Mathematics, Statistics, and Computer Science **@ UIC**

Special Colloquium

Individualized Multi-Directional Variable Selection

Dr. Annie Qu (UIUC)

Abstract: In this paper we propose a heterogeneous modeling framework which achieves the individual-wise feature selection and the covariate-wise subgrouping simultaneously. In contrast to conventional model selection approaches,the key component of the new approach is to construct a separation penalty with multi-directional shrinkages, which facilitates individualized modeling to distinguish strong signals from noisy ones and selects different relevant variables for different individuals. Meanwhile, the proposed model identifies subgroups among which individuals share similar covariates' effects, and thus improves individualized estimation efficiency and feature selection accuracy. Moreover, the proposed model also incorporates within individual correlation for longitudinal data. We provide a general theoretical foundation under a double-divergence modeling framework where the number of individuals and the number of individual-wise measurements can both diverge, which enables the inference on both an individual level and a population level. In particular, we establish the population-wise oracle property for the individualized estimator to ensure its optimal large sample property under various conditions. Simulation studies and an application to HIV longitudinal data are illustrated to compare the new approach to existing variable selection methods.

Tea at 4:00-4:30 PM at SEO 300.

Tuesday, January 29 at 3:00 PM in 636 SEO