NII News

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Papillon 2002 workshop

The third edition of the annual workshop of the Papillon project (July 16 –18)

The third edition of the annual workshop of the Papillon project was held from July 16th to July 18th, 2002 at the National Institute of Informatics (NII) in Tokyo. The Papillon project is a scientific collaboration between the NII (Japan) and the Group of Study for the Machine Translation (GETA) of the University Joseph Fourier in Grenoble (France). This project has double objectives: (1) the construction of a multilingual lexical base and (2) the development of scientific search in the field of the computational linguistics.

The assessment is overall positive. This workshop confirmed the progression of participation in this workshop: 22 participants in the first edition in Tokyo in 2000, 32 participants in the second edition in Grenoble, 41 participants this year in Tokyo. A great number of laboratories were represented within the two nations, on the French side, the GETA, the LALICC (Sorbonne), the LIMSI (Orsay), the LIRMM (Montpellier), the LORIA (Nancy), on the Japanese side the NII, Advanced Telecommunications Research Institute International (ATR, Kansai), the NTT Communication Science Laboratories (Kyoto), Nara Institute of Science and Technology, Mitsubishi Research Institute, the universities of Tokyo, of Osaka, of Chiba, of Sakushin and Shimane. On the whole 23 presentations were presented during the 3 days of the seminar. The majority of the contributions brought a high scientific level, equivalent to the best current world level.

On the organizational level, the project manages its growth by creating a technical committee and a coordinating committee. It is indeed necessary to organize the participation in this project of several laboratories (in particular those indicated above) and to expend the number of languages. NII, in particular has established cooperation agreements related to Thai and Vietnamese languages. The GETA has established cooperation agreements related to the Lao, the Malay Language and Vietnamese Languages, German researchers based in Japan intended to bring their lexicon German-Japanese. Professor Jim Breen, the Monash University (Australia) granted the use of his bilingual English-Japanese dictionary, a worldwide reference in this field. All these agreements, lexicons and dictionaries share the same condition that their use is free and free of rights. A session was in particular devoted to the legal aspects of attribution of usage-free licenses on the model of the free software.

*(**Frederic Andres,** Associate Professor, Distributed Processing Research, Software Research Division)*

NTCIR Workshop 2001/2002

Conference Reporting the Results of the Third NTCIR Workshop (October 8 –10)

Held as part of a MEXT grant-in-aid for scientific research (on priority areas) in Informatics, "Research on Information Utilization Systems for Heterogeneous Contents," the Third NTCIR Workshop was an evaluation workshop covering information-access technology such as information retrieval, question answering, and automatic text summarization. The conference reporting the results of the third NTCIR workshop was held on October 8–10, 2002 at the Hitotsubashi Memorial Auditorium of the National Center of Sciences.

The NTCIR workshop is an international workshop for cooperative research, organized by the National Institute of Informatics. The workshop featured research conducted in the following manner: the organizers defined research tasks, provided data sets (the test collections) for experiments to evaluate systems' effectiveness, and defined methods of evaluation. Participating research groups conducted the research, taking their own approaches to the common data sets. Results were compared analytically based on the common methods of evaluation, in order to clarify the advantages and disadvantages of each strategy. The workshop fulfilled numerous other roles as well, including the development of large-scale data sets with right answers, the promotion of information and technology transfer, intensive research on specific topics, and an exhibition of cutting-edge technology.

Invited speaker Ms. Donna Harman (NIST)

Invited speaker Dr Amit Singhal

The Third NTCIR Workshop program included the following five tasks.

Cross-Lingual Information Retrieval Task (CLIR) : Monolingual and cross-language information retrieval in Chinese, Korean, Japanese, and English

Patent Retrieval Task (PATENT) : (a) Cross-genre retrieval, retrieval of related patents using newspaper articles as queries, (b) cross-lingual information retrieval, and (c) optional tasks

Question-Answering Task (QAC) : (a) Responding with five candidate answers, (b) responding with one set of all the answers, and (c) asking a series of questions

Text Summarization Task (TSC) : (a) Single document summarization, and (b) multiple documents

Web Retrieval Task (WEB) : (a) Survey retrieval (including similar documents search), (b) target retrieval, and (c) an optional task

Each task was planned and led by the task organizers, researchers from the relevant field; they set the research task and investigated the appropriate evaluation methods. The task participants—65 research groups from nine countries (44 groups were from universities, fourteen from businesses, and seven from national institutions)—completed the task and presented their own task results.

At least 200 people attended the Results Reporting

Participants Discussing in the Digital Poster Sessions

Conference and participated in the discussions. In the open forum on the first day, the morning was devoted to tutorials concerning evaluative experiments on information retrieval, question answering, and text summarization. The afternoon session was devoted to a summary of the Third NTCIR Workshop and to speeches by invited speakers. The first invited speaker was Ms. Donna Harman, National Institute of Standards and Technology, who has led TREC and DUC, evaluation of information-retrieval and automatic summarization. The second invited speaker was Dr. Amit Singhal, of the Internet search engine Google Inc. The second and third days were primarily for the task participants and the participant groups reported and presented their own research results. Discussions and exchanges of

opinion between participants were also very popular, particularly in the Digital Poster Sessions. NTCIR Workshops are held approximately once every eighteen months. The recruiting of task participants for the next workshop (in 2003 / 2004) began in March 2003. The next Workshop's Results Reporting Conference is planned for May 2004. The test collections developed are to be available for research purpose use although a few document collections are available for participants only due to copyright restrictions.

• URL : http://research.nii.ac.jp/ntcir/

(*Noriko Kando*, Associate Professor, Library Information Research, Human and Social Information Research Division)

SUPER SINET Research No.1

New Developments in High-Energy Physics and Nuclear Fusion Science Resulting from SuperSINET

Head of the Computing Research Center,
High-Energy-Accelerator Research Organization (KEK)

Yoshiyuki Watase

PhD (D r. Sc.), Graduate School of Science, Tohoku University in 1970 ; became an Research Associate in the Faculty of Science, Niigata University in 1971; joined the National Laboratory for High-Energy Physics in 1974 ; assumed current position in 1997. Conducts experimental research in elementary particle physics using high-energy accelerators, as well as practical research into computers and networks.

SuperSINET, the high-speed network for scientific research that has been in operation since January 2002, has founded new methods for research and will give a major impact on science. By its nature, research involving large-scale experimental facilities is primarily carried out within the host laboratory. The credit of scientific results is also given to the laboratory. However, through the use of this high-speed network, modes of future research will undergo major changes that are not yet clear. Access to this network allows researchers to work

together as if they are in the same location, regardless of where they are actually located.

Until now, the research fields reaping perhaps the greatest benefits from the high-speed network have been experimental high-energy physics and nuclear fusion — so-called "Big Science." This is due to the fact that such research involves numerous researchers and requires massive facilities normally available in only one place in a country, or even only one place in the world.

Of the high-energy-physics research currently conducted using SuperSINET, the Belle Experiment of the High-Energy Accelerator Research Organization (KEK) has received the greatest benefit from the network. This experiment produces B mesons and anti-B mesons in large numbers by head-on collision of positrons and electrons. Researchers then analyze the decay processes of these particles and antiparticles (matter and antimatter) in detail, to check for symmetry of physics. Because it enables the transfer of data that previously had to be transported via magnetic tape or similar media, SuperSINET has made direct access to such data truly possible. Through the maximal implementation of the capabilities of the computing systems of KEK and universities, we can envision analysis of the expanding volume of data that accumulates on a daily basis (more than 400 gigabytes). This past summer, for example, we were able to analyze as many as 200 terabytes of data, enabling the release of our research results in a timely fashion. Trends such as these will become even more important in the future. In anticipation of the development of an international high-speed network to CERN will soon begin developing its LHC (Large Hadron Collider) as a global experimental research system (CERN plans to begin actual experiments in 2007). These types of high-speed networks lay the foundation for achieving the goal of developing a global data Grid for sharing data and resources.

Measured Difference in the life time of B and anti-B meson decaying to J/ψ + Ks

B Factory Experiment: Belle
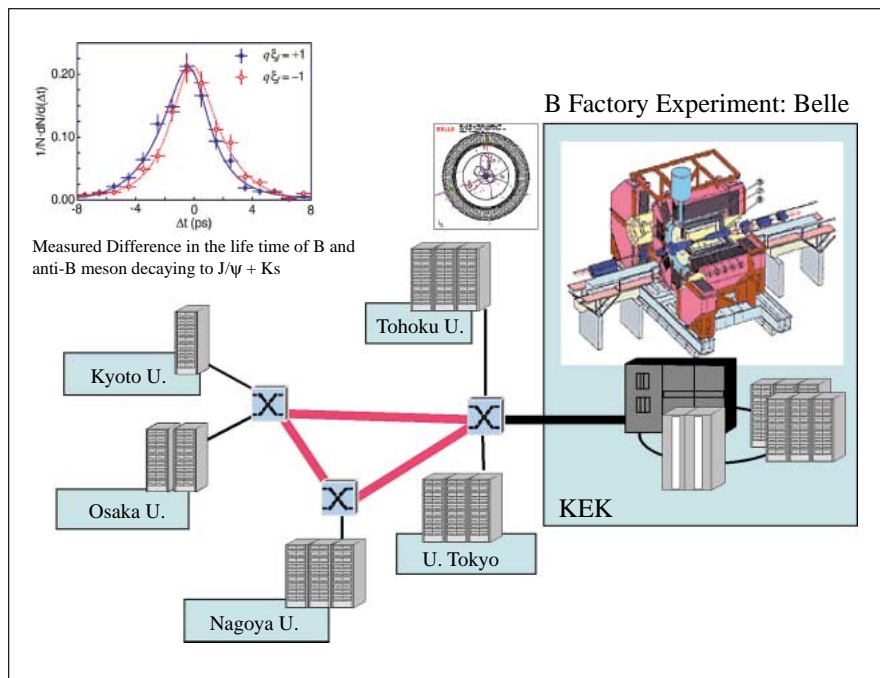
Distributed Data Analysis system of KEK B Factory Experimnent over the SuperSINET

In the field of nuclear-fusion research as well, the completion of ITER may yield the same types of benefits. The large-scale plasma experimental device of the National Institute for Fusion Science, the LHD (Large Helical Device), is currently connected to the laboratories of three universities via Super SINET, allowing the real-time sharing of experimental data and video images of experimental shots, as well as cooperative analysis of this data. Research is progressing to clarify confinement characteristics and other phenomena through the observation of large-scale plasma using various measurement devices. We would like to see this type of remote-participation research continue to increase in the future, making research more efficient and expanding its range.
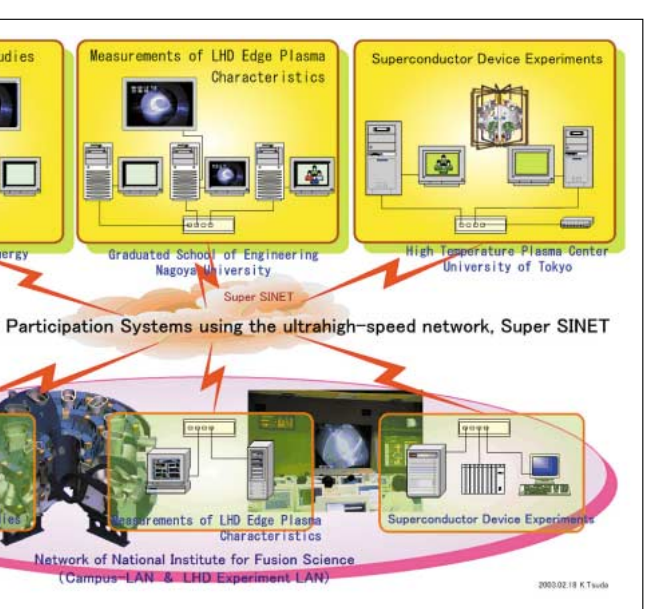
Remote Participation from three institutes to the Large Helical Device at NIFS

Research   introduction

Near Real-Time International Sharing of Remote Sensing Data on the Internet

Recent advances in remote sensing toward (1) higher resolution, (2) more spectral bands and (3) higher temporal frequency, have increased the amount of satellite data. We receive to cope with ever increasing amount of satellite data, challenging research topics include the archival of data, the sharing of data among people, and the extraction of useful information from data. In this short article, we address the issue of sharing remote sensing data on the Internet for the near real-time monitoring of earth environment.

