

UNDESIRABLE AND FRAUDULENT BEHAVIOUR IN ONLINE AUCTIONS

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Abstract: Online auctions are a popular means for exchanging items over the Internet. However, are many inherent security and fairness concerns. Participants can behave in an undesirable and fraudulent manner in an attempt to gain an advantage at the expense of rivals. For example, a bidder might seek to suppress the price by bid sniping, or the seller could introduce fake bids to inflate the price. In addition, an outsider or rival seller can lure away bidders by directly offering them better deals, or a malicious seller can auction mis-represented or non-existent items. This conduct is a problem as it results in market failure, thereby inhibiting the usefulness of online auctions as an exchange medium. While cryptography has been used to provide security in terms of bid authentication and privacy, there is no documented means to prevent many of the aforementioned problems. This paper investigates undesirable and fraudulent behaviour in online auctions. We examine the following practices: bid shielding, shill bidding, bid sniping, siphoning and selling non-existent or misrepresented items. We describe the characteristics of such behaviour and how to identify it in an auction. We also provide recommendations for recourse against undesirable and fraudulent participants.

1 INTRODUCTION

Online auctions are one of the most popular destinations on the web. Buyers and sellers can exchange items amongst a worldwide audience from the comfort and privacy of their own homes. Participants remain largely anonymous and can bid in any manner they desire. However, this freedom comes at the expense of new security risks and fairness concerns.

By behaving in an undesirable or fraudulent manner, one party is able to gain at the expense of another. For example, bidders can use practices such as *bid shielding* and *bid sniping* to keep the price low. Alternately, *shill bidding* is a strategy which a seller may pursue, to artificially inflate the auction price. In addition, *siphoning* is a tactic employed by an outsider, who is seeking to profit from an auction by offering bidders a cheaper, identical item. Finally, a seller might attempt to auction a *non-existent or misrepresented item*.

Auction security has been previously discussed in (Franklin and Reiter, 1996; Stubblebine and Syverson, 1999; Trevathan *et al*, 2005). Cryptographic methods have been proposed to solve many of these security issues (see e.g., (Franklin and Reiter, 1996;

Viswanathan *et al*, 2000; Trevathan *et al*, 2006)). However, cryptographic solutions are generally limited to bid authentication and privacy. Protecting auction participants from the aforementioned problems is a much harder task (i.e., a bidder's bidding strategy or misrepresented goods). Furthermore, none of the proposed models in literature specifically address the auction format used in online auctions.

This paper discusses undesirable and fraudulent practices in online auctions. We describe the characteristics of such behaviour, and show how auction participants can identify if they are a victim. We also provide recommendations/options for what to do when such behaviour is encountered. We show how behaviours are related, and when an auction exhibits one form of undesirable behaviour, the other forms soon manifest to counter balance it. This inevitably leads to market failure, and retards the usefulness of online auctions as an exchange medium.

This paper is organised as follows: Section 2 describes the basic format and rules of a typical online auction. Sections 3 through 7 discuss each major form of undesirable auctioning behaviour. Each of these sections includes a description of individual behavioural characteristics, remedies/recourse for

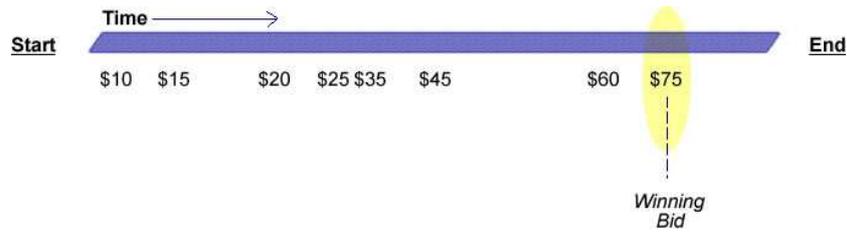


Figure 1: An Example Online Auction.

