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Detecting anomalous traders using multi-slice network analysis

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Abstract

Manipulation is an important issue for both developed and emerging stock markets. Many efforts have been made to detect manipulation in stock market. However, it is still an open problem to identify the fraudulent traders, especially when they collude with each other. In this paper, we focus on the problem of identifying anomalous traders using the transaction data of 8 manipulated stocks and 42 non-manipulated stocks during a one-year period. For each stock, we construct a multi-slice trading network to characterize the daily trading behavior and the cross-day participation of each trader. Comparing the multi-slice trading network of manipulated stocks and non-manipulated stocks with their randomized version, we find that manipulated stocks exhibit high number of trader pairs that trade with each other in multiple days and high deviation from randomized network at correlation between trading frequency and trading activity. These findings are effective at distinguishing manipulated stocks from non-manipulated ones and at identifying anomalous traders.

Keywords: network analysis, trading network, multi-slice network, manipulation, anomaly detection

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