

## Survey on Online Auction System

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**Abstract:** Internet has driven the globalisation which addresses the interaction and integration among the people, different business institutes, government bodies, and many more. As people are exposed to unlimited number of quantitative and qualitative products through use of internet, they seek for the expected one at reasonable or favourable cost and time. Online auction has become prominent solution to the expectations of online buyers since it excludes the need of physical presence of bidder at the auction place and the product can be obtained at the affordable price. This paper gives the overview of current going auction forms and the other related issues like designing of effective, efficient and optimal system of offering single item, predicting the end-bid price and the major issue faced by online auction system i.e. shill bidding. Paper put forth an architecture representing the use of predicted end-bid price to avoid shill bidding.

**Keywords:** Auction, bidder, shill bidding, end-bid value.

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### I. Introduction

Auction mostly meant to the sale of goods or property where people make higher and higher bids for each product until that get sold to the one who pays the most, which referred as English auction. It basically requires seller, bidders and auctioneer who is supposed to conduct auctions by accepting bids and declaring goods sold. Naturally, bidders' bid is rejected if it is below the offer price. With online auction, auction is carried out on internet. In actual, other than English auction there are many forms of auctions like Dutch, Vickrey and so many; depending upon factors like a process or price with which auction initiates, the time it takes to end up it, restrictions on bid amount and so on.

There are main four types of auction when single item is being sold [1]:

- i) Ascending-bid auctions, also called English auctions. These auctions are carried out interactively in real time; with bidders present either physically or electronically. The seller gradually raises the price, bidders drop out until finally only one bidder remains, and that bidder wins the object at this final price. Oral auctions in which bidders shout out prices, or submit them electronically, are forms of ascending-bid auctions.
- ii) Descending-bid auctions, also called Dutch auctions. This is also an interactive auction format, in which the seller gradually lowers the price from some high initial value until the first moment when some bidder accepts and pays the current price. These auctions are called Dutch auctions because flowers have long been sold in the Netherlands using this procedure.
- iii) First-price sealed-bid auctions. In this kind of auction, bidders submit simultaneous "sealed bids" to the seller. The terminology comes from the original format for such auctions, in which bids were written down and provided in sealed envelopes to the seller, who would then open them all together. The highest bidder wins the object and pays the value of her bid.
- iv) Second-price sealed-bid auctions, also called Vickrey auctions. Bidders submit simultaneous sealed bids to the sellers; the highest bidder wins the object and pays the value of the second-highest bid. These auctions are called Vickrey auctions in honor of William Vickrey, who wrote the first game-theoretic analysis of auctions (including the second-price auction). [1]

Mostly online bidding prefers English way of auction, with which possibility of 'shill bidding' fraud is associated. Paper addresses this issue and suggests predicting the final bid value in advance may avoid the problem of shill bidding at major extent.

### II. Related Work

This section deals with the assumptions and considerations of designing, developing and deploying existing systems.

- 1) Designing of Auction System: To design a system, the following issues are needed to be taken into account [2].
  - i) Non uniform network latency
  - ii) Unreliable internet connection

iii) To communicate large number of bidders during bidding.

In order to refer these designing problems, some websites prefer software agents to perform auction. Agents are most useful when multiple agents communicate, cooperate and collaborate to solve complex problems. Agency is a collection of agents that work together to provide some service. Each agent in an agency has some specialized task that it performs. In case of auction system, the bidder and auctioneer agents communicate and cooperate with each other to implement an electronic auction house.

2) Running the auction system[3]:

The system is divided into two distinct interfaces, the web interface for obtaining pre auction data like the sale dates and catalogues as well as auction interface which provides access for the client to control the agent on the server.

The auction interface accesses and modifies a run-time database. This database maintains the current state of the auction. The state of the auction is defines with following parameters:

- i) An item to be auctioned.
- ii) The offered price of an item.
- iii) The bidding messages
- iv) The current active agent and its bid value.
- v) The highest bid value and the agent who made the bid.

Interface separation helps in effective utilization of time for the actual auction process.

3) Predicting end-bid price of a product[4]:

System can be said to be successful, when it satisfies all its stakeholders, i.e. an auctioneer, seller and bidders. When auction ends, an item get in possession of bid winner. Bid amount must be greater than or equal to the minimum amount expected or offered by seller. Predicting the cost is a challenging task as products themselves vary in features and appearances as well as other product excluding factors like shipping charges, reliability of sellers, and appearance of the listing, beginning and ending times of auction are different for different product. Bidders are also geographically separated.

The high-level steps of this approach are outlined below:

1. Collect data about auction listings.
2. Define the set of features to be extracted.
3. Create meta-features that are derived from the initial set of features.
4. Train a classifier/extractor to use the training data to now extract features from unseen data.

Ebay.com is a major online marketplace. Besides the time and the amount of each bid placed in each auction, eBay also records plenty of information about the bidders, the seller, and the product being auctioned. Web crawler collects data about product features, seller features, and auction form for processing from ebay. On collected data, regression or classification data mining technique is applied in order to predict winning bid value of a product.