Toward this goal, we, National Institute of Informatics (NII), formed a research group that consists of researchers in Japan and Thailand, in which core members are from Institute of Industrial Science, University of Tokyo, and Asian Center for Research on Remote Sensing (ACRoRS), Asian Institute of Technology (AIT). The idea is to build an international network infrastructure for

Old generation: a lower resolution image from the AVHRR sensor, satellite NOAA.

New generation: a higher resolution image from the MODIS sensor, satellite TERRA. The same observation area as the right image, but more precise.
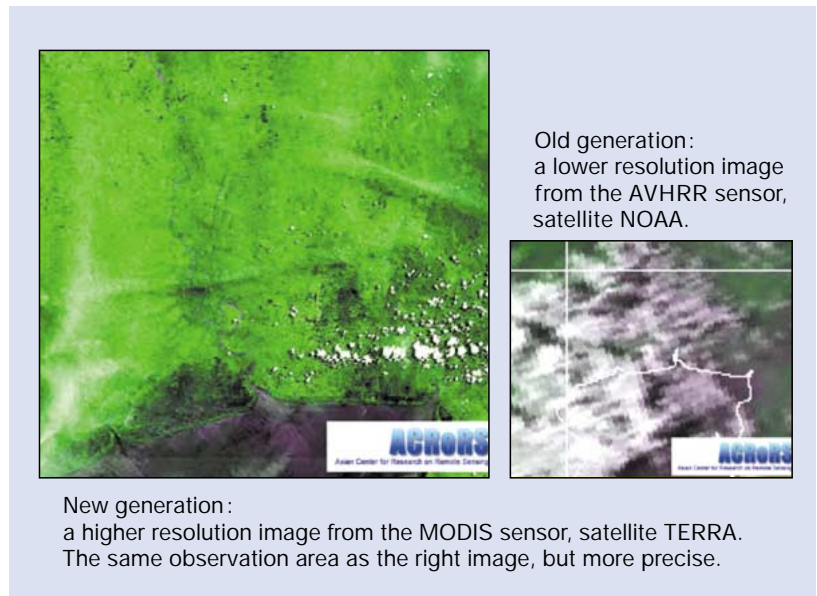
sharing satellite data, as illustrated in the schematic diagram below. On this network, Japanese and Thai researchers have started to share MODIS data from TERRA satellite as shown above, and other environmental satellite data such as NOAA AVHRR data.
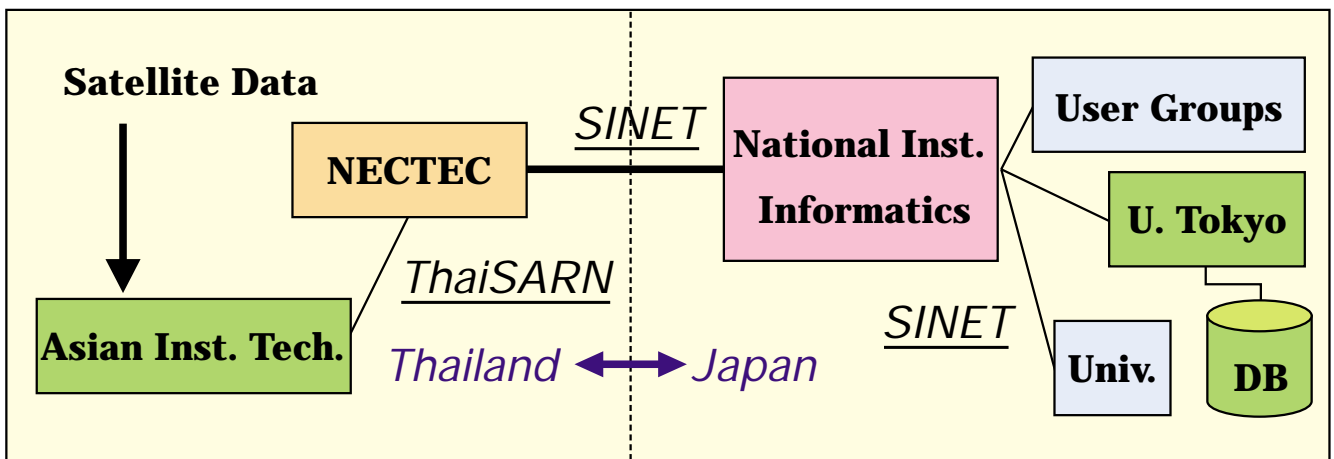
The important component of this network is the SINET international link between Japan and Thailand. This link has been connecting NII and NECTEC (Thailand) since 1994 for promoting the exchange of academic information between both countries. By connecting this international link to domestic academic networks (SINET / ThaiSARN), satellite data is now being exchanged between Japanese and Thai researchers just after the reception of data from satellites. Thus the sharing of satellite data on the Internet has significantly

improved the extent and agility of environmental research in both countries.

NII is involved in this project with research interests in the application of network, image processing, and data mining research to real-world problems. Those research areas are of fundamental importance in the informatics community, and we believe the sharing and information extraction of environmental data is one of the key applications for the informatics community to apply state-of-the-art ideas and to contribute to the society.

On the other hand, other members, University of Tokyo and ACRoRS, have started a WWW-based service to deliver satellite data to the general public, with the future plan of extending the service to various real-world monitoring purposes such as forest fire detection, flood monitoring, earthquake/volcano monitoring, agricultural crop estimation, and land-use monitoring. Since those monitoring applications are closely tied to social issues, the development of an easy-to-use interface for non-experts is another important research topic to improve accessibility to the data.

(Asanobu Kitamoto, Research Associate, □ Research Center for Testbeds and Prototyping)

Approaches to high speed computing for huge amount of data

Because of the recent development of information technology, we can get tremendous amount of data, much more easily than we could in the past. Studies using this huge amount of data have been appearing. One of the biggest problems in these studies is how to solve problems related to such data, because problems become quite hard to solve when the amount of data is huge, even if they can be solved easily with a smaller amount. Several problems on the data, such as keyword search can be solved in a short time for a huge amount of data. But combinatorial problems, such as searching combinations of data satisfying a specified property, often would take more than thousands years. To speed up computation, we usually use super computers, or do parallel computing on cluster computers. Although these can reduce the computation time to 1/1000 of what would be otherwise, the problems take several years.

Efficient algorithms often do a good job of speeding up computation, especially for combinatorial problems. Algorithms are ways of calculating, are schemes for constructing software, or are fundamental theory for designing software. Similar to the fact that no good architecture can be built without good design, no good program can be made without good algorithm. Without devising algorithms, we have to spend a quite long time for computation.

For example, consider a problem of sorting a sequence of n numbers in the increasing order. If we use a bobble sort, a computer takes n^2 basic steps in computation. A PC can execute 100 million basic operations per second at present, so it takes about 10,000 seconds if n=1,000,000. If we use heap sort instead, a computer takes n log n basic steps, and the computation time is reduced to 0.2 second for n=1,000,000. Surprisingly, the factor is 50,000. The factor of increased speed grows with an increase in the problem size (see Figure 1). Thus, drastic improvements should occur.

When we model a practical problem to a mathematical model, we usually think about whether the model can be solved or not. If the problem formulated by the model is small, we concern ourselves with only the existence of solutions; however, if it is large, we also have to think about whether the solution can be obtained in a practical time span or not. That span depends on the problem; for some a minute, an hour, or a day is fine. An excellent model becomes impractical if the computation time is a hundred years. If we know what kinds of problems are solved in a short time, then it will be a good tool for constructing good models (see Figure 2).

In the following, we show a research result we are currently studying. A clique is a subgraph, circled in Figure 3, such that every two vertices in the clique are connected by an edge. In network models such as web networks and dictionaries, a clique is regarded as a cluster composed of similar elements. By finding cliques, these models are analyzed. These network models are often huge, so, we are studying fast algorithms for finding the cliques.

Representations of the data for dictionaries and web networks form graphs ranging from 100,000 to 100,000,000 vertices, and ranging from 1,000,000 to 1,000,000,000 edges. If we find a maximal clique in a usual way, we have to spend at least 1 second, and usually 100 seconds. It takes 1 day, sometimes even 1 year, to find many maximal cliques to classify all of the data. To speed it up, we developed two

improvements to re-use the buffers in computations efficiently and to maintain the candidates of the search efficiently. Through these improvements, we managed to find 10,000 maximal cliques per second. A computation that used to take several days has been reduced to only a few seconds.
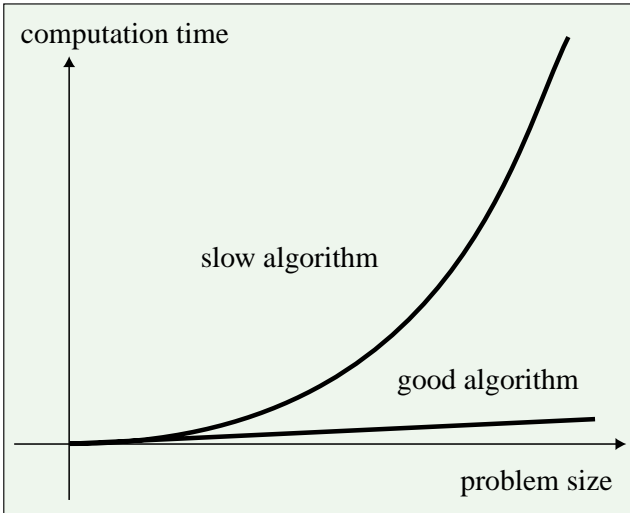
Figure 1 : difference grows by the increase of problem size

A clique is quite a simple model among graph objects. Thus, to increase its applicability to other problems, we are now investigating fast algorithms for finding "quasi cliques" with high objective values such as sizes, weights, and the number of edges in which it is included. Here, a quasi clique indicates a subgraph obtained by removing several edges from a clique.

There are so many algorithmic problems in the real world. Improvements cannot be made for all of them, only for a few problems. However, developments of algorithms for these few problems often give a drastic progress in computation, so they are well worth the effort to devise. Our future work will involve developing fast algorithms to tackle many kinds of huge problems.

