

Theoretical Model for e-Auction

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Summary

An electronic auction is an element of electronic commerce which uses the internet for procurement. E-auction has been a popular method for retailing and purchasing products and services online. In this paper the proposed e-auction models for the most prevalent classes of auction which are: forward auction and reverse auction are presented. These online models aim at the effectiveness of bidding and taking into account some important cofactors like efficient payment method and trust building measures.

Key words:

Electronic Auction, Online Auction, Purchase via bidding, Database

1. Introduction

Online auction is an electronic commerce (EC) technology for trading merchandise and services across a global e-marketplace using web-services. This technology has become an increasingly prevalent mechanism for both sectors, consumers as well as amongst retailers, such as businesses and consumers (B2C) [1].

These days with the development of information technology, Internet auction has become more popular and has been accepted by clientele. The popularity of electronic auction is a result of improved EC development thus gaining wide spread approval [2]. The Internet provides almost perfect market information and infrastructure for executing auctions at lower administrative costs [3].

Online auctions provide flexibility of cost, based on supply and demand, subject to specific competitive conditions. As an effect, online auctions coordinate demand and supply through market clearing prices, allowing a maximum number of products to be sold [4].

There are four broad categories of auctions that have been proposed: Forward auction also known as English auction; goods or services are offered for bidding at an ascending price and at the end of the auction, the bidder with the highest bid (price) is successful in purchasing the item. Second type of auction; also known as Sealed-bid auction; offers a sealed bid to auctioneers. The auctioneer opens all the bids and the item is sold to the bidder offering the highest price. This type of auction is executed in a single round of communication between bidders and auctioneers. The third type is a Reverse auction also called Dutch

auction. This type of auction is similar to forward auction, but the bidding price varies over time. It is the reverse of the forward auction and the price is decreased descending until the buyer accepts to pay for the price. This type of auction is also known as an open descending price auction. Fourth type of auction; Vickrey auction, the winner will pay the price that the “runner-up” had bid, that is, next highest price [1, 5]. There is other term used in auction which called Continues Double Auction (CDA) which allows for many sellers and buyers to continuously submit bids for the purchase and sale of a commodity. The most well known use for CDAs is in share markets [6]. Figure 1 below illustrates the taxonomy of the electronic auction type [7].

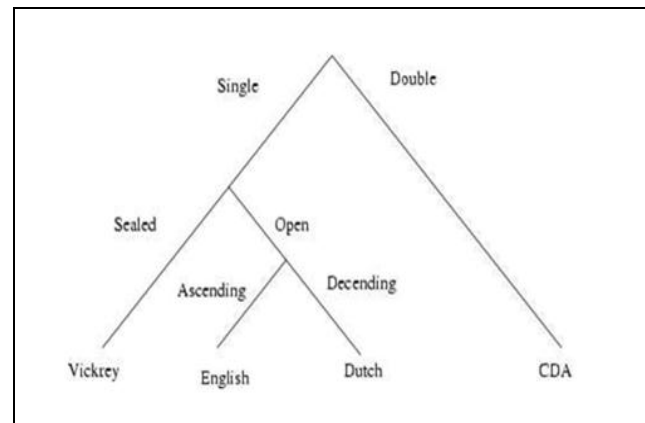


Figure 1: Taxonomy of the electronic auction

The emergence of large online auctions sites has highlighted several problems regarding issues of trust and deception in these markets. The lack of trust worthy information concerning the milieu, especially the dependability of the participants of these markets may lead to suspicion and uncertainty among partakers. The scarcity of trust has become a huge bottleneck of online auctions development [8]. A password-based authenticated key exchange protocol not only allows a user to login remote servers with an easily rememberable password, but also achieves mutual authentication as well. A shared session key is then established for subsequent communication [10]. In this paper the proposed e-auction models for the most popular types of auction which are: forward auction

(English auction) and reverse auction (Dutch auction) are discussed.

The rest of this paper is organized as follows: section 2 describes the related work. Section 3 communicates the proposed models in detail. Section 4 illustrates conclusion.

2. Related work

Timothy Leunga and William Knottenbelt (2011), proposed models for forward auction (English auction) and for reverse auction [1], which describes the mechanism of bidding and its results, as shown in Figure 2(a, b & c).

