two SATOR AREPO word squares in Pompeii, perhaps with Christian associations, making them the earliest surviving Christian inscriptions

100 CE

200

ca 200 New Roman (or Minuscule) Cursive script which evolved into modern lower case letterforms

ca 220 Earliest surviving woodblock printed fragment (China)

300

ca 300 Maya writing

ca 300 Latin handwriting starts to use larger letters at the start of sentences, though the same shape (not mixed case)

330–360 Codex Sinaiticus, the oldest extant codex; a biblical manuscript written in Greek

367 Old Roman Cursive script banned except for official imperial documents, eventually leading to lower case text (derived from New Roman Cursive) being normal and upper case exceptional

400

420–589 Chinese Kaishu script (Regular Script) replaces Lishu

500

Before 500s Literacy introduced to Japan in the form of the Chinese writing system, via Baekje

500-1000 Florilegium, which are selections of 'flowers'(select passages) from work, rather than a summary, to help people deal with the volume of books

593 Woodblock printing starts in China

600

600s Quill pens, made from the outer feathers of crows and other large birds, becomes popular

700

ca 700s Word spacing pioneered by Celtic monks

ca 700 St Cuthbert Gospel, the oldest surviving Western book, which still has its original goatskin leather cover

700s Japanese writing develops away from Chinese

764 Empress Kōken commissions the earliest known examples of woodblock printing in Japan

800

800s paper starts to replace parchment as the primary writing material for administrative uses in Baghdad

813 Council of Tours decreed sermons should be in vulgar language not Latin. This may have triggered early Romance languages to be spelt literally, rather than as Latin with distorted pronunciation

842 Oaths of Strasbourg, first surviving document in Romance (early French), with parallel version in Frankish (early Germanic)

868 The oldest known printed book, *The Diamond Sutra,* a Buddhist book in China

854–931 Prototype professional peer-review process recommended in the *Ethics of the Physician* written by Ishāq ibn ʻAlī al-Ruhāwī

900

ca 900 Screen Printing in China during the Song Dynasty

900s Arabic numerals come to Spain, though they were not commonly used until the fourteenth century.

960–1279 Chinese Kaishu script evolves to Songti script

1000

1080 The *Missal of Silos,* the oldest known document on paper created in Europe

1056 First recorded paper mill in Xàtiva on the Iberian Peninsula

1100

1190 First paper mill in France

1200

1200s The term 'Originalia' is coined in contrast to Florilegia, indicating a greater authority to original sources than excerpts

1246 Call numbers associated with the location of books, in the Library at Amiens Cathedral in France

1276 Paper mills established in Italy

1290 *Ars Magna* by Ramon Lul

1300

1377 *Jikji* the oldest surviving book printed using moveable metal type by Gyeonghan in Korea

1300s The word 'history' meant, "relation of incidents whether true of false." The word goes back to the Proto-Indo-European root of wid-tor weid, it literally mean "to know" and "to see."

1304–1374 Humanism founded by Francesco Petrarch, reviving enthusiasm for ancient Roman thinkers, with books as the centre of their discourse

1320 First paper mills in Germany

1340–1350 First paper mills in Holland

1346 First known two-color print, a frontispiece to a Buddhist sutra scroll

1400

1400s First prototype of a Jacquard-type loom by Jean le Calabrais

1424 The University of Cambridge has one of the largest libraries in Europe with just 122 books. Books are still handwritten on parchment

1453 Constantinople captured by the Turks and books from its Imperial Library are burned or removed, marking the end of the last of the great libraries of the ancient world

1455 'Gutenberg Bible', also-called Forty-two-line Bible, or Mazarin Bible, the first complete moveable type printed book extant in the West, printed by Johannes Gutenberg

1457 First known color printing is used in *Mainz Psalter* by Johann Faust and his son-in-law Peter Schöffer

1470 Roman typeface, the first recognisably modern typeface, a combination of capital letters inspired by ancient Roman architectural inscriptions and Carolingian minuscules, developed by Nicolas Jenson

1470 First printed joke book, *Facetiae* by Poggio Bracciolini

1470 Earliest extant example of sequential numbering in a book, *Sermo in festo praesentationis beatissimae Mariae virginis,* printed in Cologne. This did not become standard for another half century. Peter Schoffer, apprentice of Gutenberg, is the inventor of the title page and Arnold Therhoernen in Cologne, is one of the first to use both a title page and page numbers

Late 1470s, title, author, and publisher information included by printers on the first inside page of a book

1479 *Manicule in Breviarium totius juris canonici*, compiled by Paolo Attavanti printed in Milan by the German firm of Leonhard Pachel and Ulrich Scinzenzeller

1481 First marginal annotations used in printed texts on a Venetian edition of Horace with commentaries by Acro and Porphyry

1483 First Talmud printed

End of the 1400s almost all printed books have title pages

End of the 1400s the numerals 4, 5, and 7 begin to take the forms we are familiar with today

1500

1500-1700 Handwrittern newsletters in Europe called avvisi, reporti, gazzette, ragguagli, nouvelles, advis, corantos, courantes and zeitungen

1500s Garamond typeface. Claude Garamont, a French type designer, publisher and punch-cutter lived in Paris. Thus, many old-style serif typefaces are collectively known by his name as 'Garamond'

1500s The word 'history' is differentiated into 'history' and 'story' in English, though in other languages, such as Spanish and Norwegian there is still no distinction

1500s Maya writing mostly fallen out of use

ca1500 Etching for printing by Daniel Hopfer

1501 Italic typeface by Aldus Manutius

1513 Likely first pagination with Arabic numerals in *Cornucopiae* by Niccoloo Perotti

1517 Martin Luther posts a thesis against indulgences and thus sparking what would be called the Reformation, a questioning of authority which would spur greater literacy rates and interest in education

1530s Monasteries disolved in England

1538 Latin-English wordbook by Sir Thomas Elyot

1539 Henry the Eighth's *Great Bible*, by Myles Coverdale banning all glossing

1540 Henry the Eighth's authorised Grammar, of which formed the basis of schoolbooks in England for the next 300 years

1545 Bibliotheca universalis by Conrad Gessner, a complete bibliography of all printed books (except itself)

1556 *Notizie Scritte,* first monthly newspaper published in Venice

1557 The Geneva Bible, the primary Bible of 16th-century English Protestantism displaces the Great Bible

1560 First blueprints for the modern, wood-encased carpentry pencil by Simonio and Lyndiana Bernacotti

1564 Graphite for pencils comes into widespread use following the discovery of a large graphite deposit in Borrowdale, England

1568 Bishops' Bible, English translation of the Bible produced under the authority of the established Church of England and later used as the base text for the King James Bible

1575 First paper mills in Mexico

1565 Mechanical/Lead holder pencil by Conrad Gesner

1588 First commercially successful paper mill in Britain by John Spilman in Kent

1593 Index to content in a book, by Christopher Marlowe in Hero and Leander

1595 The first printed catalog of an institutional library, the *Nomenclator* of Leiden University Library

1600

1600 *Orbis Sensualium Pictus* textbook for children by John Amos Comenius

1604 *Relation aller Fürnemmen und gedenckwürdigen Historien,* first weekly newspaper, published in Germany by Johann Carolus

1611 *King James Bible*

1642 Mezzotint Printmaking by Ludwig von Siegen

1648 Part emoticon '(smiling yet:)' by poet Robert Herrick

1665 *Journal des sçavans,* in Paris, first academic journal

1665 *Philosophical Transactions of The Royal Society,* in London, second academic journal

1665 Oxford Gazette, first English newspaper

1667 Acoustic string telephone by Robert Hooke

1674 First decipherment of a script, the Staveless Runes, by Magnus Celsius

1677 Artificial versifying by John Peter

1600s Quills become more pointed and flexible

1690 First paper mills in the USA

1700

1702 The Daily Courant, the world's first daily newspaper, printed on paper so cheap it was designed to be thrown away after reading

1704 Daniel Defoe, considered the first journalist, publishes *The Review*

1704 Newton's *Opticks*, the first major scientific book published in English, not Latin

1706 Newton's *Opticks* translated into Latin

1714 First patent for a mechanical typewriter issued to Henry Mill

1723 *De Etruria regali libri VII* Thomas Dempster used sans serif typeface to represent inscriptions in Ancient Greek and Etruscan

1725 Improvement to the Jacquard-type loom by Basile Bouchon who introduced the principle of using a perforated band of paper

1731 First peer-reviewed journal, *Medical Essays and Observations* (Philosophical Society of Edinburgh, Edinburgh).

1739 Last international treaty written in Latin, the Treaty of Belgrade, indicating the new pre-eminence of living languages over dead ones

1748 First modern use of sans-serif ("grotesque") lettering, anonymous letter carver, grotto at Stourhead, England

1755 *A Dictionary of the English Language* by Samuel Johnson

1767 Index Card organization by Carl Linnaeus

1769 Every house in Britain needs to have a number for addressing, introduced with the Stamp Act,

1770 Natural rubber used as an eraser by Edward Nairne

1771 UK Parliament formally gives journalists the right to report proceedings

1772 Aquatint printing by Peter Perez Burdett, named by Paul Sandby

1780 Didot and Bodoni by Firmin Didot and Giambattista Bodoni, the first modern modern Roman typefaces

1780 First card catalog by librarian Gottfried van Swieten, Prefect of the Imperial Library, Austria

1783 James Madison of Virginia proposes the creation of a congressional library

1786 Rounded sans-serif script font developed by Valentin Haüy for the use of the blind to read with their fingers

1787 Constitution of the United States, mentioned here as a milestone in written documents producing and framing a society

1787 *The Federalist Papers* by Alexander Hamilton with John Jay and James Madison in *The Independent Journal*, considered the most important documents for interpreting and understanding the original intent of the Constitution of the United States

1791 First card catalog for libraries, using the back of playing cards by a group of men with bibliographic experience led by Barthélemy Mercier

1795 Modern Pencil by Nicholas-Jacques Conté

1796 Lithography by Alois Senefelder

1796 Colour Lithography by Alois Senefelder

1799 The Fourdrinier machine, a continuous paper making machine by Louis-Nicolas Robert of France

1800

1800 The Library of Congress established when President John Adams signed an act of Congress also providing for the transfer of the seat of government from Philadelphia to the new capital city of Washington

1801 Blackboard by James Pillans

1801 Carbon Paper by Pellegrino Turri

1804 Jacquard loom by Joseph Marie Jacquard

1806 Patent for Carbon Paper by Ralph Wedgwood

1875 First literary agents

1810

1816 First typeface without serifs by William Caslon IV

1816 First working Telegraph by Francis Ronalds used static electricity; it was rejected by the Admiralty as "wholly unnecessary"

