The UI issues for the search engine

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Abstract

According to Internet World Stats and EUROPA, "use search engine" is the highest proportion of Internet individual activities. Therefore, despite functions, databases and technology update of search engine development, it should be considered the usability, operation, and user behavior. This article explore from the development process of the Web and search engines, and summarized the current search engine interface, as well as a search engine Web2.0 applications. Finally point out the user-oriented design has become the core issue, and the search engine have important relations with user interface input, output, and how to give users individual demand results automatically. In conclusion, in order to improve user efficiency and convenience, it should test the practicality and appropriate of the current search engine interface and integration of Web2.0’s various functions to provide personalized search engine interface of user-oriented.

1. Introduction

As the Internet evolves, its users and uses grow and diversify globally. Based on Internet World Stats [1], the world-wide internet population has surpasses 1,460,000,000 people as of June 2008. The global penetration rate of the Internet has reached 20%. It can be said that the internet has become a fixture of everyday life. Correspondingly, EUROPA[2] investigation report states that "use search engine" is the highest proportion of Internet individual activities, more than other items. Nielsen Media[3] indicated over 80% of Web searchers use Web search engines to locate online information or services. Search engines make an unprecedented amount of information quickly and easily accessible – their contribution to the web and society has been enormous[4]. The Web and especially major Web search engines are essential tools in the quest to locate online information for many people[5]. Therefore, Wiza, Walczak, & Cellary[6] pointed out the search engines become one of the most important and most frequently used services heavily influencing the way users perceive the Internet.

Berghel[7] showed clearly that the first attempt to deal with the information overload on the Web was the search engine. The amount of data on the Web all over the world as a knowledge library, it accumulated fast and varied. Search engine has become a management tool to organize the huge knowledge and allows users to access the information quickly and easily.

The term ’search engine’, used by the average citizen of the World Wide Web, encompasses a wide variety of services which provide access to Internet resources[8]. Ferragina, P.& Gulli, A. [9] explained the purpose of a search engine is to retrieve, from a given collection, the documents deemed relevant to a user query. We define “search engine” as a tool to search resources on the Web.

1.1. Before Web

Vaughan[10] mentioned the astonishing growth of the Web propelled the rapid development of Web search engines. Before World Wide Web, Archie (Archie FAQ) [11] was created by McGill University in Montreal’ student – Alan Emtage and Peter Deutsch and Bill Wheelan in 1990 which is the first program with search engine prototype. It is the first program automatically search for anonymous FTP (File Transfer Protocol) in the Internet.

1.2. Web1.0

In 1989, the concept of ‘Web’ was proposed by Tim Berners-Lee at the European Organization for Nuclear Research (CERN) in Geneva[12, 13]. He developed the first web browser and the web server
in the world, and promoted the WWW (World Wide Web) in 1990. Tim Berners-Lee stated that the primacy mission of the Web is to provide people with information services, and it has led to the Web development applications[14]. CERN publish the Web technology standards in 1991[15]. In the same year, Mark McCa), ill developed a Gopher (Gopher FAQ) search tool. Despite Gopher and WWW development of the similar concept, but text-only performance’s Gopher is gradually replaced by WWW that provide a rich multimedia to users.

Tim Berners-Lee founded the World Wide Web Consortium (W3C) in 1993, and create standards and recommendations to improve the quality of the Web[16]. After that, search engines have also begun to develop rapidly. For example, Allwe[17] was limited to search title of web pages initially : WWW Worm arranges search results ; WebCrawler[18] was the first "full text" search engines, it let users search for any word in any webpage, which became the standard for all major search engines since : David Filo & Gerry Yang founded Yahoo! Directory[19] ; as well as the first beginning of using automatic summary page in the search results, and support the relevance ranking of search results -Lycos[20].

Java language ran in 1995, and Meta Search Engines came the same year. AltaVista[21] is the first natural language queries and first allowed users to add or delete their own URL within 24 hours. Web began to import Flash function in 1996, and the following year, Northern Light[22]Company launched the search engine that easily automatic classification of the search results. Subsequently, today's well-known Live Search[23] and Google [24] founded by Larry Page and Sergey Brin was born; allthe.web[24] search engine, started to provide support for Flash, PDF and multi-lingual search.

