Information Geometry and Its Applications

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Message from the Guest Editors

Information geometry is a method of exploring the world of information by means of modern differential geometry.

The mathematical field of Information Geometry originated from the papers of C.R. Rao, who used Fisher information to define a Riemannian metric in spaces of probability distributions, and the papers of S. I. Amari, who showed that the differential-geometric structure of a statistical manifold can be derived from divergence functions, yielding a Riemannian metric and a pair of dually coupled affine connections.

The methods of Information Geometry have been applied to a wide variety of topics in physics, mathematical finance, biology and the neurosciences.

Topics: statistical manifolds and submanifolds, information geometry of space-time, Information geometry versus Riemannian geometry, dualistic structures of manifolds in information geometry, conjugate connections from divergence, dually flat spaces and canonical Bregman divergences, information geometry associated with a single-time Hamiltonian, information geometry associated with a multi-time Hamiltonian, dual Laplacians, applications of Information Geometry, stochastic information.

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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