1817 A Code of Signals for the Merchant Service, the first general system of signalling for

merchant vessels by Captain Frederick Marryat

1819 Rotary printing press by David Napier

1820

1822 Mechanical Pencil with a 'Mechanism to Propel Replaceable Lead' by Sampson Mordan and John Isaac Hawkins

1828 Pencil Sharpener by Bernard Lassimonne

1829 Embossed printing invented by Louis Braille

1830

1836 Chorded Keyboard by Wheatstone and Cooke

1837 Early forerunner of Morse Code by Samuel F. B. Morse, Joseph Henry, and Alfred Vail

1839 Vulcanized rubber used for erasers by Charles Goodyear

1839 Electrical Telegraph commercialised by Sir William Fothergill Cooke

1840

1843 Rotary Drum Printing by Richard March Hoe

1843 Wood pulp introduced to paper mills for paper production

1844 Newsprint by Charles Fenerty of Canada. Designed for use in printing presses that employ a long web (continuous sheet) of paper rather than individual sheets of paper

1844 Morse Code by Samuel F. B. Morse, Joseph Henry, and Alfred Vail, in use

1846 Printed Output envisioned by Charles Babbage from his Difference Engine 2

1850

1854 Boolean algebra the mathematical basis of digital computing, developed by George Boole in *The Laws of Thought*

1855 International Code of Signals drafted by the British Board of Trade

1857 International Code of Signals published as the Commercial Code

1857 National Telegraphic Review and Operators Guide lists emoticon precursors <3 and :*

as shorthand for 'love and kisses'

1857 *Study On Some Deficiencies in our English Dictionaries*, which identified seven distinct shortcomings in contemporary dictionaries published by the Unregistered Words Committee of The Philological Society, a small group of intellectuals in London headed by Richard Chenevix Trench

1858 Eraser on pencil by Hymen Lipman

1858 First transatlantic telegraph cable laid by Cyrus West Field

1860

1860s The first card catalog, designed for readers, rather than staff, by Ezra Abbott, Harvard's assistant librarian

1860 Herbert Coleridge succeeds Richard Chenevix Trench as the first editor of the Unregistered Words Committee's effort; this work was the precursor of what eventually became the *Oxford English Dictionary* (OED)

1860 Hectograph, gelatin duplicator or jellygraph printing process by Nelson S. Knaggs

1860 T*he New York Herald* starts the first 'morgue', meaning archive

1861 The Unregistered Words Committee published the first sample pages, Herbert Coleridge dies and Frederick Furnivall takes over as editor

1864 Non-Digital 'spam'. Unsolicited group telegram advertisement

1868 Kineograph / Flip-Book by John Barnes Linnett

1868 The Remington by Christopher Latham Sholes, the first successful typewriter

1870

1870s QWERTY layout by Christopher Latham Sholes

1874 Stencil Duplicating by Eugenio de Zuccato

1876 Telephone patent by Alexander Graham Bell

1876 Telephone Switch, which allowed for the formation of telephone exchanges and eventually networks by Tivadar Puská

1876 Autographic Printing by Thomas Edison

1879 The Oxford University Press agrees to publish The Unregistered Words Committee's dictionary, to be edited by James Murray

1879 *Index Medicus* edited by John S. Billings and Robert Fletcher, published by Frederick

Leypoldt

1880

1828 *On the recent Improvements in the Art of Printing* published in *The Quarterly Journal of Science, Literature, and Art,* by Edward Cowper

1850 *On Printing Machines, Especially Those Used in Printing 'The Times' Newspaper* published in *Institution of Civil Engineers. Minutes of Proceedings*, by Edward Cowper, outlining his contribution to printing which had increased newspaper printing from 200-250 copies per hour on a hand press to 10,000 copies per hour

1873 First illustrated daily newspaper, *The Daily Graphic,* published in New York.

1877 Current definition of entropy, by Ludwig Eduard Boltzmann

1881 Harvard Citation Style (author date) by Edward Laurens Mark at Harvard University

1881 Emoticon precursors as *Puck* magazine published a set of type-set faces expressing joy, melancholy, indifference and astonishment using basic type characters

1883 Téléphonoscope concept by Albert Robida

1884 Linotype by Ottmar Mergenthaler

1884 The Oxford University Press agrees to publish *A New English Dictionary on Historical Principles; Founded Mainly on the Materials Collected by The Philological Society*

1887 Snigger Point by Ambrose Bierce, a precursor emoji/emoticon symbol in the form of an opening parenthesis character '(', but rotated 90° to the left

1888 Ballpoint Pen by John J. Loud

1890

By 1890 Some papers boasted circulations of more than one million

1890 US Census undertaken using the punched-card technology, an invention suggested by John S. Billings to Herman Hollerith in the company which would become IBM

1891 Automatic Cyclostyle duplicating machine by David Gestetner

1895 Universal Decimal Classification (UDC), starting with the Universal Bibliographic Repertory (RBU: *Répertoire Bibliographique Universel*) by Paul Otlet and Henri La Fontaine with the implementation being as card catalogue by Herbert Haviland Field, using the Dewey Decimal Classification system by Melvil Dewey

1894 *Information and Entropy in Thermodynamics* by Ludwig Boltzmann

1895 *A New English Dictionary on Historical Principles* renamed as the *Oxford English Dictionary* (OED)

1900

1901 Trans-Atlantic Radio Signal by Marconi Company

1902 The term Diglossia coined by Karl Krumbacher to refer to the phenomenon of divergence between spoken and written language

1903 First message to travel around the globe by Commercial Pacific Cable Company, from US President Theodore Roosevelt, wishing "a happy Independence Day to the US, its territories and properties..." It took nine minutes for the message to travel worldwide

1903 *The Daily Mirror,* the first tabloid-style newspaper

1904 Patent for a 'type wheel printing telegraph machine' filed by Charles Krum which would go on to become Teletype in 1929

1906–7 Photographic Copying Machines by George C. Beidler at the Rectigraph Company

1907 Commercial Transatlantic Radio Telegraph Cable opened by Marconi Company

1910

1910 Felt-tip marking pen by Lee Newman

1910's Teleprinter, Teletext via telegraphs, by

1910 Mundaneum by Paul Otlet and Henri La Fontaine

1910 First criminal caught via wireless telegraph: the murderer Dr Crippen on board a transatlantic ship

1913 Plantin typeface by Frank Hinman Pierpont and draughtsman Fritz Stelzer of the British Monotype Corporation, based on a Gros Cicero face cut in the 16th century by Robert Granjon

1914 Optophone (OCR precursor) by Emanuel Goldberg, a machine which read characters and converted them into standard telegraph code

1914 Handheld Scanner (OCR precursor) by Edmund Fournier d'Albe a machine which read characters and converted them into tones

1920

1920s First full-time Type Designer Frederic Goudy

1922 *Ulysses* by James Joyce, first extensive use of stream of consciousness: text conveying thoughts not speech

1923 Spirit duplicator (also referred to as a Ditto machine, Banda machine, or Roneo) by Wilhelm Ritzerfeld

1925 Corkboard by George Brooks

1926 *Information in physics* by Leo Szilard

1926 research and development which would become Telex initiated by Reichspost in Germany

1927 The Statistical Machine patented by Emanuel Goldberg

1927 Futura typeface family by Paul Renner

1924 Art Color Pencils by Faber-Castell and Caran d'Ache

1928 Standardised punch cards by Clair D. Lake

1929 Hellschreiber by Rudolf Hell, precursor to dot matrix printing

1929 *Practical Criticism: A Study of Literary Judgment* by Richards, I.A

1930

1930 *The Readies*, a concept for portable speed reading by Bob Brown

1931 *Knowledge Machine* by Emanuel Goldberg

1931 Biro by brothers László Bíró and György Bíró

1931 The American Telephone and Telegraph Company (AT&T) introduced its teletypewriter exchange service, TWX

1932 Times New Roman typeface by Victor Lardent under the direction of Stanley Morison, on a commission of the Times newspaper, based on the Plantin typeface

1932 Information in quantum and particle physics by John von Neumann

1933 Telex by Reichspost in Germany operational

1933 Machine translation by Petr Petrovitch Smirnov-Troyanski

1934 *Logik der Forschung* by Karl R. Popper advanced the theory that the demarcation of the limit of scientific knowledge, is its 'falsifiability' and not its 'verifiability'

1934 Mundaneum/ "Mondothèque," by Paul Otlet. Includes automated linking between "card catalogs with sixteen million entries, photos, documents, microfilm, and more. Work on

integrating telegraphy and multiple media, from sound recordings to television"

1935 *Monde* book by Paul Otlet

1936 Dvorak Keyboard Layout by August Dvorak

1937 *World Brain* by H. G. Wells

1940

1940s-60s Information as a concept, through the works of Claude Shannon (information theory), Warren Weaver (machine translation), Alan Turing (universal computer), Norbert Wiener (cybernetics) and Friedrich Hayek (invisible hand is information)

1942 Xerography Patent by Chester Carlson. The technique was originally called electrophotography

1943 The term 'acronym' coined, meaning word formed from the first letters of a series of words

1944 Marking pen which held ink in liquid form in its handle and used a felt tip by Walter J. De Groft which becomes 'Sharpie'" in 1964

1945 Memex proposed by Vannevar Bush in *As We May Think*

1945 ENIAC first programmable, electronic, general-purpose digital computer by J. Presper Eckhart and John Mauchley (University of Pennsylvania)

1946 *A Logic Named Joe* by Murray Leinster

1946 Works on Machine Translation by Andrew Booth

1947 Machine translation, suggested in a letter from Warren Weaver suggests to Norbert Wiener

1946 Electric Printing Telegraph by Alexander Bain, precursor to the fax

1948 *A Mathematical Theory of Communication* by Claude Shannon, including the word 'bit,' short for binary digit, credited to John Tukey

1948 *The Human Use of Human Beings: Cybernetics and Society* by Norbert Wiener. The word cybernetics was first used in the context of the study of self-governance of people by Plato and in 1834 by André-Marie Ampère to mean the sciences of government in his classification system of human knowledge. Here Norbert Wiener introduced the term for the scientific study of control and communication in the animal and the machine

1949 *El libro mecánico* by Ángela Ruiz Robles

1949 *Translation* memo by Warren Weaver

1949 The Lumitype-Photon Phototypesetting by the Photon Corporation based on the

Lumitype of Rene Higonnet and Louis Moyroud

1949 Fr Roberto Busa starts work on computerizing his *Index Thomisticus* (St Thomas Aquinas), in the process founding Humanities computing

1949 The Chinese Language Character Reform Association established

1950

ca 1950 Niklas Luhmann's Zettelkasten system for storing and cross-referencing information in card indexes

1950 Whirlwind computer at MIT including a display oscilloscope becomes operational

1950 *Computing Machinery And Intelligence* by Alan Turing where he proposes the question 'Can machines think?'

