

[HTML] Validating crash surrogates: a causal graphical framework and a SHRP2 case study of hard braking

KFK Wu, C Flannagan - *Accident Analysis & Prevention*, 2027

Although there has been a variety of crash surrogates have been applied in traffic safety areas, formal discussions on how to validate crash surrogates for practical use remain limited. To fill this gap, this study seeks to propose a validation procedure ...

Local forest structure modifies realized climate vulnerability under macroclimatic forcing: Attribution from a national forest inventory

W Ji, H Zhang, F Yang, Q Li, B Zhang, H Li, T Ma... - *Agricultural and Forest ...*, 2026

Forests are a major component of Nature-based Climate Solutions, but their mitigation value depends on how climate vulnerability is realized beyond macroclimatic exposure. Existing large-scale assessments remain largely exposure ...

[PDF] Preoperative Radiotherapy and Local Recurrence in Grade 3 Soft Tissue Sarcoma: A Causal Bayesian Network Analysis

A Valle, B Fuchs, M Birbaumer, P Heesen - *Cancers*, 2026

Background: Estimating the effect of preoperative radiotherapy in grade 3 (G3) soft tissue sarcoma (STS) is difficult because treatment reflects clinical risk. We estimated whether local recurrence risk among treated patients would differ under surgery ...

[PDF] CoBe: A Benchmark For Conversational Counterfactual Text Editing

A Raghavan, I Hwang, S Havaladar, KZ Lee, A Maiti... - *arXiv preprint arXiv ...*, 2026

Counterfactual text editing is the ability to revise a given text in light of a hypothetical change while preserving facts not causally affected by that change. When asked what would have happened if a doctor had not recommended surgery, the model ...

Information avant la lettre: The mathematical constitution of brain waves in early EEG analysis (1929–1932)

JM Garrido-Wainer - *Studies in History and Philosophy of Science*, 2026

This article examines the epistemological conditions under which the brain's electrophysiological trace was first constituted as a mathematical object of analysis. Rather than treating information as a cultural metaphor externally projected onto the ...

Spatio-temporal graph foundation models for earth system intelligence: an end-to-end, continual, and multimodal learning framework

M Sheode, SK Anuragi, D Kishan - *Earth Science Informatics*, 2026

Spatio-temporal graph neural networks are commonly designed for a single task, a fixed or externally specified topology, and one dominant data modality. These assumptions are restrictive for Earth observation and Earth-system applications ...

[PDF] One Thing Leads to Another: The Essentials of Time Series Causal Discovery

K Butler, D Machlanski, MPJ Camilleri, Z Liu... - *arXiv preprint arXiv ...*, 2026

Time series causal discovery---the process of detecting causation between time series---has its roots in signal processing research from over a half century ago. It has since received active and widespread interest, evolving into different forms ...

[\[PDF\] Does Location Matter? A Black-Box Causal Audit Reveals Model-Dependent Audio Grounding in LALM Hallucination](#)

M Khalooei, M Sabokrou - [arXiv preprint arXiv:2610.13112](#), 2026

Large audio-language models (LALMs) frequently exhibit object hallucination, affirming absent sounds. The dominant mitigation, Audio-Aware Decoding (AAD), contrasts logits under real audio against an all-zero "blank" waveform, flagged by ...

[\[PDF\] Foreword to the Special Issue on The Foundations of Applied Statistics](#)

RS Kenett, DM Steinberg - [Applied Stochastic Models in Business and Industry](#), 2026

1 Background Statistics originated with the development of official statistics used to guide governments and to shape policy making such as taxes and duties. Over the last century and a half, the impact of Statistics has expanded dramatically, proving to ...

[\[PDF\] DAG Structure Learning with Node-Varying Heavy-Tailed Disturbances](#)

R Francis, SP Chopuri - [arXiv preprint arXiv:2610.13304](#), 2026

DAG structures can be learned from observations by incorporating acyclicity via smooth constraints, such as DAGMA's log-determinant function. Typically, observations and the underlying DAG are related through linear structural equation ...