(Takeaki UNO, Associate Professor, Foundations of Algorithms Research, Foundations of Informatics Research Division)
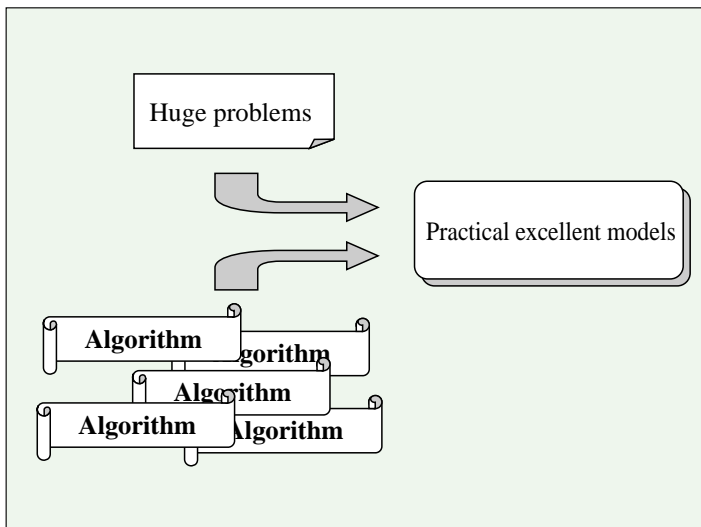
Figure 2 : modeling huge problems with the use of algorithms
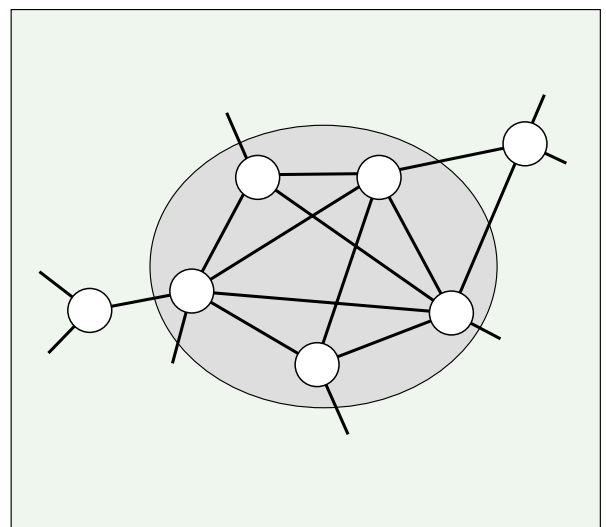
Figure 3 : the circled subgraph is a clique

■ Variational Methods in Image Processing

A unified treatment of shape deformation is required for intelligent editing of image contents for multimedia technology. Deformation of image data based on curvature flow and the diffusion process on surfaces provide a mathematical foundation for a unified treatment of deformation. These deformation operations for boundaries are discussed in the framework of the free boundary problem in

mathematics. For the derivation of solutions of the partial differential equation representing deformed surfaces, the numerical computation is achieved using an appropriate discretization scheme.

We have introduced a new transform for the binary digital set, which we call digital curvature flow. Digital curvature flow describes the geometric flow which is controlled by the curvature of the

boundary of binary digital images on a plane. The new transformation could also be considered a discrete curvature flow on an isotecpolytope, the edges of which are parallel to the axes of an orthogonal coordinate system. For the numerical analysis of partial differential equations, it is necessary to generate grids or to decompose the region of interest into small domains for the discretization of equations.

Therefore, numerical analysis is achieved in discrete forms. However, types of these grids usually depend on the problems and equations which should be solved. In contrast to this classical numerical treatment, we define discrete treatment of the deformation of boundaries in digital space, which are defined as a collection of lattice points.

We applied the curvature-flow-based method to an inverse quantization method for planar binary digital images. Inverse quantization is the process for the estimation of original smooth curves and surfaces from quantized sample data. Once the original boundary is estimated from digital shapes, we can easily generate digital images for any resolution. The inverse quantization of digital terrain data for the recovery of smooth terrain surface and series of iso-level counters are solved using variational problems. This is a surface reconstruction method common in computer vision and areal data processing. The expansion and super-resolution of digital binary images are the same problem because for the achievement of these process we are required to construct a smooth boundary curve as an estimation of the original boundary from digitized images which are expressed as a collection of pixels. Once a smooth boundary is estimated, applying sampling again to the estimated shape, we can generate digital images in any resolutions. Therefore, as an application of our algorithm, we can convert the resolution for the binary shapes to express digital images. We use B-

Global Research Communication and Academic Journal from Japan in the field of Physics

Visiting professor of the Full-Text Contents Laboratory at the Research Center for Testbeds and Prototyping

Makoto Gonokami

Ph.D in Physics from the University of Tokyo, Faculty of Science, in 1985. Research associate at the University of Tokyo, Faculty of Science. Professor of Applied Physics, Graduate School of Engineering, University of Tokyo, in 1998 Visiting associate professor of the Development and Research Department at the National Center for Science Information systems in 1998. Visiting professor at the Research Center for Testbeds and Prototyping.
Research field : quantum electronics, material science, and quantum optics.

Scientific papers are the proofs and results of the research activities for the researchers. The aspects have been dramatically changed according to the recent advances in information technologies including the Internet. In such a situation, the scientific journals in Japan have been at the turning point. In the field of physics, the journals like JPSJ(the Journal of the Physical Society of Japan) and JJAP(Japanese Journal of Applied Physics) have been published for a long period. These journals have been an important role in presenting research results originally from Japan to the world, like the high temperature superconductors and the blue light emitting diode. They are admitted as one of the international top journals in the world. For the preparation for the future age of online

spline for the description of smooth boundary which is estimated from the boundary of binary digital image.

*(**Atsushi Imiya,** Professor, Systems Software Research, Software Research Division)*
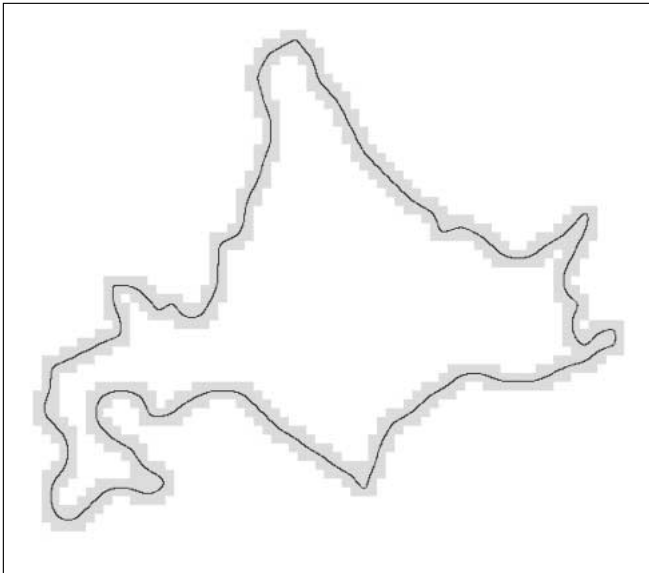
A curve which passes on pixels.
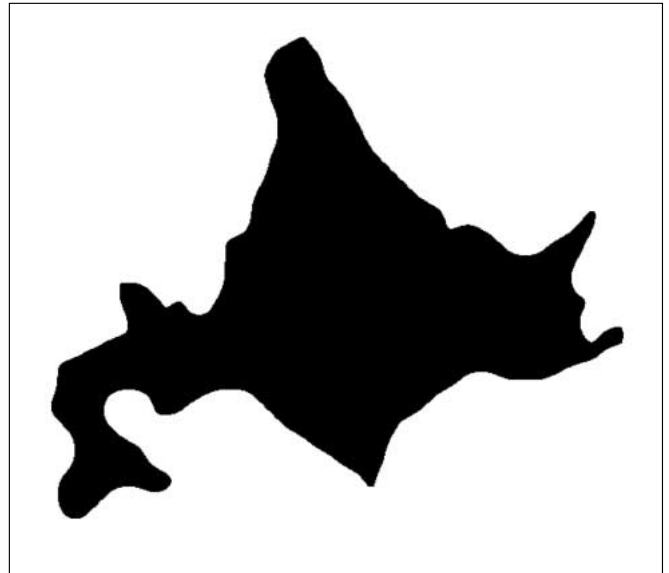
An estimated boundary by a variational method.

publishing, the Physical Society of Japan and the Japan Society of Applied Physics set up IPAP(the Institute of Pure and Applied Physics) and started the system of publication of physics journals in English in April of 2000. At present, the IPAP publishes four journals in English including JPSJ and JJAP. In my talk I introduced their activities and talked about the problems in the scientific publications.

The online publishing has accelerated to the exclusive monopolizations by a few leading journals in the US in the field of Physics. The publication of important research results by Japanese researchers have been brought from the place in the Japanese journals published in Japan to the overseas influential journals. One of the reasons is that the research has been leading to the top of the world level, however, it is not such a simple matter. The researches originated in Japan have been published firstly in the Japanese journals in English till today. For example, lots of important papers like the recent topic-the invention of the light emitting diode were published in JJAP. It is very important for our country which stands on the advanced science and technology to offer the new flow of the research to the world. Therefore it is a serious problem that the representative top Japanese journals will be in decline. There is another problem of the online publishing of academic journals in the evaluation of researchers' achievements. Another harmful effect is that they only aim at collecting the numbers of citations of the papers, which makes the precious scientific talents drive to the popularity. If we will urge the scientific prosperous country, it is necessary for us to contribute overwhelmingly to the set up of the worldwide asset of science and technology. For this purpose, it is necessary that we will strengthen the scientific journals.

Environment-Adaptive Personal Communications in Ubiquitous computing Networks

Research Associate, Multumedia Integration Processing,
Multimedia Information Research Division

Eiji Kamioka

He is a research associate at National Institute of Informatics (NII). He received the B.S., M.S., and Ph.D. degrees in physics department from Aoyama Gakuin University in 1989, 1991, and 1997, respectively. He worked for SHARP Corporation communication laboratories from 1991 to 1993, researching and developing multimedia communications, and joined the Institute of Space and Astronautical Science (ISAS) from 1997 to 1998 as a Research Fellow of the Japan Society for the Promotion of Science (JSPS). He moved to NACSIS as a research associate in 1998. His current interests are ubiquitous computing networks and context-aware computing networks.

The recent remarkable advances in mobile communication devices, such as cellular phones and PDAs (Personal Digital Assistants), have put ubiquitous computing in the limelight in the academic and industrial communities.

Ubiquitous computing indicates the "ubiquity" of computers as the word shows, and it also incorporates an important concept called "invisibility". Invisibility means that we use computers without being conscious of operating them; computers blend into our daily lives naturally and finally disappear from our awareness.

In this lecture, I presented EAPEC (Environment-Adaptive Personal Communications) which aims at realizing personal communications in ubiquitous computing environments. The EAPEC automatically collects information on the user's dynamically changing context in terms of available devices, media, and services, accepts a message from a sender, automatically selects the most appropriate communication device and media type for a receiver, converts the sender's message into the one acceptable to the receiver, and finally forwards the converted message to the receiver.

The EAPEC can be extended for a context-aware information delivery system which obtains user context, such as communication environments, locations, time, actions, and to-do-list, and provides users with information they need.