1950s-60s Simplified Chinese characters created by works moderated by the government of the People's Republic of China

1951 Doug Engelbart's Epiphany: "Problems are getting more complex and urgent and have to be dealt with collectively – we have to deal with them collectively"

1951 *Qu'est-ce que la documentation?* by Suzanne Briet

1951 Regular expressions by mathematician Stephen Cole Kleene

1951 Linear B deciphered as a syllabic script for early Greek, by Michael Ventris

1951 LEO I the first general-purpose business computer, Lyons Ltd, text on paper-tape readers and punches

1951 UNIVAC (UNIVersal Automatic Computer) by J. Presper Eckert and John Mauchly at EMCC/ Remington Rand

1952 Manchester Mark I computer Love Letter Generator by Christopher Strachey, using a random number algorithm by Alan Turing

1952 Antitrust Investigations And Trial Against IBM starts, dragging on for thirty years, finally being dismissed in 1982. IBM will cautiously monitor its microcomputer business practices, fearful of a repeat of government scrutiny

1952–4 Dot Matrix Teletypewriter developed by Fritz Karl Preikschat

1952 'Love letter generator' aimed to generate a literary text from scratch, by Christopher Strachey

1953 UNIVAC 1103 designed by Seymour Cray at the Engineering Research Associates and built by the Remington Rand corporation

1953 Magic Marker by Sidney Rosenthal

1953 The Lumitype-Photon Phototypesetting System first used to set a complete published book and to set a newspaper

1954 Charactron by J. T. McNaney at Convair was a shaped electron beam cathode ray tube functioning both a display device and a read-only memory storing multiple characters and fonts on the UNIVAC 1103

1954 IBM 740 CRT used computers to draw vector graphics images, point by point, on 35 mm film 1956 Keyboard and Light Pen for computer text input at MIT on the Whirlwind computer

1954 The Chinese Language Character Reform Committee was founded

1955 Teletype-setting used for newspapers

1956 Chinese List of Simplified Characters issued by State Council

1956 First commercial computer sold with a moving-head 'hard disk drive', the 305 RAMAC by IBM

1956 'Artificial Intelligence' term coined by John McCarthy at MIT

1957 COMIT string processing programming language by Victor Yngve and collaborators at MIT

1957 Univers typeface family by Adrian Frutiger

1957 The term 'initialism' coined, a written word formed from the first letters of other words in a name or phrase. NATO, where the letters are sounded as a word are regarded as acronyms. FBI, where the letters sound as letters, are initial-words or initialisms

1957 Dye-Sublimation printing by Noël de Plasse at Sublistatis SA

1957 Helvetica typeface family by Max Miedinger

1958 *The Uses Of Argument* by Stephen Toulmin introduces the argumentation diagram

1958 Lisp programming language designed by John McCarthy at MIT and developed by Steve Russell, Timothy P. Hart, and Mike Levin

1958 Integrated Circuit (IC) by Jack Kilby at Texas Instruments

ca 1958 Speed reading by Evelyn Wood

1960

1960s 'Word Processing' term invented by IBM

1960 PLATO (Programmed Logic for Automatic Teaching Operations) generalized computer-assisted instruction system by Donald Bitzer at the University of Illinois

1960 Colossal Typewriter by John McCarthy and Roland Silver at Bolt, Beranek and

Newman (BBN)

1960 Ted Nelson's epiphany about interactive screens becoming universal, on-line publishing by individuals

1960 Suggestion for emoticon by Vladimir Nabokov

1960 *Man-Computer Symbiosis* by J.C.R. Licklider at BBN

1961 Selectric Typewriter by IBM with a ball print head instead of jamming bars, which could be easily replaced for different fonts and left the paper in place and moved the type ball instead

1961 Information Flow in Large Communication Nets by Leonard Kleinrock

1961 Synthesised Speech by John Larry Kelly, Jr and Louis Gerstman of Bell Labs

1961 Expensive Typewriter by Steve Piner and L. Peter Deutsch

1962 TECO (Text Editor & Corrector), both a character-oriented text editor/word processor and a programming language, by Dan Murphy

1962 the Western Union Telegraph Company established its Telex system in the United States (where the name Telex is a registered trademark)

1962 Highlighter Pen by Frank Honn

1962 Modern fibre-tipped Pen by Yukio Horie at the Tokyo Stationery Company

1962 Enciclopedia Mecánica by Ángela Ruiz Robles

1962 RUNOFF by Jerome H. Saltzer. Bob Morris and Doug McIlroy (text editor with pagination)

1962 *The Structure of Scientific Revolutions* by Thomas S. Kuhn

1962 Spacewar! by Steve Russell in collaboration with Martin Graetz and Wayne Wiitanen

1962 *Augmenting Human Intellect: A Conceptual Framework* by Doug Engelbart at SRI

1963 Sketchpad (a.k.a. Robot Draftsman) software by Ivan Sutherland at MIT

1963 The 'smiley face' by Harvey Ball, emoticon precursor

1963 Augmentation Research Center by Doug Engelbart at SRI

1963 Transport font, a sans serif typeface first designed for road signs in the United Kingdom by Jock Kinneir and Margaret Calvert

1963 TJ-2 (Type Justifying Program) by Peter Samson (first page layout program)

1963 ASCII (American Standard Code for Information Interchange) a character encoding standard for electronic communication developed from telegraph code

1963 'Hypertext' word coined by Ted Nelson

1963 Computer Mouse and Chorded Keyset by Doug Engelbart

1964 ELIZA natural language-like processing computer program by Joseph Weizenbaum at the MIT Artificial Intelligence Laboratory

1964 LDX (Long Distance Xerography) by Xerox Corporation, considered to be the first commercial fax machine

1964 *Understanding Media* by Marshall McLuhan

1964 ASCII 7-bit standard

1964 TYPSET text formatting software used with the RUNOFF program

1965 TV-Edit, one of the first CRT-based display editors/word processors that was widely used by Brian Tolliver for the DEC PDP-1 computer

1965 Semi-Conductor based thermal printer by Jack Kilby at Texas Instruments

1965 'Hypertext' by Ted Nelson first in print, as well as first design (zipper lists)

1965 MAIL Command for MIT's CTSS, proposed by Pat Crisman, Glenda Schroeder and Louis Pouzin, implemented by Tom Van Vleck and Noel Morris

1966 *Object Oriented Programming* by Ole-Johan Dahl and Kristen Nygard at the Norwegian Computing Center

1966 *Computers and the Humanities*, Journal founded by Joseph Raben at Queens College in the City University of New York

1967 HES (The Hypertext Editing System) co-designed at Brown University by Ted Nelson, Andy van Dam and Steve Carmody, as well as other student implementors, based in part on a spec Ted Nelson had written previously for Harcourt Brace

1967 The Quick-Draw Graphics System masters thesis by Jef Raskin

1967 Logo programming language designed by Wally Feurzeig, Seymour Papert, Cynthia Solomon at Bolt, Beranek and Newman

1967 Newspapers use digital production processes and begin using computers for operations

1968 A 'low-tack', reusable, pressure-sensitive adhesive accidentally created by Dr. Spencer Silver at 3M which would eventually be marketed as Post-it® Note

1968 Doug Engelbart's Seminal Demo of the NLS system at FJCC, including windows, hypertext, graphics, efficient navigation and command input, video conferencing, the computer mouse & chorded keyset, word processing, dynamic file linking and revision control

1968 Dynabook Concept computer by Alan Kay

1968 Digi Grotesk, digital typeface by Rudolph Hell

1968 *The Art of Computer Programming* by Donald Knuth

1968 OCR-A monospaced typeface for Optical Character Recognition by 23 American type

foundries

1968 OCR-B monospaced typeface by Adrian Frutiger for Monotype, following the European Computer Manufacturer's Association standard

1968 Serial Impact Dot Matrix Printer by OKI

1968 SHRDLU natural language understanding computer program by Terry Winograd at MIT

1969 FRESS, inspired in part by HES and Engelbart's NLS by Andy van Dam and his students at Brown University

1969 GML, leading to SGML by Charles Goldfarb, Edward Mosher and Raymond Lorie at IBM

1969 Ed line editor/word processor for the Unix, developed in by Ken Thompson

1969 Vladamir Nabokov presents concept of emoticon/emoji to New York Times

1969 Structured Writing and Information Mapping by Robert E. Horn

1969 ARPANET based on concepts developed in parallel with work by Paul Baran, Donald Davies, Leonard Kleinrock and Lawrence Roberts

1970

1970s Gyricon Electronic Paper by Nick Sheridon at Xerox PARC

1970 Xerox PARC founded by Jacob E. Goldman of Xerox

1970 The Western Union Telegraph Company acquires TWX from AT&T

1970 IBIS (issue-based information system) conceptualised by Horst Rittel

1970 Journal by David A. Evans

1970 *Bomber* by Len Deighton, first published novel written with the aid of a commercial word processor, the IBM's MT/ST (IBM 72 IV)

1970 Daisy Wheel Printing by Andrew Gabor at Diablo Data Systems allowing for proportional fonts

1971 New York Times article refers to "the brave new world of Word Processing"

1971 Laser Printer by Gary Starkweather at Xerox PARC

1971 File Transfer Protocol (FTP) by Abhay Bhushan

1971 Project Gutenberg by Michael S. Hart

1971 Email with @ by Ray Tomlinson

1971 PUB scriptable markup language. Brainchild of Les Earnest of the Stanford Artificial

Intelligence Laboratory and implemented by Larry Tesler

1972 TLG (*Thesaurus Linguae Graecae*) founded by Prof Marianne McDonald at the University of California, Irvine, to create a comprehensive digital collection of all surviving Greek texts from antiquity to the present era

1972 C programming language by Dennis Ritchie and Ken Thompson

1972 Xerox Star memo written by Butler Lampson, inspired by NLS

1973 Xerox Alto by Xerox PARC designed primarily by Charles P. Thacker

1973 Addison-Wesley replaces its mechanical typesetting technology with computerised typesetting

1973 Copy & Paste by Larry Tessler at Xerox PARC

1973 Click & Drag by Jeff Raskin at Xerox PARC

1973 Micral, first personal computer using a microprocessor by André Trương Trọng Thi, Réalisation d'Études Électroniques (R2E), (Orsay, France)

1973 Community Memory Bulletin Board precursor

1974 Omni-Font Optical Character Recognition System (OCR) Scanners by Ray Kurzweil at Kurzweil Computer Products

1974 Bravo word processor by Butler Lampson, Charles Simonyi at Xerox PARC. They would go on to produce Word

1974 *Computer Lib/Dream Machines* by Ted Nelson

1974 'Writing with light, writing on glass' were the closing words of Wilfred A. Beeching's Century of the Typewriter