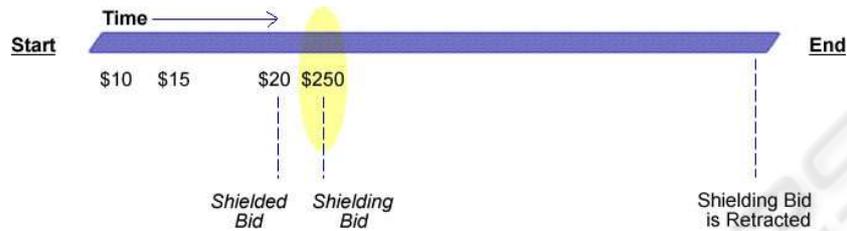


Figure 2: Bid Shielding.

victims and relationships between certain types of behaviour. Section 8 provides some concluding remarks.

2 ONLINE AUCTIONS

There are many types of auction (e.g., Vickrey, CDA, etc.). The most popular type of auction is the English auction. In an English auction, bidders outbid each other in an attempt to win an item. The winner is the bidder with the highest bid. English auctions are commonly employed in online auctions such as those offered by eBay¹ and ubid²

Online auctions differ to traditional auctions in that the auction ends after a given period of time. Figure 1 illustrates a typical online auction (such as that offered by eBay). Time flows from left to right. Bidders can only submit bids between the auction start and end times. Each bid must be for an amount that is greater than the current highest bid. When the auction terminates, the winner is the bidder with the highest bid (in this case \$75).

eBay and ubid offer a mechanism for automatically bidding on a bidder's behalf. This is referred to as the *proxy bidding system* on eBay, and the *bid butler* on ubid. A bidder is only required to enter the maximum price they are willing to pay. The bidding software will then automatically outbid any other bid until the maximum, potentially saving the bidder money. Such

¹<http://www.ebay.com>

²<http://www.ubid.com>

mechanisms remove the need for a bidder to be constantly watching an auction for bidding activity.

3 BID SHIELDING

Bid shielding typically involves several bidders working in collusion with each other, or a bidder with access to multiple accounts. The first bidder enters a bid for the amount they are willing to pay for an item. A second bidder then immediately enters an excessively high bid in an attempt to deter other bidders from continuing to bid. As the auction is drawing to a close, the second bid is retracted. When this occurs, the next highest bid remaining (i.e., the first bid) then becomes the winning bid.

Figure 2 illustrates a bid shielding scenario. Initially regular bidders make a few bids (\$10 and \$15 in this case). The first colluding bidder enters his/her bid for \$20. This is referred to as the *shielded bid*. The second colluding bidder then enters a bid for \$250, which is well above the current bidding range, and is unlikely to be outbid. This is known as the *shielding bid*.

In the example, the shielding bid deters regular bidders from bidding again. Prior to the end of the auction, the second colluding bidder retracts the shielding bid for \$250. The winning bid then falls back to the shielded bid for \$20. As the bid is retracted near the end of the auction, other bidders do not have time to respond. By this stage, most regular bidders have lost interest in the auction anyway.

Bid shielding generally cannot be accomplished as shown in the example due to the presence of software

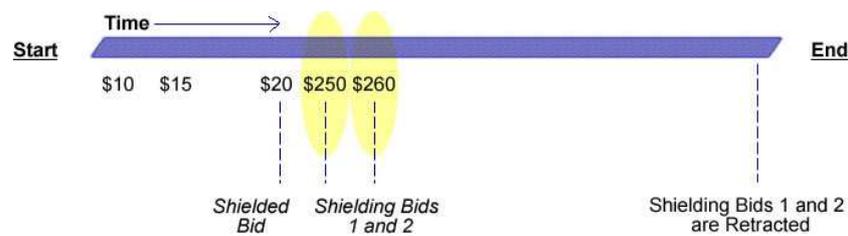


Figure 3: Bid Shielding in Auctions with Automated Bidding Agents.

bidding agents (i.e., eBay's proxy bidding system). As soon as the shielding bid is entered, the bidding history won't show this as a bid for \$250. Instead, this will be listed as the minimal amount required to outbid the shielded bid (e.g., \$21, as \$1 is the minimum increment). Rival bidders will then be inclined to continue bidding, which in turn drives up the shielding bid's value.

