

Applying Social Network Analysis for Classification and Performance Prediction – The Case of Patent Infringement Lawsuit in Pharmaceutical Industry

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ABSTRACT

Recent years, social network has gained much popularity because of the opportunities it gives entities to connect to each other in an easy manner, and to exchange and share various kind of information through this network. Besides, the social network analysis provides a set of methods for analyzing the structures of all entities as well as a variety of theories explaining the patterns observed in this network structures. The study of these structures uses social network analysis to identify the local and global patterns, locate influential entities and key players, and examine network characteristics.

In this study, we proposed a method to analyze the patent influence of well-known companies in terms of patent-infringement relationship in pharmaceutical industry which is one of the most successful industrial sectors in the world. For this purpose, the network graph of patent-infringement is constructed using the data from patent-infringement lawsuits cases between pharmaceutical companies and the influential level of these companies are analyzed by computing their network centrality in the network graph. In particular, the proposed study applies social network analysis to make performance prediction via three major tasks, including identifying roles of companies, classification and forecasting tasks. The first task of identifying roles of companies analyses the influence of companies by computing network centrality in the constructed graph of patent-infringement lawsuit of well-known companies in the pharmaceutical industry. The second task of classification uses corporation and financial performance features to do classification with the implementation of the Naïve Bayes algorithm. The third task of forecasting verifies the impact of centrality measures from the patent infringement network on business indicators such as global market value and gross profit via regression analysis. The results from these major tasks are discussed together for a more understanding of performance prediction behind patent

infringement relationship between pharmaceutical companies. This study could be a beneficial contribution for managers to make efficient prediction and do strategic planning for a successful business.

Keyword: Data mining 、 social network analysis 、 network centrality 、 prediction data mining 、 patent infringement lawsuit