Special Issue

Advances in Statistical AI and Causal Inference

Message from the Guest Editors

This Special Issue focuses on recent advancements in statistical models and machine learning methods at the intersection of artificial intelligence (AI) and causal inference. Although AI has achieved remarkable success, there remain challenges in developing statistical theory and methodology for AI. This issue particularly highlights theoretical advancements involving deep neural networks and causal inference, particularly with regard to non-asymptotic theory and small sample learning. The theoretical analysis of deep neural networks can be divided into three components: approximation, optimization, and generalization. Causal inference includes frameworks such as the Rubin causal model, mediation analysis, causal graphs, observational studies, and instrumental variables to enable our understanding of causality and reasoning. We highlight how machine learning and deep learning can be effectively integrated with causal inference, enabling researchers to address potential biases in estimating causal effects and heterogeneous causal effects. We also encourage researchers to incorporate novel insights into their empirical research and experimental design.

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Message from the Editor-in-Chief

The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

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