Developing online auction with behavioural and intuitive functions

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Abstract: This paper discusses the techniques and methods in developing a web-based auction site which integrates behavioural targeting into its design. This paper further presents and explains several theorems in achieving behavioural and intuitive approaches to online auctioning process.

The system, called i-BID, is developed using Web 2.0 standards in its design to demonstrate the implementation of the behavioural and intuitive approaches. This online system is objectively developed to provide users with a rich, intuitive, and efficient interface.

i-BID was rated high on the ‘ease and intuitiveness’ criterion while the general impact of the behavioural targeting functions of the site is fairly high.

Keywords: online auction; behavioural targeting; BT; intuitive functions.


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1 Introduction

Being economical is considered a cliché nowadays because of the current economic crisis. People are only capable of buying a fair amount of things because of the decline in their purchasing power. With this, people need to earn more to be able to spend more. In order to earn more, people are exploring every profitable initiative that comes to mind, and one of it is selling old but usable items. This also benefits the buyers; while the sellers earn, buyers are able to save money.

Among the hindrances encountered by sellers wishing to sell used items in the market are the lack of possible stores where they can display their items and the limited number of potential buyers given limited access to item. Renting out a stall remains an option, but this is not favourable to the sellers as this competes with their earnings. Garage sales may also be explored, but given the limited area, the previously mentioned concerns may be hardly addressed. Most viable is going for something that assures wider coverage of the target market as this pushes up the chances of the items being sold.

On the part of the buyers, shopping for items in the market has its own drawbacks. They tend to spend more time looking for items that suit their preferences. Buyers also tend to haggle for the least possible prices, but because supermarkets hardly budge, the buyers are left with a limited variety of items. Unless they move from one market to another, which worsens the concern on time, they are also unable to compare prices and find the right item. This becomes more difficult when looking for a novelty item.
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The effectiveness of using computers, specifically the internet, as a tool for business started to gain ground a few years back. This technique is now known as ‘electronic commerce’ or ‘e-commerce’. It facilitates and features the link among suppliers, distributors, manufacturers and buyers. E-commerce continues to grow and has been adopted by various industries in order to maintain a competitive edge against competitors (Cameron, 1997).

“The tremendous response to e-Commerce from both the public and the corporate world has forced people to consider it as the next revolution in the history of our civilization.” (E-Commerce, 2000)

The use of e-commerce has resulted in the term ‘electronic marketplace’. According to Pitcher as cited in the study entitled ‘Electronic commerce and the transformation of marketing’ by Dholakia et al. (n.d.), it said that electronic marketplaces provide consumers with a plethora of information and choices. An abundance of goods is available just a click away. Online auction is a successful product of e-commerce which trend in terms of use remains up.

1.1 Online auction

An auction is defined as a public sale of items to the highest bidder (Webster, 2002). Online auction differs in that it uses the web to sell products and let interested buyers bid for a particular item. An online auction has a wide variety of items available and serves as a storefront wherein sellers can promote everything (Montaldo, 2008). Further, Montaldo presented two types of online or internet auctions:

1. business-to-person, wherein the site itself has physical control of the item and also receives payment for sold good

2. person-to-person, wherein the individual sellers or smaller businesses possess the merchandise and offer them for auction directly to consumers; after the last and highest bid, it will be the duty of the seller to deal with the buyer directly and arrange for payment and or delivery.

1.2 The behavioural approach

Analysing consumer’s behaviour plays a significant role in the context of e-commerce, more specifically at online auctions. It would be beneficial to consumers if they are provided with information that is relevant to their interests. This process of evaluating consumers’ behaviours is known as ‘behavioural targeting’ (BT). In this process, information on the browsing behaviour, such as searches made or pages visited user profiles, and other online activities are being collected in order to predict buyers’ preferences in order to develop appropriate advertisements (VanBoskirk, 2005; Koran et al, 2008; What_is_BT.htm, 2008). BT gives an edge in that it offers consumers merchandise that can most likely influence him to buy the said merchandise. Simply put BT provides at least two (2) benefits to consumers:

1. receive content or advertisements that are germane to them

2. gain better online experience, which means that they will not waste time on looking for items they want because it is already provided for them.
For the advertisers and or sellers, BT also offers benefits namely:

1. recognise consumers that are attracted to their items
2. supply relevant advertisements which most likely influence their prospected buyers on purchasing the item
3. enhance advertising performance, reduces waste, and more importantly increase their return of investment (HowToTarget, 2008).

