

## Special Issue

# Explainable Artificial Intelligence: Theoretical Foundations and Methodological Advances

### Message from the Guest Editors

The scope covers the entire theoretical and methodological spectrum of XAI, including the refinement of symbolic explainability theories, the optimization of explainable machine learning models, the integration of domain knowledge into XAI frameworks and the exploration of emerging XAI paradigms. Its application scenarios can be moderately extended to fields such as manufacturing and cyber-physical systems, with a core focus on theoretical depth, methodological innovation, and specific industrial implementations.

- symbolic explainability approaches granular computing Fuzzy logic Bayesian networks Probabilistic graphical models
- explainable machine learning models Random forests Gradient boosting trees k-Nearest neighbors
- XAI-based modelling for complex systems interpretable AI-enhanced adaptive control methodologies XAI-enabled intelligent optimization methodologies Knowledge graph-driven explainable AI methods
- emerging explainable AI approaches neuro-symbolic explainable AI Federated explainable AI Large model explainable AI

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### Guest Editors

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### Deadline for manuscript submissions

31 August 2026



## Machine Learning and Knowledge Extraction

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## About the Journal

### Message from the Editor-in-Chief

Machine learning deals with understanding intelligence to design algorithms that can learn from data, gain knowledge from experience and improve their learning behaviour over time. The challenge is to extract relevant structural and/or temporal patterns (“knowledge”) from data, which is often hidden in high dimensional spaces, thus not accessible to humans. Many application domains, e.g., smart health, smart factory, etc. affect our daily life, e.g., recommender systems, speech recognition, autonomous driving, etc. The grand challenge is to understand the context in the real-world under uncertainty. Probabilistic inference can be of great help here as the inverse probability allows to learn from data, to infer unknowns, and to make predictions to support decision making.

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