Identifying Mortality Related Cliques in a Comorbidity Network

TREO Talk Paper

Pankush Kalgotra  Ramesh Sharda
Raymond J. Harbert College of Business, Oklahoma State University, 370A Business
Auburn University, Auburn, AL, US  Building, Stillwater, OK, USA
pankush@kalgotra.com  ramesh.sharda@okstate.edu

Abstract

A trap is defined as a situation where the entities in that trap are highly likely to experience an outcome. For example, a customer who has bought a certain group of items may be designated a high potential or high-risk customer on some other attribute, going beyond the market basket analysis. The purpose of this paper is to detect traps related to a problem outcome by adapting the clique property of a network. We present a heuristics based method to first develop a latent network from the transactional data and then identify outcome related traps in the form of cliques. The method is demonstrated to detect mortality related traps of diseases in patients. We applied a network approach to create relationship between diagnoses and then used the clique property to identify high-risk traps of diagnoses. Using half of the patient records, the algorithm identified mortality related cliques in the network where the mortality rate in the patients diagnosed with all diseases is significantly higher than the rate in patients without all diagnoses in a clique. We validated the results on the other half of the patient records. The presence of the clique diagnoses in the patients can help physicians take preemptive treatment decisions to avoid letting a patient “fall into a trap” of the multiple diseases. The methodology can also be applied in other management problems to find contextual traps.