1.3 Intuition approach

Intuition is a term which refers to the perceiving of the truth of something immediately without reasoning or analysis (Webster, 2002). In connection to this, intuitive user interface denotes an interface that is readily understandable to its users without the need of special knowledge (Bærentsen, 2000). Bærentsen said that:

“Anybody can walk up to the system; see what kind of services it affords, and what should be done in order to operate it. While operating the device, navigation and manipulation of the system interface should proceed without the need for conscious awareness of the sensory- motor operational aspects of the interface.”

Furthermore, Bærentsen said that an intuitive user interface supports learning of the operation and functions offered by a system, which are yet unknown to the user, but in a way that it is not perceived as ‘teaching’.

According to a web usability consultant, Niekelsen (2001), an intuitive user interface must consider the usability of the system thus, should have these components:

- **learnability**, how the user accomplishes the basic task in the first encounter of the interface
- **efficiency**, how quickly the user performs the task after learning the interface
- **memorability**, how the users easily re-establish proficiency after a period of not using the interface
- **errors**, how many inaccuracies, oversights or mistakes do users make and how these can be easily recovered
- **satisfaction**, how the interface provides for a pleasant experience.

Achieving these components of usability will more likely establish an intuitive user interface. Niekelsen quoted:

“To design an easy-to-use-interface, pay attention to what users do, not what they say. Self reported claims are unreliable, as are user speculations about future behavior.”

In addition, in designing a user interface, Lidwell and Butler (2003) recommend making use of the 80-20 rule which states that 80% of the effects generated by a large system are brought about or caused by 20% of the variables in that system. This is useful in focusing resources thus, allowing for greater efficiency in design. Since all elements in design are not created equally, the 80-20 rule can be used to assess the value of elements and target areas for redesign and optimisation. Non-critical functions that are part of the less
important 80% can therefore be minimised or removed all together from the design in favour of efficiency.

2 Related works

2.1 Online auction sites

Online auction sites have been around for more than a decade now, though actual real life auction venues have been around since around 500 B.C. These Roman auction houses, atrium auctionarium, sold items for a seller to the highest bidder while taking a commission from these transactions (Reynolds, 2008). Auctions have been continued throughout the centuries, but the establishment of actual auction houses in Europe came centuries after the fall of the Roman Empire. Two of the oldest standing auction firms, Sotheby’s and Christie’s were established during the 18th century.

In modern times, auction firms continue to operate, and with the emergence of the internet, it was only a matter of time before online auction sites started to spring up. What auction sites do is basically create a market where people can find things they may be interested in, as well as sell items they may not need for profit.

One of the most famous online auction sites is eBay (http://www.ebay.com), formerly Echo Bay Technology, which was founded in 1995 (Salkind, 1999) by Pierre Omidyar, Jeff Skoll, and later joined by Harvard Business School graduate Meg Whitman in 1998. It only started with collectible and home items, but later branched out to include Disney and GM, which are high profile sellers. This was the start of eBay being one of the big business hosting auctions (Mullen, 2005).

Overstock.com (2010) is also an online auction site and a closeout retailer that sells discount brand-name merchandise. The company was founded in 1997 and was first named D2: Discounts Direct. In 1999, it changed its name to Overstock.com. Its headquarters is situated at Salt Lake City, Utah. Patrick Byrne, who is the Chairman and CEO of Overstock.com, owns nearly 40% of it.

The company offers an online auction service which acts as an online market place for buying and selling products. The company offers products like watches, jewellery, sporting goods, books, magazines, video games, DVDs, apparel, designer accessories, electronics, computers and many others. Its closest competitors are Amazon.com, Buy.com, and SmartBargains.com.

2.2 Auction sites in the Philippines

The success of auction sites relies heavily on its users. Users who are willing to put up items as well as purchase them are the driving force behind such sites. As seen with Bidshot Wireless Services, Inc. (2007), a local auction site, there are clearly a huge number of items available to potential buyers. One issue with Bidshot, however, is that due to the number of items for sale, there is a tendency for older items to go unnoticed. This is one aspect that the group wishes to improve on, as will be discussed later in this paper.

Another local auction site is known as Auction.ph Corporation (2006). Corporation provides online market service where businesses and consumers sell and buy goods or avail of services either through auction or outright purchases. The company is situated at
Clark Special Economic Zone (CSEZ) in Pampanga, Philippines, led by President Oh Hyuk.