Bid shielding in the presence of automated bidding agents can be achieved by using two shielding bids. Figure 3 illustrates this scenario. As in the previous example, a shielded bid for \$20 is submitted. A shielding bid for \$250 is entered followed immediately by another shielding bid for \$260. As the second shielding bid outbids the first, the bidding history immediately reflects the value of the first shielding bid (i.e., \$250), thus giving the appearance of a high price. Near the end, **both** of the shielding bids are retracted. The winning bid then drops to \$20 (i.e., the shielded bid).

This sort of behaviour disadvantages the seller in terms of suppressing the price. Honest bidders are also disadvantaged as they are forced out of the auction.

There are no mechanisms in place to prevent bid shielding. Most auctioneers keep a record of the number of bid retractions made by a bidder. However, the purpose for the record keeping is actually to deter bidders from renegeing on winning bids (i.e., win and then later decide they don't want the good). Retractions that occur before an auction terminates are also typically deemed less suspicious than those that occur afterwards. Furthermore, keeping records on retraction rates is largely useless as bidders can simply register under different aliases.

Another type of price suppressing behaviour is referred to as *pooling* or *bid rigging*. Two or more bidders collude, and agree not to bid up the price. However, this attack is only effective if the number of bidders is small, or the majority of bidders are in collusion.

4 SHILL BIDDING

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.

In March 2001, a U.S. federal grand jury charged three men for their participation in a ring of fraudulent bidding in hundreds of art auctions on eBay (see (Schwartz and Dobrzynski, 2002)). The men created more than 40 user IDs on eBay using false registration information. These aliases were used to place fraudulent bids to artificially inflate the prices of hundreds of paintings they auctioned on eBay.

The men hosted more than 1,100 auctions on eBay from late 1998 until May 2000, and placed *shill bids* on more than half of those auctions. The total value of the winning bids in all auctions which contained shill bids exceeded approximately \$450,000. The total value of the shill bids in these auctions exceeded approximately \$300,000 (equivalent to 66%).

To be effective, a shill must comply to a particular strategy which attempts to maximise the pay-off for the seller. This section provides an insight into the general behaviour of shills. It describes a shill's characteristics and strategies, presents examples of shill behaviour in an auction, and discusses shill detection techniques.

4.1 Shill Mindset

The main goal for shilling is to artificially inflate the price for the seller beyond the limit that legitimate bidders would otherwise pay to win the item. The pay-off for the seller is the difference between the final price and the uninflated price. A shill's goal is to lose each auction. A shill has an infinite budget. If the shill wins, the item will have to be re-auctioned. Resale of each item costs the seller both money and effort thereby eroding the possible gains from shilling.

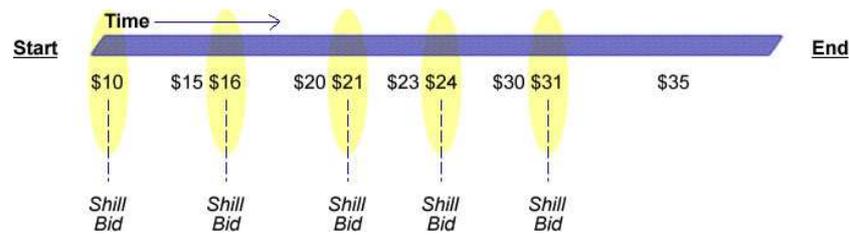


Figure 4: Aggressive Shill Bidding.

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.