[\[PDF\] Market Impact Estimation via Causal Foundation Models](#)

D Thumm, Y Chen - [arXiv preprint arXiv:2610.12537](#), 2026

When a trader executes a large order, the relevant question is not \emph {what will the price be?} but \emph {what would the price have been had I not traded?} Market impact is thus a causal quantity, yet classical models (Almgren–Chriss, propagators) ...

[\[PDF\] Graphical Probability Theory: Complete Diagrammatic Calculi for Stochastic Systems](#)

MA Torres Ruiz - 2026

Probability theory is traditionally founded on measure-theoretic tools, whose axioms are directly applied across diverse areas to produce both theoretical and practical results. While this low-level approach, akin to programming in machine code ...

[\[PDF\] Falsification-Aware Causal Structure Discovery for Wildfire Severity under Spatial and Environmental Confounding in Central Chile](#)

E Campusano, M Quezada-Araya, H Astudillo... - 2026

Wildfire incident databases often combine variables recorded at different stages of an event: pre-existing terrain and spatial context, meteorological descriptors associated with the incident, and burned-area variables that summarize final impact ...

[\[PDF\] When LLMs Default to Traffic: Systematic Domain Bias in Causal Mechanism Generation](#)

Y Khan, H Khan

Large language models (LLMs) are increasingly deployed as reasoning engines in risksensitive domains where the quality of causal explanations carries direct operational consequences. Existing evaluation frameworks measure whether a ...

[PDF] Proxy-Assisted Conditional IV Representation Learning for Causal Effect Estimation

Z Yao, L Xu, G Yin – Northern Lights Deep Learning Conference 2027

Instrumental variable (IV) methods address unmeasured confounding but typically require an observed valid instrument. In modern high-dimensional settings, however, available pre-treatment measurements may be nonlinear mixtures of instrumental ...

[HTML] Causal-Chemprop: Causal Machine Learning for Molecular Property Prediction and Design

C Natajaya, L Attia, JW Burns, PS Doyle – Journal of Chemical Information and Modeling

A priori estimation of molecular properties has long been a topic of immense interest to the pharmaceutical sciences for molecular design. While neural network-based models have achieved high predictive accuracy, they have limited utility in molecular ...

[PDF] Causal Discovery under Time-Varying Delays

LCD Kaltenpoth, J Vreeken

Causal discovery aims to uncover the causal relationships among variables beyond correlations from observational data. On time series, a major challenge is nonstationarity, which is typically modeled as regime-based shifts or drifting causal ...

[PDF] CoBe: A Benchmark For Conversational Counterfactual Text Editing

A Raghavan, I Hwang, S Havaladar, KZ Lee, A Maiti... - arXiv preprint arXiv ..., 2026

Counterfactual text editing is the ability to revise a given text in light of a hypothetical change while preserving facts not causally affected by that change. When asked what would have happened if a doctor had not recommended surgery, the model ...

Cyber-Physical Resilience: Cultivating Symbiotic Architectures Beyond Traditional Control

R Mohamad, H Fida, W Jiang, SP Anandaraj – 2026

Cyber-Physical Resilience: Cultivating Symbiotic Architectures Beyond Traditional Control introduces a revolutionary paradigm shift in cyber-physical systems (CPS) design, challenging conventional wisdom that treats physical components as ...

[PDF] Time Series Mediation Analysis with Non-Linear and Machine Learning Methods

T Marsh – 2026

Non-linearity in mediation analysis has been primarily studied in the context of binary variables which encode a treatment and control, estimating a 'direct 'and 'indirect 'effect of a covariate (aka treatment) X on a response Y, with a third variable M (the ...

Before Kotler, There was Krishna!: A Civilisational Interpretation of Modern Marketing

EK Iyer – 2026

Before Kotler, There Was Krishna reimagines modern marketing through an Indian 3ptimizing3nal lens. Drawing from classical texts such as the Bhagavad Gita, Mahabharata, and Arthashastra, it reveals how foundational ideas—consumer ...