The company boasts of the strength of its member-oriented features and services. It assures the security and reliability of payments and transactions through their Escrow System. It is convenient because it can be accessed anytime, anywhere. Buyers will be presented with a wide variety of items. It also hopes to take the lead in the online auction market in the Philippines by developing various options and by providing buyer-oriented services.

Because of its contributions in information technology in the country, the company was welcomed to the business community by the Philippine Chamber of Commerce and Industry (PCCI). It was also accepted by MEGALINK consortium, Rizal Commercial Banking Corporation, and UNIONBANK – known financial institutions in the country – for its delivery of secure and efficient payment transactions. With these citations, Auction.ph has become one of the most trusted online auction sites in the Philippines.

However, auction sites are not without its problems. The most dangerous encountered is fraud as this strikes directly at the users of the site. Given this, the group will look into certain measures in order to prevent fraud and tighten accountability.

2.3 Sites with BT

Tacoda, which was founded in 2001, is a BT site that has the ability to provide possible marketers with an overall view of a site’s audience. They are able to do this by merging the information gathered from the audience through existing data sources like ad servers, e-mail databases, etc. with the subscription, contest, and registration data. This process enables Tacoda to get a demographic profile of the audience as well as their site behaviours, providing the marketers with important and useful information (Baker, 2004).

A post-search service is also one of the ways used for targeting users, which come in the form of relevant ads often appearing after leaving the search site. They are cookie-based; therefore, personal information is not requested. AlmondNet is one of the sites that use this technique. They use post search to gather what people search, through its partnerships with other sites and internet service providers or ISPs (Sullivan, 2005).

Other sites also use search profiling in targeting users with specific needs. Thus, the ads are served a few days after the initial query, allowing advertisers to reach consumers in the final stages of the buying cycle (Clay, 2006). Yahoo launched an advertising programme they called as Yahoo Impulse which allows them to serve subsequent graphical ads from participating advertisers for a tailoring period of 48 hours by tracking a user’s Yahoo cookie. Yahoo captures a user’s query and categorises them (Perez, 2005).

Another site with BT is Amazon.com. While a user views an item, it recommends items purchased by other users who have purchased the current item. This is similar to one of Newegg.com’s features which suggest items that other users have purchased as well. Newegg is a computer hardware online retailer based in the USA. Aside from this, Newegg also suggests similar items to the current item that a user is looking at based on the model of the product.

The system will integrate both of these features into its design, though changing the parameters that these functions rely upon, e.g., changing models to brands fitting the same category, in order to make it work better with the openness of the system.
Newegg also has an in depth and user-friendly search which provides users with greater accuracy by allowing them to be very specific in their search. Users are able to specify categories, models, manufacturers, interfaces, etc. The system will base on this searching/browsing method to a certain degree since unlike Newegg, which focuses on computer merchandise, the system is open to almost all kinds of items that can be sold under the law.

A 2004 study by AOL’s Advertising.com (2004) has found a definitive link between behaviourally targeted online ads and clicks through rates. The study concluded that users responded well to advertisements that drew upon their online behaviour. What this means is that marketers can employ various techniques in airing ads meant to target a certain demographic. They may use the content of a site for specific kind of ads its users would be more responsive to as seen in video gaming sites, blogging sites, and the more risqué sites. Other ads could be aired based on the time of day to target a certain demographic active during those hours. These are similar to ads shown on local television where there is a tendency that those aired in the morning are more focused on the Filipina housewife (e.g., children’s milk, detergent bars, etc.), while those aired during the evenings have a mix for the Filipino man (e.g., alcohol, cigarettes, etc.).

A research report based on behavioural done by 24/7 Real Media (2007) revealed that BT in online ads can greatly boost reach and return on investment. However, it is to be noted that the effectiveness of BT varies on the kind of service making use of it. In fact, the study has conceded that BT is not appropriate for all kinds of services. Going by the figures noted in the study, BT is more suited for services that cater towards customer preference like Hotel Recommendation Services. However, for services like DSL providers, BT in their ads was shown to not be effective due to the fact that there is not much in the way of user preference to go by.

The above studies prove that BT would work well on an online auction site as user preference in these sites can be quite abundant. What this means is that users have different tastes and do not generally bid for the same kinds of items as other users; and since such sites offer different goods, it would be beneficial to users to be able to see items that they are interested in that could otherwise go unnoticed if not brought to their attention.

