ITAM
INSTITUTO TECNOLÓGICO AUTÓNOMO DE MÉXICO

Seminario Aleatorio
Sesión 408

Modelling Populations of Interaction Networks via Distance Metrics

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https://gmbolt.github.io/

Abstract

Networks appear in a wide range of applications, from social networks, representing the friendships amongst people, to brain networks, representing the functional connectivity between regions of the brain. In this talk, I will discuss a new Bayesian modelling framework we propose to analyse samples of networks, where in each network the units of observation are interactions, also known as interaction networks. An example of data representable in this form is clickstream data, describing the online interactions of users with a website. Here a single user's data can be seen as an interaction network, and hence in observing a sample of users we obtain a sample of interaction networks. As far as we are aware, this is a presently unconsidered problem, with current work either being suitable to analyse a single interaction network, or a sample of standard (not interaction) networks. In our approach, we define Gaussian-like distributions over the space of interaction networks, using location and scale parameters akin to the mean and variance. Upon inferring their values, we thus obtain an "average network" and a measure of variability, providing familiar statistical summaries. Moreover, our models makes use of distance metrics between interaction networks, which can be flexibly set by the practitioner. Our methodology also raises interesting computational problems. In particular, features of the problem necessitate the use of Markov chain Monte Carlo (MCMC) algorithms to sample from our models and their associated posterior distributions. Moreover, this task is made particularly challenging by the sample spaces being discrete and multi-dimensional, necessitating the use of the recently proposed involutive MCMC (iMCMC) framework.

**Viernes 21 de abril de 2023,
13:00 horas de CDMX,
salón: B-3, ITAM Campus Río Hondo**

https://itam.zoom.us/j/99049126929?pwd=ZFpERnpPaFE2Y3ZzclRtNUh4T0VEQT09
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Código de acceso: 776986

El Seminario Aleatorio del Departamento de Estadística del ITAM está destinado tanto a profesores como a estudiantes, por lo que se agradece a los profesores que colaboren invitando a sus alumnos a estas sesiones.