

Indian Statistical Institute

Applied Statistics Unit

SEMINAR NOTICE

Speaker: Soumya Chakraborty, Bethune College

Title: Robust Estimation of Multivariate Location and Scale via Divergence Minimization and its Applications in Machine Learning

Date: 03 October, 2023

Time: 16:15 PM

Venue: ASU Seminar Room

Online Platform: Google Meet (meet.google.com/ymw-ydmn-zdg)

Abstract: Robust estimation of location vector and scale matrix is a cornerstone in the field of multivariate analysis and its applications. An estimator is said to be robust if it is peripherally affected by model misspecification or presence of outliers in the data. Robustness faces hard trade-off with asymptotic efficiency. In addition, many of the robust estimation procedures are computer intensive in nature. The trade-off between robustness and efficiency increases proportionally with data dimension in case of multivariate location-scale estimation framework along with computational burden. We investigate the robust estimation of multivariate location and scale by minimizing density power divergence (DPD), a statistical distance measure. Primarily, we try to solve the aforesaid optimization problem directly following an iteratively reweighted least squares (IRLS) approach which suffers from certain computational difficulties. Thus, we propose another component-wise procedure for the same problem which parallelly estimates the components of the location vector and the scale matrix (a constant multiple of the covariance matrix). The third approach is quite intuitive and it is based on one-step updates of some highly robust initial estimators. The main advantage of the last approach is that it can maintain a high breakdown value along with desired efficiency unlike the first two approaches. Theoretical properties of the aforesaid approaches are studied and those methods are applied in various machine learning problems including clustering and anomaly detection.

All are invited to attend.

Please write to SOMENATH DAS somenath1011@isical.ac.in in case you do not receive the invitation link 48 hours before the seminar time.