1974 Transmission Control Protocol (TCP) an internet working protocol for sharing resources using packet switching among network nodes forming the foundation of the Internet (short for internet working)

1975 ZOG by Allen Newell, George G. Robertson, Donald McCracken and Robert Akscyn at Carnegie Mellon University

1975 Microsoft founded by Bill Gates and Paul Allen

1975 MUSA Speech Synthesis systems (MUltichannel Speaking Automaton) project led by Giulio Modena

1975 Altair 8800 computer by Ed Roberts and Forrest M. Mims III

1975 Gypsy document preparation system/word processor by Larry Tesler, Timothy Mott, Butler Lampson, Charles Simonyi, with advice from Dan Swinehart and other colleagues

1975 Colossal Cave Adventure text adventure game by Will Crowther and later expanded by Don Woods

1976 Second edition of *The Art of Computer Programming* by Donald Knuth, published by Addison-Wesley, which was typeset using phototypesetting which inspired him to develop TeX since he found the typesetting inferior to the original, Monotype typeset edition

1976 Frutiger series of typefaces by Adrian Frutiger

1976 Apple Computer (later Apple Inc.) founded Steve Jobs, Steve Wozniak and Ronald Wayne

1976 *The Metanovel: Writing Stories by Compute*r by James Meehan

1976 Emacs (Editor MACroS) word processor by David A. Moon, Guy L. Steele Jr. and Richard M. Stallman, based on TECO

1976 vi word processor by Bill Joy (now Vim)

1976 PROMIS (Problem-Oriented Medical Information System) by Jan Schultz and Lawrence Weed the University of Vermont

1977 Apple II computer by Steve Wozniak at Apple

1977 DataLand developed at MIT

1977 Zork interactive fiction computer game by Tim Anderson, Marc Blank, Bruce Daniels, and Dave Lebling at MIT

1977 Inkjet Printing by Ichiro Endo at Canon

1977 Preliminary Description of TEX Memo by Donald Knuth

1977 Name/Finger protocol (provided status on a particular computer system or person at network sites) by Harrenstien

1978 Aspen Movie Map, the first hypermedia/interactive videodisc by Andy Lippman, Bob Mohl and Michael Naimark of the MIT Architecture Machine Group

1977 *Personal computers as dynamic multimedia* by Alan Kay and Adele Goldberg

1978 Public dial-up BBS by Ward Christensen and Randy Suess

1978 TeX by Donald Knuth released as the first version which was used by others. Written in SAIL (Stanford Artificial Intelligence Language)

1978 American Mathematical Society Gibbs Lecture by Donald Knuth, *Mathematical Typography*; published in the Bulletin (New Series) of the American Mathematical Society, volume 1, 1979, pp. 337-372

1978 Vancouver Citation Style (author number), as a part of the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (URMs)

1978 QuarkXPress desktop publishing software by Quark

1978 Earliest documented electronic Spam (although the term had not yet been coined) by Gary Thuerk

1978 LISA computer by Apple design starts, with a requirement for proportional fonts

1978 Speak & Spell by Texas Instruments

1978 Highlighters with fluorescent colours by Dennison Company

1978 Wordstar word processor by Rob Barnaby

1979 WordPerfect word processor by Bruce Bastian and Alan Ashton at Brigham Young University

1979 Hayes Modem by Dennis C. Hayes and Dale Heatherington

1979 Metafont by Donald Knuth

1979 -) proposed by Kevin Mackenzie as a joke-marker precursor emoticon

1979 *Architext* by Genette, Gerard. Hypertext as based on a hypotekst

1979 EasyWriter for Apple II by John Draper

1979 TV-EDIT word processor was used by Douglas Hofstadter to write 'Gödel, Escher, Bach'

1979 Macintosh Project started by Jef Raskin and included Brian Howard, Marc LeBrun, Burrell Smith, Joanna Hoffman, and Bud Tribble. Named for Raskin's favourite apple, the succulent McIntosh. He changed the spelling of the name to avoid potential conflict with the audio equipment manufacturer named McIntosh

1979 Post-Its® by 3M sold commercially

1979 Steve Jobs visited Xerox PARC, organized by Jef Raskin, as part of an investment agreement

1980

1980s SPAM used as a term to describe users on BBSs and MUDs who repeat it a huge number of times to scroll other users' text off the screen. It later came to be used on Usenet to mean excessive multiple postings

1980s Telex usage goes into decline as fax machines grow in popularity

1980 ZX80 by Sinclair

1980 Smalltalk designed by Alan Kay, Dan Ingalls, Adele Goldberg and developed by Alan Kay, Dan Ingalls, Adele Goldberg, Ted Kaehler, Diana Merry, Scott Wallace, Peter Deutsch at the Learning Research Group of Xerox PARC

1980 PC by IBM

1980 Imagen founded by Les Earnest, sold to QMS in 1987

1980 Floppy Disks become prevalent for personal computers

1980 Vydec1800 Series Word Processor by Exxon

1980 ENQUIRE proposed by Tim Berners-Lee

1980 USENET by Tom Truscott and Jim Ellis

1982–3 The Encyclopaedia Project by Alan Kay, Charles Van Doren, Brenda Laurel, Steve Weyer and Bob Stein at Atari Research Group

1981 Movie Manual by David Backer at the MIT Architecture Machine Group

1981 Raskin leaves the Macintosh project and Steve Jobs takes over

1981 BITNET, EARN and NetNorth network university IBM mainframes, allowing text (mail, files, chat) to be shared by non-Arpanet institutions

1981 TPS (Technical Publishing Software) by David Boucher at Interleaf, allowed authors to write text and create graphics WYSIWYG

1981 First major use of Information Murals in Organizations by David Sibbet

1982 Guide by Peter J. Brown at Canterbury University

1982 Adobe founded by John Warnock and Charles Geschke

1982 First ASCII emoticons :-) and :-(by Scott Fahlman at Carnegie Mellon University

1982 CD-ROM by Denon

1982 Tron movie released, the first movie written on a computer, an Alto at PARC. Written by Bonnie MacBird based on inspiration by Ted Nelson's Computer Lib with consultation from Alan Kay, whom Bonnie would later marry

1982 TeX82, a new version of TeX, rewritten from scratch, renaming the original TeX TeX78

1983 Viewtron by AT&T and Knight Ridder

1983 MILNET physically separated from ARPANET

1983 ThinkTank outliner for Apple II

1983 ARPANET switches to TCP/IP

1983 Lisa by Ken Rothmuller, replaced by John Couch with contributions from Trip Hawkins, Jef Raskin and Steve Jobs, at Apple

1983 Word word processor for DOS by Charles Simonyi and Richard Brodie for Xenix (Unix OS) and MS-DOS, at Microsoft. Originally called 'Multi-Tool Word'

1983 KMS (Knowledge Management System), a descendant of ZOG by Don McCracken and Rob Akscyn at Knowledge Systems (a spinoff from the Computer Science Department of Carnegie Mellon University)

1983 Hyperties by Ben Shneiderman at the University of Maryland

1983 Multi-Tool Notepad word processor by Richard Brodie at Microsoft

1983 '1984' Macintosh Television Commercial by Apple

1984 Literate Programming introduced by Donald Knuth, and approach to treat a program as literature understandable to human beings. Implemented at Stanford University as a part of research on algorithms and digital typography under the name WEB

1984 Macintosh launched. In addition to the original contributors, the team also included Bill Atkinson Chris Espinosa, Joanna Hoffman, George Crow, Bruce Horn, Jerry Manock, Susan Kare, Andy Hertzfeld, and Daniel Kottke

1984 MacWrite word processor included with Macintosh, by Randy Wigginton, Don Breuner and Ed Ruder of Encore Systems for Apple. Also known as 'Macintosh WP' (Word Processor) and 'MacAuthor' before release

1984 The Print Shop designed by David Balsam and programmed by Martin Kahn at Brøderbund

1984 Metafont by Donald Knuth updated to a version still in use at the time of writing this book

1984 FidoNet bulletin board system software by Tom Jennings

1984 LaserWriter printer by Apple

1984 'Cyberspace' term coined by William Gibson in Neuromancer

1984 Organizer by David Potter at Psion

1984 PostScript by John Warnock, Charles Geschke, Doug Brotz, Ed Taft and Bill Paxton at Adobe, influenced by Interpress, developed at Xerox PARC

1984 MacroMind founded by Marc Canter, Jay Fenton and Mark Stephen Pierce

1984 PC Jr desktop computer by IBM

1984 Notecards by Randall Trigg, Frank Halasz and Thomas Moran at Xerox PARC

1984 Highlighted Selectable Link by Ben Shneiderman and Dan Ostroff at University of Maryland

1984 TIES by Ben Shneiderman at University of Maryland

1984 LaserJet by HP

1984 Text Messaging / SMS (short message service) developed by Franco-German GSM cooperation by Friedhelm Hillebrand and Bernard Ghillebaert

1984 Filevision by Telos

1984 LaTeX by Leslie Lamport who was writing a book and needed macros for TeX, resulting in 'Lamport's TeX' ('LaTeX')

1984 Zoomracks for Atari by Paul Heckel

1985 Symbolics Document Examiner by Janet Walker

1985 Guide, commercial edition, by OWL (Office Workstations Ltd)

1985 Pagemaker desktop publishing software by Aldus, bought by Adobe in 1994

1985 StarWriter word processor by Marco Börries at Star Division

1985 Intermedia by Norman Meyrowitz and others at Brown University

1985 Windows operating system spearheaded by Bill Gates at Microsoft

1985 Write word processor by Microsoft, included with Windows

1985 Word word processor by Microsoft ported to Macintosh

1985 Amiga computer by Commodore

1985 Emacs General Public License by Richard Stallman, the first copyleft license

1985 TRICKLE by Turgut Kalfaoglu at Ege University, İzmir; BITNET-to-Internet gateway allows sharing of text and programs between two disparate networks

1986 Guide by Peter J. Brown at the University of Kent, marketed by OWL

1986 Harvard Graphics desktop business application by Software Publishing Corporation

1986 Texinfo GNU Documentation System by Richard Stallman and Bob Chassell, developed by Brian Fox and Karl Berry

1986 FrameMaker document/word processor by Frame Technology. Developed by Charles 'Nick' Corfield based on an idea from Ben Meiry and commercialised with Steve Kirsch. Bought by Adobe 1995

1986 Hyperties commercial version by Cognetics Corporation

1986 Solid Ink Printing by Tektronix

1986 SGML (Standard Generalized Markup Language), ISO 8879

1986 Uncle Roger by Judy Malloy released on Art Com Electronic Network on The Well

1987 PowerPoint presentation software created by Robert Gaskins and Dennis Austin at Forethought Inc., bought by Microsoft same year and released as a Microsoft product 1989

