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Human-computer interaction and the Web

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As successful as the web is for delivering information globally and rapidly, many problems remain which make it a challenging or unproductive experience for some users, or even impossible for other users

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Why Web?

Web use is approaching ubiquity

Web users are largely discretionary users

Web usability problems have a clear relationship with sales

The web is evolving at a rapid pace

Website technical development is easy

What makes the web hard to use?

Browsing and Linking: "What's Wrong with the World Wide Web" Revisited

- The generally applicable personalization of links and content is still largely unachievable without specialist tools.
- Creating personalized annotations and links
  - Web browsers have no inherent way of presenting the structure and interrelationships of data of any sort. For example, there is no way to visualize even the simple interrelationships of web documents, such as "Where can I go from here?" or "Which documents point to this document?" The reader has no idea of the position of a given document within the corpora unless an author explicitly embeds such details. (Bieber et al. 1997)

Finding Things on the Web

Search and Query on the Web

- *One recent estimate has placed the size of the World Wide Web at around 24 billion pages.‡ With this wealth of information, the web would be untenable without mechanisms to assist navigation and file location. The most common web tool in use today is the search engine. To use a search engine, the user must submit a series of terms known as a query. This query in some way formulates and embodies what the user of the search system would like to retrieve information about.*
  - 1. The confusion and uncertainty surrounding query formulation
  - 2. The impenetrability of seemingly endless results

Finding Things on the Web

Relevance

- Information systems are often designed for a hypothetical “average” user.
- This “one-size-fits-all” approach ignores diversity in cultural and educational backgrounds, abilities, objectives, and aspirations.
- An information system with a single-user interface for all users is conceptually the same as a car manufacturer selling a car in only a single color—“any color so long as it’s black

For Example;

One solution is to build personalizable information systems, delivering content specific to requirements of different users

- In e-Learning applications, for example, more challenging lessons are not served to the user until mastery of prerequisite material is achieved.
- In e-Commerce, a simple form of user consensus underlies a recommender system that personalizes suggestions for further purchases based on the current users' purchasing history similarity to that of other users.

User Interface Issues

Context of Use

- Context of use is seen as a critical constituent of usability, defined by ISO (1998) to “consist of the users, tasks and equipment (hardware, software and materials) and the physical and social environments in which a product is used.
- Therefore, the web designers should consider ;
  - “wider range of physical environment factors”, for instance, varying lighting, noise and thermal conditions, as well as other tasks that users may simultaneously carry out.
  - User activities, example; establishing fundamentally new interaction styles for use in a driving context of use (e.g., speech recognition, voice output, haptic interfaces).

User Interface Issues

Navigation Issues

According to one diary-based study (Lazar et al. 2003), between one-third and one-half of time spent using a computer is unproductive, a situation predominately attributed to problems in web navigation.

A broad view (adapted from the CHI workshop) is taken here, in which navigation can be said to involve the following:

Planning Route: Many people find it difficult to generate a suitable plan, for a range of reasons, either concerning basic cognitive limitations (such as remembering URLs), a lack of knowledge (choosing appropriate search terms, misunderstanding Boolean logic), or because methods are poorly implemented (e.g., confusing layouts for site maps).

Following Routes: In this stage, typical problems facing the web user often relate to the design of linking mechanisms between pages, **for example**, ambiguous link labeling, unclear graphics or icons, relevant information appearing offscreen, the need to visually scan large numbers of links, and so on

Continued

Orienting within the "space": The "where am I?" For optimum navigation performance and confidence, people need to have a sense of their current location in relation to their surroundings (e.g., their final destination, their start point, other key "landmarks," such as a home page).

Learning the Space: Websites with poor differentiation (e.g., all pages appearing to be similar), low visual access (e.g., difficult to see where one can go next) and high path complexity (e.g., many links on a page) will all contribute to a poorly formed cognitive map (Kim and Hurtle 1995).

BROWSING AND LINKING

It look sat some solutions, including automatic management of broken links, the easy personalization of links and how links can enable different perspectives on the same data.

Broken and Misdirected Links

Broken links, generally the well-known “error 404,” remain an irritation for users of the web (Nielsen 1998).

