

Interpolative Distillation for Unifying Biased and Debiased Recommendation

S Ding, F Feng, X He, J Jin, W Wang, Y Liao, Y Zhang - Proceedings of the 45th ..., 2022

Most recommender systems evaluate model performance offline through either: 1) normal biased test on factual interactions; or 2) debiased test with records from the randomized controlled trial. In fact, both tests only reflect part of the whole picture ...

Stuck in the cycle? Assessing a reciprocal model of incarceration, health, and relative risk over twenty-five years

DC Semenza, IA Silver - Journal of Criminal Justice, 2022

Purpose Researchers have chronicled a complex relationship between incarceration exposure and health, yet prior studies do not account for reciprocal dynamics or cycles of reentry over time. Methods We analyzed bi-directional relationships ...

Alleviating Spurious Correlations in Knowledge-aware Recommendations through Counterfactual Generator

S Mu, Y Li, WX Zhao, J Wang, B Ding, JR Wen - ... of the 45th International ACM SIGIR ..., 2022

Limited by the statistical-based machine learning framework, a spurious correlation is likely to appear in existing knowledge-aware recommendation methods. It refers to a knowledge fact that appears causal to the user behaviors (inferred by the ...

QUASER: Question Answering with Scalable Extractive Rationalization

A Ghoshal, S Iyer, B Paranjape, K Lakhotia, SW Yih... - Proceedings of the 45th ..., 2022

Designing natural language processing (NLP) models that produce predictions by first extracting a set of relevant input sentences, ie, rationales, is gaining importance for improving model interpretability and producing supporting evidence for users ...

DeSCoVeR: Debiased Semantic Context Prior for Venue Recommendation

S Rajanala, A Pal, M Singh, RCW Phan, KS Wong - Proceedings of the 45th ..., 2022

We present a novel semantic context prior-based venue recommendation system that uses only the title and the abstract of a paper. Based on the intuition that the text in the title and abstract have both semantic and syntactic components, we ...

[PDF] Harnessing Out-Of-Distribution Examples via Augmenting Content and Style

Z Huang, X Xia, L Shen, B Han, M Gong, C Gong, T Liu - arXiv preprint arXiv ..., 2022

Machine learning models are vulnerable to Out-Of-Distribution (OOD) examples, such a problem has drawn much attention. However, current methods lack a full understanding of different types of OOD data: there are benign OOD data that can be ...

[HTML] Explainable digital forensics AI: Towards mitigating distrust in AI-based digital forensics analysis using interpretable models

AA Solanke - Forensic Science International: Digital Investigation, 2022

The present level of skepticism expressed by courts, legal practitioners, and the general public over Artificial Intelligence (AI) based digital evidence extraction techniques has been observed, and understandably so. Concerns have been raised ...

Taming the boojum: Being theoretical about peculiarities of learning

RI Bowers - Learning & Behavior, 2022

The case of the “biological constraints” movement in mid-20th-century psychology provides a reminder of the weight of psychology’s reliance on theory and theory driven methods. By 1980, a critical mass of demonstrations of the specificity of ...

[PDF] On The Universality of Diagrams for Causal Inference and The Causal Reproducing Property

S Mahadevan - arXiv preprint arXiv:2207.02917, 2022

We propose Universal Causality, an overarching framework based on category theory that defines the universal property that underlies causal inference independent of the underlying representational formalism used. More formally ...

[PDF] Decision support for the diagnosis and management of chronic conditions using Bayesian Networks with a case study in Gestational Diabetes

MR Neves - 2022

Clinical decision support is needed for chronic medical conditions. Compared with a decision about the treatment choice in an acute condition, the management of a chronic condition involves repeated and regular decisions. Moreover, these ...

[PDF] New debiasing strategies in collaborative filtering recommender systems: modeling user conformity, multiple biases, and causality.

M Boujelbene - 2022

Recommender Systems are widely used to personalize the user experience in a diverse set of online applications ranging from e-commerce and education to social media and online entertainment. These State of the Art AI systems can suffer from ...

[PDF] Comment On:“Decision-Theoretic Foundations For Statistical Causality”

J Pearl - 2022

I've followed the works of Professor Dawid since the early 1980's, when I discovered his seminal paper,“Conditional Independence in Statistical Theory”(Dawid, 1979). In that paper, Dawid boldly protests statistics' stalemate over causality, and ...

[PDF] Identification of causal influences in quantum processes

I Friend, A Kissinger - 2022

Causal identification is a type of causal inference problem concerned with recovering from observational data and qualitative assumptions the causal relationships generating the data, and hence the effects of hypothetical interventions. Though the ...

[PDF] Causal History, Statistical Relevance, and Explanatory Power

D Kinney - 2022

In discussions of the power of causal explanations, one often finds a commitment to two premises. The first is that, all else being equal, a causal explanation is powerful to the extent that it cites the full causal history of why the effect occurred. The second ...