[Causal Representation Regularized Heterogeneous Graph Neural Network for Robust EEG-fNIRS Bimodal Emotion Recognition](#)

[Y Xiao, C Lu, T Zhao, X Jiang, H Lian, S Shan, J Liu...](#) - [Expert Systems with ...](#), 2026

Multimodal electroencephalography (EEG) and functional near-infrared spectroscopy (fNIRS) emotion recognition models often achieve promising performance by exploiting cross-modal interactions. However, these correlation ...

[\[PDF\] Heterogeneous Treatment Effect Estimation with Distribution Shift and Unmeasured Confounding](#)

[W Liu, Y Zhang, A Wu, K Kuang, M Ma, Z Wang](#) – [ACM Transactions on Knowledge ...](#), 2026

Heterogeneous treatment effect (THE) estimation is vital for understanding how treatment effects vary across individuals or subgroups. Recently, numerous THE models, such as balancing methods and instrumental variable (IV) methods, have ...

[\[HTML\] An Intelligent Integration Layer for Physics–AI Collaboration in Digital Drilling: Architecture, Interface Contracts, and Numerical Demonstration](#)

[D Sui, F Rasheed](#) – [Applied Sciences](#), 2026

Drilling systems generate abundant predictions from sensors, physics-based models, digital twins, and artificial intelligence (AI), yet the step from prediction to engineering decision remains fragmented across modules and human expertise, and no ...

[Bringing topological heterogeneities into the study of time-series data on militarized international disputes: a deep learning approach](#)

[B Arfi](#) – [Journal of Computational Social Science](#), 2026

This paper develops a deep machine learning framework for analyzing the role of topological heterogeneities in multivariate time-series data. Topological heterogeneities—global invariants of the shape of the data at each point in time—are ...

[\[PDF\] Structure, Meaning, and the Answerability of Automated Systems](#)

[M Brännström](#) – [Proceedings of the AAAI/ACM Conference on AI, Ethics ...](#), 2026

This paper presents an ongoing PhD research project that reframes transparency in AI systems from a property of models to a participatory relation between a system and the people interacting with it. Rather than asking whether a model is ...

[On Limits of AI-Empowered Science: Mapping Creative Scientific Reasoning of Large Language Models](#)

[J Malík](#) – [Global Philosophy](#), 2026

This paper investigates the creative reasoning capabilities of Large Language Models (LLMs) in scientific research, examining whether these systems can generate genuinely novel hypotheses or are limited to optimizing existing knowledge. Using ...

[\[PDF\] Development and Validation of an Explainable AI–Bayesian Framework for Global Food Safety Risk Prediction and Supply Chain Resilience](#)

[SMT Rahman](#) – [American Journal of Health and Medical Sciences](#), 2026

This study developed and validated an explainable AI–Bayesian framework that predicts food safety incident risk in global import supply chains and links predicted risk to supply chain resilience. The framework fuses a tree-augmented Bayesian ...

[PDF] Thinking out of distribution: what a PhD must train in the age of AI

J Gago, R Di Tella, J Shi – *AJE Advances: Research in Epidemiology*, 2026

No one goes to the gym to lift weights efficiently. If the goal were simply to move heavy objects, a forklift would do it better. We exercise because the process itself builds capacity (strength, endurance, coordination) that can be drawn on in many ...

[PDF] Causal Effect Identifiability in Causal Abstractions: A Strict Hierarchy of Criteria

C Yvernes, M Clausel, E Devijver, E Gaussier – *arXiv preprint arXiv:2610.13520*, 2026

Identifying causal effects from observational data typically requires a fully specified causal graph, an assumption that is often unrealistic in complex or high-dimensional settings. Causal abstractions address this limitation by retaining only partial causal ...

Equal under the Algorithm: A People's Guide to Fair Computation

O Reingold – 2027

Seeing fairness through a computational lens More and more of the decisions that shape our lives are driven by algorithms: what healthcare we receive, what loans we are offered, whom we date, the news we read, the schools we attend, and the jobs ...

[HTML] Is Information Digital? A Defense of Reality

EA Lee – *International Conference on Bridging the Gap between ...*, 2026

Data-driven techniques such as large language models have proved astonishingly powerful, yet progress with cyber-physical systems such as robots has been slower. The usual explanation is insufficient training data. This paper considers a more ...

