

Modelling sparsity, heterogeneity, reciprocity and community structure in temporal interaction data

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Abstract

Probabilistic models with bayesian nonparametric assumptions have been used in many applications of machine learning such as density estimation, clustering, latent feature models and survival analysis. In this talk I will focus on probabilistic modelling for temporal interaction data. The construction is based on point processes - mutually-exciting Hawkes point processes that can capture the fact that interactions may arise as a response to past interactions (reciprocity), or due to shared interests between individuals (community structure). The class of models captures both the global graph features such as sparsity, community structure and power-law degree as well as the local pair dynamics within each pair such as reciprocating relationships. We conduct experiments on a variety of real-world temporal interaction data using sampling techniques and show that the proposed model outperforms many competing approaches for link prediction, as well as giving interpretable parameters.