Statistics Seminar

Department of Mathematical Sciences

DATE:	Tuesday, October 12, 2021
TIME:	1:15pm – 2:15pm
LOCATION:	Zoom meeting
SPEAKER:	Geran Zhao, Binghamton University
TITLE:	EPISTASIS DETECTION VIA THE JOINT 2 CUMULANT

Abstract

Selecting influential nonlinear interactive features from ultrahigh dimensional data has been an important task in various fields. However, statistical accuracy and computational feasibility are the two biggest concerns when more than half a million features are collected in practice. Many extant feature screening approaches are either focused on only main effects or heavily rely on heredity structure, hence rendering them ineffective in a scenario presenting strong interactive but weak main effects. In this article, we propose a new interaction screening procedure based on joint cumulant (named JCI-SIS). We show that the proposed procedure has 16 strong sure screening consistency and is theoretically sound to support its performance. Simulation studies designed for both continuous and categorical predictors are performed to demonstrate the versatility and practicability of our JCI-SIS method. We further illustrate the power of JCI-SIS by applying it to screen 27,554,602,881 interaction pairs involving 234,754 single nucleotide polymorphisms (SNPs) for each of the 4,000 subjects collected from polycystic ovary syndrome (PCOS) patients and healthy controls.