Is Information Digital? A Defense

EA Lee – *Bridging the Gap Between AI and Reality: 4th ...*, 2026

Data-driven techniques such as large language models have proved astonishingly powerful, yet progress with cyber-physical systems such as robots has been slower. The usual explanation is insufficient training data. This paper considers a more ...

[PDF] Twenty-Four Kinds of Because: The Paṭṭhāna as a Typed-Twenty-Four Kinds of Because: The Paṭṭhāna as a Typed-Causation Vocabulary for AI Alignment—A ...

T Ly – 2026

AI alignment practice sorts its interventions by when and how they are applied—prompting, in-context examples, retrieval, supervised fine-tuning, reinforcement learning from human feedback, weight editing, activation steering, ablation ...

[PDF] Discovering Causal Factors Influencing Student Academic Performance Using Causal Discovery and Inference

B Baral, TD Roy, BB Thapa – 2026

Understanding the true cause-and-effect relationships of factors involved in an academic setting is crucial for the development of effective strategies to enhance the performance of students. Mostly used approaches based on correlation analysis and ...

[\[PDF\] The Causal Verification Framework: Distinguishing Laws from Artifacts in the Physical and Engineering Sciences](#)

[A Justanieah](#) - 2026

Adjudicating whether observed global correlations in multi-level physical systems represent genuine causal laws or emergent statistical artifacts is a fundamental challenge across engineering and applied sciences. Such correlations underpin ...

[\[PDF\] OLTRE I PESI](#)

[M Palombi](#) - 2026

La dipendenza del comportamento dei Large Language Models dalle rappresentazioni interne non costituisce, di per sé, una nuova scoperta: activation steering, representation engineering e analisi di controllabilità hanno già mostrato ...

[\[PDF\] Is Life Organized Energy? A Quantitative and Falsifiable Probe of Biological Organization](#)

[E Quiroga](#)

Arthur C. Clarke's line "What is life but organized energy?" is usually read as an evocative but scientifically empty flourish. This paper asks what would have to be true for it to function as a testable hypothesis. Rather than asking whether life simply ...

[\[PDF\] From Correlation to Explanation: Epistemic Challenges in Neuroimaging and Contemporary Data-Intensive Technologies](#)

[R Brandt](#)

This paper examines the relationship between technological sophistication and epistemic reliability in contemporary scientific research. Using functional magnetic resonance imaging (fMRI) as a central case study and the so-called "Dead Salmon" ...

[\[PDF\] FROM ARTICULATION TO COGNITION](#)

[JC Rae](#)

Artificial intelligence systems, particularly large language models (LLMs), increasingly exhibit behaviours associated with reasoning, planning, abstraction, tool use, and limited forms of self-monitoring. These capabilities intensify a longstanding ...

[\[PDF\] The M 3 Framework: A Multi-Level Structural Synthesis of Artificial Intelligence Evolution](#)

[S Das](#), [S Maji](#)

Artificial intelligence (AI) has evolved across symbolic AI, statistical learning, deep learning, foundation models, and emerging agentic systems, accompanied by changes in computational organisation, operational capability, and sociotechnical ...

[\[PDF\] Chain of Thought Monitoring Can Fail Even When CoT Is Necessary](#)

[L Bürger](#), [P Komorowski](#), [M Weckbecker](#), [E Kortukov](#)... - [arXiv preprint arXiv ...](#), 2026

Chain of Thought (CoT) monitoring is used by frontier labs to detect misbehaviour of AI systems. Yet, its reliability remains poorly understood. We attribute this to the lack of a successful organizing principle that leads to generalizable conclusions about ...

Causal mediation analysis with nonignorable missingness in covariates, mediator, and outcome

Z Zhang, D Wang, L Fu – *Economics Letters*, 2026

Causal mediation analysis typically assumes that all variables are fully observed, yet missingness is common and often nonignorable. We develop a framework for mediation analysis when pretreatment covariates, the mediator, and the outcome are ...