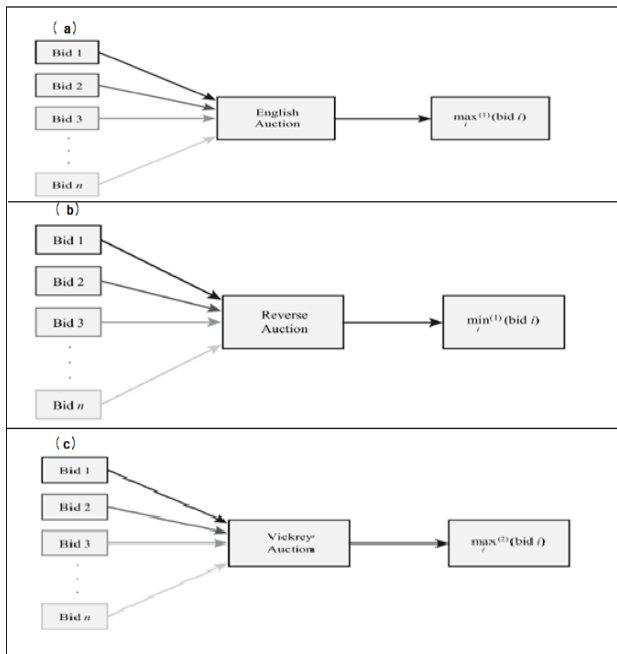


Figure 2: (a) Forward auction model, (b) Reverse auction model (c) Vickrey auction model
Dong-Her Shih, David C. Yen, Chih-Hung Cheng and Ming-Hung Shih (2011),

proposed a model for e-auction for a web services [9], which gives internet connectivity along with database, etc, this model is shown in Figure 3.

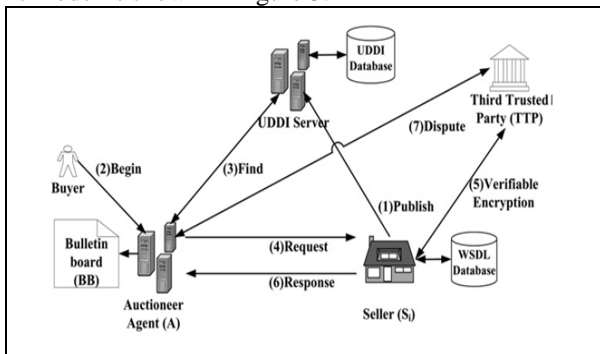


Figure 3: Model for e-auction for a web services

Hong-TwuLiaw, Wen-Sheng Juang, and Chi-Kai Lin (2006), they proposed a scheme for electronic auction [2]. They considered four stages in this scheme which are: advertisement, bidding, exchange of the product, and the payment. This scheme is shown in Figure 4 below:

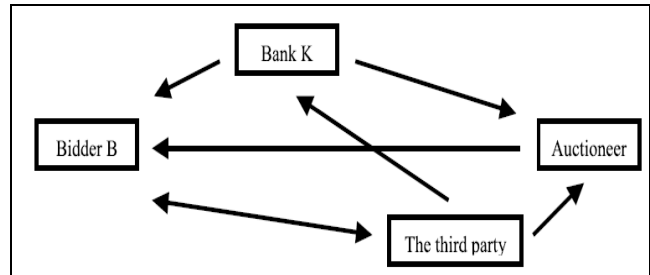


Figure 4: E-auction scheme

3. Proposed model

This section describes three important factors, such as, trust and its significance, reverse auction and forward auction in e-transactions.

3.1. Trust

Business transactions are built on the grounds of mutual trust and co-operation. A malicious vendor or consumer might influence the auction proceedings in a manner inconsistent with the auction rules. For this reason a design is proposed, a kind of trust phase using registration model. The registration model will identify the user using unique identification, and with this, the auctioneer can check and trace the history of the user and based on that information, will wish to abort or continue. The model is shown in Figure 5.

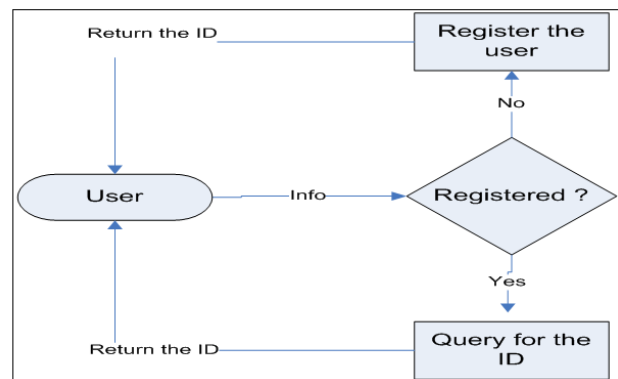


Figure 5: Proposed model for registration

In this model the user will access the registration system. Then the system will make a quick checking in its database to search for any previous information for this particular

user. If the query found any information about this user then the system will pass information and return his ID/details. If the search does not come up with any foul play that can be attributed to the user, the system will then proceed with the registration process and assign him a unique ID for participating in the auction. The registration process is obligatory for both the purveyor and consumer.

