MASTER'S THESIS (Summer 2010)

TOPIC: ***Data Mining Approaches for Detection of Suspicious Bidders in Online Auctions***

PRESENTOR: Benjamin Ford

ADVISOR: Dr. Haiping Xu

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COMMITTEE MEMBERS: Dr. Iren Valova and Dr. Kenneth C.K. Lee

ABSTRACT

Shill bidding activity in online auctions has seen a large potential for abuse with the significant increase in available item listings, which makes manual investigation of all auctions and bidders increasingly impossible. Automated data mining techniques are becoming more necessary to process this increasing workload. In this thesis, we first examine observable features of a bidder's behavior, and utilize a hierarchical clustering technique to divide a collection of bidders into normal and deviant groups. Based on the clustering results, we generate a decision tree that can be used to efficiently characterize new bidders as normal, suspicious, or highly suspicious. In order to detect suspicious bidders in real-time, we further present a real-time self-adaptive classifier (RT-SAC) framework that utilizes an incremental neural network approach. The neural network is initialized with historical auction data, and can be trained incrementally to gradually adapt to new data points. By doing so, the classifier will be able to keep pace with changing bidding trends without a significant loss in accuracy and time performance. We use a case study to demonstrate how to tune parameters for RT-SAC, and how our approach can be used to effectively identify suspicious bidders in real time.