
Social and Strategic Networks

MAHSA DANESHMAND, Brock University

Recommending perishable items

We develop a recommendation algorithm for a local entertainment and ticket provider company. The recommender system predicts the score of items, i.e. event, for each user. The delicate feature of these events, which makes them very different from similar settings, is that they are perishable: each event has a relatively short and specific lifespan. Therefore there is no explicit feedback available for a future event. Moreover, there is a very short description provided for each event and thus the keywords play a more than usual important role in categorizing each event. We provide a hybrid algorithm that utilizes content-based, collaborative filtering and network-based recommendations. We also present an axiomatic analysis of our model. These axioms are mostly derived from social choice theory. This is a joint project with Babak Farzad.

BABAK FARZAD, Brock University

Strategic formation of hierarchical networks

Hierarchical networks are different from similar small-world networks in the distribution of nodes' clustering coefficients. Typically, in a hierarchical network, nodes of higher degree (in particular hubs), are expected to have lower clustering coefficients. We present a grid-based game theoretic network formation model where the cost of establishing each link depends on the distance of the endpoints. In this game-theoretic model, players are located in a grid with the objective of minimizing their collective distances to others in the network. Our framework is inspired by Even-Dar and Kearns' model (NIPS 2007: 385-392) and consequently that of Atabati and Farzad (COCOA 2014: 581-592). However, in our model, the cost of establishing each link is dynamically determined depending not only on the distance but also the degrees of the endpoints. We show that the model generates hierarchical networks.

HONGYI JIANG, Wake Forest University

A new look at the friendship paradox – weighted and directed networks, connectivity and activity

In this talk we consider the friendship paradox (on networks) for general transitions. We provide a rigorous perspective on stochastic orderings for node characteristics for random neighbours when compared with uniformly selected nodes. Results for weighted and directed networks are given, and several applications to social, biological and transportation networks are considered.

BRENDAN LIDRAL-PORTER, Wake Forest University

Digraphs and choice functions

In this talk, we consider the problem of addressing inequities between individuals in time via choice. Such scenarios naturally may arise in instances where a notion of "fairness" occurs, such as in data and network processing, resource allocation, decision theory, and clinical trials. Connections with path-connected digraphs and cyclic preference are explored. Other problems related to digraphs and choice (as well as several open questions) are considered.