EAPEC Network Architecture
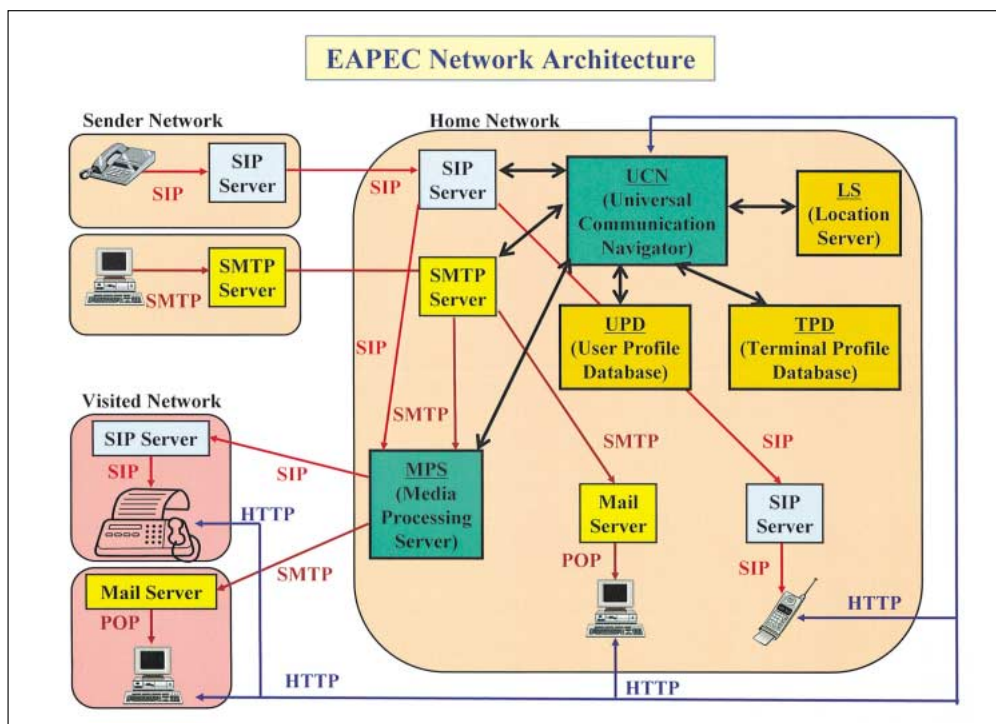
Traffic Control and Congestion Control in IP based Network

Visiting Associate Professor, Network Security Research, Infrastructure Systems Research Division

Japan Telecom, R&D P&S Supplier Unit, Information & Communication Laboratory, Vice President

Susumu Yoneda

He obtained Ph.D at Engineering School of the Johns Hopkins University in 1984. He joined Bell Communications Research as a member of Technical Staff, and moved to Japan Telecom in 1993. In 1997, he was a manager of Information & Communication Labs, and became Vice President of the labs in 2002. His interests include data communication network architecture.

Best effort Internet traffics will be still increasing. The Internet itself becomes a foundation of our economical as well as social activities. In this circumstance, network providers are taking various techniques such as packet priority controls and policy coordination among providers so that they can meet user's traffic needs. However, these techniques can only provide a higher priority treatment on the requested traffics at a given time. This does not mean that requested traffic needs and quality can be met. In order to resolve this problem, ITU proposed GBRA (Generic Byte Rate Algorithm) based on the technology developed for ATM, and completed a Recommendation that could precisely control traffics and congestions in IP based network. A companion Recommendation on quality objective in IP based network assumes the traffic and congestion control technologies addressed in the former Recommendation. In this presentation, history of ATM and definitions / techniques associated with IP traffic controls are addressed, and some objective values of quality in IP based network are introduced.

Generic Byte Rate Algorithm

N bytes packet

L

R byte per unit time
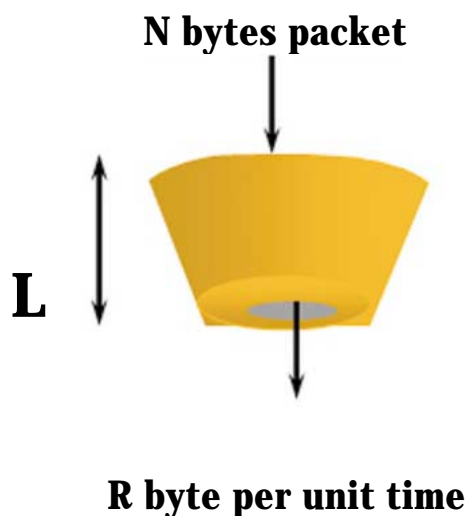
For a sequence of packet arrival times, {ta}, GBRA determines which packets conform to the traffic contract

A counter scheme based on two parameters

The increment I in units of seconds per byte. I is related to R by $I=1/R$

The limit L in seconds. L is related to R and B by $L=B/R$.

"Leaky bucket"

A packet that would cause the bucket to overflow is non-conforming

Knowledge Discovery from Very Large Scientific Databases : "Digital Typhoon" Project as a Case Study

Research Associate,
Research Center for Testbeds and Prototyping

Asanobu Kitamoto

He earned B. Sc. from Electronic Engineering, Faculty of Engineering, University of Tokyo in 1992, and Ph.D. from Electronic Engineering, Division of Engineering, University of Tokyo in 1997, From 1997 to 2000, he served as Research associate at National Center for Science Information Systems. After 2000, he is Research associate at National Institute of Informatics. His research interests include visual informatics, data mining, and pattern recognition.

In many disciplines of science, such as bioinformatics and astronomy, gaining more and more popularity is the new style of scientific research in which very large scientific database infrastructure serves as a key component not only for the archiving of comprehensive and consistent observations but also for computationally demanding data analysis/mining processes. Our project, "Digital Typhoon" is one example of such style of research, being started with building the comprehensive archive of typhoon image database infrastructure, from which we try to discover useful knowledge of the typhoon with statistical evidence based on the huge amount of observation data.

The infrastructure, which we name the "typhoon image collection," archives about 44,000 high-quality images processed from satellite images of the meteorological satellite "Himawari (GMS)" that represent about 260 typhoon sequences in the Northern and Southern Western Pacific basin since the 1995 typhoon season. Early this year, this typhoon image collection started its operation, with automatically collecting new typhoon images as soon as a new typhoon is formed.

The next step is our primary challenge, an image data mining, and for this purpose we put together various ideas studied in related research areas such as data representation, database search engines, query languages, data browsing, and data visualization. Our final goal is to represent quantitative properties of typhoon cloud patterns and discover knowledge and rules that are relevant for solving important real-world problems such as typhoon analysis and prediction.

In addition, the typhoon image collection is a unique data collection in its own right. It consists of many image sequences of real-world complex systems, so it can serve as a practical benchmark collection not only for image processing and meteorology, but also for a wide range of scientific research. To promote the dissemination of the typhoon image collection, we started to host a dedicated web site for our project on which we provide up-to-date typhoon images and related information and research papers for both experts and non-experts.

• URL : http://www.digital-typhoon.org/

K-means clustering of typhoon cloud patterns in the Western North Pacific basin to show the diversity of cloud patterns.
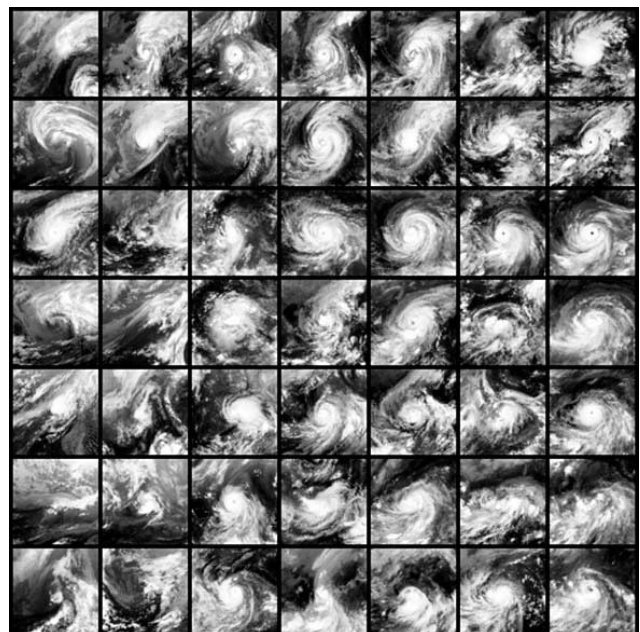
Performance Improvement of Content Delivery over the Internet.

Visiting Professor, High Speed Network Laboratory,
Research Center for Testbeds and Prototyping

Yasuhiko Yasuda

Yasuhiko Yasuda was born in Tokyo on July 7, 1935. He received B.E and M.E.degrees in Electrical Engineering, and Ph.D.degree in Electronic Engineering from the University of Tokyo, in 1958, 1960 and 1963, respectively. In 1963 he joined the Institute of Industrial Science, the University of Tokyo as associate professor and was promoted to full professor in 1977. Since retiring from the University of Tokyo in August of 1992, Dr. Yasuda has been professor at the Department of Electronics, Information and Communication Engineering, School of Science and Engineering, Waseda University. His current interest is in the fields of image coding and processing, Internet applications, and mobile and satellite communications. He is a past President of IEICE and a past President of IIEEJ. He is currently serving as Chairman of Radio Regulatory Council (Soumu-shou). Dr.Yasuda has been awarded numerous prizes from various academic organizations including the IEICE Outstanding Achievement Award.

Zhou Su

Zhou SU: is currently working for the Ph.D Degree at the graduate school of science and engineering, Waseda University, after receiving his BS and MS degree from Xi'an Jiaotong University, Xi'an, China in 1997 and 2000, respectively. He was an exchange student between Waseda and Xi'an Jiaotong University from 1999 to 2000. From 2001 he has been a research associate at Waseda University. His research interest is in the field of multimedia multi-media communication, web performance and network traffic. He received the SIEMENS Prize in 1998, and received Rockwell Automation Master of Science Award in 1999. He is a student member of the IEICE

Classifying the evolution stages of Internet with respect to the information that flows over its network, its main traffic was text information at the earlier stage but now around 70% of its total traffic is image information and in the near future it is anticipated to become stream information. Although the processing capability of servers or routers and capacity of transmission lines are increasing year by year, it is at the same time indispensable to take new approaches to the Internet system to process explosively increasing traffic properly, to utilize network resources more effectively and to improve service for users by reducing the response time.

As one of these approaches we are investigating a new one of making higher coincidence probabilities of image information temporarily stored in cache memories to the users' request. This approach includes the following: the method of employing both pre-fetching and graceful caching which is based on the concept of hierarchical or scalable coding to still images that was proposed by one of the talkers more than 25 years ago for the first time in the world (see the figure), the method of properly locating each segment of stream information on one of the layered proxy servers, and the method of arranging each layered stream information on a different contents server. The simulation results show that the proposed scheme is very useful.

Resource Server — Cache Server (Proxy Server) — Client

Original Image   Graceful Caching   Request
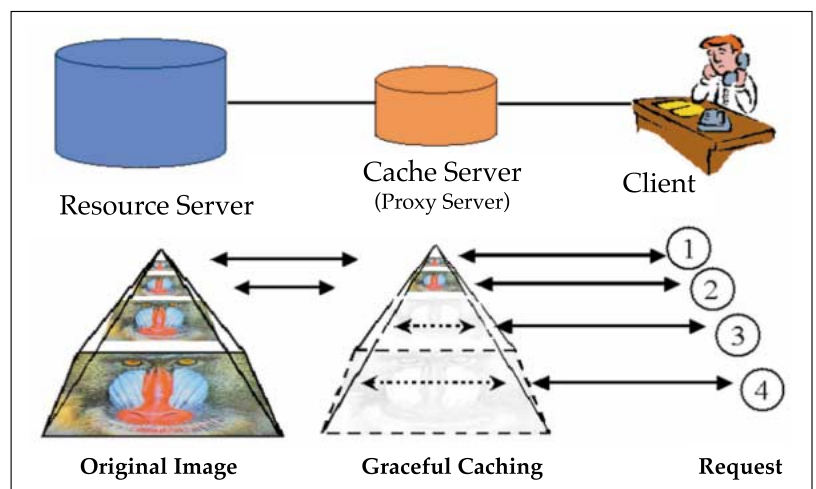
■ "The European 6th Framework Program : Opportunities for International Co-operation"

Science and Technology Counselor Delegation
of the European Commission

Maurice Bourene

Maurice BOURENE was born in 1939 in France. He obtained a Master of Sciences in Physics at the University of Marseille and then a "Doctorat es Sciences". He joined the French Atomic Energy Commissariat (CEA) in 1966 as a researcher. In 1980 he obtained at the University of Paris VII a "License", degree in Japanese language. He worked at the French Embassy in Tokyo from 1982 to 1986 as Science Attaché.After that he moved to the Delegation of the European Commission in Japan where he is currently. He created the S&T unit. He is First Counselor for S&T.