Network science in sports

JM Buldú, V Latora, JH Martínez, P Rodríguez-Sánchez... - *Physics Reports*, 2027

Network science has become a central methodological framework for the study of complex systems, with applications across social, biological, and technological domains. Its strength lies in formalizing such systems as collections of interacting ...

[PDF] Urban green space as a public health intervention: a systematic review of causal inference methods in observational studies

J Ying, H Chen, Y Zhang, Y Feng, H Yang – *Humanities and Social Sciences ...*, 2026

In the context of rapid urbanization, urban green spaces (UGS) are widely promoted as a lever for improving population health, yet a central debate remains: are reported health benefits an urban myth or a substantiated causal reality? We systematically ...

[HTML] Improving geochemical anomaly recognition associated with mineralization via counterfactual causal inference

T Mi, Z Jian, W Xueqiu, S Binbin, L Jilong, W Chao... - *Ore Geology Reviews*, 2026

Identifying geochemical anomalies in lithologically complex regions remains challenging due to the superposition of multiple geological processes, which complicates the separation of regional background from mineralization-related ...

[PDF] Rethinking World Models for Biosignals

X Bao, B Huang, X Wang, K Han, C Yang, M Jin, S Pan – *arXiv preprint arXiv ...*, 2026

World models promise to learn how systems evolve and respond to actions, enabling simulation, planning and decision-making. Bringing this promise to biosignals requires more than accurate prediction of physiological recordings. We examine ...

[PDF] Identification and Estimation of Treatment Effects from Network Data with Confounded Social Links

L Liu – *arXiv preprint arXiv:2610.14527*, 2026

In observational network data, the adoption of a treatment and the formation of social ties often depend on the same characteristics that affect outcomes. We propose a generalized propensity score for each unit's effective treatment, built from a model for ...

[PDF] agent-risk: Risk Assessment for Changes to AI Agents

Y Zhao, Z Xu, AH Zhang, SA Yang, X Hu – *arXiv preprint arXiv:2610.16280*, 2026

Before changing a deployed AI agent (a stricter safety gate, a new model), organizations must approve the change, starting from existing logs. Extending classical risk analysis to partial records and partial changes to running systems ...

[PDF] TabGift: A Context-Efficient Foundation Model for Tabular Data Generation

YS Li, JP Jiang, HJ Ye - arXiv preprint arXiv:2610.16990, 2026

Tabular data generation aims to synthesize realistic samples from limited observations while faithfully capturing the underlying data distribution. Tabular foundation models (TFMs), pretrained on diverse tabular tasks and adapted through ...

[PDF] Causal Root Cause Analysis in Software-Defined Systems: A Review with Context-aware Causal Observability as a Case Study

O Khan, A Khamis - IEEE Access, 2026

Software-defined systems, spanning software-defined networking (SDN), software-defined storage (SDS), cyber-physical systems (CPS), IoT, and, more recently, software-defined vehicles (SDVs), are becoming increasingly complex and software ...

[PDF] ACED-Bench: Evaluating How LLM Agents Acquire and Act on Causal Evidence

Y Chen, A Weerasinghe, S Biswal, U Rajkumar, O Boz... - arXiv preprint arXiv ..., 2026

Large language models are increasingly used as scientific assistants, yet we still lack reliable ways to evaluate whether they can investigate a system rather than merely answer a prompt. A useful evaluation must let agents choose experiments, interpret ...

[PDF] CivWorldBench: Evaluating Language World Models in Structured Multi-Agent Sandbox Worlds

A Li, H Yu, Z Tao, L Chen, K Li, M Li, C Cai, B Liang... - arXiv preprint arXiv ..., 2026

The growing use of language models for forecasting motivates a broader evaluation of their world-model capabilities. Such evaluation must go beyond predictive accuracy to assess hidden-state inference and intervention prediction. Real-world ...

