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E-Commerce Standard Users Interface: Design and Implementation

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Abstract

A rapidly growing segment of the Internet is e-commerce. The future of economic competitiveness for most enterprises relies on entrance and active participation in the e-commerce market. About a third of the time users fail when they try to purchase products on an e-commerce site. An essential problem with e-commerce is that the controls and organization are different for each site. There is no standard way of building the navigation of the e-commerce site. Most sites do not have a global navigation system and the local one may be confusing, like solving a maze. The objective of this study is to provide an implementation method by which an agent of the artificial intelligence (AI) user interface creates a standard navigation menu to increase the usability of e-commerce. The selected menu items of the e-commerce standard user interface are based on a study of the graphical user interface (GUI) used in Windows environment and an evaluation of one hundred and two (102) e-commerce sites. The ideal standard navigation menu, E-menu, could cross over entire e-commerce sites in the World Wide Web (WWW) environment. The E-menu system considers the global level, which is simply to say "buy-your-stuff-and-leave" by clicking on a very straightforward navigation standard menu.

Key words:

E-commerce, Usability of E-commerce, Standardization, Standard User Interface, Navigation Menu, Artificial Intelligent Agent, Intelligent Agent, E-menu

1.Introduction

Web users today are very impatient. They require immediate recognition and ease of use to spend time viewing a web site. Navigation menu is a vital issue for e-commerce. Getting lost in a large e-commerce site can be confusing and frustrating. The navigation menu provides the flexibility of movement without overwhelming the user with excessive options. In effect, e-commerce sites have to be sensitive to the fact that shoppers are amateurs and they are looking for sites that appeal to their level of capability. The site's providers need to make navigation systems dramatically simpler. A standard navigation menu may sound complex, but it is actually as simple as letting the users jump around a site without clicking through levels of hierarchy. If we compare the e-commerce sites to Windows programs, most Windows programs have a standard graphical user interface (GUI) that they use to communicate to the user. The most standard part is the menu bar and the drop down menus. Any user who has been using Windows for any length of time can navigate with some degree of proficiency through any Windows application (Allum,1998). The same cannot be said for e-commerce sites. A recent study of one hundred and two (102) e-commerce sites helped to determine how the menus would look and function. Since it would be impossible to change every site in the Internet or to convince every site to conform, an e-menu system was needed that would change the site on route.

The goal of this study is to minimize users' look up time and make e-commerce sites usable so visitors can easily and quickly access information. This study provides a method by which an agent of the artificial intelligent user interface creates a standard navigation menu to enhance the usability of e-commerce. The selected menu items of the e-commerce standard user interface are based on a study of the graphical user interface (GUI) used in Windows and an evaluation of one hundred and two (102) e-commerce web sites. The standard navigation menu, called E-menu, can cross over the entire e-commerce sites in the World Wide Web (WWW) environment. The E-menu system considers the global level, which is simply to say "buy-your-stuff-and-leave" by clicking on a very straightforward navigation standard menu.

2.Problem Statement

E-commerce is changing how businesses market their products, and how they serve their customers and business partners. About a third of the time users fail when they try to purchase products on an e-commerce site (Nielsen & Norman, 2000; Zona Research, 1999). In reality, what happens is not just that the user fails, but that the site fails and does not sell a thing. Is "lost-in-hyperspace" (Theng & Thimbleby, 1998) a symptom of poor design? An essential problem with e-commerce sites is that the controls and organizations are different for each site. There is no standard way of building the site's navigation (Nielsen, 1998 & 1999). Most sites do not have a global navigation system and the local one may be confusing.

3.Standardization

Consider the effect if every telephone you used had the numbers in different positions? It would be very confusing. Since the dawn of time, we have known that standardization is one of the strongest contributors to usability (Nielsen, 1999). In mainframe days, IBM had big projects to get everybody to use the same function keys (Shirky, Webber, Newcomer & Jaworski, 1999). The Macintosh was based on a detailed book of "Apple Human Interface Guidelines" published in 1987 that were followed by almost all applications. One of the main benefits of the Macintosh and later Windows over earlier systems was the resulting standards that made it possible for users to use software right out of the box. For example, people knew that they could move stuff around by a sequence of select-object, cut-command, scroll-to-new-location, click-on-insertion-spot, paste-command (Nielsen, 1999). The Cut and Paste commands are always abbreviated Command-X and Command-V. There is no real reason people should associate the letter V with insertion or pasting, but since it is always the same, it works (Nielsen, 1999). Similarly for the Web, following design standards simply ensures that users know what you are talking about. You are still the one who decides what story to tell and how to put the design elements together.

4.Navigation System

It is no surprise that many studies list navigation as a key driver of online purchases (Tilson, Dong, Martin, & Kieke, 1999). As many web sites are non-linear, the use of tools to aid navigation around a complex site is essential in helping users find their way. Merchants often drive away sales with poorly designed web sites that make it difficult for a willing shopper to buy a product. If a site makes purchasing easy, it will probably have a much higher rate of converting visitors into buyers. Bort (1999) lists five top components of a usable site: intuitive navigation, clear instructions, features that help the visitor with the site's goals, salesmanship and customer support. Especially on the first principle of intuitive navigation, Bort (1999) claims that without a clear understanding of what the site sells and how to navigate it, customers might get lost, or worse, leave. For intuitive navigation, one click is the benchmark. The best navigation system allows the visitor to get anywhere in the site with one

click. Besides, Bort (1999) states that a related strategy and good practice in general is placing a navigation bar in the same place on every inside page, usually at the top of the page or along the right or left side. These spots are prime real estate for e-commerce sites, since they load first. Conversely, navigation bars on the bottom are less amenable to usability. The site structure should be based on what the customer wants, such as easy navigation, as opposed to how the company is organized (Gehrke & Turban, 1998).

Wilson (2000) points out that too many web sites make sense to a company-insider, but are obscure to a Web visitor. Navigation systems determine a path to be traveled by any object through any environment in the field of e-commerce. They are central in helping users to find the information they need from the e-commerce site. Apart from being a key aid in finding information, navigation systems also play an important role in maintaining the orientation of the user. Navigation is the process by which a user explores all the levels of interactivity, moving forward, backward, and through the content and interface screens. A good navigation system will leave the user with little question about where they are in the document and where they can go from there.

4.1.Standards Navigation Menu

The success of e-commerce for any enterprise, especially if it is not a well-known name, is greatly dependent on the appropriate design of its web site. Without efficient and user-friendly navigation, the user is likely to get confused, lost, or frustrated and leave the site for good. Gehrke and Turban (1999) propose that a navigation bar on each page seems to be the best navigation device and a user can then skip from page to page without getting lost. Standard navigation systems seem to play a key role in improving the overall usability of e-commerce sites.

