Special Issue

Machine Learning: Mathematical Foundations and Applications

Message from the Guest Editors

This Special Issue invites to compile experts and scholars from related fields to present their recent research on machine learning and its mathematical foundation and applications. The scope of this Special Issue includes, but is not limited to, the following topics:

- **Foundations of ML and Optimization**
  - Mathematical theory of ML algorithms (e.g., convergence, complexity)
  - Loss function design and optimization
  - Regularization techniques and dimensionality reduction
  - Hyperparameter tuning and model selection

- **Scalable and Efficient ML**
  - Distributed/parallel computing for large-scale ML
  - Efficient training techniques (e.g., gradient compression, quantization)
  - Physics-informed neural networks (PINNs) for scientific ML

- **Advanced Learning Paradigms**
  - Deep learning architectures and optimization
  - Graph neural networks (GNNs) and probabilistic graphical models (e.g., Markov random fields)
  - Large Language Models (LLMs) and knowledge mining

- **Applications and Tools**
  - Data mining and visualization
  - Pattern recognition and intelligent systems
  - Real-world applications of ML in science, engineering, and industry

Guest Editors

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Deadline for manuscript submissions

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About the Journal

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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