

ACMS Statistics Seminar

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Washington University, St. Louis

Tuesday, October 3, 2023

154 Hurley Hall

3:30 PM – 4:30 PM



Conformal Prediction for Network-Assisted Regression

An important problem in network analysis is predicting a node attribute using both network covariates, such as graph embedding coordinates or local subgraph counts, and conventional node covariates, such as demographic characteristics. While standard regression methods that make use of both types of covariates may be used for prediction, statistical inference is complicated by the fact that the nodal summary statistics are often dependent in complex ways. In this talk, I will discuss how a network analog of conformal prediction produces finite-sample valid prediction sets for a wide range of network covariates under a mild joint exchangeability assumption. I will also discuss how these results generalize to the case where the observed network is a non-representative sample from the population. In particular, when the population graph is jointly exchangeable, I show that the sampled network is conditionally exchangeable if the sampling mechanism satisfies certain invariance properties. These exchangeability results imply that conformal prediction offers finite sample validity under common sampling schemes such as ego sampling and snowball sampling.

Joint work with Elizaveta Levina and Ji Zhu.

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