After recalling what is the European Union (EU), the keys events and dates which marked its extensions, Dr BOURENE presented the structures of the EU and explained how the decisions are taken. Then he presented the sixth Framework Program (FP6) and explained what are the opportunities for co-operation for "third countries" not members of the EU and not associated the Framework Program.

The Sixth Framework Program (FP6) is the EU's main instrument for the funding of research in Europe. The overall budget,17.5 billions euros (_), for 2003-2006 includes 1,23 billions _ for Euratom. It represents an increase of 17% from the fifth Framework Program and 3.9% of the EU's total budget (2001). It also represents 6% of the total R&D civilian public budget allocated by the different States Union's Members for research activities. There are no national quotas for FP6 funds, quality is the base for the selection.

There are three main domains

1. Focusing and Integrating European Research (13,285 millions) with concentration on selected priority research areas
2. Structuring the European Research Area (2,655 millions) through a stronger link with national, regional and other European initiatives
3. Strengthening the foundations of the European Research Area - ERA - (330 millions) with coordination and simplification

For the first domain seven keys priorities for the advancement of knowledge have been chosen: genomic and biotechnology for health (2,200 millions), information society technologies - IST- (3,600 millions), nanotechnologies and nanosciences (1,300 millions), aeronautics and space (1075 millions) food quality and safety (685 millions), sustainable development, global change and ecosystems (2,120 millions) and citizens and governance in the European knowledge-based society and social cohesion (225 millions). In addition a specific budgetary line concerns specific activities covering a wider field of research which benefit from 1,320 millions.

Computer science and Informatics are concerned by different priorities programs but mainly by the thematic IST priority. The main topics which have been listed in IST are:

- applied IST research addressing major societal and economic challenges
- communication, computing and software technologies
- components and Microsystems
- knowledge and interface technologies

The main focus of FP6 is the creation of a European Research Area (ERA) as a vision for the future of Europe. New support instruments have been introduced:

- networks of excellence including "virtual centers of excellence"
- integrated projects
- programs implemented jointly

These new instruments give more opportunities for co-operation with third countries, like Japan, especially through networks of excellence and the new fellowship scheme.

In principle the 6th Framework Program is opened to third countries. However there are yet discussions on how this will be made. In the case of third countries without an agreement like Japan, the participation to the 6th FP will be conditioned to specific domains of interest for the EU. However

since July, Gaimusho has officially asked for the opening of negotiations for an agreement. In that case, Japanese research laboratories, from public as well as from private sector will be permitted to join the program. The main advantages, beside the participation through a consortium to the main core of it, will be the participation to networks of excellence and to a new fellowship program that will be an exchange program, giving the opportunity

to European researchers to come to Japan as well as Japanese researchers to go to Europe with a preference for an inter institutions exchange with the aim to stimulate co-operation.

In conclusion Dr. BOURENE emphases what are the possibilities for NII to joint one of the Network of excellence or an integrated project with some European laboratories.

Protocol Processing Hardware and Its Application to High Speed Internet Study

Visiting Professor, Network Security,
Infrastructure Systems Research Division.

Toru Hasegawa

Ph.D in Physics from the University of Tokyo, Faculty of Science, in 1985. Research associate at the University of Tokyo, Faculty of Science. Professor of Applied Physics, Graduate School of Engineering, University of Tokyo, in 1998 Visiting associate professor of the Development and Research Department at the National Center for Science Information systems in 1998. Visiting professor at the Research Center for Testbeds and Prototyping.
Research field: quantum electronics, material science, and quantum optics.

Gigabit links such as OC-48 links and Gigabit Ethernet links have become popular at both academic IP networks and commercial ISP networks. Protocol processing hardware plays a key role for providing QoS and network security on such high speed IP networks. For example, the protocol processing hardware enables network equipments to detect network attacks and to control QoS at the wire speed. Therefore, the author has studied the protocol processing communication boards that are equipped with an FPGA (Filed Programmable Gate Array) chip. Since the FPGA is programmable, we can implement various applications using the same communication board. We have implemented an OC-48c communication board with an FPGA chip, and have written several FPGA programs for traffic measurement, traffic generation and real time data transfer. The programmability of FPGA is so useful that we

can achieve many communication applications using the same board. In this talk, we describe the implementation overview of the OC-48c communication board and its application to traffic measurement and traffic generation. Finally, we describe the high speed real time VLBI experiment using the communication board.

High Speed Internet Traffic Testing and Measurement
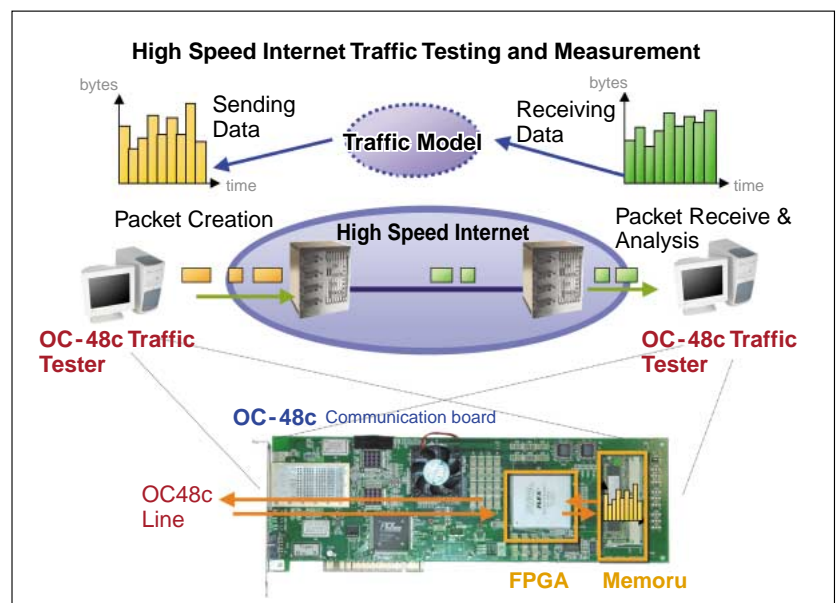
Constraint Programming for User Interfaces

Research Associate, Programming Languages Research,
Software Research Division

Hiroshi Hosobe

He received his D.Sc. degree in Information Science from the University of Tokyo in 1998. After serving as a JSPS postdoctoral research fellow and as a research associate at NACSIS, he joined NII in 2000. His research interests primarily lie in constraint programming, user interfaces, interactive graphics, and information visualization.

Constraint programming is a powerful tool for solving various problems, and has been widely used in many areas such as artificial intelligence, logic programming, and user interfaces. Constraints are, in general, mathematical relations written declaratively, and are automatically maintained by software called constraint solvers. While typical computer programming necessitates writing computation procedures to fulfill requirements of programs, constraint programming allows declaratively specifying such requirements as constraints, which makes the programming tasks easier. For example, in user interface construction, programmers can realize complex layouts of graphical objects by simply describing the layouts with constraints.

The speaker has been studying and developing various constraint programming technologies for user interfaces. In particular, he has been conducting research on constraint solvers, and has constructed the solvers called HiRise (which processes thousands of linear constraints with preferences in real time), Chorus (which handles various user-defined nonlinear geometric constraints), and Chorus3D (which provides 3D geometric constraints and coordinate transformations). These solvers facilitate the construction of graphical systems and 3D applications involving user interaction. Also, he has been carrying out applied research on constraint programming, and has developed a system which diagrammatically visualizes XML data in intuitive form.

Constraint Programming for User Interfaces

Automatically maintains layouts of graphical objects.
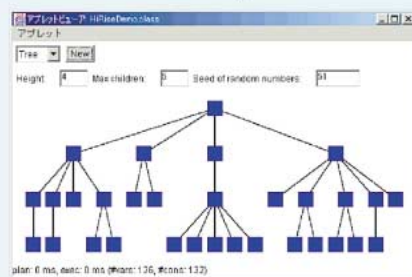
Constraints
- The vertical distances between parents and their children are equal.
- The intervals of neighboring leaves are equal.
- Subtrees sharing the same parents are adjacent.
- Etc.

Applications

Information Visualization

Mathematics Education

Virtual Reality

Research goes back to a patent: From babble chamber to genomic data processing.

Professor, Systems Software Research,
Software Research Division

Atsushi Imiya

Dr Eng. from Tokyo Institute of Technology in Computer Science, 1985,He was Research Associate, 1985, Assistant Professor 1986 and, Associate Professor 1989, Kanazawa University, Associate Professor 1990-1998 and Professor, 1998, Chiba University. And he was an invited senior researcher at Slovak Academy of Sciences, 1992, a visiting researcher University of Hamburg 1996-1998. Since 2002, He is a Professor of NII. He was an editor of Dagstuhl Winter School on Digital and Image Geometry, 2000.

The Hough transform detects lines and conics on a plane from noisy samples. The principal technique of the classical Hough transform is the voting process which draws the dual line of a sample point in the accumulator. The detection of parameters of lines and conics are performed by the detection of the peaks in the accumulator. Therefore, the accumulator is a fundamental tool for the Hough transform. This technique goes back to a US patent by P.C.V. Hough in 1962. The technique was developed for the detection of lines on the noisy atomic photos. The method is nowadays extended to the detection of many different figures in a photo. Furthermore, the most elegant extension of the technique, namely, the geometric hashing, is a standard technique for the estimation of the three-dimensional structure of the proteins, which was introduced in the computer vision community on 80's. Today, if you try to search items on World Wide Web using the key word "Geometric Hashing," many items searched by this key word also contain key words "protein," "structure," "alignment," and so on. These key words are come from bioinformatics.

We briefly overview the history of the Hough transform from mathematical viewpoints. The classical Hough transform votes the dual line of a point to the accumulator. The collection of dual lines in the accumulator is called a linogram. The r-theta Hough transform votes a sinusoidal curve defined by a point using the Hesse's canonical forms of lines. The collection of sinusoidal curves is called a sinogram. This modification permits us to detect lines which are parallel to the axes in the image plane. Since these two methods preserve a collection of lines and curves during the procedures, these methods maintain the connections of cells in the accumulator to describe lines and curves in the accumulator. The randomized Hough transform votes points to the accumulator and reduces the complexity of maintenance of collection of cells in the accumulator since in this method it is required to maintain the connections of cells. For the determination of parameters of lines and conics, the peaks in the accumulator are detected using the search of points in the array. Therefore, even for the randomized Hough transform, a data structure suitable for the fast search is required. As far as adopting the voting process is concerned, the maintenance of the accumulator cannot be neglected.

The Hough transform is based on the mathematical property that the grouping of sample points is achieved by the permutation for the sequence of the sample points. Using this idea we have introduced a method which does not require any accumulators.

Therefore, our computation scheme does not depend on the number of parameters of models which determines the size of the accumulator. This is the most important advantage of our proposing method.