4.2 Shill Characteristics and Strategies

A shill has the following characteristics:

1. A shill usually bids exclusively in auctions only held by one particular seller, however, this alone is not sufficient to incriminate a bidder. It may be the case that the seller is the only supplier of an item the bidder is after, or that the bidder really trusts the seller (usually based on the reputation of previous dealings).
2. A shill tends to have a high bid frequency. An aggressive shill will continually outbid legitimate bids to inflate the final price. Bids are typically placed until the seller's expected payoff for shilling has been reached, or until the shill risks winning the auction (e.g., near the termination time or during slow bidding).
3. A shill has few or no winnings for the auctions participated in.
4. It is advantageous for a shill to bid within a small time period after a legitimate bid. Generally a shill wants to give legitimate bidders as much time as possible to submit a new bid before the closing time of the auction.
5. A shill usually bids the minimum amount required to outbid a legitimate bidder. If the shill bids an amount that is much higher than the current highest bid, it is unlikely that a legitimate bidder will submit any more bids and the shill will win the auction.
6. A shill's goal is to try and stimulate bidding. As a result, a shill will tend to bid more closer to the beginning of an auction. This means a shill can influence the entire auction process compared to a subset of it. Furthermore, bidding towards the end of an auction is risky as the shill could accidentally win.

The most extreme shill bidding strategy is referred to as *aggressive shilling*. An aggressive shill continually outbids everyone thereby driving up the price as much as possible. This strategy often results in the shill entering many bids.

In contrast, a shill might only introduce an initial bid into an auction where there has been no prior bids with the intent to stimulate bidding. This kind of behaviour is a common practice in both traditional and online auctions. However, most people typically do not consider it fraudulent. Nevertheless it is still shilling, as it is an attempt to influence the price by introducing spurious bids.

This is referred to as *benign shilling* in the sense that the shill does not continue to further inflate the price throughout the remainder of the auction. A benign shill will typically make a "one-off" bid at or near the very beginning of the auction.

Regardless of the strategy employed, a shill will still be a bidder that often trades with a specific seller but has not won any auctions.

Another factor that affects a shill's strategy is the value of the current bid in relation to the reserve price. For example, once bidding has reached the reserve price, it becomes more risky to continue shilling. However, this is conditional on whether the reserve is a realistic valuation of the item that all bidders share.

4.3 Shill Bidding Examples

Figure 4 illustrates an example auction with aggressive shilling. The shill aggressively outbids a legitimate bid by the minimal amount required to stay ahead, and within a small time period of the last bid. The shill bids force the other bidders to enter higher bids in order to win. The shill does not win the auction despite the high number of bids;

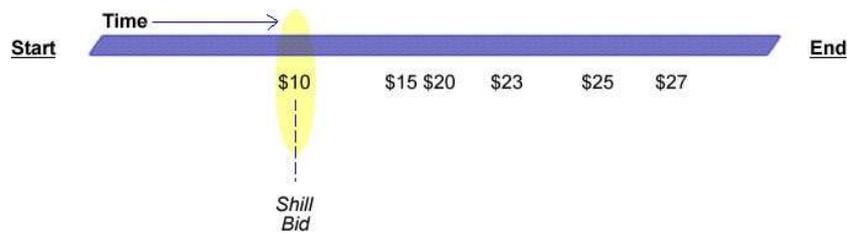


Figure 5: Benign Shill Bidding.

Figure 5 illustrates an example auction with benign shilling. Initially no bids have been made. A shill bid is entered for \$10 to try stimulate bidding. After seeing that there is some demand for the item, other bidders eventually submit bids for the item. The shill does not enter any further bids.

4.4 Shill Detection

There is often much confusion regarding what constitutes shill behaviour. Bidding behaviour that might seem suspicious could in fact turn out to be innocent. Furthermore, a shill can engage in countless strategies. This makes it difficult to detect shill bidding. While the online auctioneers monitor their auctions for shilling, there is no academic material available on proven shill detection techniques.