3.2. Forward Auction

Figure 6 (a & b) below is the proposed forward auction model for e-Auction system.

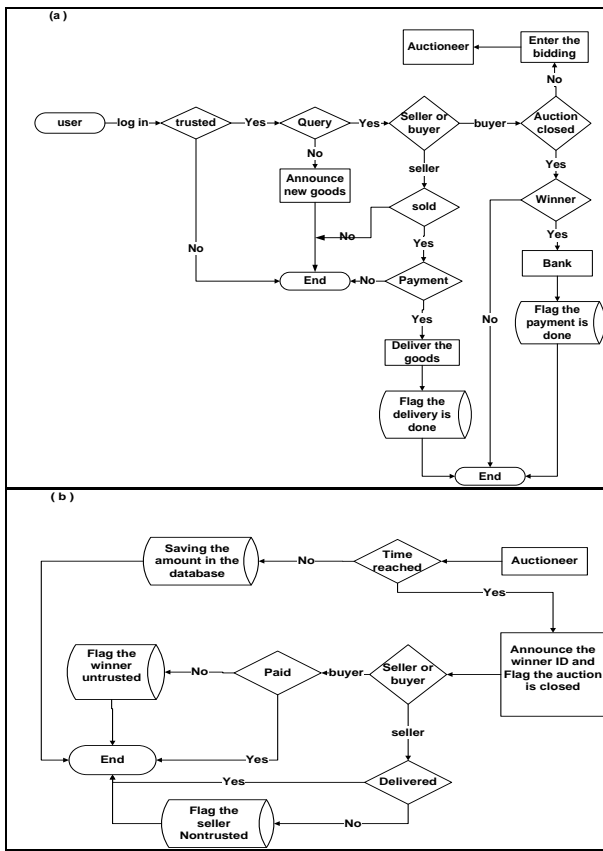


Figure 6 (a) & (b): Proposed model for forward auction

In Figure 6(a), the user login into the auction online system by using the ID. When login is successful the intermediary will check the record, if un-trusted then will not be able to enter into the auction otherwise can access the system. The user can make a query to find goods or can announce for a new one; in such situation the user will be a seller. The user made a query for goods, the system will check the status whether user is a dealer or a consumer. In case if the user is consumer, three cases take place: case 1; the auction is available (running); the consumer can enter in the bidding. case 2; the auction is unavailable (closed) and the consumer is the winner, in this case the

buyer should pay the amount to the auctioneer and system will check the payment statues to be paid and inform the auctioneer. Case 3; the auction is unavailable and the consumer is not the winner; in this case the consumer should exit the system.

In case if the user is dealer, three cases take place: case 1; the goods are available; in this case the dealer should exit the auction. In case 2; the goods are sold and the winner paid the amount to the auctioneer; in this case the dealer should deliver the goods to the winner and the system will change statue to delivered and inform the auctioneer. In case 3; goods are sold and the winner does not pay the amount; in this case the dealer should exit the auction.

In Figure 6(b) the auctioneer is responsible to check three aspects. First: saving the bids to the database. Second: announce the auction's winner and change the auction statues to unavailable (closed). Third: checking the payment statues and delivery statues for closed auction if any of them is not completed; then will be informed change the trusted statues for the malicious (seller or buyer) to "un-trusted". Figure 7 shows the time sequence for the proposed model in forward auction.

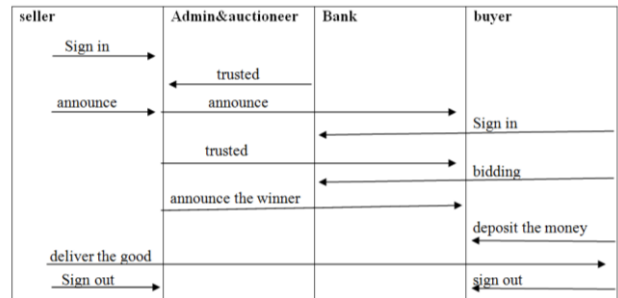


Figure 7: The time sequence for proposed forward auction model

There are four participants: administrator or auctioneer, dealer, consumer and the bank. The seller will login into the auction system then the system check the trusted statues and allow announcing goods. The buyer (bidder) will also login into the auction system then the system will check the trusted statues and allow to bid. If the auction is closed; the auctioneer will determine the winner with the higher price and announce to the bidders. The winner will deposit the amount in the bank; and the seller will deliver goods to the winner. Both dealer and bidder will logout from the auction system.