1987 MacroMind Director multimedia authoring by MacroMind

1987 V.I.P. (Visual Interactive Programming) by Dominique Lienart at Mainstay Inc

1987 Storyspace by Jay David Bolter & Michael Joyce, maintained and distributed by Mark Bernstein of Eastgate Systems

1987 *Afternoon a story,* by Michael Joyce, first digital hypertext narrative

1987 Unicode by Joe Becker from Xerox with Lee Collins and Mark Davis from Apple

1987 Franklin Spelling Ace by Franklin Electronic Publishers

1987 Apple Knowledge Navigator visionary concept video initiated by John Sculley, sponsored by Bud Colligan, written and creatively developed by Hugh Dubberly and Doris Mitsch with input from Mike Liebhold and advice from Alan Kay, inspired by the MIT Media Lab, with product design by Gavin Ivester and Adam Grosser at Apple

1987 TEI (Text Encoding Initiative) 'Poughkeepsie Principles': text encoding guidelines for Humanities texts

1987 HyperCard by Bill Atkinson at Apple

1987 Amanda Goodenough's children's point and click stories in Hypercard published by Voyager

1987 Hypertext'87 First ACM conference on hypertext

1988 Microcosm by Wendy Hall, Andrew Fountain, Hugh Davis and Ian Heath

1988 NeXT Cube by NeXT

1988 IRC by Jarkko Oikarinen

1988 Think'n Time (Visual outliner with dates) by Benoit Schillings & Alain Marsily at Mainstay Inc

1988 # (hash) and & (ampersand) used in IRC to label groups and topics (RFC 1459)

1988 Wolfram Mathematica by Stephen Wolfram

1988 Hypertext edition of Communications of the ACM using Hyperties by Ben Shneiderman

1988 Idex by William Nisen of Owl, based on Guide

1988 *Hypertext Hands-On!* by Ben Shneiderman and Greg Kearsley, first commercial electronic book

1988 *Reflections on NoteCards: seven issues for the next generation of hypermedia systems* by Frank,G. Halasz

1988 Serial Line Internet Protocol (SLIP) by J. Romkey

1988 Breadcrumb Trail navigation metaphor in Hypergate by Mark Bernstein

1989 GRiDPad 1900, the first commercial tablet by GRiD Systems Corporation

1989 Robert Winter's CD Companion to Beethoven's Ninth Symphony, published by Voyager, the first viable commercial CD-ROM

1989 Markup (Visual document annotations with markup signs - Groupware) by Dominique Lienart & all at Mainstay Inc

1989 SuperCard by Bill Appleton at Silicon Beach Software

1989 gIBIS by Jeff Conklin and Michael Begeman, commercialised in the 1990s as CM/1 and QuestMap

1989 Bidirectional Email-to-Fax Gateway hosted by UCC

1989 Word for Windows word processor by Microsoft

1989 *Mapping Hypertext: Analysis, Linkage, and Display of Knowledge for the Next Generation of On-Line Text and*

Graphics by Robert E. Horn

1989 *Information Management: A Proposal* by Tim Berners-Lee at CERN. World Wide Web protocols published on USENET in alt.hypertext

1990

1990s T9 invented by Martin King and Cliff Kushler, co-founders of Tegic

1990s Compendium by Al Selvin and Maarten Sierhuis

1990 MarcoPolo (Visual Document Management - Groupware) by Benoit Schillings & Alain Marsily at Mainstay Inc

1990 Archie, a tool for indexing FTP archives, considered to be the first Internet search engine, by Alan Emtage and Bill Heelan at McGill University/Concordia University in Montreal

1990 Python programming language by Guido van Rossum

1990 *The SGML Handbook* by Charles F. Goldfarb

1990 *Designing Hypermedia for Learning* by David H. Jonassen and Heinz Mandl (editors) in which updated conference proceedings are annotated by the authors with typed hypertext links in the margins connecting passages between the articles

1991 Gopher protocol by the University of Minnesota (initial version of the protocol appeared in 1991, codified in 1993 as a RFC 1436)

1991 *Seven Issues: Revisited* Hypertext '91 Closing Plenary by Frank G. Halasz at Xerox Corporation

1991 World Wide Web by Tim Berners-Lee becomes the first global hypertext system

1991 DocBook DTD by HaL Computer Systems and O'Reilly & Associates

1991 Camelot Project started as in at Adobe, later to become PDF

1991 PowerBook Laptops by Apple

1991 Aquanet by Catherine C. Marshall, Frank G. Halasz, Russell A. Rogers and William C. Janssen Jr.

1991 Visual Basic programming language by Microsoft

1991 Java programming language project launched by James Gosling, Mike Sheridan and Patrick Naughton. Originally called Oak, then Green, and finally Java

1991 Instant Update by ON Technology

1991 HTML by Tim Berners-Lee, influenced by SGMLguid, an in-house markup language at CERN

1991 CURIA (now CELT: Corpus of Electronic Texts) first corpus in Early Irish to be published on the World-Wide Web by University College Cork, Ireland

1991 Expanded Books Project by The Voyager Company

1991 TeachText by Apple, included with System 7

1992 First Text Message (SMS) is sent by Neil Papworth reading: "Merry Christmas" to Richard Jarvis at Vodafone

1992 Veronica a search engine system for the Gopher protocol by Steven Foster and Fred Barrie at the University of Nevada, Reno

1992 Lynx internet web browser by Lou Montulli, Michael Grobe, and Charles Rezac at the University of Kansas

1992 Frontier by Dave Winer at UserLand Software released on Mac

1992 OpenDoc by Kurt Piersol and Jed Harris at Apple. First code named 'Exemplar', then 'Jedi' and 'Amber'

1992 Palm Computing founded by Jeff Hawkins

1992 *The End of Books* By Robert Coover, Hypertext fiction cover story in the New York Times Book Review

1992 Before Writing by Denise Schmandt-Besserat

1992 Portable Document Format (PDF) by Adobe

1992 BBEdit word processing software by Rich Siegel at Bare Bones Software

1993 Mosaic web browser by Marc Andreessen and Eric Bina at NCSA massively popularises the web

1993 Microsoft Word word processor celebrates its 10th anniversary with 10 million Word users

1993 Encarta multimedia encyclopedia by Microsoft

1993 Hypermedia Encyclopedias sell more copies than print encyclopedias

1993 Newton MessagePad PDA by Steve Sakoman, Steve Capps, Larry Tesler, Michael Culbert, Michael Tchao and others at Apple under John Sculley

1993 Early Blog by Rob Palmer

1993 Open Agent Architecture (OAA) delegated agent framework by Adam Cheyer et al. at SRI International

1993 Georgia typeface designed by Matthew Carter and hinted by Tom Rickner for Microsoft

1993 *Searching for the Missing Link: Discovering Implicit Structure in Spatial Hypertext* by Catherine C. Marshall and Frank Shipman. First occurrence of Spatial Hypertext in print

1993 AppleScript launched with System 7 by Apple

1994 PDF made freely available

1994 Links.net blog by Justin Hall, before the term would be used

1994 TrueType Open by Microsoft

1994 Point-to-Point Protocol (PPP) enabled internet communications between two routers directly by W. Simpson

1994 Netscape Navigator web browser by Jim Clark and Marc Andreessen at Netscape Communications Corp

1994 Scripting News by Dave Winer

1994 Yahoo! founded by Jerry Yang and David Filo

1994 Amazon founded by Jeff Bezos

1994 Semantic Web vision presented by Tim Berners-Lee at the first World Wide Web Conference

1994 QR Code System by the Japanese company Denso Wave, a subsidiary of Toyota

1994 World Wide Web Consortium founded

1994 PageMill HTML authoring by Seneca Inc., bought by Adobe one year later, discontinued 2000

1994 *VIKI: Spatial Hypertext Supporting Emergent Structure* by Catherine C. Marshall, Frank M. Shipman III, James H. Coombs

1994 *A Subversive Proposal* by Stevan Harnad at the University of Southampton

1995 WordPad word processor by Microsoft is included in Windows 95, replacing Write

1995 Netscape goes public and gains market value of almost $3B on first day of stock market trading

1995 The World Wide Web Handbook by Peter Flynn, first comprehensive book on HTML

1995 Ruby scripting langauge by Yukihiro 'Matz' Matsumoto

1995 Windows 95 operating system by Microsoft

1995 WikiWikiWeb, the first wiki, by Ward Cunningham

1995 Java public release by James Gosling at Sun Microsystems (since been acquired by Oracle), the first programming language to use Unicode for all text

1995 JavaScript by Brendan Eich at Netscape (orignally called Mocha, then LiveScript and later JavaScript)

1995 AltaVista founded by Paul Flaherty, Louis Monier, Michael Burrows and Jeffrey Black

1995 FutureSplash by FutureWave, sold to Macromedia in 1996 and renamed Flash

1996 Cascading Style Sheets (CSS) by Håkon Wium Lie and Bert Bos at the World Wide Web Consortium

1996 Palm OS PDAs including the Graffiti handwriting system

1996 Vaio laptop by Sony

1996 Cyberdog OpenDoc based Internet suite of applications by Apple

1996 OpenType by Microsoft joined by Adobe

1996 Anoto by Christer Fåhræus to provide digital pen capability to paper

1996 Hotmail email system by Sabeer Bhatia and Jack Smith, bought by Microsoft in 1997

1996 The Internet Archive by Brewster Kahle

1996 GoLive HTML authoring software by GoNet Communication, Inc., bought by Adobe 1999

1996 TextEdit word processor by Apple. Not meant for use, it was sample code

1996 Live word count by Keith Martin, demonstrated in the Wordless word processor, later appearing in Microsoft Word 98

1997 Emoji developed by Japanese mobile operators during the 1990s including SoftBank and Shigetaka Kurita for i-mode

1997 Meta Content Framework developed by Ramanathan V. Guha at Apple Computer's Advanced Technology Group, leading to RDF

1997 OpenDoc by Apple cancelled

1997 Apple Data Detectors by Jim Miller, Thomas Bonura and others at Apple's Advanced Technology Group, which would also lead on to LiveDoc

1997 Resource Description Framework (RDF) derived from W3C's PICS, Dublin Core and from the Meta Content Framework (MCF) developed by Ramanathan V. Guha at Apple and Tim Bray at Netscape

1997 Dreamweaver HTML authoring software by Macromedia, bought by Adobe 2005

1997 Yandex by Arkady Volozh and Ilya Segalovich

1997 Flash multimedia authoring and platform by Macromedia, later bought by Adobe

1997 'weblog' term coined by Jorn Barger to describe a log of his internet activity

1997 Jabberwacky released online by Rollo Carpenter

1997 E-Paper by Barrett Comiskey, Joseph Jacobson and JD Albert at E Ink Corporation

1997 Newton PDA by Apple cancelled after Steve Jobs return

1997 Unistroke by David Goldberg at Xerox PARC

1997 9000i Communicator monile phone by Nokia, the first mobile phone with a full keyboard