(Wang *et al*, 2002) suggest that listing fees could be used to deter shilling. Their proposal charges a seller an increasing fee based on how far the winning bid is from the reserve price. The idea is to coerce the seller into stating their true reserve price, thereby eliminating the economic benefits of shilling. However, this method is untested and does not apply to auctions without reserve prices.

We are developing techniques to detect shill bidding (Trevathan and Read, 2005). Our method examines a bidder's bidding behaviour over several auctions and gives them a shill score to indicate the degree of suspicious behaviour they exhibit. Bidders who engage in suspicious price inflating behaviour will rate highly, whereas those with more regular bidding behaviour will rate low. A bidder can examine other bidder's shill scores to determine whether they wish to participate in an auction held by a particular seller.

The shill score has been tested using simulated auctions involving real world people. To facilitate testing we implemented an online auction server (see (Trevathan and Read, 2006)). Several types of tests have been conducted. The first type involves auctioning fake items to real bidders. Each bidder is allocated a random amount of money, which they use to bid in the auction. Even though bidders don't actually receive the item, these tests manage to recreate the men-

tal drive and desire to win. Winners are excited and often boastful after a hard fought auction. One person (namely the author) is tasked with being a shill in order to stimulate bidding. The shills goal is to increase the price as much as possible, without actually winning the auction.

When the shill score is used on these auctions, it clearly identifies the shill bidder. It also exonerates innocent bidders that bid in a regular manner. The shill scores for a series of tests is given in Figure 6. In this case, the bidder known as Shelly is the shill bidder. Shelly engaged in aggressive shilling behaviour and consequently has a shill score that is over nine. This is clearly much higher than the other bidders. The results from these tests are thus far encouraging.

We have also conducted similar auctions using real items (e.g., bottles of wine and collector's edition playing cards), where the winner was required to pay real money. In these settings, bidders are more cautious. However, the shill was still able to influence the auction proceedings and also was detected by the shill score. (Note that all shilling victims were fully reimbursed!) Furthermore, the shill score has been tested using commercial auction data and simulations involving automated bidding agents.

5 BID SNIPING

Bid sniping is another undesirable type of bidding behaviour. A bidder who employs a sniping strategy is referred to as a *sniper*. A sniper will only bid in the closing seconds of an auction, thereby denying other bidders time to react. This essentially prevents the sniper from being outbid.

Figure 7 illustrates the mechanics of bid sniping. Regular bidders enter their bids as normal. In the closing seconds, the sniper enters a bid for the minimum required to win (i.e., \$41). The bid entered by a sniper is referred to as a *sniper bid*. None of the other bidders have time to outbid the sniper bid, and therefore the sniper wins.

Sniping behaviour is the exact opposite of shilling. A sniper's goal is to win the auction for the lowest

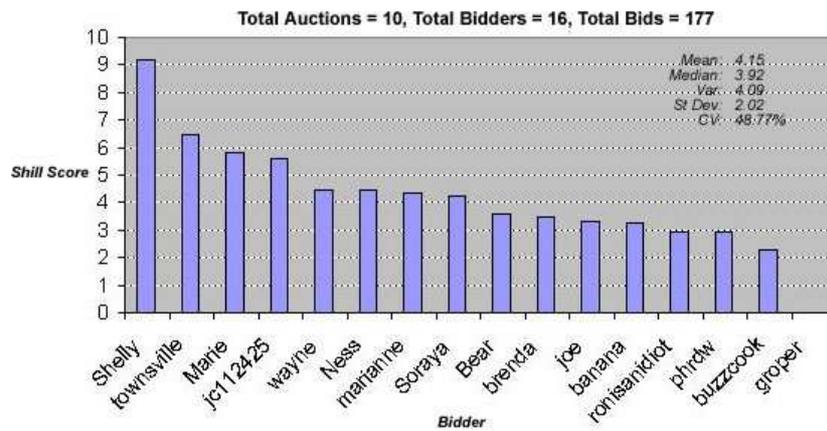


Figure 6: An example of the Skill Score when run on auction simulations containing one aggressive shill.