Recently, Mattavelli et. al. introduced a combinatorial method for the line detection. Their idea is based on the construction of the minimum consistent equations from sample data. The method is an extension of slope selection in statistics, which selects a line from samples with many outlayers. The slope selection problem is based on Thiel-Sen

estimation which yields a robust estimator. Our method is based on the expression of the line fitting problem. The line fitting problem with total mean squares is expressed as a semidefinite programming problem. The L_1-norm line fitting is expressed as a linear programming problem. However, for these method, the line for fitting should be unique. Therefore, to apply these method for the fitting of many lines, the clustering of data point should be preprocessed. However, the Hough transform estimates the parameters of lines and derives the clusters determine lines, simultaneously. Therefore the Hough transform is expressed as a semidefinite programming problem with unknown permutation matrix. Furthermore, we introduced a relaxation method which involves optimization steps by semidefinite programming, which computes the parameters of lines, and integer programming, which estimates clusters of lines. In Figure we show the results of our method for the detection of ellipses and lines in a photo. These ellipses and lines act as feature of the understanding of the objects and enviroment by autonmous robots.
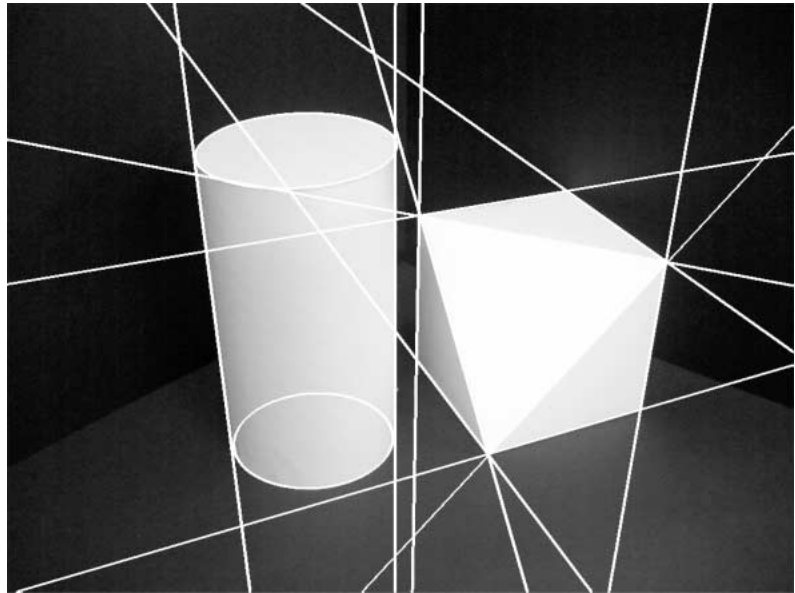
ACM SIGIR Workshop on Cross-Language Information Retrieval : Research Roadmap

On August 15, 2002, at the 25th International Conference of the Association for Computing Machinery Special Interest Group on Information Retrieval (ACM SIGIR) in Tampere, Finland, Fred Gey (University of California, Berkeley), Noriko Kando (National Institute of Informatics), and Carol Peters (Italian National Research Council) held a Workshop on Cross-Language Information Retrieval. The Workshop was intended to thoroughly discuss research directions for the next five years, based on a review of the current status of cross-language information retrieval (CLIR) research and on social needs.

CLIR is vital technology for the simultaneous retrieval of information across multiple languages in an Internet environment. Since its proposal at the ACM SIGIR 1996 workshop, CLIR research has developed at a rapid pace.

At this workshop, a diverse group of CLIR researchers was assembled from twenty countires. Eighteen presentations and intensive discussions took place. The topics included the importance of evaluation, multimedia CLIR for audio and visual content, cross-language question answering, methods for presenting retrieval results in easy-to-understand ways, the need for expansion of the range of applicable document genres, differences not only in languages but also in cultures and social convention, and the necessity of research on languages with few linguistic resources. The results will be reported in the ACM SIGIR Forum, and a collection of papers is planned for publication in the special issue on CLIR of an International Journal Information Processing and Management.

*(**Noriko Kando,** Associate Professor, Library Information Research, Human and Social Information Research Division)*

"The Seventh Pacific Rim International Conference on Artificial Intelligence (PRICAI-02)"

PRICAI-02 (The Seventh Pacific Rim International Conference on Artificial Intelligence) was held from August 18th to 22nd, 2002. PRICAI is a series of biennial conferences which are the most prestigious for artificial intelligence field in the Asia-Pacific region. It was held at National Center of Sciences sponsored by the Japanese Society for the Japanese Society of Artificial Intelligence and supported by National Institute of Informatics. About 240 researchers gathered from 17 nations, and over 60 research presentations were made. The prominent professors of the United States, Australia, Germany, and Japan gave invited lectures about the directivity of artificial intelligence. They showed that there are great possibilities that artificial intelligence technology will be used for new fields, such as a cellular phone, multimedia, and even arts. Moreover, there

were five individual workshops on agent technology, knowledge discovery, and so on.

*(**Hideaki Takeda,** Associate Professor,*
Knowledge Systems, Intelligent Systems Research Division)

Computerm 2002 : The Second International Workshop on Computational Terminology

Computerm 2002: The Second International Workshop on Computational Terminology was held as a post-conference workshop of COLING 2002, the largest international conference in the field of computational linguistics, at Taipei, Taiwan. The workshop was organized by Kyo Kageura (NII, Japan), Beatrice Daille (University of Nantes, France), Lee-Feng Chien (Academia Sinica, Taiwan) and Hiroshi Nakagawa (University of Tokyo, Japan).

It was organised as a one day workshop with around 10 papers; there were many submissions so the acceptance ratio was below 50 per cent. Among the accepted papers, three were on multilingual terminology, two on the extraction of terms and their variations, two on structuralisation of terminology, two on complex term parsing, and two on applications to NE/QA. There were around 35 participants all through, with very active discussions. In the wrap up discussion, it was

agreed among the participants that this workshop be continued, preferably at every two years.

*(**Kyo Kageura,** Associate Professor, Information Management*
Research, Human and Social Information Research Division)

ADTACARA-2002
The Regional Workshop on Advanced Digital Technology-Assisted Cultural Artwork Restoration and Archiving ,
Baku Scientific and Training Centre, Baku, Azerbaijan 14th-16th October 2002

In the framework of UNESCO's follow up to the "Tokyo Symposium on Digital Silk Roads", with a view to offering a unique opportunity for IT experts in the Silk Road region to acquire new digital technologies to be used for implementing a variety of projects and activities under the Digital Silk Roads initiative, Baku scientific and Training Centre has organized a workshop on "Advanced Digital Technology-Assisted Cultural Artwork Restoration and Archiving" (ADTACARA) in cooperation with NII and INRISA with the participation of Associate Professor Frederic Andres, Dr. Laure Bertil-Equille, and specialists of the caucasian region under UNESCO coordination and in partnership with ACCESS-net members in the participating countries such as Kyrgyzstan, Azerbaijan, Turkmenistan, Tajikistan, Uzbekistan, Kazakhstan, Ukraine, Belarus, Moldova, and Georgia. The workshop focused on the metadata and annotation management related to the case studies of Digital Silk Road data collection. Following

this workshop, the ADTACARA network has been set by UNESCO in order to be one of the active groups collecting Silk Road data in the Caucasian Region and uploading the data to the SPI/DSR site (Scientific Portal for International Cooperation on Digital Silk Road).

*(**Frederic Andres,** Associate Professor, Distributed Processing Research, Software Research Division)*

"Cyberspace permeating to everyday life"
A Symposium on Cyberspace was held

The 5th Symposium of the Special Interest Group on Cyberspace of The Virtual Reality Society of Japan was held at the National Center for Sciences on December 2, 2002.

"Cyber" space has been permeating to our living space rapidly such as permeation of "mobile phone culture" into our daily lives. The symposium was titled "Cyberspace permeating to everyday life". Nine presentations were given by both academics and practitioners. They were on advanced research and development that augment interface between virtual information space and our living

space. They offered good opportunity to think about what the future society is like.
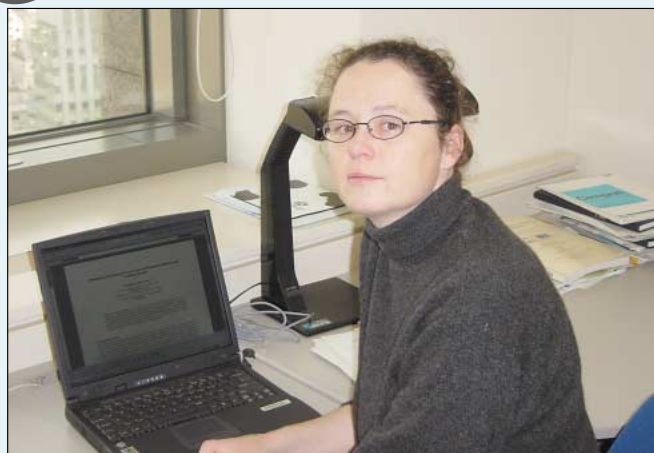
Over 70 participated and discussed future technology and society very actively.

the 6th symposium will be held in 2003. Please check the URL (http://welcome.to/sigcs/) for detailed information.

*(**Tomo'o Inoue,** Research Associate, Human-Machine Symbiosis Research, Intelligent Systems Research Division)*

MASSAGE FROM FOREIGN RESEARCHER

JSPS Invitation Fellow
From September to December, 2002

Eva Heinrich

Senior Lecturer,
Institute of Information Science and Technology,
Massey University, New Zealand

Three Months Research Visit at NII

As I am writing this article my three months research visit at the NII is rapidly coming to an end. I will be leaving the NII on the 23rd of December to head back to New Zealand to enjoy the summer break and then to return to my teaching and research duties at Massey University. The time here at the NII has provided many contrasts to my 'normal' life in New Zealand ranging from life in Tokyo as compared to the slow pace of a small New Zealand city, time to fully concentrate on research as compared to juggling research with teaching, supervision and administrative duties or simply being away from family and friends for an extended period of time.

While here at the NII I worked with Dr Andres on research relating to the UNESCO Digital Silk Roads project for the preservation of cultural heritage utilising digital technologies. In such a project extensive repositories of electronic documents are generated and these documents are typically annotated with meta data. These document collections form an ideal resource for informing and enriching eLearning material. In the eLearning context documents are typically referred to as 'learning objects' and are annotated according to the learning object meta data standard, LOM or according to the Dublin Core standard, DC. Common criticism voiced in regard to these metadata for the use in eLearning are the lack of context and instructional information for the meta data and the very open definition of the concept 'learning object'.

In our project, we have addressed this criticism by suggesting the introduction of an 'interpretive layer' between document collection and creation of learning material. This layer will provide context for individual documents, instructional meta data and content-based annotations to assist an instructor to easily locate appropriate information and material for the development of learning material. Over the next year we will apply this theory in context of the Digital Silk Roads data.

My time at the NII has certainly been interesting and rewarding. The research facilities here are excellent and I am thankful to the people at NII for the very warm welcome I received. I am hopeful to be able to continue my research association with the NII over the coming years.

The international graduate course at the Graduate University for Advanced Studies (Ph.D. program in informatics) accepts six new students

In October, the Graduate University for Advanced Studies established an international graduate course as a special course for foreign students, allowing them to complete the Ph.D. program within the standard period of study by attending lectures generally given in English. In line with this movement, the School of Mathematical and Physical Science of the Graduate University for Advanced Studies, which was founded by NII, has also been accepting applications from excellent students from foreign countries, primarily Asian countries. Our purpose is to develop internationally minded and creative researchers with a broad perspective who can respond to new trends in academic

research, through education in an international atmosphere with Japanese students. The following six students have been enrolled.

Name	Nationality	Graduate University	Note
Pattara Kiatisevi	Thai	University of Stuttgart	Japanese Government Scholarship
Pen Kimveasna	French	Ecole Polytechnique de Nantes	Japanese Government Scholarship
Tang Bihua	China	University of Electronic Science and Technology, China	
Li Lei	China	University of Science and Technology of China	
Jumpot Phuritatkul	Thai	Asia Institute of Technology	
Tuangthong Wattarujeekrit	Thai	Kasetsart University	

(Research Cooperation Division)

Introduction to the Program of the Department of Informatics, School of Mathematical and Physical Science, the Graduate University for Advanced Studies

No.1　Foundations and Infrastructure Science

This article is the first of a series introducing the Ph.D. Program for Informatics, Graduate University for Advanced Studies: the research area of Foundations and Infrastructure Science, one of the four research areas in the newly-established Ph.D. Program in cooperation with NII.