[PDF] [**MECHANISMS AND MECHANISTIC REASONING IN MEDICINE**](#)

Z Anić

In the late 1990s and early 2000s “The New Mechanistic Philosophy” emerged as a framework for thinking about numerous traditional issues in philosophy of science, but first and foremost, it offered a new account of scientific explanation. The ...

[PDF] [**Developing Optimal Causal Cyber-Defence Agents via Cyber Security Simulation**](#)

A Andrew, S Spillard, J Collyer, N Dhir

In this paper we explore cyber security defence, through the unification of a novel cyber security simulator with models for (causal) decisionmaking through optimisation. Particular attention is paid to a recently published approach: dynamic ...

[PDF] [**Future Foods**](#)

EAC Grundy, P Slattery, AK Saeri, K Watkins...

abstract Transitioning toward plant-based diets can alleviate health and sustainability challenges. However, research on interventions that influence animal product consumption remains fragmented and inaccessible to researchers and ...

[PDF] [**Dynamic Assessment of Agriculture and Economic Growth Nexus in Morocco: Evidence from Structural VAR and Directed Acyclic Graphs**](#)

O Elalaoui, K Allali, A Fadlaoui, N Maatala, A Ibrahimy

The recurrence of international crises and their negative impact on the economy and household food security has stimulated a strong revival of interest in the role of the agricultural sector and its relationship with the national economy. Recently, a macro ...

[HTML] [**Relational inductive biases, deep learning, and graph networks \(关系归纳偏差, 深度学习和图形网络\)**](#)

PW Battaglia, JB Hamrick, V Bapst...

Artificial intelligence (AI) has undergone a renaissance recently, making major progress in key domains such as vision, language, control, and decision-making. This has been due, in part, to cheap data and cheap compute resources, which have ...

[HTML] [**News Feed**](#)

B Ingratta

Las plumas de vuelo son las plumas largas, duras, de forma asimétrica, pero simétricamente iguales, ubicadas en las alas o en la cola de un ave; mientras que las de las alas reciben el nombre de remeras o rémiges (del latín remex,-igis ...

[**Bias Mitigation for Evidence-aware Fake News Detection by Causal Intervention**](#)

J Wu, Q Liu, W Xu, S Wu - Proceedings of the 45th International ACM SIGIR ..., 2022

Evidence-based fake news detection is to judge the veracity of news against relevant evidences. However, models tend to memorize the dataset biases within spurious correlations between news patterns and veracity labels as shortcuts, rather than ...

Counterfactual measure for medical diagnosis

JG Richens, CM Lee, S Johri - US Patent [11,379,747](#), 2022

A method for providing a computer-implemented medical diagnosis includes receiving an input from a user comprising at least one symptom of the user. The method also includes providing the at least one symptom as an input to a medical ...

[PDF] The Role of Deconfounding in Meta-learning

Y Jiang, Z Chen, K Kuang, L Yuan, X Ye, Z Wang, F Wu... - International Conference on ..., 2022

Meta-learning has emerged as a potent paradigm for quick learning of few-shot tasks, by leveraging the meta-knowledge learned from meta-training tasks. Well-generalized meta-knowledge that facilitates fast adaptation in each task is preferred; ...

[PDF] Instrumental Variable Regression with Confounder Balancing

A Wu, K Kuang, B Li, F Wu - International Conference on Machine Learning, 2022

This paper considers the challenge of estimating treatment effects from observational data in the presence of unmeasured confounders. A popular way to address this challenge is to utilize an instrumental variable (IV) for two-stage regression, ie, 2SLS ...

[PDF] Entropic Causal Inference: Graph Identifiability

S Compton, K Greenewald, DA Katz, M Kocaoglu - International Conference on ..., 2022

Entropic causal inference is a recent framework for learning the causal graph between two variables from observational data by finding the information-theoretically simplest structural explanation of the data, ie, the model with smallest ...

[PDF] Causal structure-based root cause analysis of outliers

K Budhathoki, L Minorics, P Bloebaum, D Janzing - International Conference on ..., 2022

Current techniques for explaining outliers cannot tell what caused the outliers. We present a formal method to identify "root causes" of outliers, amongst variables. The method requires a causal graph of the variables along with the functional causal ...

[PDF] IDYNO: Learning Nonparametric DAGs from Interventional Dynamic Data

T Gao, D Bhattacharjya, E Nelson, M Liu, Y Yu - International Conference on Machine ..., 2022

Causal discovery in the form of a directed acyclic graph (DAG) for time series data has been widely studied in various domains. The resulting DAG typically represents a dynamic Bayesian network (DBN), capturing both the instantaneous and time ...