Figure 7: Bid Sniping.

price. Whereas a shill’s goal is not to win and to inflate the price. Sniping is often used as a preventative measure against shilling. A sniper may not be able to prevent shilling occurring during an auction. However, the sniper can prevent themselves from being shilled.

Sniping disadvantages regular bidders in that they are denied the opportunity to respond to the sniper bid. Bidders are typically frustrated when they realise that sniping has occurred. This is especially the case when a bidder has observed an auction for a long period of time, only to be beaten in the closing seconds. The seller is also potentially disadvantaged by sniping, as the sniper bid does not stimulate rival bidding, that might have occurred, had other bidders been able to respond.

Sniping is permitted on eBay, although its use is discouraged. Instead eBay recommends that a bidder should only place a single bid at his/her maximum valuation using the proxy bidding system. Despite this recommendation, sniping is rampant, and is now considered as a natural part of the online auctioning experience. (Shah *et al.*, 2002) performed a study into the amount of sniping in 12, 000 eBay auctions. Their results showed for the majority of auctions, a significant fraction of bidding occurs in the closing seconds.

A *sniping agent* is a software bidding agent that fol-

lows a sniping strategy. The sniping agent constantly monitors an auction, and waits until the last moment to bid. Many companies now exist such as Bidnapper.com³, ezsniper⁴ and Auction Sniper⁵ which offer sniping agents for use on eBay auctions.

uBid auctions differ to eBay in that auctions terminate using a timeout session. Once the ending time of an auction has been reached, the auction is extended for ten minutes for each bid received. This limits the effectiveness of sniping, but can lead to a show down between snipers. As a result the auction can run for a lot longer than the seller anticipated. The seller can enforce a maximum extension limit to prevent the auction continuing indefinitely. However, this results in the auction being essentially the same as a normal auction without a timeout session.

The only preventative measure for a bidder against sniping, is to “out-snipe” the sniper. However, this often results in there being *multiple snipers* in an auction. This behaviour leads to failure of the English auctioning process. If everyone engaged in sniping, the auction would essentially become a *sealed bid* auction. In a sealed bid auction, bidders submit their bids secretly during a bidding round. At the close of

³<http://www.bidnapper.com>

⁴<http://www.ezsniper.com>

⁵<http://www.auctionsniper.com>

bidding, the Auctioneer determines the winner. English auctions on the other hand are *open bid*, and allow bidders to bid multiple times. In a traditional offline English auction, sniping cannot occur. Sniping is a feature unique to online auctions. Sniping behaviour blurs the boundaries of an online auction between the type of auction it is and the rules that govern it.

6 SIPHONING

Siphoning (or bid siphoning) refers to the situation where an outsider observes an auction and contacts bidders offering them an identical item at a better price. The outsider is referred to as a *siphoner*, and is said to “siphon” bids from the auction. The siphoner benefits in that he/she does not incur any of the costs involved with organising and advertising an auction.

Siphoning disadvantages the Auctioneer through lost revenue. That is, the siphoner does not have to pay the Auctioneer to list/advertise an item. Siphoning also disadvantages the seller whose auctions are being siphoned. This is in a form of price undercutting (i.e., the siphoner offers the item at a better price), and reduces the demand for the seller’s items. A bidder who does business with a siphoner loses the protection offered by the auction, and exposes themselves to fraud (e.g., misrepresented or non-existent items).

Siphoning may also be used in conjunction with shilling. When a shill bid accidentally wins, the seller of the item can contact the next highest bidder, and directly offer them the item. This saves the seller the time and expense of re-auctioning the item.