1.3. Web2.0

Until Tim O'Reilly[25, 26] proposed the concept of "Web 2.0" in an international conference, Web began to be divided into Web1.0 and Web2.0. Needlemen[27] indicated whole idea of Web 2.0 is to build event-driven user experience, not just Web sites. Deshpande and Jadad[28] showed Web 2.0 allows users to contribute knowledge in a collaborative fashion, such as Wikipedia ; Boulos[29]et al gave examples of Blog (Web Log) to provide a resource-rich multimedia environment.

At this point, the development of search engines combined with lot of Web2.0’s related functions. Such as KartOO[30] used advanced GUI features ; Snap[31] provide the preview window ; a blog search engine - Technorati[32] ; Wikiseek[33] is specialized search for Wiki and so on.

From the Web development, we can find the current Web2.0-oriented network based on user-centered concept, and it allows users to become an important leading role to interact with people or groups in the network. Search engine’s a historical development also like the Web. We can find search methods, functions and databases ever-changing update through technological progress. However, the search engine interface almost display accordance with article described, and various functions are also independent and scattered everywhere. Although the characteristics of its own has made, only like a small instrument. There is no integration with all of them (Table 1 and Table 2).

2. Search Engine User Interface

In 1999, W3C[34] made WAI (Web Accessibility Initiative) [34] to promote the development of guidelines for Web, and pointed out that design with the Web interface must conform to WCAG[35], ATAG[36, 37] and UAAG[38, 39] three types of specific rules. Moreover, W3C[40] defined UI (User Interface) as improving the technology that allows users to effectively perceive and express information.

Bevan[41] interpreted a web site requires a user-centered design process, which users find effective, efficient and satisfying. Furthermore, from WCAG1.0[42, 43] to WCAG2.0[44], W3C for users to developed, it is find WCAG2.0 better consider about user interface of usability(such as: WCAG2.0 Principle 1,2), operation (such as: WCAG2.0 Principle 4), and user behavior (such as: WCAG2.0 Principle 3).

Therefore, provide users a Web site with convenient and easy-to-use has become a very important thing around design process. Except function progresses of the technical level, developing a series of web-related rules of W3C and constantly updating search engine, all should be based on user-centered to consider. In briefly, the user is no longer just passive acceptance of information, but more cooperation and create content positively. Besides, User interface is an important communication for users to input and receive, so the current search engine interfaces must be reviewed and investigated.

The use of search engine process can be divided into three parts: input, background processing and output. Because of the background processing has been discussed in the preceding paragraph, the following focus on the search engine user interface of input and output.
Liu, Lieberman & Selker[45] indicated the user interfaces rely on a grammar of set operators and keywords in most of today’s search engines. In order to obtain good search results, users are required to fill the right keywords and the right combination in the search box. Also, several search engine functions are combined into one page, such as (a) search history: some past searches you’ve performed are displayed below the search box; (b) relevant keywords: when a search query is entered into a search engine, the search engine will interrogate its database of possible keyword matches related to the keyword query; (c) spelling correction for search engine queries: this function of search engine will select the best choice among all possible corrections for a misspelled term when users misspell query; and (d) Top search queries: This tool provides users the most popular search queries for discovering keywords that users rank for.

Moreover, the voice search engine that provides search results from a voice search query and the multimedia search engine that offers image, audio and video searching are released.

2.2. Search Engine Output

Mukherjea & Hara[46] stated users go through pages of scrolled lists to find the relevant information in search engine interface.

A search engine results page is the listing of web pages returned by a search engine in response to a search query. The layout of search results page can be distributed to: (a) search results snippets, such as Google, AltaVista: the most common presentation at present, including a list of web pages with titles, a link to the page, and a short description showing where the keywords have matched content within the page; (b) snippets + media elements, such as Cuil[47] (Figure 1): some images and icons are displayed on the search results page; (c) adding dominant media elements to search results, such as Picsearch[48]. The arrangement of the search results can be distributed to: (a) article described (such as: Lycos, LiveSearch): search results according to the correlation to arrange, and that is the most common type. (b) grid(such as: Cuil): display as chessboard.

Additional features: (a) preview: such as Snap provides Snap Shots products(Figure 2). (b) search: such as YAHOO! provides relevant words in the user interface, KartOO(Figure 3) express the relevance with lines automatically and uses GUI (Graphical user interface). (c) information classification: such as Clusty[49]. These additional
functions only different in the location of search engine interface and there is no substantial change about use and presentation of search results.