Nielsen (1998) redesigned Sun's web site, which contains several goals such as facilitating navigation of the increasingly large site, providing a unified visual appearance for the highly heterogeneous content, making search available from every page, and ensuring high usability and a quality user experience. Sun's web site is extremely large (over 22,000 pages in 1998) and has a wide variety of content. Sun's web site has a large amount of highly diverse content. Because of Sun's highly diverse content. Nielsen used a strongly stated unifying visual look of the navigation template (see Figure 1).

Figure 1 Unifying visual look of the navigation template.

To unify the appearance of the highly heterogeneous content, Nielsen decided to use a visually striking page template that could surround a wide range of page content with a uniform set of navigation options as Figure 2 shows. Universal options appear across the top of the page where they will be prominent when the page loads; special options for the current part of the site appear down the side in a colored stripe that remains visible no matter how far down the user scrolls. The flipped-L navigation area is dominated by the company's logo

color. Sun's new design also provides two kinds of navigational information to users--navigational breadth and depth.

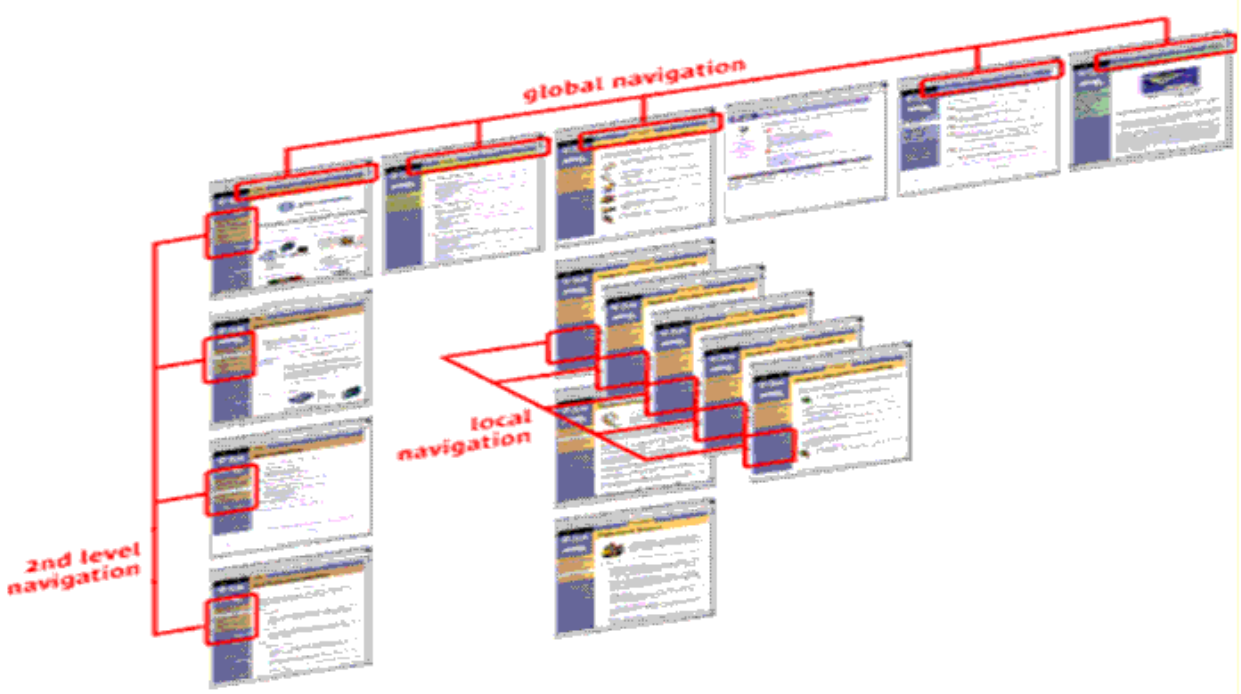


Figure 2 Sun's new web template by Nielsen (1998)

"Breadth" shows users which other options are available at a given level of the hierarchy. Sun's templates provide breadth at two levels: global and local. The very top level of the site structure is visualized across the top of the horizontal navigation bar, giving users a global indication of the total scope of content that is available to them. Local alternatives are listed down the side of the vertical navigation stripe. The user's current location is highlighted to provide a sense of place. "Depth" shows users where their current location fits within the structure of the site. Ideally, depth is visualized as a path from the home page down through all levels of the information architecture, revealing all higher-level structures inside of which the current page is nested. The advantage of the visually striking page template is that the design follows the hierarchical information architecture; however, the drawback is that only the designer understands the hierarchy. For most users, it is hard to get a strong feeling of what the company is doing. In contrast, the E-menu system of this study considers only the global level, which is simply to say "buy-your-stuff-and-leave" by clicking on a very straightforward navigation standard menu. Obviously, the E-menu system is a highly useful and functional design for pure e-commerce sites.

4.2.Evaluation of 102 E-Commerce Sites

E-commerce usability is a complex problem involving the interdisciplinary issues of human-computer interaction, software engineering and cognitive psychology (see Figure 3). Through the evaluation of one hundred and two e-commerce sites and comparing the differences of navigational properties among the selected sites, three problems related to human-computer interaction in e-commerce are stated, including sites that are hard to use, not customer-centered, and that require a high click stream. The problems relating to cognitive psychology in e-commerce include site inconsistency and the ease with which the user could become

"lost in hyperspace." The problems relating to software engineering in e-commerce are that the sites contain no standard navigation systems and are poorly designed. All of these problems are related to and are direct causes of poor usability.