1997 OpenType by Microsoft

1997 Liquid Mail email system by Frode Alexander Hegland featuring smart Views

1998 iMac desktop computer by Apple

1998 First blog published on an established news site by Jonathan Dube at The Charlotte Observer

1998 *Can Computers Think? History and Status of the Debate*. Seven posters. Industrial strength argumentation map by Robert E. Horn

1998 Open Diary blogging service by Bruce Ableson

1998 Visual Language: Global Communication for the 21st Century Robert by E. Horn

1998 (possibly 1999) Fluid Links demo video at the ACM CHI conference by Polle T. Zellweger, Bay-Wei Chang, and Jock D. Mackinlay

1998 'SPAM' in The *New Oxford Dictionary of English*

1998 Google founded by Larry Page and Sergey Brin

1998 XML 1.0 becomes a W3C Recommendation

1998 Netscape goes open source with the name Mozilla

1998 XML-RPC text-based networking protocol between apps running across operating systems

1998 Frontier blog software by Dave Winer at UserLand Software released on Windows

1998 MathML by W3C

1998 @font-face by W3C

1998 AOL buys Netscape for $4 Billion

1999 Open eBook

1999 The short form, 'blog', was coined by Peter Merholz. Shortly thereafter, Evan Williams at Pyra Labs used 'blog' as both a noun and verb and devised the term 'blogger' in connection with Pyra Labs' Blogger product, leading to the popularization of the terms

1999 LiveJournal blogging service by Brad Fitzpatrick at Danga Interactive

1999 Blogger blogging service by Evan Williams and Meg Hourihan with significant coding by Paul Bausch and Matthew Haughey

1999 RDF Site Summary (RSS 0.9) the first version of RSS, by Dan Libby and Ramanathan V. Guha at Netscape

1999 RSS 0.91 by Dave Winer at UserLand

1999 my.netscape.com and my.userland.com

1999 Edit This Page by Dave Winer

1999 *Code and Other Laws of Cyberspace* by Larry Lessig

1999 Mac OS X operating system by Apple

1999 Ajax web development techniques for asynchronous web applications emerges

1999 *ActiveText: A Method for Creating Dynamic and Interactive Texts* by Jason E. Lewis and Alex Weyers at Interval Research Corporation

1999 *Spatial Hypertext: An Alternative to Navigational and Semantic Links* by Frank M. Shipman and Catherine C. Marshall

1999 Electronic Literature Organization (ELO) founded by Scott Rettberg, Robert Coover, and Jeff Ballowe

2000

2000 Optical Character Recognition (OCR) software is made available online for free

2000 1 billion indexable pages on the Web, estimated by NEC-RI and Inktomi

2000 ClearType by Microsoft

2000 XML Linking Language (XLink) an XML markup language for creating internal and external links within XML documents, and associating metadata with those links, by Steven DeRose, Eve Maler, David Orchard and Bernard Trafford

2000 EPrints by Stevan Harnad, funded by Wendy Hall, supervised by Les Carr and implemented by Rob Tansley and others at the University of Southampton

2000 CoolType by Adobe

2000 ScholOnto by Simon Buckingham Shum, Enrico Motta and John Domingue at the Knowledge Media Institute, The Open University. This evolved over the next decade into ClaiMaker and Cohere with Victoria Uren, Gangmin Li, Anna De Liddo and Michelle Bachler

2000 *Riding the Bullet* by Stephen King, the first mass-market e-book for encrypted download

2000 EverNote founded by Stepan Pachikov

2001 'Chinese General Language and Character Law' rolled out.

2001 Tinderbox by Mark Bernstein, Eastgate Systems

2001 Semantic Web vision popularised in a Scientific American article by Tim Berners-Lee, James Hendler and Ora Lassila

2001 G4 Titanium PowerBook laptop computer by Apple

2001 *The Wiki Way* by Bo Leuf and Ward Cunningham

2001 Creative Commons by Lawrence Lessig, Hal Abelson, and Eric Eldred

2001 Wikipedia online collaborative encyclopedia by Jimmy Wales and Larry Sanger at Nupedia

2001 Movable Type weblog publishing system by Benjamin Trott and Mena Grabowski Trott at Six Apart

2001 JSON by Douglas Crockford

2001 Douglas Adams' speech about Virtual Graffiti held at the 3GSM World Congress

2002 Bibliotheca Alexandrina founded, the modern Library of Alexandria, with Ismail Serageldin as the founding director

2002 EPrints version 2 lead developer Christopher Gutteridge

2003 Android Inc founded by Andy Rubin, Rich Miner, Nick Sears, and Chris White

2003 Friendster social media service Jonathan Abrams

2003 Myspace blogging and social media service by Brad Greenspan, Josh Berman and Tom Anderson at eUniverse

2003 *Deep Love* by Yoshi, first cell phone novel (Japanese 'Keitai Shousetsu')

2003 The Legal Deposit Libraries Act widens the definition of what publishers should send to the libraries to include digital publications, pending further regulation

2003 WordPress blogging service by Matt Mullenweg and Mike Little

2003 Blogger blogging service is bought by Google

2003 TypePad blogging service by BizLand, later Endurance International Group (EIG)

2003 Ulysses word processor by Max Seelemann and Marcus Fehn

2004 Facebook social media service by Mark Zuckerberg, Eduardo Saverin, Andrew McCollum, Dustin Moskovitz and Chris Hughes

2004 First hypertext format full length articles accepted at ACM's Hypertext Conference with *Twin media: hypertext structure under pressure* by David Kolb awarded 'Best Paper'

2004 First hypertext format article at ACM's Document Engineering conference by James Blustein and Mona Noor

2004 Institute for the Future of the Book founded by Bob Stein

2004 Tag Cloud at Flickr, Technorati, WordPress Plugins and more

2004 Scala programming language by Martin Odersky

2005 Pages word processor by Apple

2005 Markdown by John Gruber collaboration with Aaron Swartz

2006 Time Person of the Year is 'You'

2005 Writely by programmers Sam Schillace, Steve Newman and Claudia Carpenter at Upstartle

2006 Upstartle bought by Google

2006 Google Docs by Google

2006 Twitter social media service founded by Jack Dorsey, Noah Glass, Biz Stone and Evan Williams at Twitter

2006 One Laptop Per Child by Nicholas Negroponte

2006 HyperScope Project by Doug Engelbart and Brad Neuberg, Eugene Kim, Jonathan Cheyer and Christina Engelbart

2006 Hyperwords Project by Frode Hegland, Fleur Klijnsma and Rob Smith

2006 Office Open XML by Microsoft

2006 *The Semantic Web Revisited* by Tim Berners-Lee, Nigel Shadbolt, and Wendy Hall, in IEEE Intelligent Systems

2006 Debategraph by Peter Baldwin and David Price

2006 *Gamer Theory* by McKenzie Wark's, the first networked book, produced by the Institute for the Future of the Book

2006 *Dialogue Mapping: Creating Shared Understanding of Wicked Problems* by Jeff Conklin

2007 Hashtag by Chris Messina (name by Stowe Boyd)

2007 iPhone by Apple Inc.

2007 Kindle by Amazon

2007 Scrivener for macOS by Keith Blount at Literature & Latte

2007 EPUB by IDPF

2008 MacBook Air by Apple

2008 Last Stable Build of Netscape Navigator

2009 Like Button by Facebook

2009 Webfonts by Typekit

2009 OmmWriter by Herraiz Soto & Co

2009 iPhone Copy & Paste by Apple

2009 Twine open-source tool for authoring interactive fiction by created by Chris Klimas

2009 Worst year in decades as far as advertising revenues for newspapers and newspapers begin moving online

2010

2010 Thumbs Up Emoji

2010 Retina Display by Apple

2010 iA Writer word processor by Oliver Reichenstein

2010 iPad tablet by Apple

2010 Swift programming language development by Chris Lattner, with the eventual collaboration of many other programmers at Apple

2010 Siri developed by Dag Kittlaus, Tom Gruber, and Adam Cheyer, bought by Apple

2010 Emoji ratified as part of Unicode 6.0

2011 iMessage by Apple

2011 ByWord word processor by Metaclassy

2011 Scrivener word processor for Windows by Keith Blount at Literature & Latte

2011 Annual Future Of Text Symposium by Frode Alexander Hegland launched

2011 Liquid text utility by Frode Alexander Hegland at The Liquid Information Company

2011 Siri personal digital assistant released as part of the iPhone 4S by Apple

2011 Swype by Cliff Kushler allying users to drag their fingers on a virtual keyboard to connect the dots between letters

2011 ClaiMaker by Gangmin Li, Victoria Uren, Enrico Motta, Simon Buckingham Shum and John Domingue

2012 Knowledge Graph by Emily Moxley, Google's lead product manager, at Google

2012 Muse by Adobe

2012 *The Web-Extended Mind* by Paul Smart

2012 *Inventing on Principle* presentation by Bret Victor

2012 Google Now Assistant launched by Google

2012 Medium online social publishing platform by Evan Williams

2012 LiquidText by Craig Tashman

2012 Outlook by Microsoft replaces Hotmail

2013 Non-Print Legal Deposit Regulations further define the digital elements of the Legal Deposit Libraries Act and lead to large-scale on-going transfer of e-journals and e-books to the legal deposit libraries for posterity

2013 *Distant Reading* by Franco Moretti

2013 First Full-Scale Harvest of the UK Domain by the UK Web Archive, using the Non-

Print Legal Deposit Regulations

2013 Ulysses III (major rewrite) by Max Seelemann and Marcus Fehn

2014 Xanadu by Ted Nelson

2014 Alexa assistant released by Amazon

2014 Cortana assistant released by Microsoft

2014 Framtidsbiblioteket (The Future Library project) launched, a public artwork that aims to collect an original work by a popular writer every year from 2014 to 2114

2014 Author reboot by Frode Alexander Hegland at The Liquid Information Company with coding by Jacob Hazelgrove

2014 Most up to date version of TeX is 3.14159265 as of the publication of this book

2014 Swift programming language launched at the Apple Worldwide Developers Conference (WWDC)

2014 Author early release by Frode Alexander Hegland at The Liquid Information Company

2014 Augmented Writing by Textio

2015 Notion by Ivan Zhao at Notion Labs

2015 Watch by Apple

2015 Hamilton musical, by Lin-Manuel Miranda, makes it Broadway debut, highlighting the beauty and power of the written word, with an opening line stating that Hamilton "put a pencil to his temple, connected it to his brain"

2016 Reactions, also-called Tapback, for iMessage by Apple

2016 Universal Clipboard by Apple

2016 Viv Labs, developed by Dag Kittlaus, Adam Cheyer and Chris Brigham, acquired by Samsung

2016 Notion founded by Ivan Zhao and Simon Last

2017 Roam Research founded by Conor White-Sullivan

2017 Web Annotations Standardised by the W3C Web Annotation Working Group

2018 Bixby Marketplace, an open assistant ecosystem based on Viv Labs Technology, launched by Samsung

2019 Reader PDF viewer with Visual-Meta support by Frode Alexander Hegland at The Liquid Information Company with coding by Jacob Hazelgrove

2020

2020 Muse by Adobe discontinued

2020 Flash by Adobe discontinued

2020 iPad Keyboard with Trackpad by Apple

2020 Adobe Liquid Mode for Easier PDF Viewing on Mobile Devices powered by Sensei Machine Learning

Future

2023 (Jan 1), Adobe Type 1 (Postscript) fonts reach end of life; no further support in Adobe products (other software unaffected)

unknown The "absolutely final change (to be made after my death)" of TeX will be to change the version number to π,

at which point all remaining bugs will become features. Likewise, versions of Metafont after 2.0 asymptotically approach e (currently at 2.7182818), and a similar change will be applied after Knuth's death.

unknown All the pioneers of digital text will die, leaving it to future generations to rediscover and hopefully improve upon how we interact with our textual knowledge, and each other.

unknown You will read this. What will you do with what you have learnt in this book, what will you think of the way we

saw text in 2020, how do you think the way we present and interact with text can be improved?

