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**Title: The infinite latent position cluster model for multivariate networks**

**Abstract:**

Relational data are often characterized by complex features. In many situations, interactions among a set of subjects consist of relations along multiple dimensions, like for example being co-workers, being friends, and belonging to the same social club. Multivariate network data record this composite structure, with multiple networks observed on the same set of actors. Clustering is also a typical feature of multidimensional relational data, since subjects tend to connect differently across the social dimensions according to the community they belong to. To model such complex multivariate relational data and detect the presence of clusters, we propose the infinite latent position cluster model, a general latent variable modeling framework for model-based clustering for multivariate networks. The model states that the nodes of the multivariate network arise from a mixture distribution, which identifies the groups. Moreover, their propensity to connect is a function of their distances in a latent social space and of the communities they belong to. The model is postulated within a hierarchical Bayesian framework, where the use of a Dirichlet process mixture allows for joint inference on latent coordinates and number of clusters. The work is developed in application to data concerning the interaction structure among the members of the Noordin Top terrorist network, active in Indonesia and nearby areas and perpetrators of several bombings during the period 2003-2009. Joint work with Silvia D'Angelo (University College Dublin) and Marco Alfò (La Sapienza University of Rome).