Consider the following scenario: A seller is auctioning off a traditional Japanese sword. A legitimate bidder enters a bid for \$1000. The seller then enters a shill bid for \$1200. The legitimate bidder refrains from bidding and the shill bid wins. Later on the legitimate bidder is approached by the seller. The seller claims that the winner is a *dead beat*⁶, or has backed out of the deal due to financial or other personal reasons. The seller then offers the item to the bidder at, or near, the bidder’s price of \$1000.

Siphoning combined with shilling disadvantages both the bidders and the Auctioneer. Bidders are forced into paying an inflated price due to the shill bids. The siphoning component this time does not affect the seller, but rather the Auctioneer. This is because the seller does not have to repeat the auction and is denying the Auctioneer revenue from listing fees. The seller in effect has “siphoned” bids from his/her own future auctions.

⁶A bidder that has won an auction and fails to make payment.

Siphoning is impossible to detect by the Auctioneer alone. Instead bidders must report the behaviour once it has happened to them. However, most bidders are aware of what siphoning is, and probably wouldn’t recognise that they have been siphoned. Furthermore, if a bidder receives a better price, or an item they really want, then they would not see such behaviour as undesirable. In this case they are unlikely to report it.

There is no clear law regarding siphoning. The only advice to bidders is to decline communication with anyone that contacts them outside of the official channels. In addition, if you were not the winner of an auction, don’t accept an item from the seller after the auction has ended.

7 NON-EXISTENT OR MISREPRESENTED ITEMS

A dubious seller might attempt to auction a non-existent item, or misrepresent an item. In the first instance, the seller accepts payment from the buyer but doesn’t deliver the item. In the second, the seller misrepresents the item by advertising it as something it isn’t, or delivers an item of lesser value. In the shill case described in Section 4, the men misrepresented paintings as being significant works when they were inexpensive replicas (see (Schwartz and Dobrzynski, 2002)).

To ensure that an item conforms to its description, eBay recommends that buyers study the seller’s photos. However, this is unsatisfactory as the seller can simply copy pictures from a legitimate item, and post these for the non-existent/misrepresented item.

eBay also recommends asking the seller questions regarding the item. However, a seller may simply lie. Furthermore, some bidders might be reluctant to ask questions as they desire anonymity. For example, if the bidder has a high profile, they might want to conceal the fact that they are bidding. This might occur in the case where the bidder feels that their privacy would be compromised in some manner (e.g., reveal that they have a fetish for an item), change other bidders’ perceptions of the item (e.g., stimulate unwanted bidding), or influence the seller to raise the reserve price.

Another recommendation is to check seller feedback. eBay has a system where buyers and sellers can leave feedback regarding their dealings with each other. A party to a transaction can rate their experience as either good, neutral or bad. An individual is given a rating based on the feedback received. However, feedback ratings are not a reliable measure of an individual’s integrity, and feedback can be falsely generated using multiple bidder accounts.

Online auctioneers offer a dispute resolution proce-

where a buyer can initiate action against a seller if an item was not received, or if the item is different from what was expected. If a seller constantly does not deliver items, the Auctioneer can revoke his/her account. However, the seller can simply re-register under a different alias.

Insurance can be offered to buyers for items not delivered. eBay has created a successful off-shoot business, PayPal⁷, for guaranteeing online transactions. However, launching an insurance claim can be an arduous process, and might not fully compensate the victim. Furthermore, it can require the compensated funds to be spent by participating in future auctions. In addition, it is only a solution that can be used **after** fraud has occurred.

Escrow fraud is an emerging threat to online auctions. A fraudster sets up a fake escrow service for paying a seller for an item. When the winning bidder wires the money to the escrow agency, the agency vanishes along with the payment. Neither the seller receives the payment, nor does the winner receive the item. The following are typical characteristics of an escrow scam:

1. Check for poor grammar on the escrow site.
2. Although site may look authentic, it is usually copied from a legitimate site such as Escrow.com⁸ and Auctionchex⁹.
3. There are obvious give-aways in the **Terms** page, which is generally stolen from another site.
4. A site will often leave hints of what its previous incarnation was - especially if they've just changed domain names recently.
5. Be wary if the seller insists on using a specific escrow site. Sellers don't usually press for escrow, buyers do.