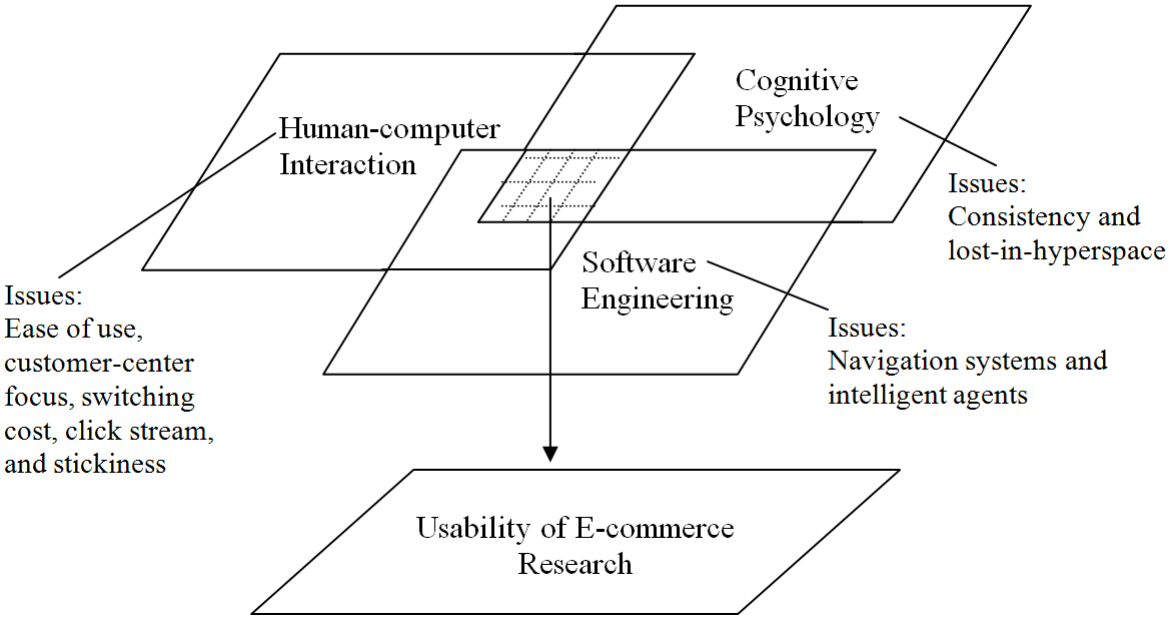


Figure 3 An interdisciplinary approach to the usability of e-commerce.

To increase usability through standard user interfaces, a standard user interface system (called the E-menu system) is introduced. The design of the E-menu system is implemented in this study to solve the usability problem of e-commerce. The E-menu system is a new solution that is a productive problem-solving approach for designing a usable e-commerce site. The prototype of the E-menu system is implemented in JavaScript and Java. Figure 4 outlines an overview of the methodology in this study.

The source list of one hundred and two e-commerce sites to be evaluated was adapted from the site lists of Top Rankings Media Metrix 500 Press Room, top5sites.com, GO2NET 100 hot shopping sites and the recommended shopping sites from the magazine "Texas Technology." The main criterion for the evaluation of the e-commerce sites was based on customer experiences (Nielsen, 1999 and ZDInternet.inc., 1999). To decide whether a particular e-commerce feature goes on the good or bad list, three questions were asked while the evaluation was proceeding: Is the site something that customers would appreciate? Will customers like this feature and come back to use it again? And does this feature help customers accomplish their goal? Table 1 displays the source list of one hundred and two e-commerce sites.

Nielsen (1999) suggests that affirmatives for each of three questions are most easily obtained by doing the same as everybody else. If most big web sites are designed in a certain way, then follow along, since users will expect the features to work the same as on other sites. Jakob's Law of Web User Experience (1999) suggests that users spend most of their time on other sites, so that is where they form their expectations for how the Web works. After evaluating the one hundred and two e-commerce sites, the most common used forty-two features which are most beneficial to customers are listed in Table 2.

ID	Names	E-Commerce Sites
1	1-800Usahotels	http://1800usahotels.com/
2	AltaVista Shopping	http://www.shopping.com/
3	Amazon	http://www.amazon.com/
4	AOL	http://www.aol.com/shopping/
5	Apple Computers	http://apple.com/
6	Auction Universe	http://www.auctionuniverse.com/
7	Auctions	http://auctions.com/
8	Autobytel	http://www.autobytel.com/
9	Barnesandnoble	http://www.barnesandnoble.com/
10	Best Video	http://bestvideo.com/
11	Beyond	http://www.beyond.com/
12	Big Star	http://www.bigstar.com/
13	BlueFly	http://bluefly.com/
14	boo	http://www.boo.com/
15	Buy	http://www.buy.com/
16	BuySafe	http://www.buysafe.com/
17	CDUniverse	http://www.cduniverse.com/
18	Cdnow	http://www.cdnow.com/
19	Cheaptickets	http://cheaptickets.com/
20	Chumbo	http://www.chumbo.com/
21	Columbia House	http://columbiahouse.com/
22	Compaq Computers	http://www.compaq.com/
23	CompUSA	http://compusa.com/
24	ComputerDiscountWarehouse	http://www.cdw.com/
25	coolsavings	http://www.coolsavings.com/
26	Cool Shopping	http://coolshopping.com/
27	Cyberflicks	http://cyberflicks.com/
28	Dell Computers	http://www.dell.com/
29	Drugstore	http://www.drugstore.com/
30	DVDEXPRESS	http://www.dvdexpress.com/
31	EMusic	http://www.emusic.com/
32	E*TRADE	http://www.etrade.com/
33	Ebay	http://www.ebay.com/
34	EddieBauer	http://www.eddiebauer.com/
35	Egghead	http://www.egghead.com/
36	EToys	http://www.etoys.com/
37	EWanted	http://ewanted.com/
38	Expedia	http://expedia.com/
39	FAOShwartz	http://fao.com/
40	Fashionmall	http://fashionmall.com/
41	Fingerhut	http://fingerhut.com/
42	flooz	http://www.flooz.com/
43	Freeshop	http://www.freeshop.com/
44	Furniture	http://www.furniture.com/
45	Garden	http://www.garden.com/
46	Gateway2000USA	http://www.gw2k.com/home/
47	Gear	http://www.gear.com/
48	GONetwork	http://www.go.com/
49	GORP	http://www.gorp.com/
50	guess	http://www.guess.com/
51	iDot	http://idot.com/
52	iFlorist	http://iflorist.com/
53	iMALL	http://www.imall.com/
54	insight	http://www.insight.com/
55	iQVC	http://iqvc.com/
56	IUMA	http://www.iuma.com/
57	iWant	http://iwant.com/
58	JCrew	http://www.jcrew.com/
59	JCPenney	http://www.jcpenney.com/
60	KBKids	http://kbkids.com/
61	Kmart!	http://www.bluelight.com/
62	Levi Strauss	http://www.levistrauss.com/
63	Lowe's	http://www.lowes.com/
67	mySimon	http://www.mysimon.com/
68	Netmarket	http://www.netmarket.com/
69	Netscape Shopping	http://webcenters.netscape.com/
70	Netzip	http://netzip.com/
71	nick	http://www.nick.com/
72	Office Depot	http://officedepot.com/
73	OfficeMax	http://www.officemax.com/
74	OnSale	http://onsale.com/
75	Oxygen	http://www.oxygen.com/
76	PCFlowers	http://pcflowers.com/
77	PetSmart	http://www.petsmart.com/
78	Priceline	http://priceline.com/
79	Proflowers	http://www.proflowers.com/
80	QVC	http://www.iqvc.com/
81	RandomHouse	http://www.randomhouse.com/
82	RedRocket	http://www.redrocket.com/
83	Reel	http://www.reel.com/
84	REI	http://www.rei.com/
85	Shop	http://www.shop.com/
86	Shopnow	http://www.shopnow.com/
87	SpencerGifts	http://www.spencergifts.com/
88	Stupid	http://stupid.com/
89	The Gap	http://www.gap.com/
90	TicketmasterOnline!	http://www.ticketmaster.com/
91	TowerRecords	http://towerrecords.com/
92	Toysrus	http://toysrus.com/
93	Travelocity	http://travelocity.com/
94	Truly Texas	http://trulytexas.com/
95	uBid	http://ubid.com/
96	Viamall	http://www.viamall.com/
97	Victoria's Secret	http://www.victoriassecret.com/
98	Video Flicks	http://www.videoflicks.com/
99	Virtual Flowers	http://www.virtualflowers.com/
100	Vitamin Shoppe	http://vitaminshoppe.com/
101	Wal-Mart Online	http://www.wal-mart.com/
102	Wine master	http://www.billwadewinemaster.com/