3.3. Reverse Auction

The proposed reverse auction model is given below in Figure 8.

Reverse auction model in Figure 8 is same as forward auction model but the difference comes when the system check if the user is seller or buyer. In case if the user is

seller three cases takes place: case 1; the goods are available; in this case the seller can enter the bids to the auctioneer. In case 2; the goods are sold and seller whom is the winner, than the buyer deposit the amount; in this case this seller should deliver the goods to the buyer and system will change the delivery statues to be delivered and inform the auctioneer. In case 3; the goods are sold and seller whom is the winner, but the buyer does not deposit the amount; in this case seller should exit the auction system or return to query for other goods.

In case if the user is buyer then two cases takes place: case 1; auction is unavailable (closed); in this situation the buyer should communicates with bank an deposit the amount and the system will change the payment statues to paid. In case 2; the auction is available (running); in this case the buyer should exit the system or return to query for other goods. The rest of the model is same as forward auction model. Figure 9 shows the procedures for the proposed model in reverse auction.

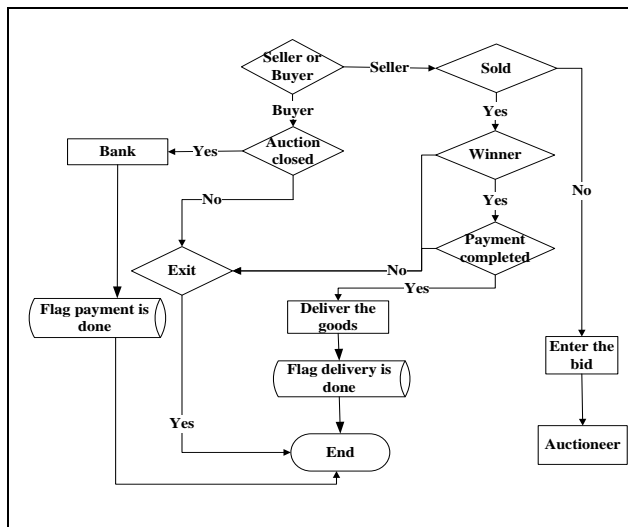


Figure 8: Proposed model for reverse auction

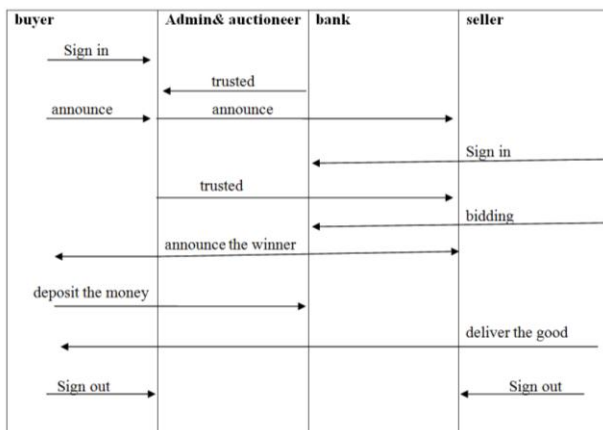


Figure 9: The time sequence for proposed reverse auction model

There are also four participants: administrator or auctioneer, seller, buyer and bank. The bidder will login into the auction system then the system check the trusted statues and allow to request. The seller (bidder) will also login into the auction system then the system will check the trusted statues and allow to bids. If the auction is closed; the auctioneer will determine the winner with the lowest price and announce the seller. The buyer will deposit the amount in the bank; and the seller will deliver goods to buyer. Both seller and buyer will logout from the auction system.

4. Conclusion

In this effort, the proposed models for the most famous types of electronic auction which are forward auction and reverse auction are presented. In these models we took into account the dependency issue that can arise during the e-auction transactions. It must be solved by the trust issue within the registration phase where each seller or buyer should register in the auction using ID to be authentication to access the auction and allowed for authorization/operations. Further, the proposed models also consider the payment procedure and communicate through the auction model with the bank system to allow to the auction's winner to deposit his amount easily, and also enables the auctioneer to check the payment statues before delivering the goods. Furthermore, these models are protecting the e-auction from the malicious sellers and bidders by using a high level of trust and security at different levels of communications.

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