Special Issue

Probabilistic Models for Dynamical Systems

Message from the Guest Editor

Probabilistic models play a crucial role in the analysis of dynamical systems by incorporating stochastic components into variables and time-varying systems. They enable the simulation of nonlinear and stochastic dynamics, are employed in the creation of innovative, dynamic models and are widely utilised in several areas. Probabilistic models assist in predicting future events or states based on past observations, making them invaluable in understanding complex systems like weather patterns and financial markets. Gaussian processes, Monte Carlo simulations, and Markov processes with imperfect probability are among the methods employed in probabilistic modeling. Furthermore, ethical considerations arise in fields such as autonomous vehicles and medical diagnosis. While ongoing research focuses on developing efficient algorithms and techniques for high-dimensional problems, improving accuracy and interpretability remains a priority. Practical implementation of probabilistic models faces challenges such as high dimensionality, complex structures, limited data availability, computational intensity, model selection, and inherent uncertainty.

Guest Editor

Dr. Carlos Dias Maciel
Signal Processing Lab, Department of Electrical and Computer Engineering, University of São Paulo, São Carlos 13566-590, Brazil

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Entropy
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
entropy@mdpi.com

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Editor-in-Chief

Prof. Dr. Kevin H. Knuth
Department of Physics, University at Albany, 1400 Washington Avenue, Albany, NY 12222, USA

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