Table 1 The Source List of One Hundred and Two (102) E-commerce Sites

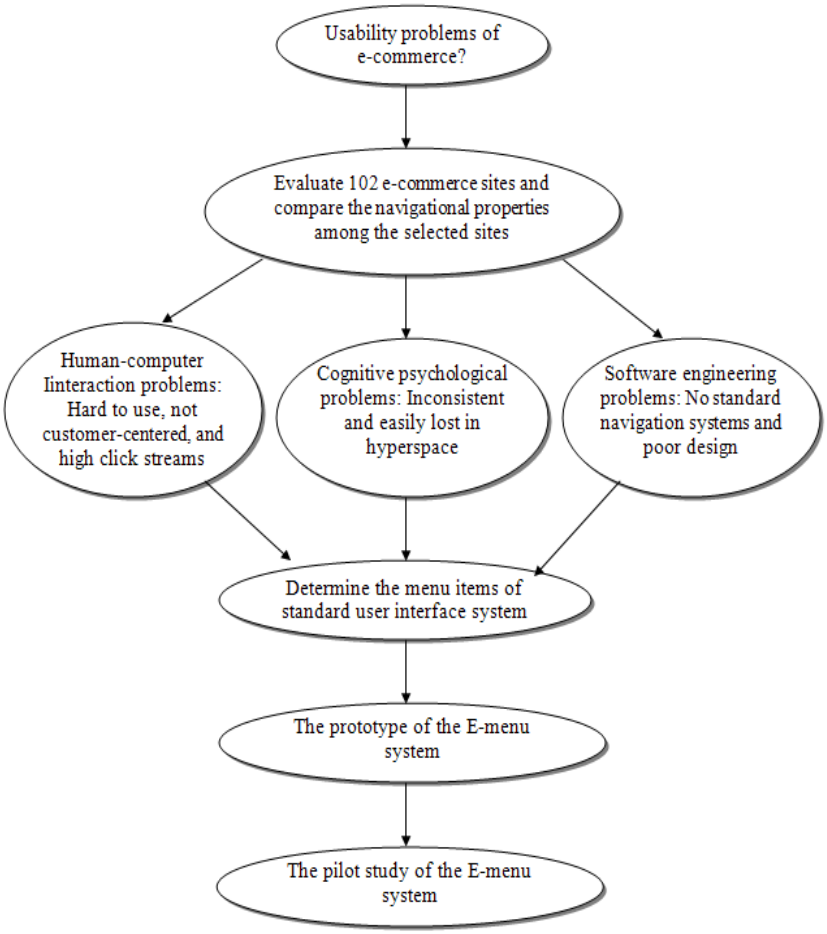


Figure 4 Overview of Methodology.

1. Privacy Page	14. Return Policy	28. Financial Services
2. Security Page	15. Phone Order	29. Wish List
3. Kid's Privacy Policy	16. Store Locator	30. Rebates Information
4. User Agreement/ Copyright/Terms of Use	17. International Services	31. Coupons/Discount Information
5. Company Information	18. Jobs	32. Catalog Request
6. Contact Us	19. Affiliate Program	33. Gift Certificate
7. Customer Services/Help	20. FAQ	34. Warranties
8. Tech Support	21. Free E-mail Account	35. Advertise Page
9. My Account/My Profile	22. Collecting E-mail List	36. Shopping Chat
10. Sign-in/Check Out	23. New Visitors' Guide	37. Customer Testimonials
11. Search	24. Customer Satisfaction Survey	38. Site Awards
12. Order Status/Shopping Cart	25. Y2K Compliance	39. Payment Options
13. Ship Information	26. News/Press Room	40. Express Check Out
	27. Feedback Information	41. Credit Card Application
		42. Fair Credit Billing Act

Table 2 Selected Forty-Two Features of One-Hundred and Two Site's Evaluation

When the feature exists on the e-commerce site, the corresponding field is marked 1; otherwise, the field is marked 0. The total scores for all existing features are listed in the second column. The ten highest frequencies from the forty-two features on the one hundred and two e-commerce sites were selected to build the E-menu system, since these ten features are listed on most of the e-commerce sites. Table 3 lists the results of the five highest scores and the five lowest scores from the e-commerce sites on the list. From the evaluation results, the e-commerce sites with the five highest scores are viewed as good e-commerce sites, the five lowest scores as bad e-commerce sites, because they do not have the commonest features of most sites.

5 Highest Scores	Total Scores	5 Lowest Scores	Total Scores
Furniture	28	iFlorist	9
TicketmasterOnline!	27	1-800Usahotels	6
uBid	27	ColumbiaHouse	5
KBKids	27	Shop	4
Barnesandnoble	26	TrulyTexas	2

Table 3 Results of Five Highest Scores and Five Lowest Scores for the E-commerce Sites

The highest score of the e-commerce sites is the Furniture site twenty eight; the lowest score is the Truly Texas site two. The items of the standard navigation menu are chosen by the following table, in which is listed the ten highest frequency variables (see Table 4).

5.Standard User Interface System: E: Menu System

The idea behind the E-menu system is that all e-commerce sites should have some type of standard navigation systems. Most e-commerce sites lack the fundamental design necessary to facilitate navigation of the site. There are numerous studies reporting the fact that e-commerce sites are failing in usability, ease of use and general functionality. E-menu may be the solution to these problems. E-menu acts as an intelligent agent between the user and the e-commerce site. E-menu analyzes each site that the user visits and creates a standard menu so that the user will always have a standard navigation tool.