Contributors

Frode Alexander Hegland, *editor,* with Mark Anderson, Peter Flynn, Mark Bernstein, Bernard Vatant, Robert E. Horn, Jonathan Finn, Niels Ole Finnemann

Postscript : Digital Text

Sometime in the Fall of 1954, Douglas Ross wrote his name–in freehand–into a computer using "a bright, glowing displayed spot of blue-white light, about 1/4 inch square" [143] hunched over a 16 inch oscilloscope called the 'Area Discriminator'. This may well have been the first entry of interactive text into a computer where by 'interactive' I mean that it could later potentially be moved, deleted, changed the visual appearance of and more. At the time the term was 'manual intervention, shortened to 'MIV'. Two years later write a memo suggesting the use of an electrically-controlled typewriter, specifically a Flexowriter for text input .

Alas, this exciting description of the first moment of interactive text turns out not to be the first moment, though it may be the first moment text was entered freehand. Alan Kay, who knew Ross, questions his assertion (via private email) and Ivan Sutherland, who would go on to create the hugely innovative Sketchpad, commented—also via private email: "I don't know. It was certainly well before Sketchpad. Program text has been in digital form since the very early days of computing. But how that text was 'displayed' may have been only on paper via a teletype machine or electrically controlled printer. Visual editing on a display system as opposed to a printer also pre-dates Sketchpad. So called WYSIWYG editing was done early I can suggest only our dead colleagues for more information (or a library)".

However what we do know is that in the Barta Building on MIT's Cambridge campus, at some point towards the end of 1949, a 5 inch laboratory CRT flickered alive and the first digital text appeared on the first real-time interactive computer, the Whirlwind, shining in an array of 256 by 256 dots [145]. The designer was by Jay Forrester and it is therefore likely he who entered the first text, but this has not been recorded.

Basic web search for subsequent dates of digital text history are easy to find, such as the first use of the term 'digital' {coined by Bell Labs researcher George Stibitz in 1942}, Doug Engelbart's epiphany: "Boy, the world is complex, jeez, the problems are getting more complex and urgent and have to be dealt with collectively—we have to—deal with them collectively" {1951} Ted Nelson coining the term 'hypertext' {1963}, Doug Engelbart's 'Mother of all Demos' {1968}, the first sending of a text message {December 3rd, 1992}, launch of the web {1991} and so on.

Not so for the very first glow of that screen–the very first spark of digital text–the exact first moment we entered symbolic text into a digital system. This moment is as lost in time as much as when the very first time our ancestor made a purposeful mark. At this moment magic

(of the Arthur C. Clarke 'Third Law' type) was unleashed on the world.

The early days of digital text are not behind us however. We still have serious limitations with how we can interact with our text and serious issues with addressing and citing. As we have moved into an era of digital-first documents, we have introduced more connectivity but also more brittleness-when servers go down or DNS fails to resolve, connections are lost. We can, and must, invent a better Future of Text: https://futuretextpublishing.com

Glossary

"ARC" Engelbart Concept: Augmentation Research Center, The name of Doug's lab at SRI where he proposed a system called H-LAM/T in 1962 and developed and in 1968 demonstrated NLS: oNLine System, his platform for shared knowledge work research, later renamed Augment and from which I decided on the name Author, since Author and Augment share etymological roots.

"BibTeX" is a specific format for conveying citation information within the LaTex environment, developed by Oren Patashnik and Leslie Lamport, released in 1985. The benefit of the system was to separate citation information from presentation style and it is human readable, though it slightly looks like code. It inspired the format of Visual-Meta and Visual-Meta contains a straight BibTeX section to allow the document which contains it to be cited.

"Bootstrapping" Engelbart Concept: The act of co-evolving the tool and human systems to make better tools and systems, thus pulling us up by our bootstraps. (For an overview, see the Bootstrap Paradigm Map). This is done on three levels of activity.

"Co-Evolution" Engelbart Concept: Most capabilities are improved, or augmented, by many interdependent technical and non-technical elements, of which tools make up only a small part: On one hand, there is the human system, which includes paradigms, organizations, procedures, customs, methods, language, attitudes, skills, knowledge, training and so on- all of which all exists within the basic perceptual and motor capabilities of the human being. On the other hand, there is the tool system, which includes media, computers, communications systems etc. Together, they comprise the augmentation system

"CoDIAK" Engelbart Concept: CoDIAK (Concurrent Development, Integration, and Application of Knowledge) process aligns with the academic process of publishing and referring to published sources, though in his version there is considerably more speed and interactive options. He believed passionately in the notion of a Collective IQ.

Our capability for dealing with complex, urgent problems-i.e., "to understand them adequately, to

unearth the best candidate solutions, to assess resources and operational capabilities and select appropriate solution commitments, to be effective in organizing and executing the selected approach, to monitor the progress and be able to adjust rapidly and appropriately to unforeseen complications, etc." in Augmenting society's collective IQs

"Collective IQ" Engelbart Concept: A measurable group intelligence and the need for improving how we think together.

"DOI" Document Object Identifiers. An effort to make addressing academic documents via the web more robust.

Used in Author to let the user paste a DOI to cite an academic document which is then sent to CrossRef to be parsed into BibTeX which is then used to create a full citation.

"Doug Engelbart, Douglas Carl Engelbart, Doug" From Wikipedia: "He was an engineer and inventor, and an early computer and Internet pioneer. He is best known for his work on founding the field of human–computer interaction, particularly while at his Augmentation Research Center Lab in SRI International, which resulted in creation of the computer mouse, and the development of hypertext, networked computers, and precursors to graphical user interfaces. These were demonstrated at The Mother of All Demos in 1968. Engelbart's law, the observation that the intrinsic rate of human performance is exponential, is named after him."

He was also my mentor and greatly influened my work, resulting in my company called The Augmented Text Compant and my word processor being called Author, in honour of his 'Augment' system. Visual-Meta is inspired by his Open Hyperdocument work.

"Glossary" means, in the context of this work, a specific user or editor list of definitions for a specific document.

This is different from a dictionary since dictionary definitions have general validity.

Inspired by discussions with Doug Engelbart.

"high-resolution addressing" being able to link to specific parts of a document, not just the

document as a whole. A Doug Engelbart term.

"hypertext" a term invented by Ted Nelson for interactive and connected digital text.

"metadata" information about other information, in the case of documents, this can include structural information (headings for example), biblio

"NIC" Engelbart Concept: Networked Improvement Community "Consider an "Improvement Community" (IC) as collectively engaged in improving an agreed-upon set either of individual capabilities, or of collective group capabilities-e.g. a professional society. Let's introduce a new category, a "Networked Improvement Community" (NIC): an IC that is consciously and effectively employing best-possible DKR (Dynamic Knowledge Repository) development and usage." (augmenting society's collective IQ).

"NLS" From Wikipedia: "NLS, or the "oN-Line System", was a revolutionary computer collaboration system developed in the 1960s. Designed by Douglas Engelbart and implemented by researchers at the Augmentation Research Center (ARC) at the Stanford Research Institute (SRI), the NLS system was the first to employ the practical use of hypertext links, the mouse, raster-scan video monitors, information organized by relevance, screen windowing, presentation programs, and other modern computing concepts. It was funded by ARPA (the predecessor to Defense Advanced Research Projects Agency), NASA, and the US Air Force." https://en.wikipedia.org/wiki/NLS_(computer_system)
SRI sold NLS to Tymshare in 1977 and renamed it Augment.

"PDF" 'Portable Digital Format' developed by Adobe, now free with no license restrictions. It is a print to digial medium with few digital affoardances which my work on Visual-Meta expands to allow for users to interact with the document in useful ways, while staying compatibel with the basic PDF format.

"The Future of Text" Annual Symposium and Book Series (first volume published 2020) as well as

community for fostering dialogue around the future of text which I started over a decade ago and which is often co-hosted or presented by Vint Cerf.

https://futuretextpublishing.com

"Three levels of activity" Engelbart Concept: A,B & C levels of activity are levels of work activity in the bootstrapping process:

(improving our ability to improve: a call for investment in a new future)

A level is the the work activity of the organization

B level is the activity of improving A, such as adding technological tools or improved work processes

C level is the activity of improving how we improve, something best done across organizations, in a NIC.

"ViewSpecs" Engelbart Concept: View Specifications for a user to see their work in different views.

"Visual-Meta" An open and robust way to augment flat PDF documents to make them more interactive, by The Augmented Text Company people.

http://visual-meta.info

"xFiles" Engelbart Concept: xFiles were intermediary file system for the Open Hyperdocument System (OHS) to serve as a Dynamic Knowledge Repository (DKR).

Endnotes

[a] Yes, that is a Hamilton reference.

[b] At the time of writing I am in the write-up phase and organising Expert Interviews. If all goes well, I will graduate December 2021. My thesis is on Visual-Meta.

