APPLYING SELF-ORGANIZATION MAP TO PREVENT THE SHILL BIDDING IN ONLINE AUCTIONS

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ABSTRACT. *Since malicious bidding behaviors are changed frequently, we need a profiling mechanism to profile malicious bidding behaviors for detecting shill bidder. In this study, we proposed a malicious bidding prevention model (MBP). This model can profile malicious bidding behavior for detecting potential shill bidder and reduce computational cost in detecting. There are three modules in this model, namely, profiled malicious bidder behavior module (PMBB), shilling behavior detection module (SBD), and reputation module (RM). We applied self-organizing map (SOM) algorithm to build up PMBB and SBD. PMBB can profile malicious bidder behavior by using SOM algorithm. SBD detect malicious bidder based on similarity comparison between malicious profile and user behaviors by using SOM algorithm. Finally, RM will mark the malicious reputation for prior detected user. Via the experiment results, the proposed model is effectively capable to detect shilling bidding behaviors and reduce the computational cost and time. Moreover, the auctioneer can force shill seller become normal seller or leave the auction website by punishing him/her.*
Keywords: Self-organizing maps (SOM), Shilling bidding, Online auction

1. **Introduction.** In recent years, the online auctions become popular. Online auction is a model of the customer-to-customer. It applies the competition bid to sell goods. However, online auction frauds are serious problems. Shill bidding behavior which is to inflate the price on the seller's own auction item by spurious bids will not only make the winning bidders pay more and waste more time for auctioned item but also prevent from the efficiency of online auction markets. It is a fraud problem in the online auction. Therefore, how to profile and detect shill bidder is a serious issue for online auction.

There are several studies to mention the information profile and detect shill bidding. Rubin *et al.* [5] proposed profile method based upon models that characterize sellers according to statistical metrics related to price inflation. This method can profile and detect suspicious sellers who use tactics consistent with artificial price inflation. Chen [1] proposed data mining techniques method to detect fraudulent bidders based on bidder's trade data. Trevathan and Read [7] proposed a method to profile and detect shill bidding by observing bidding patterns over a series of auctions held by a particular seller.

Since malicious bidding behaviors change frequently, we need a mechanism that can quickly profile malicious bidding behaviors for detecting shill bidder and reduce computational cost and time in the detecting. So, we apply self-organizing map (SOM) algorithm to quickly profile malicious bidder behavior and design a two step detections method to reduce detection data. Lee and Wang [4] applied the SOM algorithm to present a profiled malicious bidder behavior model (PMBB) to profile shill behaviors efficiently.