Math 278B - Mathematics of Information, Data, and Signals Seminar

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Regression and doubly robust off-policy learning on low-dimensional manifolds by neural networks

Abstract:
Many data in real-world applications are in a high-dimensional space but exhibit low-dimensional structures. In mathematics, these data can be modeled as random samples on a low-dimensional manifold. Our goal is to estimate a target function or learn an optimal policy using neural networks. This talk is based on an efficient approximation theory of deep ReLU networks for functions supported on a low-dimensional manifold. We further establish the sample complexity for regression and off-policy learning with finite samples of data. When data are sampled on a low-dimensional manifold, the sample complexity crucially depends on the intrinsic dimension of the manifold instead of the ambient dimension of the data. These results demonstrate that deep neural networks are adaptive to low-dimensional geometric structures of data sets.

This is a joint work with Minshuo Chen, Haoming Jiang, Liu Hao, Tuo Zhao at Georgia Institute of Technology.

Host: Rayan Saab

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11:30 AM
Zoom link:
https://msu.zoom.us/j/96421373881
(passcode: first prime number > 100)