## A novel probabilistic approach to counterfactual reasoning in system safety

A Ruiz-Tagle, E Lopez-Droguett, KM Groth - Reliability Engineering & System Safety, 2022

Safety-critical systems cannot afford to wait for data from multiple high-consequence events to become available in order to inform safety recommendations. Counterfactual reasoning has been widely used in system safety to address this …

## Causal Determinants of Postoperative Length of Stay in Cardiac Surgery using Causal Graphical Learning

JJR Lee, R Srinivasan, CS Ong, D Alejo, S Schena… - The Journal of Thoracic and …, 2022

Structured Abstract Objective We aimed to learn the causal determinants of postoperative length of stay (pLOS) in cardiac surgery patients undergoing isolated CABG or AVR surgery. Methods For patients undergoing isolated CABG or isolated …

## [PDF] Demand Models For Supermarket Demand Forecasting

U Kerzel - International Journal of Supply and Operations …, 2022

Model-based approaches remain an important option for modelling customer demand. While this approach allows to analyse demand using a model based on theoretical arguments, each choice of model is associated with specific assumptions …

## [PDF] On tensor decompositions, maximum likelihood estimation, and causal inference

P Semnani - 2022

In this thesis, we study three problems, each of which concerns inferring certain pieces of information from some observed data. We apply tools arising from algebraic geometry, statistics, and combinatorics to approach these problems. In …

## [PDF] CounteRGAN: Generating Counterfactuals for Real-Time Recourse and Interpretability using Residual GANs (Supplementary material)

D Nemirovsky, N Thiebaut, Y Xu, A Gupta

Following the experiments in Wachter et al.[2017b], we utilize the Pima Indians Diabetes dataset (Smith et al.[1988]). It is composed of low dimensional tabular data and helps to validate the CounteRGAN's versatility and its applicability to diverse use …

## High prevalence does not necessarily equal maintenance species: Avoiding biased claims of disease reservoirs when using surveillance data

MQ Wilber, J DeMarchi, NH Fefferman, MJ Silk - Journal of Animal Ecology, 2022

Many pathogens of public health and conservation concern persist in host communities. Identifying candidate maintenance and reservoir species is therefore acentral component of disease management. The term maintenance species implies …

## Robust Methods for Quantifying the Effect of A Continuous Exposure from Observational Data

R Tourani, S Ma, M Usher, GJ Simon - IEEE Journal of Biomedical and Health …, 2022

A cornerstone of clinical medicine is intervening on a continuous exposure, such as titrating the dosage of a pharmaceutical or controlling a laboratory result. In clinical trials, continuous exposures are dichotomized into narrow ranges, excluding large …

## [HTML] Marginal Structural Models to Estimate Causal Effects of Right-to-Carry Laws on Crime

WM Van Der Wal - Statistics and Public Policy, 2022

Abstract Right-to-carry (RTC) laws allow the legal carrying of concealed firearms for defense, in certain states in the USA. I used modern causal inference methodology from epidemiology to examine the effect of RTC laws on crime over a period from …

## [PDF] Multiscale Non-stationary Causal Structure Learning from Time Series Data

G D'Acunto, GDF Morales, P Bajardi, F Bonchi - arXiv preprint arXiv:2208.14989, 2022

This paper introduces a new type of causal structure, namely multiscale non stationary directed acyclic graph (MN-DAG), that generalizes DAGs to the time-frequency domain. Our contribution is twofold. First, by leveraging results from …

## Cross-direct effects in settings with two mediators

EE Gabriel, A Sjölander, D Follmann, MC Sachs - Biostatistics, 2022

When multiple mediators are present, there are additional effects that may be of interest beyond the well-known natural (NDE) and controlled direct effects (CDE). These effects cross the type of control on the mediators, setting one to a constant …

## Causal inference for oncology: past developments and current challenges

EEM Moodie - The International Journal of Biostatistics, 2022

In this paper, we review some important early developments on causal inference in medical statistics and epidemiology that were inspired by questions in oncology. We examine two classical examples from the literature and point to a current area of …

## [PDF] Testing Causality in Scientific Modelling Software

AG Clark, M Foster, B Prifling, N Walkinshaw… - arXiv preprint arXiv …, 2022

From simulating galaxy formation to viral transmission in a pandemic, scientific models play a pivotal role in developing scientific theories and supporting government policy decisions that affect us all. Given these critical applications, a …