[PDF] Decouple to Forget: Semantic Mediation for Sensitive Unlearning in Large Language Models

J Cong, A Song, Y Yu, T Sarwar, X Li, Z Xu, X Yi... - arXiv preprint arXiv ..., 2026

Machine unlearning for large language models seeks to remove specified knowledge while preserving general capability, yet current methods often treat an entire response as the unit of forgetting. This coarse granularity causes unnecessary ...

[PDF] CAG-WAM: Causal Action-Gain World Action Models for Robot Manipulation

P Guo, C Zhang, X Zhang, C Zheng, W Qiang - arXiv preprint arXiv:2610.14720, 2026

World Action Models (WAMs) combine action generation with future prediction, allowing predicted futures to support action evaluation and robot decision making. However, the future associated with a candidate action may contain action-induced ...

[PDF] Searching for What Matters: Open-Ended Discovery of Multiple Hypotheses with Agentic Data Exploration

S Kabra, N Choudhary, J Du, E Huang, D Koutra... - arXiv preprint arXiv ..., 2026

Discovering what drives an outcome from data is central to science and often requires deciding what is worth investigating before a specific hypothesis is known. Yet most existing hypothesis generation settings substantially narrow this search by ...

[PDF] ActiveEvidence: Decision-Focused Evidence Graphs with Verifiable Acquisition Gaps

M Hu, S Hu, X Guo, X Wang, B Wang, P Zhang, D Zha... - arXiv preprint arXiv ..., 2026

A multimodal agent must decide whether visual evidence is worth acquiring, which candidate or resolution to query, and when further interaction can no longer change its decision. We study this problem under a strict free-metadata/paid-observation ...

[PDF] Bell's go theorem: regaining local causality with a new notion of realism

L Catani, N van der Schaaf, RS Barbosa - arXiv preprint arXiv:2610.16493, 2026

Bell's theorem is popularly stated as the inconsistency of quantum theory with local realism. Realism is here formalized by the ontological models framework, where elements of reality are points of a measurable space and probabilities obey the ...

[PDF] Generalizing Identifiability Results in Causal Discovery from Complete Data to Missing Data Settings

M Ceriscioli, S Shimizu, M Gupta, K Mohan - arXiv preprint arXiv:2610.19211, 2026

While causal discovery methods have matured for complete data, such algorithms for handling missing values remain limited. We establish general sufficient conditions under which causal graphs remain identifiable (ie, uniquely determined from the ...

[PDF] Learning Non-Gaussian SEMs with Conditional Risk, and Why the Direction of Recursion Matters

U Shah, P Birmipa, R Morrison - arXiv preprint arXiv:2610.14246, 2026

Variance-based methods recover a Gaussian linear structural equation model (SEM) with equal or suitably constrained error variances, either by recursively identifying the source nodes with smallest conditional variance (top-down method) or sink ...

[PDF] Counterfactual Rollouts for Offline Contrastive Goal-Conditioned Reinforcement Learning

T Huang, A Bo, J Zhang - arXiv preprint arXiv:2610.14953, 2026

Contrastive reinforcement learning (CRL) learns goal-conditioned values by associating state--action pairs with the states subsequently reached, assuming that no unobserved variable jointly affects the recorded action and its outcome. When ...

[PDF] Stable Causal Estimation with Optimal Transport

Y Xu, Y Wang, XL Nguyen - arXiv preprint arXiv:2610.15212, 2026

In observational studies, the overlap assumption, also called positivity, is frequently strained in practice. Limited overlap destabilizes widely used estimators such as inverse propensity weighting (IPW), whose variance depends on density ratios that ...

[PDF] Bosonic Quantum Conditional Mutual Information and Bose-Einstein Condensation

A Ghosh - arXiv preprint arXiv:2610.16626, 2026

This article aims to introduce the bosonic asymmetric quantum conditional mutual information (QCMI), $I_{\{B\}}(A; B|C)$, as a rigorously defined information-theoretic quantity for continuous-variable (bosonic) systems. After defining $I_{\{B\}}(A; B|C)$...

[PDF] Beyond Match Results: Bayesian Mediation of Ability, Performance, and Winning in Professional Tennis

G Hu, X Wang - arXiv preprint arXiv:2610.21023, 2026

Match results measure competitive ability, but they do not explain how ability is expressed during play. Match statistics offer a natural mediator, however performance is usually measured over the same match as the outcome: a full-match ...