Figure 1. Web page of Cuil

Figure 2. Web page of Snap

Figure 3. Web page of KartOO

3. Discussion

Search engine contributes to delivery substantial information working on the Web, for this reason, providing user with better search services is becoming increasingly important. At present, the development of search engine apart from the functions, systems, technology and other advances in the database, the user has become the center of Web development over the past few years. Therefore, we make the following points discussions about the user input and output interface:

3.1. Search engine as an intermediary for the user

Despite search engines provide more and more diversified services, and even add a lot of unique tools (such as: KartOO, etc.), search engines are not the user's destination. It is only an intermediary for the user on the Web and the interface should not waste user's search time. It can see Google use simply entrance as a search engine interface characteristics. Hence, it should be considered users are willing to spend how much time in the search engine interface become one of the key points.

Because of the using keyword input has been most deep-rooted concept and become a habit for users. Therefore, we consider the importation of parts at the interface should explore the ways assist user to input efficiently and accurately. It will give user prompt response to demand (input method, see 2.1), and assist user express with correct input.

3.2. Output results according to different query

There are many kinds of output ways in search engine, but the most common search results type of article described do not apply to every user. For this reason, search engine according to different query can automatically output the individual results of users' needs, what is more, search engine interface will automatically record the user's habits. Enter keywords such as flower, a user can get pictures, while another user get plant informations. In addition, users can also re-select the display method.

3.3. Implement Web2.0 concept

With the Web penetration in all areas of society, information on the web is authored and organized by different people, each with different backgrounds, knowledge, and expectations. User-oriented and provide personalized service, as well as combined with interaction and sharing features become the current trend of Web development.

The development of search engines combined with lots of Web2.0’s related functions.

3.3.1. Search results

Many search engines will be arranged according with all users’ click number, and no click reading will be placed later (such as Google's PageRank). It is enables users to get the best information they demand.

3.3.2. Personalization

Search results appear with the user habits or query with the user preferences (such as Clusty provide classification inquiries) to increase the efficiency of search. In addition, blog allow users to participate in mind and it provides user set pages by their own preference layout. Moreover, Google Labs[50] is currently developing more new features, also provides a wide range of search results, such as: map view(}
Figure 4, timeline view (Figure 5). This diversified search results interface allows users to change the established way to increase their use of selections.

3.3.3. Peer to peer sharing

Search engine record information on the historical of inquiries and provide prompts or options when users enter a keyword (such as: YAHOO!). It is a way let users select the beneficial record, and even sharing search results to unfamiliar users. It will get the best search results and save click time for users due to sharing with each user. Above all, it can be seen “community power” caused by the user groups at the Web2.0 trend, as well as the search engine began to develop the functions and needs from the user's point of view.

However, even if there are hundreds of small or large professional search engine engines, the interface almost display accordance with article described, and various functions are also independent and scattered everywhere, such as KartOO・Snap・Cuil and so on. In spite of the unique characteristics of its own has made, it only like a small instrument. There is no integration with all of them and still lost Google’s degrees at all use of search engine. To sum up, it is more important to integrate these functions, so that the user interface’s (UI) results according to different keywords or different query, furthermore, considering the usability, operation, and user behavior. Progressing a large-scale personalized search will become more feasible over time. Meta Search Engine provide multi-source database, and SOA (Service Oriented Architecture) is a way to increase the search engine functionality and interaction, simplifying the use of search engine users process. Both of all can make search engines provide users integrated interface, and personalized methods of operation.

Search engine allows users quickly and easily to access the knowledge at present, but there have been no major changes in the interface. The reason is users have become accustomed and accept to the use way. Together with that many search engines develop their own special features independently, but there is no integration in the scattered situation. Consequently, these special features like fragmented tools to users and unable to cooperate with each other. To summarize, the highest rates of use search engine on the Web should be re-integrated with user-oriented.

4. Conclusion

Search engine is a tool to get the amount of data as a knowledge library on the Web all over the world. It contributes to delivery substantial information, for this reason, providing user with better search services is becoming increasingly important. In addition, search engine as an intermediary for the user should not only focus on the development of individual features, but should explore the usability and applicability of interface in depth. It is necessary to import the concept of user-centered design and user behavior, combined with today's Web2.0 demand to design a favorable search engine interface to help users. In conclusion, in order to improve user efficiency and convenience, we think that we should test the practicality and appropriate of the current search engine interface and integration of various functions to provide user-centric personalized search engine interface.

5. References

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