[PDF] Scalable Computation of Causal Bounds

M Shridharan, G Iyengar - International Conference on Machine Learning, 2022

We consider the problem of computing bounds for causal inference problems with unobserved confounders, where identifiability does not hold. Existing non-parametric approaches for computing such bounds use linear programming (LP) formulations ...

Evaluating Causes of Effects by Posterior Effects of Causes

Z Lu, Z Geng, W Li, S Zhu, J Jia - Biometrika, 2022

For the case with a single causal variable, Dawid et al.(2014) defined the probability of causation and Pearl (2000) defined the probability of necessity to assess the causes of effects. For a case with multiple causes which may affect each other, this ...

[HTML] [**Estimating the impact of health systems factors on antimicrobial resistance in priority pathogens**](#)

R Awasthi, V Rakholia, S Agrawal, LS Dhingra... - Journal of Global ..., 2022

Objectives Antimicrobial resistance (AMR) is the next big pandemic that threatens humanity. The One Health approach to AMR requires quantification of interactions between health, demographic, socioeconomic, environmental, and geopolitical ...

[**Ontological Representation of Causal Relations for a Deep Understanding of Associations Between Variables in Epidemiology**](#)

T Pressat Laffouilhère, J Grosjean, J Pinson... - International Conference on ..., 2022

Understanding statistical results is crucial in order to spread right conclusions. In observational studies, statistical results are often reported as associations without going further. However, each association comes from causal relations. Causal ...

[**The Role of Philosophy of Science in Quantitative Linguistics**](#)

L Zámečník - Linguistic Frontiers, 2022

The paper aims to evaluate the role of the philosophy of science in contemporary quantitative linguistics. The primary goal is the reflection of the scientific methods and models of scientific explanations (Köhler 1986, 2012) used in quantitative ...

[**Modelling Causal Relationship Among Performance Shaping Factors Through Bayesian Network on Aviation Safety**](#)

Y He, Y Lu, D Huang, S Fu - Proceedings of the International Conference on ..., 2022

Aviation safety is greatly influenced by pilot performance reliability. To assess the reliability, many human reliability analysis (HRA) methods are developed. Currently, in most HRA methods performance shaping factors (PSFs) are used to represent ...

[**A controlled effects approach to assessing immune correlates of protection**](#)

PB Gilbert, Y Fong, A Kenny, M Carone - Biostatistics, 2022

An immune correlate of risk (CoR) is an immunologic biomarker in vaccine recipients associated with an infectious disease clinical endpoint. An immune correlate of protection (CoP) is a CoR that can be used to reliably predict vaccine efficacy (VE) ...

[**Fifty years of structural equation modeling: A history of generalization, unification, and diffusion**](#)

KA Bollen, Z Fisher, A Lilly, C Brehm, L Luo, A Martinez... - Social Science Research, 2022

In 1972, the birth year of Social Science Research (SSR), Structural Equation Modeling (SEM) was experiencing a decade-long rebirth, moving from its origins in genetics to social and behavioral sciences. University of North Carolina (Chapel Hill) ...

[PDF] [**On the Need and Applicability of Causality for Fair Machine Learning**](#)

R Binkytė, S Zhioua - arXiv preprint arXiv:2207.04053, 2022

Causal reasoning has an indispensable role in how humans make sense of the world and come to decisions in everyday life. While 20th century science was reserved from making causal claims as too strong and not achievable, the 21st ...

[Does information and communication technology really affect human development? An empirical analysis](#)

Y Zelenkov, E Lashkevich - *Information Technology for Development*, 2022

Positive effect of information and communication technology (ICT) on human development (HD) is not guaranteed simply by the availability of technology; this gap is especially pronounced for developing countries. Using the Capability Approach ...

[\[HTML\] Causal and Evidential Conditionals](#)

M Günther - *Minds and Machines*, 2022

We put forth an account for when to believe causal and evidential conditionals. The basic idea is to embed a causal model in an agent's belief state. For the evaluation of conditionals seems to be relative to beliefs about both particular facts and causal ...

[Composable Causality in Semantic Robot Programming](#)

E Sheetz, X Chen, Z Zeng, K Zheng, Q Shi, OC Jenkins - ... *International Conference on ...*, 2022

Assembly tasks are challenging for robot manipulation because the robot must reason over the composed effects of actions and execute multi-objective behaviors. Robots typically use predefined priorities provided by users to determine how to ...

[\[PDF\] Pairwise and high-order dependencies in the cryptocurrency trading network](#)

T Scagliarini, G Pappalardo, AE Biondo, A Pluchino... - *arXiv preprint arXiv ...*, 2022

In this paper we analyse the effects of information flows in cryptocurrency markets. We first define a cryptocurrency trading network, ie the network made using cryptocurrencies as nodes and the Granger causality among their weekly log returns ...