The purpose of the E-menu system is to create standard navigation menus for all e-commerce sites. The E-menu server accomplishes this task by intercepting a HyperText Transfer Protocol (HTTP) request from the user in a proxy fashion. The site is then loaded into the E-menu cache and an intelligent agent is used to build the standard menu. The menu is coded in JavaScript and the intelligent agent creates the unique drop down fields in the menu by analyzing the site. The menu is then inserted into the site in the cache and the site is served from the cache the next time it is requested. See Figure 5 below for a descriptive diagram of the E-menu system.

Variables	Frequency	Total	Percent
Contact Us	97	102	95.10%
Privacy Page	92	102	90.20%
Company Information	88	102	86.30%
Customer Services/Help	84	102	82.40%
Search	83	102	81.40%
Order Status/Shopping Cart	77	102	75.50%
Security Page	77	102	75.50%
FAQ	73	102	71.60%
News/Press Room	72	102	70.60%
Affiliate Program	70	102	68.60%

Table 4 Ten Highest Frequency Table of Variables of One Hundred and Two E-commerce Sites

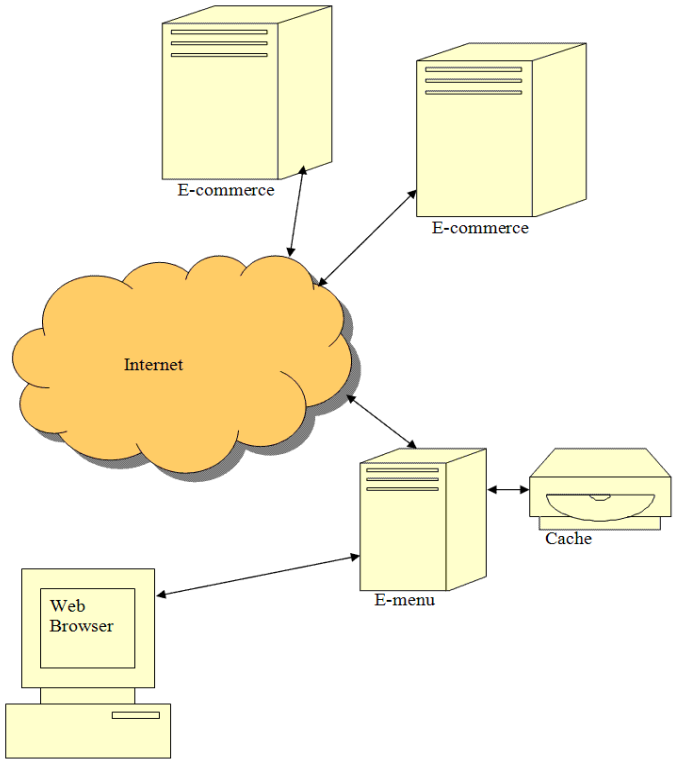


Figure 5 Diagram of the E-menu System.

The selection of the fields for the menu bar was based on a study of the graphical user interface (GUI) used in Windows and an evaluation of one hundred and two e-commerce web sites as Figure 6 shown. The fields are representative of those deemed important for navigation of e-commerce sites and should be standard across all sites. This is not to say all e-commerce sites will have something related to all of the fields, just that the fields themselves were deemed important through the studies performed.

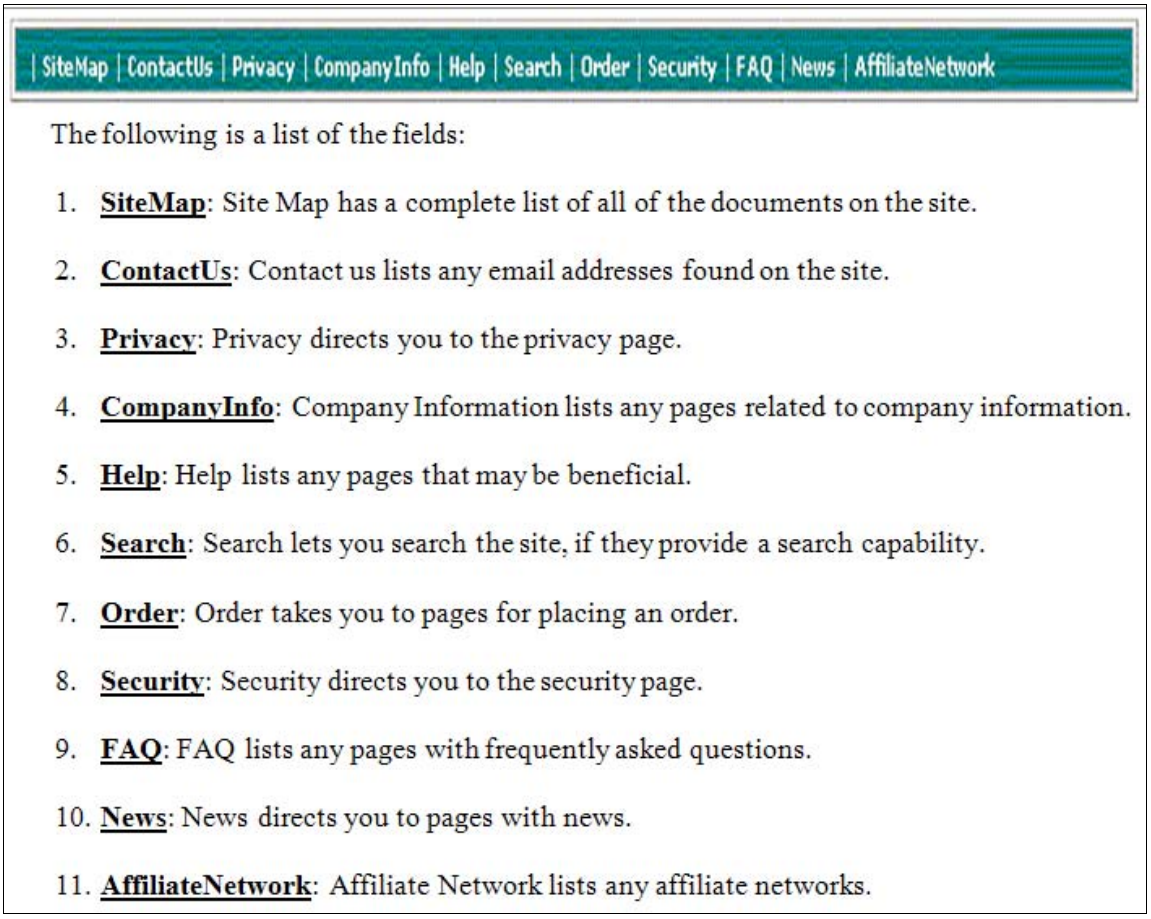


Figure 6 Menu Construction of the E-menu System.