## [PDF] Recent Developments in Causal Inference and Machine Learning

JE Brand, X Zhou, Y Xie - 2022

This paper provides an updated review of the latest advances in causal inference in sociology and other disciplines. We focus on four topics: causal effect identification and estimation in general, causal effect heterogeneity, causal effect mediation, and …

## A Causal Framework for Making Individualized Treatment Decisions in Oncology. Cancers 2022, 14, 3923

P Msaouel, J Lee, JA Karam, PF Thall - 2022

We discuss how causal diagrams can be used by clinicians to make better individualized treatment decisions. Causal diagrams can distinguish between settings where clinical decisions can rely on a conventional additive regression …

## [PDF] Counterfactual Fairness for Facial Expression Recognition

J Cheong, S Kalkan, H Gunes - 2022

Given the increasing prevalence of facial analysis technology, the problem of bias in these tools is becoming an even greater source of concern. Causality has been proposed as a method to address the problem of bias, giving rise to the popularity of …

## [PDF] MEMENTO: Neural Model for Estimating Individual Treatment Effects for Multiple Treatments

A Mondal, A Majumder, V Chaoji - 2022

Learning individual level treatment effects from observational data is a problem of growing interest. For instance, inferring the effect of delivery promises on purchase of products on an e-commerce site or selecting the most effective treatment for a …

## On the Optimality and Complexity of Reinforcement Learning

Z Fu - 2022

In this dissertation, we aim to develop algorithms that achieve optimality with provable complexity guarantees under various settings in reinforcement learning (RL). Specifically, in Markov decision processes (MDPs), we study single-agent and …

## [PDF] Critical realism and sociolinguistics

B Jeremie - 2022

This paper is a summary of some of the ideas found in my recently published works which, together, call for a philosophy of both applied linguistics and sociolinguistics. Based on a critique of successionism and interpretivism–two prominent empiricist …

## [PDF] Argumentation-based Causal and Counterfactual Reasoning

L Bengel, L Blümel, T Rienstra, M Thimm - 2022

In this paper we present a model for argumentative causal and counterfactual reasoning in a logical setting. Causal knowledge is represented in this system using Pearl's causal model of a set of structural equations and a set of assumptions …

## On the Theory of Deep Reinforcement Learning: Global Convergence and Sample Efficiency

L Wang - 2022

In reinforcement learning (RL), an agent aims to learn the optimal policy by interacting with the environment and collecting the reward for each action taken. With the aid of strong function approximators such as the neural networks, RL achieves …

## [PDF] Intergenerational Effects of Maternal Health on Pregnancy and Neonatal Outcomes in Nova Scotian Children

MM Brown - 2022

Maternal pre-pregnancy body mass index (BMI) is associated with first-generation health outcomes. The literature suggests an increased risk of low birthweight in infants born to mothers who are underweight, while infants born to mothers with …

[PDF] **Just Probabilities**

C Lee-Stronach

As we shall see, there are many cases–both real and hypothetical–that demonstrate why Conclusion is unacceptable. To avoid it, most theorists reject Probabilistic Proof by supplementing it with additional epistemic, moral, or procedural constraints. In a …

[PDF] **umx: Twin and Path-based Structural Equation Modeling in OpenMx**

TC Bates, M Neale, H Maes

Structural equation modeling (SEM) is an important research tool, especially in the social sciences. Two major uses of SEM include path-based model specification, where ease of use and graphical and table-based reporting are important for …

[PDF] **LA IA:¿ PERO RAZONARÁ IGUAL QUE NOSOTROS?**

V THEOKTISTO

La Inteligencia Artificial (IA, o AI en inglés), fundamentada en su potencial para ocasionar transformaciones profundas y reacomodos sociales que diriman el rumbo de la humanidad, se ha convertido en el más reciente campo de batalla de una …

**A Decomposable Causal View of Compositional Zero-Shot Learning**

M Yang, C Xu, A Wu, C Deng - IEEE Transactions on Multimedia, 2022

Composing and recognizing novel concepts that are combinations of known concepts, ie, compositional generalization, is one of the greatest power of human intelligence. With the development of artificial intelligence, it becomes increasingly …

[PDF] **Recent Developments in Causal Inference and Machine Learning**

JE Brand, X Zhou, Y Xie - 2022

This paper provides an updated review of the latest advances in causal inference in sociology and other disciplines. We focus on four topics: causal effect identification and estimation in general, causal effect heterogeneity, causal effect mediation, and …

[PDF] **Intergenerational Effects of Maternal Health on Pregnancy and Neonatal Outcomes in Nova Scotian Children**

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