[PDF] Bias and Variance Inflation in Hierarchical Multi-Treatment DML: Diagnosis and Correction

D Nayak, M Kumar, PN Karaka, S Kaveri - 2026

A widely encountered task in observational causal inference is estimating, for each unit, the causal effect of every member of a small collection of continuous treatments on an outcome, given a vector of pre-treatment covariates. Unit-level effect estimates ...

[HTML] Geological Reliability in Deep Learning Mineral Prospectivity Mapping: A Review

TAI Mohamed, G Liu, AA Bakheit, HM Hussein... - Minerals, 2026

Artificial intelligence (AI)-based mineral prospectivity mapping (MPM) has rapidly advanced through the integration of deep learning, multisource geoscience data, and increasingly complex representation-learning approaches. However, the ...

[HTML] From Mechanistic Models to AI Synergy: A Roadmap for Predictive and Personalized Biology

L Huang, H Sun, Y Huang, Q Gu, H Zhang, D He... - Biology, 2026

Two paradigms now drive the life sciences. One is the explanatory depth of mathematical modeling, the other the predictive power of artificial intelligence. For decades, mechanistic models have offered a rigorous, hypothesis-driven framework ...

[PDF] AI-Native 6G Networks: A Comprehensive Survey on Architecture, Enabling Technologies, Functional Capabilities, and the Path to Autonomous Connectivity

A Elnashar, MB Shakar, H Otrók, A Mourad, S Naser... - IEEE Open Journal of the ..., 2026

Sixth-generation (6G) wireless networks are envisioned to move beyond incremental enhancement toward an AI-native architecture, in which artificial intelligence and machine learning (AI/ML) function as design primitives embedded in every protocol ...

[HTML] SPADE: Spline additive-noise DAG estimation for interpretable nonlinear causal discovery in managerial decision support

QV Dang, D Le, MN Dinh - Array, 2026

Understanding causal relationships in organizational time-series data is critical for managerial decision-making, yet forecasting systems often trade interpretability for accuracy. We introduce SPADE (SPline Additive-noise DAG Estimation), an ...

Practical Mimicry and Modal Integration: Know-How, Large Language Models, and Human–AI Collaboration

J Varghese - Philosophy & Technology, 2026

Recent advances in large language models have rekindled debate over whether AI can possess know-how. This debate is stalled because intellectualists and anti-intellectualists tacitly assume a monolithic agent model, on which know-how is fixed ...

[HTML] [Causal discovery of signal morphology drivers in steel resistance spot welding: a high-dimensional data analysis](#)

H Schulz, M Stender - *Welding in the World*, 2026

Resistance spot welding is a primary joining technique in the automotive and general metal manufacturing industries due to its cost-efficiency and potential for automation. As manufacturing transitions to Industry 4.0, an unprecedented volume ...

[HTML] [Exploring the Logic of Counterfactuals for Explaining Algorithmic Decisions](#)

C Berz - *Topoi*, 2026

Interpretable machine learning (ML) is crucial for gaining insight into complex ML models. Among its most valuable tools are counterfactual explanations, identifying changes to input features that would alter an ML prediction. However, the reliability ...

[PDF] [Causal Integrated Gradients: Scalable Feature Attribution Along Causal Paths](#)

J Michiels, A Ismail, M De Vos, A Sifrim - *arXiv preprint arXiv:2610.22126*, 2026

Existing feature attribution methods that account for feature dependencies do not scale to high dimensions. We propose causal integrated gradients (CIG) and causal expected gradients (CEG), which extend integrated gradients to incorporate prior ...

[PDF] [Cross-Embodiment Causal Transfer from Human Videos to Robot Manipulation](#)

X Zhang, Y Li, P Guo, J Hu, C Zheng, W Qiang - *arXiv preprint arXiv:2610.21798*, 2026

Scaling robot manipulation models requires large amounts of interaction data, yet collecting diverse real-robot experience remains costly. Human manipulation videos, in contrast, provide abundant and diverse task experience that could potentially ...

