Indian Statistical Institute

Applied Statistics Unit

SEMINAR NOTICE

Speaker: Somabha Mukherjee, National University of Singapore
Title: High Dimensional Logistic Regression Under Network Dependence
Date: 20 June, 2023
Time: 15:15 PM
Venue: ASU Seminar Room
Online Platform: Google Meet (meet.google.com/csq-keor-ywo)

Abstract: The classical formulation of logistic regression relies on the independent sampling assumption, which is often violated when the outcomes interact through an underlying network structure, such as over a temporal/spatial domain or on a social network. This necessitates the development of models that can simultaneously handle both the network peer-effect (arising from neighborhood interactions) and the effect of (possibly) high-dimensional covariates. In this talk, I will describe a framework for incorporating such dependencies in a high-dimensional logistic regression model by introducing a quadratic interaction term, as in the Ising model, designed to capture the pairwise interactions from the underlying network. The resulting model can also be viewed as an Ising model, where the node-dependent external fields linearly encode the high-dimensional covariates. We use a penalized maximum pseudo-likelihood method for estimating the network peer-effect and the effect of the covariates (the regression coefficients), which, in addition to handling the high-dimensionality of the parameters, conveniently avoids the computational intractability of the maximum likelihood approach. Our results imply that even under network dependence it is possible to consistently estimate the model parameters at the same rate as in classical (independent) logistic regression, when the true parameter is sparse and the underlying network is not too dense. Towards the end, I will talk about the rates of consistency of our proposed estimator for various natural graph ensembles, such as bounded degree graphs, sparse Erdos-Renyi random graphs, and stochastic block models, which follow as a consequence of our general results. This is a joint work with Ziang Niu, Sagnik Halder, Bhaswar Bhattacharya and George Michailidis.

All are invited to attend.
PLEASE NOTE THE CHANGE OF TIME DUE TO RATHAYATRA