2.4 Intuitive user interface

An interactive and intuitive user interface strengthens the appeal as well as productivity of a site. Take for instance Moo Print (http://uk.moo.com), which was launched in 2006. The service takes orders for cards and prints them but with one key difference: Users are allowed to design these cards themselves using the site’s richly interactive interface. There is no need to download and install software; everything is done within the browser itself. Moo Print has mentioned that their compelling interface has resulted to astounding responses and now costumers are flocking to use their services.

Another site that has recently undergone an overhaul (circa 2007) is Gamespot (http://www.gamespot.com). The site mainly covers video games, however, it is to be noted that it has one of the most compelling and interactive designs as far as gaming websites are concerned. The site also offers minimal behavioural content that is integrated seamlessly into the interface. The site suggests games similar to the one the user is currently looking at, and does so in an unobtrusive manner. With its rich and
interactive interface, Gamespot, has become the most popular and preferred website by gamers when they need information related to games.

In addition, Yahoo! Mail has redesigned their interface in a way that it will be advantageous to the users because it is easier to use. According to a Yahoo spokesperson, Diana Lee, the redesign provides an overall improved user experience in view of the fact that it is more streamlined, integrated and innovative. Further, the redesign added features like financial broadcast and subscription services (Olsen, 2002). The Yahoo! Mail Beta messages also appear faster; the system does not wait for the entire page to reload since it is built using AJAX. Other features of Yahoo! Mail Beta include the **tabbed messages**, which allow users to quickly shuttle between the inbox and messages; keyboard shortcuts to skip steps and get things done faster; **drag and drop organisation** that makes messages easy to arrange and group, etc. making it sleeker, faster, and smarter (CNET Archive, 2005).

It is clear that a rich, intuitive, and interactive user interface can greatly increase the popularity of a site, something which is important when it comes to generating traffic. The group aims to achieve this effect with the proposed system by implementing a compelling user interface.

### 3 The i-BID

i-BID is an online auction site being developed applying BT function and an intuitive user interface. Among the BT functions included in the development of i-BID are:

- listing the most looked up items in a product category
- listing auctioned items that match the interests of a user as he/she has provided in his/her user profile
- listing of items based on the user’s online habits only within the system
- listing items that were previously viewed by other users who have viewed the current item being looked at by the current user
- listing-related items, for example, auctioned items that are of the same brand or model with the currently viewed item.

While more of a feature, the entire system is built with an organised interface. It is integrated with Web 2.0 standards and applying AJAX. The system uses PHP for its functional content and MySQL for database purposes. The project strongly makes use of PHP sessions as well as cookies for most of the behavioural function.

Because the system needs to generate income for its daily operations, i-BID offers advertising for businesses. Businesses will only be allowed to advertise but are not allowed to post items on the auction site like the regular sellers. See Figure 1 for the i-BID’s homepage.

Among the limitations of i-BID is that it is designed not to handle online payments. It only acts as a platform for the seller and the buyer to conduct their business. This means that monetary transactions for payment of goods will be based upon the agreement of both parties and that the system shall not handle monetary transactions in any way.
4 Theorems used

4.1 Bayes’ theorem

This theorem was named after the Reverend Thomas Bayes who started work on it is often used to compute posterior probabilities given observations. For instance, if a person is given a set of symptoms, the theorem can be used to compute the probability that a proposed diagnosis is correct. Bayes’ theorem relates the conditional and marginal probabilities of events A and B (Swinburne, 2005).

Here, \( P(A|B) \) is the likelihood of A given fixed B. So using this theorem, one may be able to surmise the likelihood of a user’s preference given previous information B.

Another application is the auto-categorising of items wherein one may be able to find the likelihood of an item belonging to a certain category ‘A’ based on the frequency of words in category ‘B’ found in its description. This means one is able to check for the most likely category that an item belongs to; based on the frequency of words in its description identified with the said category.

4.2 Relative frequency of choice

As the name states, frequency of choice is relative to each person. One person makes different frequent choices than others. By keeping tabs on frequent choices made by a user, one is able to surmise or get a general idea of his/her interests. This is also
integrated into the system and used to check what kinds of items a user have general interest in (Pruitt and Adlin, 2006).

The idea of keeping tabs can also be used in auto-categorising (perhaps coupled with Bayes’ theorem) of items simply by checking the number of times certain keywords turn up in an item’s description, which the system then uses to decide where to assign a certain item.

