Statistics Seminar

Department of Mathematics and Statistics

DATE:	Tuesday, April 25, 2022
TIME:	12pm – 1 pm
LOCATION:	WH 100E
SPEAKER:	Yangsheng Wang, Binghamton University
TITLE:	NONPARAMETRIC REGRESSION FOR REPEATED MEASUREMENTS WITH DEEP NEURAL NETWORKS

Abstract

Analysis of repeated measurements for a sample of subjects has been intensively studied with several important branches developed, including longitudinal/panel/functional data analysis, while nonparametric regression of the mean function serves as a cornerstone that many statistical models are built upon. In this work, we investigate this problem using fully connected deep neural network (DNN) estimators with flexible shapes. A comprehensive theoretical framework is established by adopting empirical process techniques to tackle clustered dependence. We then derive the nearly optimal convergence rate of the DNN estimators in Hölder smoothness space, and illustrate the phase transition phenomenon inherent to repeated measurements and its connection to the curse of dimensionality. Furthermore, we study the function spaces with low intrinsic dimensions, including the hierarchical composition model, anisotropic Hölder smoothness and low-dimensional support set, and also obtain new approximation results and matching lower bounds to demonstrate the adaptivity of the DNN estimators for circumventing the curse of dimensionality.