



The Role of Signal Processing and Information Theory in Modern Machine Learning

Guest Editors:

Prof. Dr. Nariman Farsad

1. Department of Electrical Engineering, Stanford University, Stanford, CA 94305, USA
2. Department of Computer Science, Ryerson University, Toronto, ON M5B 2K3, Canada

Prof. Dr. Marco Mondelli

Institute of Science and Technology Austria, 3400 Klosterneuburg, Austria

Dr. Morteza Mardani

Department of Electrical Engineering, Stanford University, Stanford, CA 94305, USA

Deadline for manuscript submissions:

closed (30 November 2020)

Message from the Guest Editors

Breakthroughs in modern machine learning are rapidly changing science, industry, and society, yet fundamental understanding in this area has lagged behind. For example, one of the central tenets of the field, the bias–variance trade-off, appears to be at odds with the observed behavior of methods used in practice and the black-box nature of deep neural network architectures defies explanation. As these technologies are integrated more and more deeply into devices and services used by millions of people worldwide, there is an urgent need to provide theoretical guarantees for machine-learning techniques and to explain why and how these techniques work, based on empirical observation.

This Special Issue aims to be a forum for the presentation of new and improved techniques at the intersection of Signal Processing, Information Theory, Statistical Mechanics, and Machine Learning. In particular, the theory of deep learning, novel uses of signal processing and information theory in machine learning, explainable deep learning, as well as active and adversarial learning fall within the scope of this Special Issue.





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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

Message from the Editor-in-Chief

The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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Entropy Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

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