The ability to predict the ending price of online auction items lends itself to a variety of applications. Such prediction helps seller in optimizing selling price as well as in getting price insurance if product get sold at price less than the predicted one.

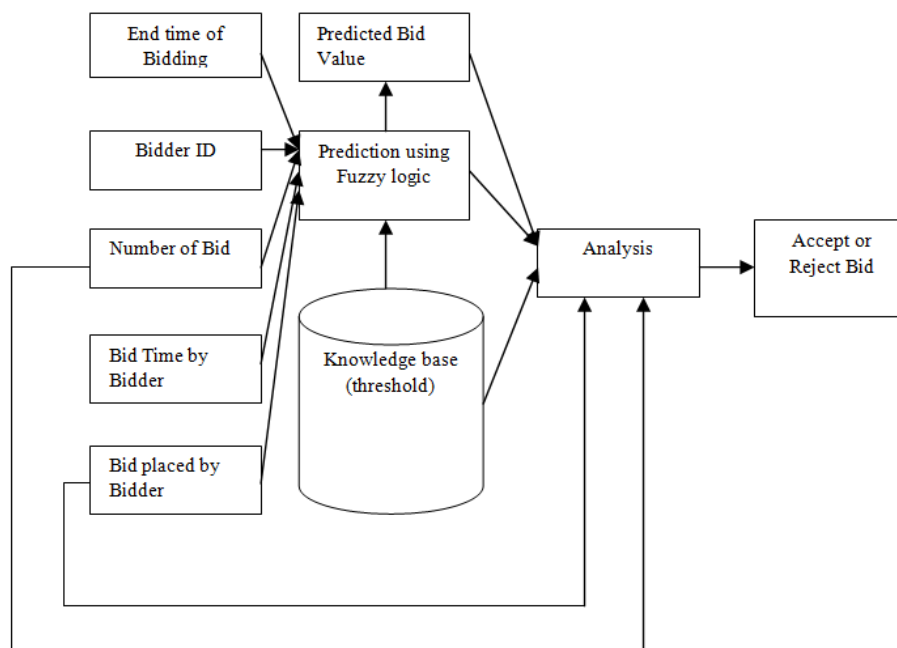
4) To avoid auction fraud[5]:

The online environment creates many unique opportunities for people to cheat. Auction fraud can occur prior to an auction (e.g., misrepresentation of items, selling of black market goods, and triangulation), during an auction (e.g., shill bidding), or after the auction terminates (e.g., buyer does not pay for the item).

Shill bidding is one of the serious fraud need to be restricted in the system. Shill bidding (or shilling) is the act of introducing fake bids into an auction on the seller's behalf in order to artificially inflate the price of an item. Bidders who engage in shilling are referred to as shills. To win the item, a legitimate bidder must outbid a shill's price. If one of the shills accidentally wins, then the item is re-sold in a subsequent auction. Shill bidding is a problem as it forces legitimate bidders to pay significantly more for the item. The shill faces a dilemma for each bid they submit. Increasing a bid could marginally increase the revenue for the seller. However, raising the price might also result in failure if it is not outbid before the auction terminates. The shill must decide whether to take the deal or attempt to increase the pay-off. On the contrary, a bidder's goal is to win. A bidder has a finite budget and is after the lowest price possible. Increasing a bid for a legitimate bidder decreases the money saved, but increases the likelihood of winning.

### **III. Proposed Work**

The auction system requires the information provided by the seller of an item to apply machine learning algorithms so that end-price can be accurately predicted. These algorithms are applicable to the products with hard features or specifications like speed, memory size, etc. But "soft" products such as clothing items vary in their attributes that used to compare different kinds of items. Features such as size, material and color do exist but they are not the kind of attributes that "define" the style of the product.



**Figure1:** Proposed architecture to predict end-bid value and detect shill bidding

This issue can be resolved by first extracting product attributes from free-text descriptions of products available online (in stores or auction websites), and then using these attributes as part of the learning process [4]. The corresponding proposed architecture predicting end-bid value to detect shill bidding is shown in figure 1.

Once the end bid price is predicted, this price can be used against the bid placed by bidder in provided interval of time. The parameter such as the extreme allowable difference between successive bids may be used as threshold and announced bid price may be treated as a function of the number of bid and end bid price in order to find the difference between the successive bids. This calculated difference can be compared against threshold value, if the calculated bid value is greater than the threshold then bid owner can be simply treated as a shill bidder and bid can be ignored and bidder must be intimidated by sending regarding message from the system.

#### IV. Conclusion

Online auction has relieved the interested bidders from being physically present in auction houses. The auction website provides variety of products online which gives plenty of choice for the bidders to select the product of their interest. The products are placed rightly under proper categories and subcategories which make it easier to search and locate the desired product. The online auction does not take place face to face which creates anonymous bidders. The auctioneers cannot have a hold on who is participating in the bidding. This can lead to anonymity in identifying the bidders and further in shill bidding. By predicting the end-bid price of product and keeping it concealed from bidders, bids can be analyzed against the predicted price or range of it and if any unpredictable unexpected bid is occurred, then the respective bid can be treated as shilled or fake one and can be ignored.

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