

Indian Statistical Institute

Applied Statistics Unit

SEMINAR NOTICE

Speaker: Priyam Das, Virginia Commonwealth University

Title: Clustering Sequence Data with Mixture Markov Chains with Covariates
Using Multiple Simplex Constrained Optimization Routine (MSiCOR)

Date: 12 December, 2023

Time: 16:15 PM

Venue: ASU Seminar Room

Online Platform: Google Meet (meet.google.com/fvx-gbft-utc)

Abstract: Mixture Markov Model (MMM) is a widely used tool to cluster sequences of events coming from a finite state-space. However, the MMM likelihood being multi-modal, the challenge remains in its maximization. Although the Expectation-Maximization (EM) algorithm remains one of the most popular ways to estimate the MMM parameters, convergence of the EM algorithm is not always guaranteed. Given the computational challenges in maximizing the mixture likelihood on the constrained parameter space, we develop a pattern search-based global optimization technique which can optimize any objective function on a collection of simplexes, which is eventually used to maximize MMM likelihood. This is shown to outperform other related global optimization techniques. In simulation experiments, the proposed method is shown to outperform the expectation-maximization (EM) algorithm in the context of MMM estimation performance. The proposed method is applied to cluster Multiple sclerosis (MS) patients based on their treatment sequences of disease-modifying therapies (DMTs). We also propose a novel method to cluster people with MS based on DMT prescriptions and associated clinical features (covariates) using MMM with covariates. Based on the analysis, we divided MS patients into three clusters. Further cluster-specific summaries of relevant covariates indicate patient differences among the clusters.

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.