4.3 Argumentum ad populum

Argumentum ad populum, which is Latin for ‘appeal to the people’ is another framework for the BT. While the phrase is better known as a logical fallacy based on how many people believe in it, it is from there where we can conclude that having many people interested in it will cause others to, at the very least, take interest in it as well. A hot item may be something that a user is looking for, so the system incorporates this and shows the user the popular (most viewed) items in various categories (Tan, 2003).

4.4 Aesthetic relativity

i-BID also made use of sociology’s theory of taste, which is defined as being relative. It states that while different persons have different preferences, there are those who share common interests. It is in this regard that the proposed system suggests similar items that have been previously viewed by other users to be made available to the current user. So if User A shares similar tastes with User B (an assumption made based on the fact that they have viewed the same item), User A might also be interested in other items viewed by User B (Lidwell and Butler, 2003).

Finally, the system refers the user to sites containing items similar to the one he is currently looking at.

4.5 Aesthetic usability effect

The aesthetic-usability effect is a condition whereby users perceive more aesthetically pleasing designs to be easier to use, regardless if they are in fact easier to use or not (Lidwell and Butler, 2003).

The system also made use of this effect in its design in order to make users feel at ease with the interface.

5 Methods used in BT

5.1 String search algorithm with Boolean logic

The system made use of a simple string search algorithm that simply returns items that match the string being searched based on the number of matching strings. However, the algorithm will not ignore other items with less string matches, and will instead display them as near matches. It will also incorporate Boolean logic into the searches to allow users to have more control and accuracy over searches.
5.2 Breaking string into words

This method is for breaking down entire blocks of text into individual words which results in an array of words. It checks mainly for whitespace or any other word delimiter specified, and will also check for Boolean operators. Boolean operators will still be stored in the word array and will be used when this array is utilised in a search. This algorithm is fundamental to the other algorithms requiring the breakdown of entire blocks of text.

The source for the string to be broken down varies depending on the process making use of it. So it can either come from user input or from stored data in the database. The ‘last point’ variable is basically the last point with a character that is not a delimiter. So in the phrase ‘ABCD EFG’, the last point at first would be ‘A’. When it explodes, everything from A to the character before the whitespace is cut forming a word, making the last point ‘E’. If the string is empty, the algorithm should return an empty array which is to be handled by the module it returns to.

The array in the two processes which cut characters from last point refer to the same array: the two processes are separated because the process flow to the right handles the storage of Boolean operators. Delimiter here refers to white space as well as other characters that signify the beginning of another word (like comma, colon, semi-colon, etc.).

5.3 Determining user’s interests

This method, as well as the rest, will make use of the two previously mentioned algorithms. What this algorithm does is check a user’s text description of his/her interests, break this down into words, omit any common word, and then store the remaining words in the database as tags that are of interest to a user (as in items that relate to those tags are of interest to a user).

5.4 Search algorithm

The search algorithm will make use of the array of words resulting from the previous algorithm. It then runs through this array of words and checks the number of words. From there, it decides to do a regular search or a Boolean search. Although the Boolean AND and OR searches are done automatically, if the word array contains a Boolean operator, it will strictly follow that operator (i.e., the phrase ‘red plastic screwdriver’ would result in a search for ‘red AND plastic AND screwdriver’ as well as ‘red OR plastic OR screwdriver’, however the phrase ‘red + plastic screwdriver’ would result in a search for ‘red AND plastic AND screwdriver’ as well as ‘red AND plastic OR screwdriver’).

There is no need to check whether the search string is empty, since the system should be able to inform a user that his/her search field is empty before sending the data to the server with the ‘Submit’ button, using AJAX.

If no results are found, the process still points to the display symbol as it merely sets the search result value to ‘No Results Found’ but will not display this in the span of the process. This will instead be displayed in the next step.
5.5 Displaying items based on user’s interests

This method makes use of the result of the previous algorithm and then runs it through the database in order to find items which share tags that are of interest to a user.

5.6 Tag generation

Tag generation is the process of breaking down an item’s description and name, and then proceeds to omit common words before storing the remaining words in the database as tags.

Since this occurs after a user clicks on the ‘Submit’ button in order to upload an item, there is no need to retrieve the item name and description from the database as it is already on hand. It is, however, stored in the database for use in other modules.

