Bayesian Nonparametric Modeling of Dynamic Networks

Daniele Durante[1]

[1] *University of Padova, Italy*

Abstract

Real world networks are often associated with a dynamic component, and the development of statistical methodologies to learn how the connectivity patterns among interacting actors are wired across time is a fundamental goal in many fields. The accurate characterization of these processes allows deeper insights in many complex phenomena, while providing inference and prediction strategies in different dynamical systems, covering social and epidemiological processes. Although the number of available contributions in statistical modeling of dynamic networks has registered an exponential growth in the recent years, current proposals still raise open questions about inference, flexibility and computational tractability. Motivated by time-varying data on face-to-face social interactions, I will present recent Bayesian nonparametric models for dynamic networks which characterize the edge probabilities as a function of actors' positions in a latent space, with these positions changing in time via Gaussian processes or nested Gaussian processes. These formulations have theoretical justification and incorporate flexibility along with adaptive dimensionality reduction, allowing improvements in posterior computation, inference and prediction of future contacts.