6. Prototype of the E-Menu System

The prototype is the original model, which is used in building the proof of concept intelligent agent tool. When developing programs, it is necessary to develop a prototype of the expected output to use for comparison and error checking. The prototype consists of the JavaScript used to build the menus. The JavaScript is divided into two main parts. The first part is a JavaScript library, menu.js, which was created in advance and is the same for all sites. The second part is JavaScript code that is created by the intelligent E-menu agent and is inserted into the Web pages of the site. The second part is unique for each site. The code menu.js is downloaded as a JavaScript library and as such, remains in the browser cache and can be used on subsequent pages without further downloads. The code creates the look of the menus using layers. The action of the menu is centered on an event-driven model that captures mouse positions and clicks, and a timer that updates the menu numerous times per second. The second aspect of Javascript is the Javascript code, which is dynamic for each site and must be changed each time a new site is visited. The code is from an actual session. The code

is volatile depending on time-to-live (TTL) specifications for the document from the original author, so it may change over time. The combination of these components comprises the prototype. Figure 8 shows an example of the original site and the site with the E-menu system from the prototype experiment. Figure 9 displays the ideal sequence of events of the E-menu system.

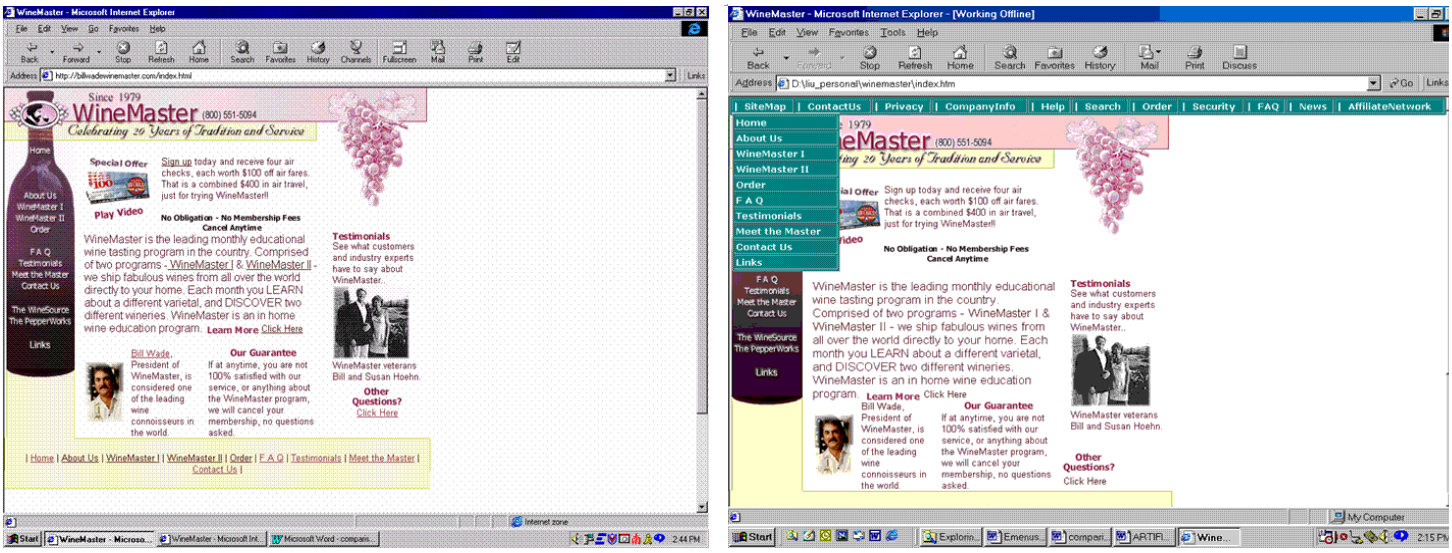


Figure 8 An example of the E-menu system with the E-menu system.

In the code, a style tag is inserted in the header for the menu fonts. Next the menu.js library is inserted in the body using a JavaScript tag with a “src” parameter. This is the equivalent of pasting the entire menu.js source code directly in that spot. Using menu.js in a library form is very convenient, since that part of the code never changes. Next is the Show Toolbar function that is unique for every site, where the unique Uniform Resource Locator (URL) and unique URL text are entered by the intelligent agent. Finally, there are the Update Edit and Call to Start functions. Figure 10 shows the menu in action. This menu was created by the E-menu Server. In the picture, the mouse was over the Help field and the drop down menu shows the links available for Help on this site.

7. The pilot study of the E-menu system

Three sites out of one hundred and two (102) were chosen to be edited by the E-menu server for the pilot study. The qualifications of the three sites are as follows.

1. The site must have been included in the evaluation and study of one hundred and two e-commerce sites.
2. The site must be of reasonable size, but not too big.
3. The site must not have an overwhelming number of HTML errors.
4. The site received a low evaluation from the study.
5. The site is not too sophisticated or complicated to be compatible with the proof of the concept E-menu Server.