Once it has been broken down, the resulting array of words is then checked, hence the looping and checking of each element in the word array. A multidimensional array will also be created which will store a word and its respective repetition count (how many times it appears in the word array). If a word is not to be omitted and is unique entry is created for it in the multidimensional array with its repetition count set to 0. If it already exists (hence not unique), then there is no need for a new entry to be added to ‘Count Words’, but simply increase the respective repetition count value by one.

5.7 Tag cloud generation

Tag clouds are basically groupings of tags related to an item, with the more relevant tags (more recurring) given prominence. What this algorithm mainly does is to give prominence to more related tags when displaying.

Since the data is already sorted when generated as a tag cloud, the top tags are the ones on top of the array with the least at the rear/end.

5.8 Displaying popular items

This method is for displaying popular kinds of items based on search tags from the previous day. It obtains the search tags (tags of results from items searched) from the previous day of all users, then stores these results and checks them for number of recurrences to indicate the most popular tags. The top 10 most popular search tags are then searched in the database (to find items that have these tags). These items are then checked for the number of shared tags (sorted based on common tags) and the top results are displayed.

Search tag array is simply the array where you store the retrieved tags from the ‘searches’ table. There should not be any problem if the number of items does not reach ten as the system will just take the top tags. The top 10 is simply the limit of tags or items the system will take for these processes. This is done with performance in mind, since if there are too many tags or items to process, then this could potentially bog down the system.
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5.9 Auto-categorisation

Auto-categorisation makes use of tags to classify items. If there are not tags yet for a category, it looks up associated words in a table to determine the correct category. The data is stored in multidimensional arrays for looping purposes as well as to easily keep track of the points a category gets (which determines where an item belongs to).

5.10 View auctions other users bid on

This method is for checking the other auctions that current bidders of an auction have placed a bid on in the past. This algorithm only searches for active bids (hence these auctions are active) as it would be pointless to search for auctions that are already closed.

Note that the ‘count’ variable here is for the loop, while ‘auction count’ is used to determine the recurrence of an auction. This is used to determine which auctions are more related (based on group interest of the bidders) to the current auction.

5.11 View similar items

This method is for viewing similar items, which are items that share the same tags as the currently viewed item.

5.12 Preemptive search (recommendations based on previous searches)

This is the method for showing newly added items that match the tags of the previous search results of a user. Sorting is based on the number of previously searched tags that are present in an item.

5.13 Sort algorithm

Modifications may occur based on the data to be sorted but these are simply to the values assigned to the variables. The first process will call the second process to the right in order to sort the elements in the array. The right element becomes the pivot element. Returned value ‘i’ is such that all elements lower than pivot element come before it, all elements greater than the pivot element come after it. This method checks if there are at least two values to be sorted.

6 Other data sources

6.1 Acquisition of the price of an item for the ‘setting the buyout price’ module

The data needed will be acquired from Amazon via the Amazon Promotions RSS Feed which is available through the Amazon Associate Web Service. This RSS Feed is available at http://www.amazon.com/Product-RSSFeeds/b/ref=sc_fe_c_0_12738641_12?ie=UTF8&node=390052011&no=12738641&me=A36L942TSJ2AJA. Since RSS is an XML-based format, the information found in it can be processed easily with PHP because of the way XML’s output is formatted.
It is necessary to sign up for Amazon, as an access key to the Amazon web service (AWS) is required in order to make use of the feed. The user name, password, and access key of the created account will be used in the PHP script to connect to the AWS. This information will be final and there will be no need to create further Amazon accounts.

6.2 Acquisition of the exchange rate for the ‘currency conversion module’

The data needed will be acquired from the European Central Bank’s Exchange Rate XML Feed found at http://www.ecb.int/stats/eurofxref/eurofxref-daily.xml. This information is always up to date so concerns regarding accuracy should not be an issue.

i-BID made use of the European Central Bank’s feed, since the Central Bank of the Philippines does not have an XML feed for the exchange rates. What this means is that conversion will be done with respect to the Euro (i.e., conversion flows from Philippine Peso to Euro to the desired currency).

Apart from the Philippine Peso, the system accepts the following currencies: US Dollar, Canadian Dollar, Hong Kong Dollar, Japanese Yen, and Euro – all are found in the XML feed.

The PHP script for acquiring the data will be very similar to the one used in acquiring the data from the AWS feed except that, instead of an item price, the script will obtain the exchange rate of the specified currencies with respect to the Euro. See Figure 2 for the flowchart.

