JSM Abstract

Title : Testing independence in networks via family of network metrics

Propelled by increasing demand and supply in network data, investigating whether network structures are associated with the attributes of interest has been an important concern in natural or social science. We consider the problem of network dependence, which refers to any types of dependence between network topology and its nodal attributes and propose the method to test network independence. However due to the interdependency in constructing network, standard independence test cannot be directly applied but instead the former network independence tests have introduced network models primarily focusing on globally persistent dependence. To overcome these challenges, we introduce a nonparametric multiscale test statistic which is robust to both high dimensionality and nonlinearity by utilizing a family of network geometries. Our simulation studies demonstrate the outstanding performance of the method under various circumstances. We also suggest the measure to quantify each node's contribution to detecting dependency, which is applied to the political network in the end.