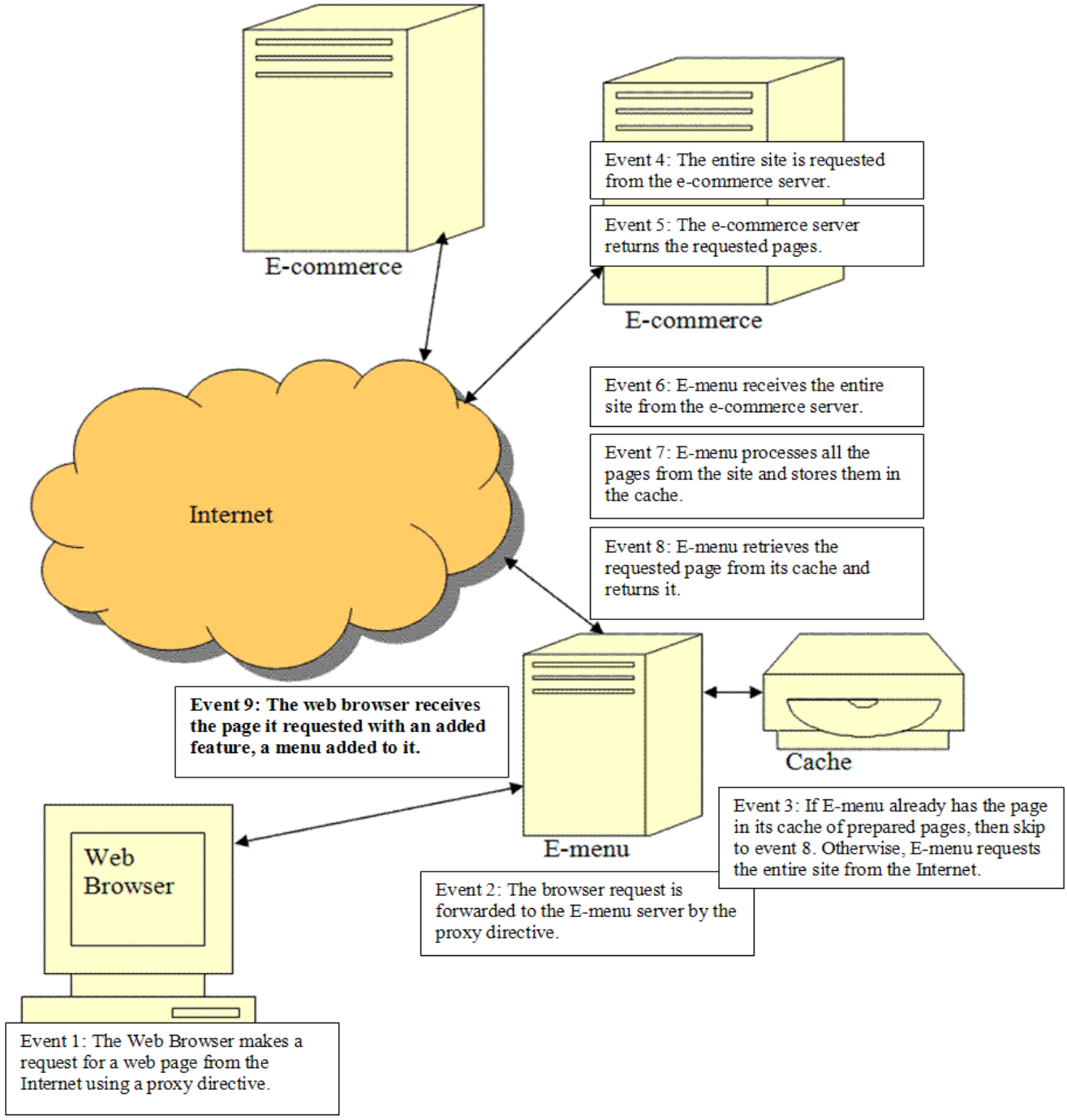
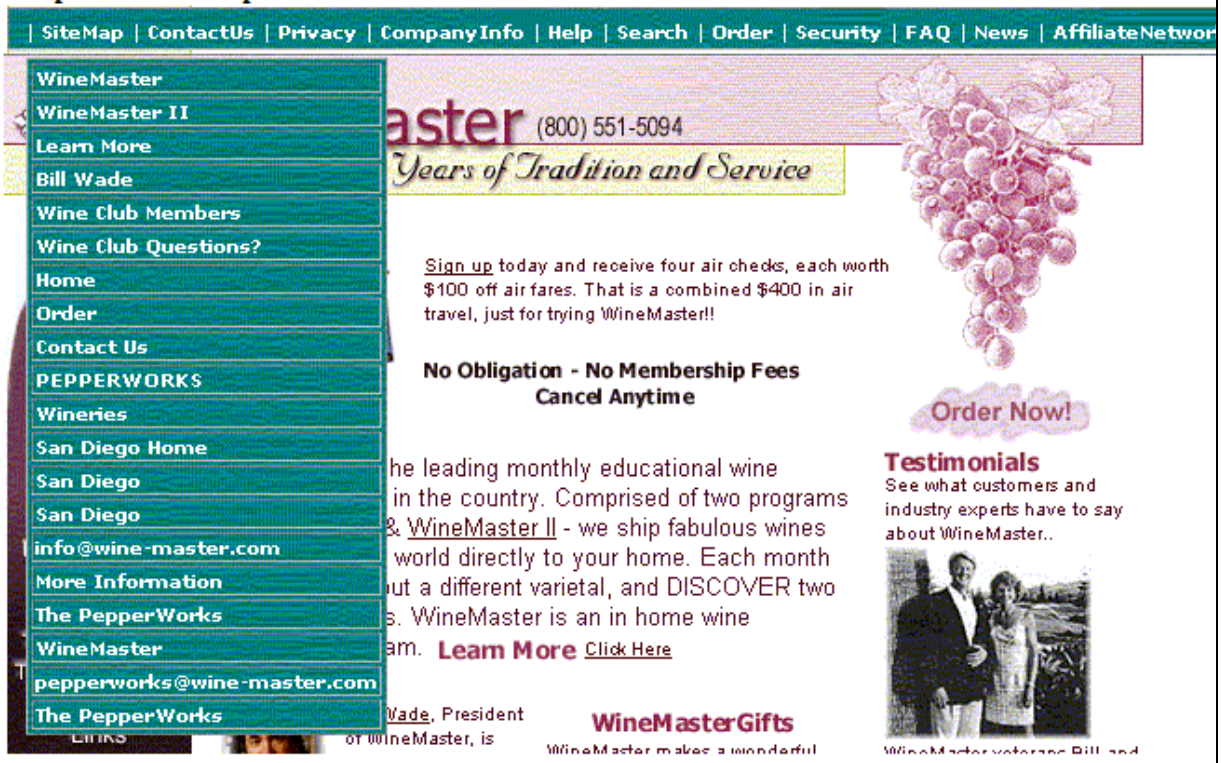


Figure 9 The ideal sequence of events of E-menu system.

Figure 10 The E-menu in action.

The results are very promising. The three chosen sites are Virtualflowers.com, Stupid.com, and Billwadewinemaster.com. The E-menu server performed very well on these sites. Figure 11 shows an example of the menu structure and layout. The menu adds a global navigation structure to the site. Pages which previously were accessible only through local navigation now become accessible from any page. This type of navigation allows any page on the site to be only one click away. The first menu button, the site map drop menu, has a link to every page on the site. The rest of the menu buttons have drop down menus for pages that fit the category for that particular menu button. For example, the order button has a drop down menu with links to the order pages. Some buttons do not match up with pages on some sites. In this case there is a pop up window that indicates this category is not available. The menu, for users, is very easy to learn, easy to use and useful. After just a few minutes, the initial learning curve is over and the menu functions the same for every site, so once the menu is learned, the user can use it with confidence.