[c] Right now:

https://youtu.be/XGdlkeqjya0

Also much of:

https://youtu.be/Lwk8e2q4qHo

https://youtu.be/XHNHq1mC0VQ

https://youtu.be/doVVuQ501_w

https://youtu.be/eM2IXmfFWEM and more…

[d] https://www.vice.com/en/article/8x7akv/masterslave-terminology-was-removed-from-python-programming-language

[e] revuebleuorange.org/bleuorange/02/saemmer/

[f] https://collection.eliterature.org/3/work.html?work=bohmische-dorfer

[g] https://www.facebook.com/NouvellesDeLaColonie

[h] https://www.persee.fr/doc/colan_0336-1500_2005_num_145_1_3351

[i] wwwwwwwww.jodi.org/

[j] https://www.facebook.com/rachel.charlus

[k] https://www.cairn-int.info/revue-communication-et-langages-2020-1-page-99.htm?contenu=resume

[l] https://transformer.huggingface.co/doc/gpt2-large

[m] https://www.hcn.org/issues/47.1/introducing-the-idea-of-hyperobjects

[n] bit.ly/3iio93G

[o] bit.ly/3z4Uibc

[p] bit.ly/2XddxNw

[q] bit.ly/3ffrhod

[r] bit.ly/3nrqxdw

ˢ go.nature.com/3hqLhwq

ᵗ arxiv.org/abs/2005.14165

ᵘ The National Archives, [Online]. Available: https://www.nationalarchives.gov.uk/. [Accessed 6 September 2021]

ᵛ The National Archives, "Our Role," The National Archives, [Online]. Available: https://www.nationalarchives.gov.uk/about/our-role/. [Accessed 6 September 2021].

ʷ "Archive of Our Own," Organization for Transformative Works, [Online]. Available: https://archiveofourown.org/. [Accessed 6 September 2021].

ˣ

ʸ R. J. Cox, "From the Editor: What Is an Archival Record, and Why Should We Care?," The American Archivist, vol. 57, no. 4, pp. 592-594. Available: https://www.jstor.org/stable/40293869. [Accessed 6 September 2021].

ᶻ I. Fintland, "Archival Descriptions through the Looking Glass: Paratexts in Wonderland," The American Archivist, vol. 79, no. 1, p. 137–160, 2016. Available: https://meridian.allenpress.com/american-archivist/article/79/1/137/64/Archival-Descriptions-through-the-Looking-Glass. [Accessed 6 September 2021].

ᵃᵃ H. MacNeil, "Picking Our Text: Archival Description, Authenticity, and the Archivist as Editor," The American Archivist , vol. 68, no. 2, p. 264–278, 1 September 2005. Available: https://meridian.allenpress.com/american-archivist/article/68/2/264/24009/Picking-Our-Text-Archival-Description-Authenticity. [Accessed 6 September 2021].

ᵇᵇ A. Cullingford, "Revealed! How to catalogue your hidden archives," The Special Collections Handbook, 9 November 2017. [Online]. Available: https://specialcollectionshandbook.com/2017/11/09/revealed-how-to-catalogue-your-hidden-archives/. [Accessed 6 September 2021].

ᶜᶜ Adam Retter, "Omega Catalogue Data Model," 23 March 2021. [Online]. Available: https://www.nationalarchives.gov.uk/documents/omega-catalogue-data-model.pdf. [Accessed 6 September 2021].

ᵈᵈ The National Archives, "Archives for Everyone," [Online]. Available: https://www.nationalarchives.gov.uk/about/our-role/plans-policies-performance-and-projects/our-plans/archives-for-everyone/. [Accessed 6 September 2021].

ᵉᵉ Matthew Hillyard , "Digital archiving: the seven pillars of metadata," The National Archives, 14

March 2018. [Online]. Available: https://blog.nationalarchives.gov.uk/digital-archiving-seven-pillars-metadata/. [Accessed 6 September 2021].

ff A. Eveleigh, "Crowding Out the Archivist? Locating Crowdsourcing within the Broader Landscape of Participatory Archives," in Crowdsourcing our Cultural Heritage, M. Ridge, Ed., Routledge, 2014, pp. 211-229. Available: https://discovery.ucl.ac.uk/id/eprint/1429960/1/Eveleigh-crowding-out-archivist.pdf. [Accessed 6 September 2021].

gg A. Flinn, "An Attack on Professionalism and Scholarship? Democratising Archives and the Production of Knowledge," Ariadne: Web Magazine for Information Professionals, no. 62, 30 January 2010. [Online]. Available: http://www.ariadne.ac.uk/issue/62/flinn/. [Accessed 6 September 2021].

hh Archive of Our Own, "Terms of Service," 23 May 2018. [Online]. Available: https://archiveofourown.org/tos. [Accessed 6 September 2021].

ii Archive of Our Own, "Wrangling Guidelines," [Online]. Available: https://archiveofourown.org/wrangling_guidelines. [Accessed 6 September 2021].

jj Tag Wrangling Committee, "AO3 News: Celebrating 40,000 Fandoms on the AO3," 12 November 2020. [Online]. Available: https://archiveofourown.org/admin_posts/17497. [Accessed 6 September 2021].

kk https://en.wikipedia.org/wiki/Intertwingularity

ll https://en.wikipedia.org/wiki/StretchText

…which describes the original idea shown at:

https://xanadu.com/XUarchive/htn8.tif

mm https://blog.tedgoranson.com/personal/blog_architecture.html

https://www.natematias.com/stretchtext/

https://eclecticlight.co/2016/09/03/stretchtext-a-hidden-gem-in-real-hypertext/

https://cyberartsweb.org/cpace/ht/stretchtext/gpl1.html

https://codepen.io/caraya/pen/RwbVMzX

http://fagerjord.no/ir8/DetourMyExperience/WritingStretchtext.html

nn https://visual-meta.info

oo https://dl.acm.org/doi/proceedings/10.1145/3465336

The ACM HT'21 Conference was held 30 August – 2 September 2021

pp https://en.wikipedia.org/wiki/NLS_(computer_system)

qq To recall, this is to note that between signified and signifier, it is not an obvious connection. See Betty J. Birner, Language and Meaning (2018).

rr "codex" – "code as text"

ss Mark C. Marino, Critical Code Studies 8 (2020).

tt Id. at 4.

uu Geoffrey Cox, Alex McLean, and Adrian Ward, "The Aesthetics of Generative Code," International Conference on Generative Art (2000).

vv Id. at 8.

ww Id. at 6-7.

xx To use Bakhtin's term, chronotope, defined as "the points at which the knots of the narrative are tied and untied […] and emerges as a center for concretizing representation. See Mikhail Bakhtin, Dialogic Imagination: Four Essays (1981).

yy Id.

zz Id. at 53.

aaa Referencing Marianne Constable, Law as Language, 1 Critical Analysis of Law 68 (2014).

bbb Recall IEML and the complexity with "semantic interoperability." See Pierre Lévy, Information Economy Metalanguage, available at: https://intlekt.io/ieml/.

ccc As a reference to Giorgio Agamben of signatures as "archaeological traces." Recall Giorgio Agamben, The Signature of All Things 36 (2009).

ddd Marino, supra 2 at 42-43.

eee Birner, supra 1 at 4.

fff David Mellinkoff as he references Stuart Chase, The Tyranny of Words 324 (1958) in The Language of Law (1963).

ggg The note draws on Finnemann, Niels Ole. 2018. 'E-text'.[42]

hhh KOS see https://www.isko.org/cyclo/knowledge_organization

iii https://www.etymonline.com/word/text?ref=etymonline_crossreference#etymonline_v_10699

jjj Terminology: In the following 'e-text' is used as standard notion for electronic and digital text covering a variety of interpretations of these notions.

kkk For a brief overview of the development of the ingredients in texting see: https://

www.zipwhip.com/blog/video-a-history-of-texting/

lll INDEX THOMISTICUS by Roberto Busa SJ and associates available at https://www.corpusthomisticum.org/it/index.age (2005)

mmm SGML, Standard Generalized Markup Language. First working draft 1980. http://www.sgmlsource.com/history/sgmlhist.htm . TEI, Text Encoding Initiative established in 1987 'to develop, maintain, and promulgate hardware- and software-independent methods for encoding humanities data in electronic form.' https://tei-c.org/about/history/ First draft of guidelines, 1990.

nnn 1994 OHCO (Organizational Hierarchy of Content Objects). Model for organization of critical scholarly editions. Steven J. DeRose, David G. Durand, Elly Mylonas, and Allen H. Renear, "What Is Text, Really?" Journal of Computing in Higher Education 1.3 (1990): 3–26.

ooo Hayles, 2002:20

ppp https://www.w3.org/History/1989/proposal.html. Published on a USENET forum for hypertext: alt.hypertext in August 1991. http://www.ngrblog.com/famous-usenet-posts/

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rrr An artifact is "something" present in the physical world that owes its existence only to human action

sss An artifact only becomes a sign, is conceived as sign, through the cognitive process of the semiotic decision, an individual cognitive operation that simultaneously defines all dimensions of the sign. During this decision, the artifact, entirely or partially, constitutes the materiality of the sign, what Klinkenberg [6] calls the stimulus of the sign

ttt The source code of a program is the state of the program that the programmer creates in his programming environment. It can contain text (JavaScript, Java, C...) but also graphic objects in environments such as Director, Flash, pure data…

uuu In particular the speed of execution of instructions. It can play a major role on the aesthetics produced on the screen.

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Visual-Meta Appendix

The information in very small type below allows software to provide rich interactions with this document.
See Visual-Meta.info for more information.

This is what we call Visual-Meta. It is an approach to add information about a document to the document itself on the same level of the content. The same as would be necessary on a physically printed page, as opposed to a data layer, since this data layer can be lost and it makes it harder for a user to take advantage of this data. ¶ Important notes are primarily about the encoding of the author information to allow people to cite this document. When listing the names of the authors, they should be in the format 'last name', a comma, followed by 'first name' then 'middle name' whilst delimiting discrete authors with ('and') between author names, like this: Shakespeare, William and Engelbart, Douglas C. ¶ Dates should be ISO 8601 compliant. ¶ The way reader software looks for Visual-Meta in a PDF is to parse it from the end of the document and look for @{visual-meta-end}. If this is found, the software then looks for {@{visual-meta-start} and uses the data found between these marker tags. ¶ It is very important to make clear that Visual-Meta is an approach more than a specific format and that it is based on wrappers. Anyone can make a custom wrapper for custom metadata and append it by specifying what it contains: For example @dublin-core or @rdfs. ¶ This was written Summer 2021. More information is available from https://visual-meta.info or from emailing frode@hegland.com for as long as we can maintain these domains.

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Our capability for dealing with complex, urgent problems-i.e., "to understand them adequately, to unearth the best candidate solutions, to assess resources and operational capabilities and select appropriate solution commitments, to be effective in organizing and executing the selected approach, to monitor the progress and be able to adjust rapidly and appropriately to unforeseen complications, etc." in Augmenting society's collective IQs},
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He was also my mentor and greatly influened my work, resulting in my company called The Augmented Text Compant and my word processor being called Author, in honour of his 'Augment' system. Visual-Meta is inspired by his Open Hyperdocument work.},
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SRI sold NLS to Tymshare in 1977 and renamed it Augment.},
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A level is the work activity of the organization
B level is the activity of improving A, such as adding technological tools or improved work processes
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