[PDF] [Top-Down Microarchitecture Analysis Without Causal Modelling Is Dangerous!](#)

C Wang, L Wang, W Gao, G Kang, F Fan, J Zhan - *arXiv preprint arXiv:2610.21387*, 2026

Top-Down Microarchitecture Analysis (TMA) is the standard for identifying CPU bottlenecks. However, TMA implicitly models performance via a single causal path: Workload (dataset, algorithm) $\Rightarrow$ CPU (CPI) $\Rightarrow$ System (Performance) ...

[PDF] [Causal Bayesian network modelling of the 'charging divide'in electric vehicle adoption](#)

B D'Amico, A Fonzone - *Transportation Research Procedia*, 2027

The transition to electric mobility depends not only on accelerating adoption but also on ensuring equitable access to charging infrastructure. This study investigates the so-called 'charging divide': whether the observed adoption gap between households ...

[PDF] [Do Humans Represent a 'Major Transition'in Evolution?](#)

JF Hoeffcker, IT Hoeffcker - 2026

Abstract We re-examine Maynard Smith and Szathmáry's thesis that 'human societies and language'represent a major transition in evolution based on changes in the storage, transmission, and translation of information. We argue that they understated ...

[\[PDF\] Essays on Central Bank Communication](#)

S Diaf – 2026

The thesis undertakes an investigation into central banks' communication under a textual perspective. The objective is to test hypotheses related to preferences, uncertainty and ambiguity. The emphasis was placed on explainability and the ...

[\[PDF\] Reliability-Based Design Optimization with Monotonicity-Constrained Surrogate Learning from Signed Causal Graphs](#)

KT Meselhy, A Azab – 2026

Reliability-based design optimization (RBDO) assumes that the objective function is known, but this assumption rarely holds in early-stage design, where few data are available. Engineers typically know the direction in which each variable affects ...

[\[PDF\] Creating a Biomedical Causal Knowledge Graph via Semi-Supervised Learning](#)

J Dorsey – 2026

Biomedical knowledge graphs have emerged as powerful tools for organizing heterogeneous biomedical data and supporting interpretable clinical reasoning. However, constructing causal knowledge graphs—which encode directed cause ...

[\[PDF\] Causal Inference-Enhanced RAG for Reliable Reasoning Under Conflicting and Incomplete Evidence](#)

T Jean – Computational Intelligence Systems, 2026

Retrieval-augmented generation has become a central architecture for grounding large language models in external knowledge, yet its reliability remains fragile when retrieved evidence is contradictory, incomplete, or drawn from heterogeneous ...

[\[PDF\] Interpretability Methods for Causal Predictions in Biomedical AI: A Systematic Review of Approaches and Evaluation Practices](#)

A Schulle – 2026

Background: Artificial intelligence has become increasingly embedded in biomedical research and clinical decision support, yet the transition from predictive association to causal understanding remains a critical methodological hurdle. Explainable AI ...

[\[PDF\] Lag-Aware Causal Multimodal Transformer for Supply Chain Demand Forecasting](#)

E Vale, M Chen – SOCIAL AND MANAGEMENT SCIENCES RESEARCH ..., 2026

Demand forecasting increasingly relies on heterogeneous signals, but multimodal fusion is often temporally naïve: exogenous channels are aligned by timestamp even when their effect on demand is delayed. This paper introduces a Lag-Aware Causal ...

[\[PDF\] The Sixth Encompassing Dimension](#)

M Kamil – 2026

This paper introduces the** Sixth Encompassing Dimension Theory (SED^T)**, a mathematical cognitive framework intended to overcome epistemic reductionism by introducing a sixth dimension that is not added quantitatively to the five classical ...

[\[PDF\] Las Palmas, 2022](#)

MCG Quintana

Durante mi paso por la Diplomatura de Fisioterapia conocí a un profesor que hoy día es mi padrino de orla, mi compañero, un amigo y el cual despertó en mí todo el interés a seguir formándome para algún día llegar a ser docente muchas gracias ...