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*Special Issue on*

## Statistical & Mathematical Modelling for AI-Driven Intelligent Systems in IoT and its Computation Challenges


*Guest Editors :*

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# FOREWORD

This special issue titled "Statistical & Mathematical Modelling for AI-Driven Intelligent Systems in IoT and its Computation Challenges," highlights quality research that intersects artificial intelligence (AI), the Internet of Things (IoT), and mathematical and statistical modeling. The issue focuses on how solid theoretical frameworks help intelligent IoT systems process diverse data efficiently and make decisions in real time. It also addresses the computational challenges in this rapidly evolving field.

The selected papers cover a wide range of topics. Several contributions present stochastic and deterministic models, including Bayesian inference, Markov chains, and graph-based learning, that improve sensing, prediction, and anomaly detection in complex IoT environments. Others discuss optimization and control strategies, such as model predictive control and reinforcement learning, which are crucial for energy-efficient edge computing and latency-sensitive applications.

A significant focus is on computational challenges. Authors discuss scalability in large sensor networks, energy limits of embedded devices, and the need for low-power algorithms that maintain robustness and accuracy. The works also explore security and privacy issues, suggesting statistical cryptographic protocols and privacy-preserving AI techniques to protect distributed IoT systems.

The application areas explored in this issue include smart cities, healthcare monitoring, precision agriculture, autonomous transportation, and industrial automation. Papers show how mathematically grounded AI can enhance resilience and reliability in these fields. Advanced topics, such as quantum-inspired optimization, neuromorphic hardware support, and explainable AI for transparent model behavior, offer insights for the future.

This special issue is the outcome of the 6th International Conference on Information Management & Machine Intelligence held at Poornima Institute of Engineering & Technology, Jaipur on 23-24 Dec 2024, wherein we received more than 280 papers which went through a rigorous peer review process after which only 33 papers from researchers covering a

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wide range of innovative concepts have been selected for publication in this issue.

The low rate of acceptance testifies to our dedication to excellence, and we assure that only the most significant contributions appear in this special issue. We are glad to share these selected contributions, which reflect the leading edge of progress in the field.

We extend our heartfelt gratitude to all authors for their significant contributions, to the reviewers for their meticulous evaluations, and to the editorial team for their steadfast guidance. We are particularly thankful to Professor B. K. Dass, Chief Editor, for his constant support and encouragement during the publication process in the *Journal of Interdisciplinary Mathematics*, published by Taru Publications, New Delhi.

We believe that this collection will serve as a valuable reference source for researchers, practitioners, and policymakers, inspiring further breakthroughs in the theory and application of AI-driven IoT systems.

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