Modern information systems are based on Mathematical Informatics and Information Communication Network Infrastructure. The NII teaching staff in this research area educate and supervise the Ph.D. students in the above Ph.D. program, taking both theoretical and experimental

approaches.

For lectures related to Mathematical Informatics, we provide Mathematical Informatics, Mathematical Logic, Logic in Computer Science and Algorithms. For lectures related to Information Communication Network Infrastructure, we provide Communication Engineering, Information and Communication Networks, Communication Protocols, and Functionally Advanced Networks.

As for the research topics for Ph.D. students, the latest research themes, associated with the above-mentioned lectures, are being arranged as shown below.

Regarding Mathematical Informatics: Theory and application of Numerical Analysis (Numerical Linear Algebra: iterative solution of large systems of linear equations, eigenvalue problems and least-squares problems, solution of inverse problems, numerical solution of partial differential equations, etc.), the fundamental concepts of Discrete Algorithms (the reduction of time complexity for fundamental algorithms arising in Combinatorial Optimization problems and their generalization to general problems, efficient implementation in practical systems), Fundamental Theories in Computer Science applying Mathematical Logic (Type Theory, Constructive Logic, Theory of Programs), Theory of Computation (Theory of the Complexity of Computation and Proofs using methods in Logic, and their application to Automatic Theorem Proving.)

Regarding Information Communication Network Infrastructure: Technologies and services for the fourth generation mobile communications and the ITS (Intelligent Transport Systems), technologies and copyright relating the server-type receiver for the digital TV, informatization of home and consumer information electronics, inter-operability of the communication terminals usable in various networks, ubiquitous and context-aware computing networks, traffic analysis for network design and QoS control methods in a high-speed Internet, design, modeling and performance evaluation of traffic control and routing protocols providing the quality of service in multi-service networks, traffic characteristics of multimedia communication, and issues on next-generation optical high-speed networks.

Currently in the research area of Foundations and Infrastructure Science, seven Ph.D. students (three of them enrolled in April, 2002 and four of them enrolled in October, 2002, including three foreign students) are making the first step toward their Ph.D. degrees.

For further information and admission to this Ph.D. graduate school, visit the following URL.
http://www.nii.ac.jp/daigakuin/English/index.html

*(Written by **Prof. Ken Hayami,** Mathematical Informatics, Foundation of Informatics Research Division, NII, and*
***Prof. Shigeki Yamada,** Functional Network, Infrastructure Systems Research Division, NII)*

Massage from Graduate Students

Takako Sanda
The Department of Informatics,
School of Mathematical and Physical Science,
the Graduate University for Advanced Studies

I have been working in a company supplying communication equipments as research engineer. Research work in a company, however, is always under controls of management people and researchers should always work for company's benefit. This situation made me decide to enter a PhD course and research the area in which they are interested.

There are several reasons that I chose NII. As NII has open mind for worker students like me, it is easer for us to handle work hours and study hours. As NII locates convenient place, central Tokyo, office workers in Tokyo can easily go there before starting or after finishing their work. Additionally, it interested me that NII would prepare international course and accept a lot of foreigner students.

After entering NII, I have been researching for information security and privacy. Recently, many areas of the Internet technologies have been rapidly growing. Especially, ubiquitous computing will be growing more and more. On the other hand, a leakage of information and a violating privacy will be more serious problem. I would like to tackle this sort of problem in order to prepare a technology not for benefit but for safety and comfortable human life.

Tang Bihua
The Department of Informatics,
School of Mathematical and Physical Science,
the Graduate University for Advanced Studies

Career Milestone Starting from NII

As one of the first oversea Ph.D. candidates, I was enrolled in last October at the National Institute of Informatics (NII). I am very honored to have this opportunity to pursue advanced academic research and enhance my professional background and my career outlook.

I was born in Sichuan, China. I received my B.S. degree in mathematics from Sichuan University, China in 1984 and M.S. degree in applied mathematics from University of Electronic Science and Technology of China, Chengdu, China in 1989. I am currently working at Beijing University of Posts and Telecommunications (BUPT) as an associate professor, where I have been engaged in research and development of mathematical methods in telecommunications since 1992. When I was at BUPT, NII was well known there for its operation of the fastest academic information network in the world - "Super SINET" with a speed of 10 Gigabytes, and Prof. Mitsutoshi Hatori was also a well-known pioneer in telecommunication research. All these had played a major role in my decision to join NII for my Ph.D. study.

My current research topic at NII is random distorted channel theory for reducing the inter-symbol interference by means of software approach. My supervisor is Prof. Ken Hayami, who is an expert in Numerical Analysis. Prof. Mitsutoshi Hatori is one of my associate advisors. Since I joined NII last October, I have been constantly impressed by NII's excellent research and teaching achievement, world-class technology equipment, rigorous scholarly standards, abundant information accessible around clock, the nurturing, caring and stimulating academic environment, open scientific approach and its sincere service to the public. My wonderful experience here has proven that my choice was absolutely right. I'm looking forward to a few years of fruitful and enjoyable experience here with NII.

■ NACSIS-CAT Training Course was held in Germany

The catalog information service (NACSIS-CAT) is used not only in Japan but also in overseas academic research organizations in European countries and China. NII has held NACSIS-CAT training Course for these overseas organizations participating in the service as required.

Following the training Course held in Cologne last year, a NACSIS-CAT training Course was held for German and Swiss organizations participating in the catalog information service at Munich University and the Leibniz Computing Centre at the Bavarian Academy of Sciences and Humanities from July 22 to July 26, 2002. This training Course was jointly held by NII, the Department of Japanology at the Institute for East Asian Studies at Munich University, Arbeitskreis Japan-Bibliotheken, and the Japan Foundation.

At the training Course, an introductory course

Training

(held over three days) and an advanced course (held over two days) were available, with the same program offered in Japan. Participants were eager to learn about the NACSIS-CAT system, and 20 people from 13 organizations completed the program.

For SPCAT, retrieval system for each library to provide the own OPAC using the data inputted into NACSIS-CAT, was introduced again this year, with collections of German organizations participating in the service used as an example.

(Dissemination Activities Division)

Commemorative photograph with participants

The Cooperative Program for the Exchange of Experiences, Expertise, and Information on S&T in Southeast Asian Countries (CO-EXIST-SEA)

The Cooperative Program for the Exchange of Experiences, Expertise, and Information on S&T in Southeast Asian Countries (CO-EXIST-SEA), which was implemented by Japan and the five Southeast Asian nations of Indonesia, Malaysia, the Philippines,

Thailand, and Vietnam in 1999, is an international cooperation program for the dissemination of information on science and technology. NII and the Japan Science and Technology Corporation participate in it from Japan. This program annually

holds workshops to exchange information and opinions on international cooperation and training programs for the training of specialists on information services.

The fourth training program of CO‑EXIST‑SEA was held at NII and the Japan Science and Technology Corporation in Tokyo from September 2 to 6, with ten trainees from five Southeast Asian countries and five trainees from university libraries in Japan invited to attend. From the second to the fourth day, a training session with the theme "XML and Java Programming" was held at NII; Dr. Hosobe, a research associate at NII, lectured. In the training session, he introduced XML, a language used to describe structured documents and data, and explained the procedure for developing software for the processing of XML data using the Java language. In addition, the trainees received practical training on the description of data using the XML language and programming in Java.

On October 8 and 9, the fourth workshop of CO‑EXIST‑SEA was jointly held by the Center for Scientific Documentation and Information of the Indonesian Institute of Sciences and the State Ministry of Research and Technology, Republic of Indonesia, in Jakarta. On the first day, following speeches by the vice-president of the Japan Science and Technology Corporation and the Minister of Research and Technology, Republic of Indonesia, a keynote address was delivered by Eisuke Naito, professor emeritus at NII and professor at Toyo University. The results of the training program of

Professor Emeritus Naito, who is giving a keynote speech at the fourth workshop

CO‑EXIST‑SEA were then reported by director of Malaysia office of the Japan Science and Technology Corporation, by Dr. Hosobe, research associate at NII and a lecturer in the training program, and by trainees participating in the fourth training program from Indonesia. After that, representatives of each country discussed the current state of the dissemination of scientific and technical information in organizations to which they belong, and Dr. Hosobe reported on the present situation at NII. On the second day, active discussions were held regarding future international cooperation.

The CO‑EXIST‑SEA program is a valuable framework for international cooperation for the dissemination of scientific and technical information between Japan and Southeast Asia and for international exchanges of staff engaged in that dissemination. Even further development of the program is anticipated.

*(**Hiroshi Hosobe,** Research Associate, Programming Languages Research, Software Research Division)*

(Dissemination Activities Division)

Training

■ "Introductory Course on Information Security Policy"

An "Introductory Course on Information Security Policy" was held by NII at seven locations throughout the country, with the aim of promoting information security measures and raising awareness of the formulation and operation of security policies in academic organizations such as universities.

In this course, based on the "Research Report on Information Security Policy for universities", the basic concepts of formulating security policies and the latest security measures were introduced. Moreover, lectures were given on case reports concerning the formulation and operation of security policies in each organization.

The participants said that they learned a great deal about the formulation of security policies, and they requested that we continue to introduce case reports on security policies at each university and the latest developments in technology.

(Dissemination Activities Division)

September 25, 2002, Nagoya University Symposium

Cooperation in the "Training program for Information Specialists in Japanese Studies" in FY 2002

In cooperation with the Japan Foundation and the National Diet Library, which jointly hosted the "Training program for Information Specialists in Japanese Studies" from December 2 to December 20, 2002, NII held part of the training program on December 10 and 11, attended by representatives of nine librarians from eight countries.

The "Training program for Information Specialists in Japanese Studies" invited foreign information specialists in Japanese studies (such as librarians) to Japan, offering training programs on Japan-related information and information services to Japanologists.

At the training session held at NII, various services provided by NII, including NACSIS-CAT, NACSIS-IR, NACSIS-ELS, Webcat, Webcat Plus and GeNii, and the overseas monitor system were introduced. Moreover, topics focusing on NACSIS-Cat, such as "technology for the processing of information in Japanese" and "the current status of authority control for author names in NII" were introduced.

There were lively questions, requests, and opinions from trainees on various services provided by NII and the problems involving and prospects for Japanese studies and information in foreign countries. Participants appreciated the opportunity to learn so much.

(Dissemination Activities Division)

Training at NII

2002 Karuizawa Saturday Salon
(July 27, September 7, September 28, October 26)

On July 27, September 7, September 28, and October 26, the fourth, fifth, sixth, and seventh Karuizawa Saturday Salon for fiscal 2002 were held at the International Seminar House for Advanced Studies at Karuizawa. A summary of the lectures is given below. The contents of these lectures will be publicly available on "el-Net" and the NII website. *(Dissemination Activities Division)*

Fourth seminar held on July 27 : Lecture on "The New World of Information and Communications Opened by Visual Media"

Deputy Director General of NII

Masao Sakauchi

Dr. Masao Sakauchi, who assumed the post of deputy director general of NII as of July 1, 2002, introduced information systems using visual media and spoke of the future direction of information and communications technology from the perspective of a specialist in information systems, as follows.

After the so-called "IT bubble" collapse, people cast doubts on whether information and communications technology could make a real contribution to social and economic development. In this lecture, I will use camera and television pictures to discuss new information systems that can truly contribute to human society. Moreover, through the use of examples such as safe road traffic using visual-recognition technology, information systems for everyday life, information systems for the protection of cultural assets, and visual-information systems combining communications and broadcasting, I will attempt to show the ideal direction for information and communications technology.

(Excerpt quoted in leaflets handed out on the day)

Fifth Seminar held on September 7 : Lecture on "Fostering People – A Fundamental Challenge for Japan in the 21st Century"

Chairman of the Broad of Fuji Xerox Co., Ltd.

