

Geometry of Boltzmann Machines

Guido Montúfar

Max Planck Institute for Mathematics in the Sciences

Germany

e-mail: montufar@mis.mpg.de

A Boltzmann machine is a network of stochastic units. It defines an exponential family of probability distributions over the joint states of all network units, with natural parameters given by pair interaction weights and biases. When some of the units are hidden, the observable probability distributions form an interesting geometric object, which has been studied in information geometry, algebraic statistics, and machine learning. In this talk I give an overview on these investigations and present new results regarding the representational power of deep Boltzmann machines and the identifiability of parameters in restricted Boltzmann machines.