Drop down SiteMap submenu



Drop down ContactUs submenu

Drop down Privacy submenu

Drop down CompanyInfo submenu

Drop down Help submenu

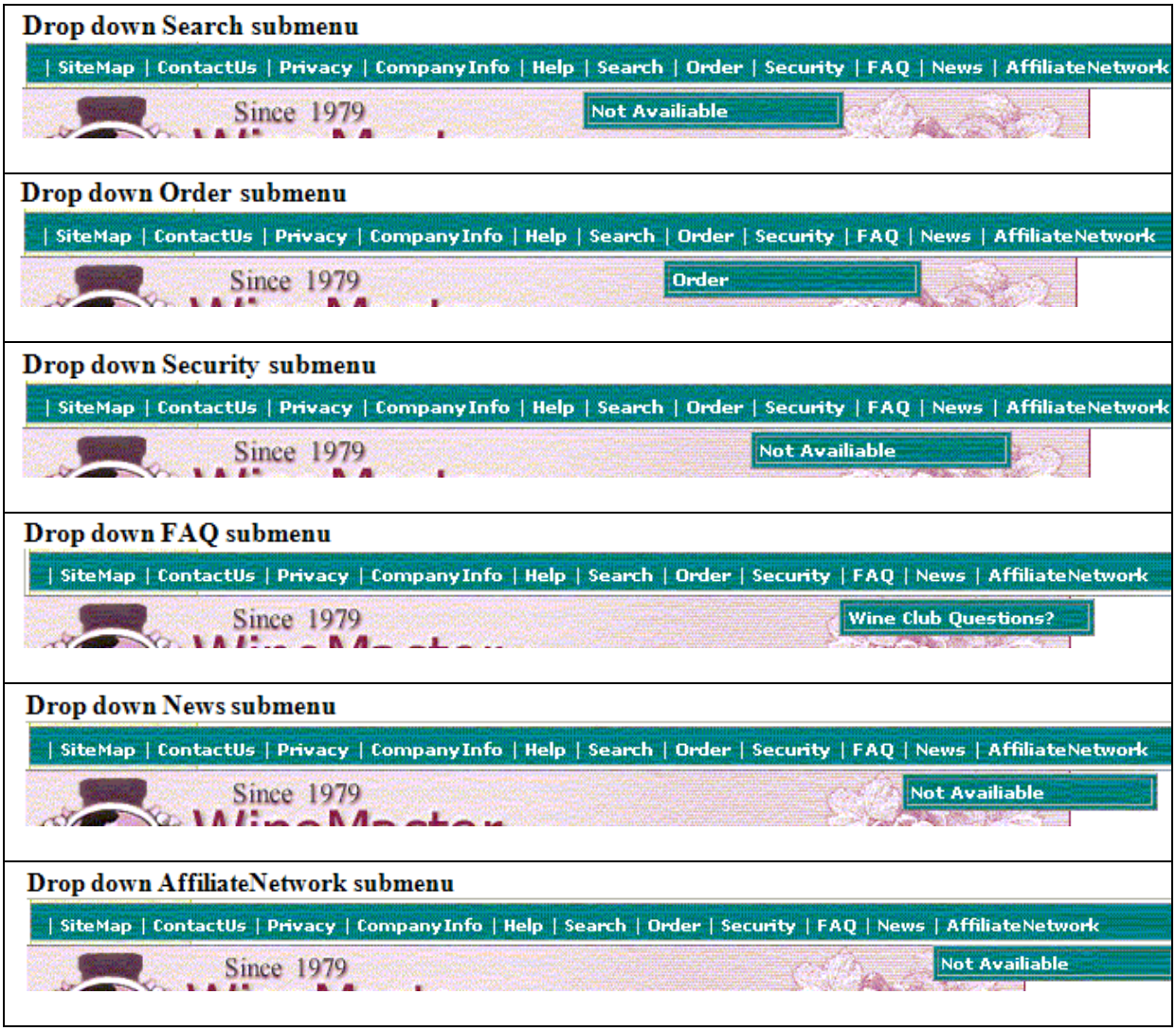


Figure 11 An example of the E-menu structure and layout.

E-commerce sites should be easy to traverse and be merchandise-oriented, not cluttered with flashy images and useless information. One such site was part of this study, the stupid.com site. There are numerous animated flashy images and navigation is mostly by discovery. The site was carefully analyzed by hand, and each page was logged in a record via the process of prototype in this study. The site was thought to have one hundred and fifty-nine (159) pages after this exhaustive analysis. Later it was discovered, through the use of E-menu, that the site has one hundred and sixty-four (164) pages, not the previously thought one hundred and fifty-nine (159). The WineMaster site had similar results with the initial hand analysis yielding eleven (11) pages and the E-menu system producing the actual seventeen (17) pages. This is proof that e-commerce sites are very difficult to navigate and the E-menu design is going very well.

8.Discussion and conclusions

The E-menu system makes it possible to create a standard navigation menu for e-commerce sites. Although E-menu is not ready for prime time, the prototype proves that a standard menu can be created by an intermediate intelligent agent, acting on behalf of the system user. These types of agents will become more popular in the Internet paradigm as the

number of e-commerce sites increase and the usability of the sites decrease due to rapid deployment strategies and technological deficiencies.

The three chosen sites in the pilot study were fairly simplistic by today's standards. The E-menu server performed well on these sites. The standard global drop down menu added a great deal of functionality and navigation to the sites. The stupid.com site in particular was very surprising. The site was studied and cataloged meticulously. When using the E-menu server to access the site, there were many pages that were not found by surfing the site. The other two sites also had surprising pages, just not as many. The following statements are the major findings for this study:

1. All e-commerce sites need a standard global navigation system: Access the e-commerce site through the E-menu system and it will have a standard global navigation system.
2. There is no mechanism in place to facilitate a standard global navigation system: The E-menu Server is the mechanism.
3. E-menu seamlessly integrates a standard global navigation system into the existing architecture.
4. The implementation of the standard global navigation system does not require e-commerce sites to modify their existing code.

9.Future Research and Recommendations

The Web is far from complete. Many good ideas are being developed in research labs that will help users understand and manage large amounts of data without being overwhelmed or confused. Information technology is no longer just for technologists. The benefits are for everyone, whether through specialized appliances, cell phones, or the Internet. The smaller the screen, the more you need to get it right. As broader and broader groups of people come online, the less complexity will be tolerated. A high-quality user experience is not a luxury but one which is essential to successful customer relationships.

Intelligent agents may cause a shift in consumer loyalty. With the increased use of intelligent agents, people will become more brand loyal than store loyal. The store will lose some of its identity, because it is not a physical environment in which a consumer enters and spends time. The E-menu system could become the next standard interface, much like Windows, which was first written to run on top of Disk Operating System (DOS) and then later became the prominent operating system (OS). E-menu could become the Internet. More research can be done in the area of global versus local navigation; that is, when is one better than the other? Should local navigation be added to the E-menu system? More research could be done in the area of the labels for the menu buttons to make a better fit for all e-commerce sites based on the issues considered to be important and necessary for all sites.

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