7 Hardware, software and peopleware consideration

i-BID should be hosted on an Apache sever with support for PHP 5 and up as well as MySQL DBMS by an offshore service to minimise expenses. For running it on a local machine, users may use WAMP. Other browsers especially text browsers are not officially supported but as long as they are JavaScript enabled and can make use of the JavaScript object ‘XMLHttpRequest’ then they should be able to handle the system. Outdated versions of the four common browsers are not supported and users are required to update to at least Mozilla Firefox 1.5, Opera 9, Microsoft Internet Explorer 7, and Safari version 3 in order to fully experience i-BID. Since i-BID only requires that the browser is capable of supporting AJAX, a user may make use of any Operating System, provided that it has the supported browser installed. A computer with a Pentium III processor or equivalent, 256 MB of RAM, as well as an internet connection of at least 128 kbps, will be needed in order for users to have a good hassle-free experience.

Users can access i-BID using the latest version of the four popular browsers (Mozilla Firefox, Opera, Microsoft Internet Explorer and Safari). However, because of the way some browsers handle AJAX (an example of this is most of Google’s web applications and Opera), users browsing the site will possibly experience minor differences between browsers, although these differences are only cosmetic and should not affect the functionality of the site.

The administrator and moderator should have adequate knowledge of the system in order to administer the system properly. The maintenance personnel should be familiar with PHP, MySQL, as well as Javascript and XML as implemented in AJAX. Since the system is developed using the model-view-controller architecture (MVC), maintenance personnel need only to be familiar with the aspect of the system that they are tasked to
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maintain. Hence, those tasked with maintaining the ‘business rules’ of the site only need to be knowledgeable in PHP and MySQL, while those responsible for the design aspect need only need to be familiar with AJAX and general web page design.

**Figure 2** Acquisition of the price of an item for the ‘setting the buyout price’ module
Figure 3  i-BID’s data flow diagram
8 Testing and evaluation

An evaluation and beta testing were done to a group of 32 testers to validate the behavioural and intuitiveness of the proposed system. The following are the components of the intuitiveness evaluation:

a. overall impression of the site
b. layout and page setup
c. ease and intuitiveness of navigation
d. use of colours.

On the other hand, a separate survey was used to validate how i-BID is effective in terms of its BT approach.

The respondents were also asked to rate the overall impact of the site based on four general criteria: overall impression of the site, layout and page setup, ease and intuitiveness of navigation, and the use of colours. It was highly rated in the ease and intuitiveness criterion. This means that the site has met one of its two main goals, which is intuitiveness.

The respondents were asked to rate the impact of the BT functions based on the two criteria, which are the accuracy of the auto-categorisation and the efficiency of behavioural functions. The general impact of the BT functions of the site is fairly high, with the accuracy of the auto-categorisation getting 7.91 points and the efficiency of behavioural functions receiving 8 out of the perfect 10 points.

9 Summary and recommendation

The site has met the goals they have set on intuitiveness and behavioural functions. The respondents who have tested the site had positive feedback. This proves that the site is effective in implementing its intuitive and behavioural functions.

The proposed system offers the following benefits: easy tracking of products to users as the system is based on their choices and interests; enhanced surfing experience because of an intuitive user interface; more efficient decision-making as similar items can be viewed to compare prices; inclusion of online habits (e.g., previous searches of another user) in the BT functions; utilisation of a currency converter for hasslefree bidding; and systematic updating of users’ interests and preferences based on adjustments made by the users to their profiles.

All information needed by the system for the purpose of BT shall be acquired legally and morally. This means the system shall not intrude on the privacy of the user by tracking his/her behaviour outside the site, or by employing other methods that would provide the same result. All information gleaned by the system for BT purposes shall be acquired within the site and with the knowledge and consent of the user.

The system will secure the privacy of both sellers and buyers while using the system. As an added feature, it will prevent as much as possible known online auction frauds particularly shill bidding, bid shielding, and misrepresentation in order to discourage criminals from using the system to victimise users. It will also prohibit the creation of
multiple accounts by the same user. This will assure the bidders that the auction of the item will not be manipulated by the seller.

A thorough review of the database architecture is currently conducted for large and bulk auctions. It is to be enhanced to apply the theory of negativism and further streamline and integrated any advanced and complex search criteria.

Research on behavioural functions should be more extensive. An anti-fraud function would also help so that the proposed system will be more secured.

References


MOO Print Limited, Available at http://uk.moo.com/.
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