



entropy



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Entropy: The Cornerstone of Machine Learning

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Message from the Guest Editors

The key feature of science is the description of some quantities in terms of others. To do this, scientists and engineers create mathematical models that describe the relationships in raw input data and methods that build on these models and ultimately produce useful output data. To make these models work, they are trained. In machine learning (ML), a model is a dynamic complex system that consists of many layers, each of which represents a simple mathematical operation. Mathematically, learning is embodied in the procedure for minimizing the objective loss function of the model. But training an ML model as a typical complex dynamic system obeys the second law of thermodynamics. ML is the process of finding a “balance point” or a model configuration with maximum entropy, which corresponds to the most probable value of the loss function. In our special issue, any scientifically based ideas aimed at maximizing the entropy of ML models are welcome: configuring data, structural elements, loss functions and qualitative metrics. We also invite papers showing application of entropy&ML to evaluate the performance of complex systems, including telecommunication networks.



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Special Issue



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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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