Yotaro Kobayashi

Mr. Yotaro Kobayashi, who is a member of the Council for Science and Technology and a manager of Academic Research Forum and plays an active role in various fields, spoke of challenge that the Japanese educational system faces, as summarized below.

Various challenges that we face in today's world, including those in corporate management, politics, economy, and international affairs, fundamentally stem from the question of how an individual should manage him / herself.

I would like to discuss issues in the Japanese educational system from a board perspective, focusing on what attributes a 21st century individual should possess and how we should foster such a person.

（ Excerpt quoted in leaflets handed out on the day ）

This lecture was broadcast live on the Internet for the first time. This trial was favorably received by those who participated in the Saturday Seminar but could not come to the venue on September 7.

Sixth seminar held on September 28 : Violin concert "Passion and lyricism — Fantasy created in C minor "

violinist

Junko Ohtsu

pianist Tomoko Okada

All of the participants enjoyed the violin, passionately and lyrically played in the clear air following the rain.

Program ——————————————————
Beethoven :
　　　Violin Sonata No. 7 in C minor, Op. 30, No. 2
Grieg: Violin Sonata No, 3 in C minor, Op. 45
Sarasate: Zigeunerweisen Op. 20, No. 1

Players normally tend to avoid programs consisting of pieces of the same tonality, to ensure that concerts will not become monotonous. However, these pieces are utterly different from each other, though they are all in C minor. If you can put aside "common sense"

and allow yourself to be absorbed in fantasy, that is, a world of vivid contrasts of sorrow and happiness, passion and lyricism, excitement and serenity, which are created through changes from C minor to related tonalities, you'll enjoy a unique experience.

（ Excerpt quoted in leaflets handed out on the day ）

Seventh seminar held on October 26 : Lecture on "The Path of Education Reform in Japan and Global Trends "

Director General of the Japan Society for the Promotion of Science

Teiichi Sato

After holding the posts of Director-General of the Minister's Secretariat and Administrative Vice-Minister of Education, Mr. Teiichi Sato now serves as a member of the Japanese National Commission for UNESCO, a special member of the Council for Science and Technology, and a

member of the Council for Science and Technology Policy. He has long contributed to educational administration. In this lecture, he discussed the future of education in Japan and the throughout the world, as follows.

Reforms of the post-World War II education system in Japan have been carried out in several stages, and I would like to trace the history of these reforms. Particularly since the G8 Summit held in Cologne in 1999, the entire world has been entering the age of "cooperation and competition." Under these circumstances, in which direction is education in Japan and throughout the world headed?

（ Excerpt quoted in leaflets handed out on the day ）

This lecture was broadcast live on the Internet. Including a good response from overseas, it was favorably received by those who participated in the Saturday salon but could not come to the venue on September 7. We plan to broadcast Saturday salon live as required. For more details, refer to the website.

Special lecture on the "Basics of Quantum Computing" by Dr. Yoshihisa Yamamoto, Visiting Professor

On August 5, Dr. Yoshihisa Yamamoto, visiting professor from the Virtual Library Laboratory of the Research Center for Testbeds and Prototyping at NII, delivered a special lecture for graduate students in the conference room on the 12th floor of the National Center of Sciences.

Professor Yoshihisa Yamamoto is an NTT R&D fellow, professor of Applied Physics and Electrical Engineering at Stanford University, and the principal researcher of the International Cooper- ation Research Project on Quantum Entanglement organized by the Japan Science and Technology Corporation. His main areas of research are light amplification, coherent transmission, non - classical light, quantum nondemolition measurement, cavity quantum electrodynamics, mesoscopic transport phenomena, and quantum information processing.

Dr. Yoshihisa Yamamoto

The lecture on the theme of the "Basics of Quantum Computing" lasted approximately three hours, starting at 1:30 p.m. Though the graduate students were on summer vacation that day, as many as 61 people attended, including graduate students majoring in informatics at NII, graduate students of other national and private universities such as the University of Tokyo, Tokyo Institute of Technology, Chiba University, Tokyo University of Science, and Aoyama Gakuin University, and corporate researchers. The lecture was followed by a lively question-and-answer session, which ran well beyond the scheduled time. Many participants expressed satisfaction at having a good opportunity to learn so much from the lecture.

(Research Cooperation Division)

■ Establishment of the Office for Research Programs

Under the Deputy Director General of NII, the Office for Research Programs was established (General Manager: Deputy Director General Sakauchi) as of September 20, 2002, with the aim of strategically promoting the planning of research projects, cooperation among industry, university, and government, and measures to acquire competitive research funds.

On December 11, 2002, a signboard‑hanging ceremony was held, attended by NII staff including Director General Suematsu, Deputy Director General Sakauchi, and Administration Manager Chiba.

At present, under the leadership of Dr. Sakauchi, the Office for Research programs is taking concrete measures for the construction of a research system to enable NII to exploit NII's characteristics, the planning of major research projects, preparations for establishment of the Technology Licensing Office (TLO), the planning of technological transfers, and the arrangement of regular press conferences for the dissemination of research results.

(Dissemination Activities Division)

■ NII Open Lecture

At NII open lecture, which are held annually at two locations in eastern and western Japan, researchers from within and outside of NII make presentations on contemporary problems related to their research activities, with the aim of disseminating information on the research and development conducted at NII.

In FY 2002, the open lecture on the theme of "Futurological Study on Advanced Information Society" was jointly held by the International Institute for Advanced Studies.

East venue : Tokyo Hitotsubashi Memorial Hall

The lecture opened with keynote addresses by Dr. Toshiyuki Sakai, professor emeritus of Kyoto University, and Dr. Masao Sakauchi, Deputy Director General of NII. The keynote addresses were followed by a panel discussion on the theme "Choice from Diverse Futures and Choice of Diverse Futures," which included informatics researchers, sociologists, and policy makers.

Participants appreciated the opportunity to have direct access to the opinions of panelists who were distinguished figures from industry,

West venue : Osaka International Convention Center

government, and university; this opportunity allowed them to see ideas about the future as part of their own future. Many of them expressed the hope that we would hold more workshops on the theme of "information."

For more details on the date, location, and content of open lecture, refer to the website at (http://www.nii.ac.jp/hrd/)
The open lecture held at the east venue was broadcast live on the Internet, with many visitors.

(Dissemination Activities Division)

Visit of the Minister of Science and Technology of the Republic of Sudan

Mr. El Zubeir Beshir Taha, Minister of Science and Technology of the Republic of Sudan, visited NII on December 19, 2002.

Director Negishi, of the International and Research Cooperation Department, outlined and explained the operations of NII and gave a demonstration of NACSIS-CAT, which was followed by an exchange of opinions.

In the demonstration, the staff explained in Arabic how to search books published by the University of Khartoum in Sudan, which pleased the minister greatly.

That night, a dinner party was held at the residence of the ambassador of the Republic of Sudan by the ambassador, attended by two faculty staff members of NII.

(Research Cooperation Division)

Research Cooperation Agreement between Tsinghua University and NII

The research cooperation was agreed between Tsinghua University, China and NII. The agreed research cooperations are in the fields of wireless mobile communications and wireless information technology, and signed by Prof. Lin Xiaokang, State Key Laboratory on Microwave and Digital Communication, Tsinghua University, and Prof. Yasuharu Suematsu and Prof. Mitsutoshi Hatori, NII.

The agreement is varied for three years, which expects to exchange researchers, to do research cooperations and to report the research results.

Tsinghua University is the famous chinese university, especially in the fields of science and technology. Mr. Jintao Hu, general secretary of the Central Communist Party of P. R. China is a graduate of the university. NII has done the exchange of researchers

and a more active exchange will follow the agree-ment.

The Research Cooperation Agreement is at first signed in the field of wireless mobile communi-cations, further agreements in various fields of informatics are expected to follow by Prof. Suematsu of NII and Prof. Gong Ke, Vice-president of Tsinghua University.

A student, Mr. Zhang Chao, from Tsinghua University enters the graduate school of NII in this April.

*(**Mitsutoshi Hatori**, Professor*
Multimedia Information Research Division)

Generic Engine for Transposable Association (GETA) now publicly available

The Generic Engine for Transposable Association (GETA) is now publicly available. For details, refer to the website at (http://geta.ex.nii.ac.jp).

[Contact] Akihiko Takano, Professor of the Software Research Division
e-mail: aki@nii.ac.jp

Successful Launch of Webcat Plus

In October 2002, NII initiated the operation of Webcat Plus (NII Book Information Navigator) as one of the new functions of GeNii (Global Environment for Networked Intellectual Information), which was opened to public in April 2002.
NII's Webcat is used by a huge number of people as a system for searching for books and journals held in university libraries in Japan. However, Webcat

Plus, in which the book retrieval function and usability are drastically improved, provides new types of services.

Webcat Plus has the following features:
• An "associative retrieval system" is offered that makes it possible to search and retrieve useful books, even when using only vague themes.
• Tables of contents and the abstracts of books are available. (This function is limited to books published in and after 1986.)
• As with Webcat, information on the collections of university libraries is available.

For the time being, both Webcat and Webcat Plus services are provided. Webcat Plus will be limited to searches for Japanese books for the time being, but we are considering expanding it to include information on foreign books in the future.
To this free service accessible by all users, we will add new functions, such as a sort display function based on various conditions and a personalizing function that allows users to make their own bookshelves, to meet users' expectations.
Webcat Plus
URL : http://webcatplus.nii.ac.jp/

(Application Division)

Exhibition for DATABASE 2002 TOKYO

DATABASE 2002 TOKYO, the largest database exhibition in Japan, was held at the Exhibition Hall of the Tokyo International Forum for three days from October 9 to 11, 2002. This exhibition was jointly hosted by the Database Promotion Center and Japan Database Industry Association.
At the exhibition, NII gave demonstrations of Webcat Plus (Japanese book Information including contents with a powerful retrieval function), which

was just made available to the public on October 8, as well as other services such as NACSIS - ELS (electronic library service) and NACSIS-IR (information retrieval service).
A corner that was set up in our booth to provide visitors with an opportunity to directly experience Webcat Plus attracted a particularly large amount of attention, a visitor saying " I read about it in the newspaper, partly because this service has just

been launched. Visitors asked the staff at our booth with various questions and requests, such as "What system is used for associative retrieval?"

According to the Promoter, 92 companies and organizations participated in the exhibition, and 35,290 people visited over three days.

(Dissemination Activity Division)

Commencement of a joint project for NII Metadata Database

In October 2002, NII initiated a joint project for NII Metadata Database with universities and research organizations in Japan. This project is designed to facilitate the distribution of academic information and support universities and research organizations to disseminate their research results throughout the world by registering the metadata about them into our database.

NII Metadata Database was experimentally made public in March 2003, through GeNii (Global Environment for Networked Intellectual Information). Through the database, users can find the academic resources and access the institutional repositories of or the WWW contents in the universities and research organizations.

(Contents Division)

Research Bulletin Portal has been made available

NII has provided information on the tables on contents of research bulletins issued by universities and research organizations in Japan, through NACSIS-IR "SOKUHO" database (Current Contents of Academic Serials in Japan). Improving on this system, NII has launched a new service called the "Research Bulletin Portal", in which not only tables of contents but also full texts are made available by linking NACSIS-ELS (Electronic Library Service). This function is limited to research bulletins with digitized full texts.

The Research Bulletin Portal was made public in March 2003 as a part of GeNii (Global Environment for Networked Intellectual Information)

(Contents Division)

Detailed information on the research and projects of NII is available at our Website.
▶ http://www.nii.ac.jp/index.html
▶ http://research.nii.ac.jp/index.html
▶ http://www.nii.ac.jp/nii-service-e.html