[\[PDF\] The d-separation criterion in Categorical Probability](#)

T Fritz, A Klingler - *arXiv preprint arXiv:2207.05740*, 2022

The d-separation criterion detects the compatibility of a joint probability distribution with a directed acyclic graph through certain conditional independences. In this work, we study this problem in the context of categorical probability theory by introducing a ...

[\[PDF\] Causal models of multilevel selection](#)

C Thies - 2022

In social evolution, fitness of an individual depends not only on the phenotype of the individual itself but also on the phenotype of its social environment. When measuring the strength of selection in empirical data, this leads to the question of how selection ...

[\[PDF\] Self-Explaining Artificial Intelligence: On the Requirements for Autonomous Explanation Generation](#)

H Rörbeck - 2022

Explainability is an important feature of any artificial intelligence (AI) system, for numerous reasons. Firstly, it provides interrogability, allowing any outsider to investigate why the system did what it did, or why some things happened and not ...

[PDF] [**A generic and adaptive approach to explainable AI in autonomic systems: the case of the smart home**](#)

E Houzé - 2022

In Jacques Tati's "Mon Oncle", a famous French movie from 1958, two of the main characters, Mr. and Mrs. Arpel, live in a then-futuristic house equipped with all kinds of controlled devices. This equipment allows them to live effortlessly, all the house ...

[PDF] [**TEMPORAL REPRESENTATION OF THE ESSENCES OF THE SUBJECT AREA FOR THE CONSTRUCTION OF EXPLANATIONS IN INTELLIGENT SYSTEMS**](#)

S Chalyi, V Leshchynskiy - *Advanced Information Systems*, 2022

The subject of research in the article is the processes of constructing explanations in intelligent systems using causal relationships. The aim is to develop a representation of the entities of the subject area, taking into account the temporal ...

[HTML] [**Searching for the principles of a less artificial AI**](#)

B Robson, G Ochoa-Vargas - *Informatics in Medicine Unlocked*, 2022

What would it take to build a computer physician that can take its place amongst human peers? Currently, Neural Nets, especially as so-called "Deep Learning" nets, dominate what is popularly called "Artificial Intelligence", but to many critics they ...

[**Cognition and Daily Life Activities in Stroke: A Network Analysis**](#)

SCL Lau, LT Connor, AW Heinemann, CM Baum - *OTJR: Occupation, Participation ...*, 2022

Understanding complex dynamics of cognitive constructs and the interplay between cognition and daily life activities is possible through network analysis. The objectives of this study are to characterize the cognition network and identify central cognitive ...

[**Hunting for protective drugs at the break of a pandemic: Causal inference from hospital data**](#)

C Berzuini, L Bernardinelli - *Statistical Methods in Medical Research*, 2022

At the break of a pandemic, the protective efficacy of therapeutic interventions needs rapid evaluation. An experimental approach to the problem will not always be appropriate. An alternative route are observational studies, whether based on ...

[HTML] [**The punctuated equilibrium of scientific change: a Bayesian network model**](#)

P Grim, F Seidl, C McNamara, IN Astor, C Diaso - *Synthese*, 2022

Our scientific theories, like our cognitive structures in general, consist of propositions linked by evidential, explanatory, probabilistic, and logical connections. Those theoretical webs 'impinge on the world at their edges,' subject to a continuing barrage ...

[PDF] [**Towards a Grounded Theory of Causation for Embodied AI**](#)

T Cohen - *UAI 2022 Workshop on Causal Representation ...*, 2022

There exist well-developed frameworks for causal modelling, but these require rather a lot of human domain expertise to define causal variables and perform interventions. They are also not grounded in frameworks for autonomous agents ...

[PDF] [Modern Methods in Precision Medicine](#)

K Gan - 2022

As the concept of precision medicine spreads, there is a growing need for developing better algorithms that a) are sample efficient (ie, require fewer samples to achieve the same accuracy level), b) think beyond association (to identify the ...

[PDF] [A System-Level View on Out-of-Distribution Data in Robotics](#)

R Sinha, A Sharma, S Banerjee, T Lew, R Luo...

When testing conditions differ from those represented in training data, so-called out of-distribution (OOD) inputs can mar the reliability of “black-box” learned components in the modern robotic autonomy stack. Therefore, coping with OOD data is an ...

[PDF] [Découverte de règles causales dans les graphes de connaissances à l'aide de plongements dans les graphes](#)

L Simonne, N Pernelle, F Saïs, R Thomopoulos

Résumé La découverte de relations causales est l'objectif de nombreuses expériences. Lorsque des données observationnelles sont disponibles, l'utilisation du cadre d'étude des résultats potentiels est un des standards pour découvrir de ...