Bidders must be wary of the escrow service they use, and not do business with unknown or un-trusted escrow vendors.

8 CONCLUSIONS

Online auctions are susceptible to undesirable and fraudulent behaviour. Such behaviour is designed to influence the auction in a manner that either favours a bidder, the seller, or an outsider seeking to profit from the auction. This results in market failure, and reduces the usefulness of online auctions as an exchange medium.

This paper investigates undesirable and fraudulent trading behaviour, and discusses its implications for

online auctioning. We show how to identify such behaviour and give recommendations for recourse against undesirable and fraudulent participants.

Bid shielding is a practice employed by one or more bidders to suppress bidding and keep the price low. There is no means to protect against bid shielding, other than to exclude users with a high bid retraction rate. However, a bidder can use a fake name to re-register.

Alternately shill bidding is a practice employed by the seller to artificially inflate the price by introducing spurious bids. Shill bidding is strictly forbidden by commercial online auctions, and is a prosecutable offence. There is limited material on shill bidding and prevention/detection techniques. We are presently developing a method to detect shill bidders by giving them a ranking called a shill score. A bidder can use the shill score to decide whether they want to participate in an auction held by a particular seller.

Bid sniping is a strategy employed by a bidder to prevent being outbid. A sniper submits a bid during the closing seconds of an auction, thereby denying other bidders time to react. Many bidders engage in sniping behaviour in an attempt to prevent themselves from being shilled. Sniping is permitted in online auctions, but is discouraged. Commercial sniping agents are available that engage in sniping behaviour on the bidder's behalf. Sniping can be reduced by enforcing a timeout limit which extends the auction by several minutes for each new bid received after the auction's termination time. The prominence of sniping behaviour raises concerns regarding the effectiveness of online auctions to conduct English auctions according to traditional rules.

Siphoning refers to the situation where an outsider observes an auction and offers an identical item to the bidders at a lower price. The siphoner avoids all of the costs associated with conducting an auction, and effectively profits from the seller. Siphoning is often used in conjunction with shilling, and scams involving non-existent or misrepresented items. Siphoning behaviour should be reported to the Auctioneer, however, there is little more that can be done.

A malicious seller can offer non-existent or misrepresented items to profit from unsuspecting buyers. It is recommended that bidders inspect photos and ask questions. However, a seller can post fake photos, lie in response to questions, and a buyer might want to remain anonymous. eBay's feed back rating is a mechanism for gauging the integrity of a buyer/seller, however, it is dubious at best. Insurance can reimburse victims of fraud, but is not a complete solution. Escrow fraud is emerging as a threat to insurance-based fraud prevention measures and is difficult to identify. The best advice is for a buyer to be wary of the goods they are bidding for.

The popularity of online auctions and the over-

⁷<http://www.paypal.com>

⁸<http://www.escrow.com>

⁹<https://auctionchex.com>

whelming number of flawless transactions, is a testament to the success of online auctioning. Nevertheless, some participants are disadvantaged by undesirable or fraudulent behaviour. Preventing such behaviour is a difficult task and existing solutions are largely inadequate.

Buying items from online auctions is the same as buying items anywhere online. A buyer cannot physically inspect the merchandise as in a “bricks and mortar” store. The buyer is forced to rely on the item’s description. Distances between buyers and sellers can be vast. This makes it hard to police transactions that go awry, especially when buyers and sellers cross political and cultural boundaries.

The best recommendation is *caveat emptor*. Don’t deal with unknown sellers, or sellers who reside in countries which do not have strict enforcement of international commerce laws. Ensure that you thoroughly research the item you are bidding for.

1841 of *Lecture Notes in Computer Science*, Springer-Verlag, 412-426.

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