Solutions:

- The solutions to broken links can be characterized as being *preventative (creating infrastructure or procedures that avoid broken links), corrective (correcting broken links where they are discovered) or adaptive (never storing actual links, only instructions for making them as required) (Ashman 2000).*

Preventative solutions

Preventative solutions are ideal because the irritation of broken or misdirected links will never happen. However, many of the preventative measures can only guarantee accurate links within a limited scope, and changes outside that scope (such as an entire domain name change) can still result in broken links. Also, they can be functionally limited; for example, it may be impossible to guarantee link integrity into information that is not part of the same preventative scheme

Corrective solutions

Corrective solutions tend to be more robust, as they assume breakage will occur and have procedures in place to correct links, where possible, or to otherwise deal with them.

These procedures are sometimes computations which aim to discover the new location for the linked document. These often function as mass correction procedures, taking place at intervals, which detect broken links and attempt to correct them, discard them, or at least to notify the page owner of the problem.

From the everyday user's point of view, this is a reasonable form of solution, requiring little or no effort on their part, with breakages often not encountered by the user. However, it is still possible that the user will discover a broken link, increasingly so if it is some time since the most recent correction.

Corrective approach

The corrective approach may discard unfixable links that the user has previously required. This leaves the user with the knowledge that a link that was once present is now gone and seemingly unrecoverable. Perhaps a more user-friendly solution to irretrievably broken links are the so-called soft 404s (Bar-Yossef et al. 2004)—when pages go missing, those pages are replaced by human-readable error messages which essentially assume the identity of the missing page. They frequently offer the user the option of a search of the site, or perhaps redirect the user to a new location. It is estimated that 25% or more of all dead links are these soft 404s (Bar-Yossef et al. 2004).

Personalizing Links

Users have different needs, and an author of web pages cannot anticipate all such requirements, let alone provide them.

Even if all the potentially useful links were provided, not only would users disagree on the value of the links, but the interface and performance of the browser would suffer.

For example, not every user wants a dictionary link, which could give a basic definition of any word selected by the users. However, non-native speakers of a language could find such a link invaluable. Glossary links are essential to a reader not familiar with technical terms, but become intrusive to seasoned readers. In each case, the users want to be able to “switch on or off” links to reflect their own needs.

Solutions?

The technology that supports personalization of links has not yet propagated into mainstream web browsers. Yet the different solutions have been trialed in a web context

for example, the Distributed Link Service enabled individuals to make their own private link sets or to contribute to their group's collective link sets (Carr et al. 1995). Even the creation of one's own link computation specifications was trialed in a web environment (Cawley et al. 1995).

Transclusion

The term was originally used to denote the inclusion, by referential addressing, of part of one document within another; although its usage has now expanded to encompass the presentation of data in a context other than the one originally intended. With one important exception, transclusion was not until relatively recently widely implemented on the web

Solutions

The HTML <IMG> tag

It is used to represent a unique entity, such as an image, in multiple contexts. Therefore, a single image may be transcluded onto many different web pages

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SEARCHING AND QUERYING

The user faces the problem of creating an accurate description of his or her requirement. And, the user must make sense of the results that the search engine produces.

Difficulties

Low user commitment. Users are reluctant to provide information beyond the bare minimum

Uncertain information needs. Users often have an incomplete understanding of their information need, and their initial need will frequently mature during, and in direct response to, the process of searching (Lancaster 1968)

Difficulties in expressing their need. Users may not know the correct syntax to frame their queries, or the commands to interact with the search engine. They may know in general terms what web pages they wish to retrieve, but struggle to find the query terms most likely to identify them

Solutions to these difficulties are discussed above

The user submits an initial query and the search engine serves results.

The user then identifies relevant and non-relevant web pages using associated checkboxes, clickable links, radio buttons, and so on. This action supplies the search engine with feedback.

The search engine then automatically modifies the original query in response to the feedback. This may involve adding search terms to the query, known as query expansion. It may also involve reweighting of the query, where information in the relevant and non-relevant set of documents is used to modify the importance of various query terms.

The modified query is run by the search engine and a new set of search results is shown to the user.

This process continues until the user's information need is satisfied.

Results List

Many solutions to this challenge have been suggested, but three interesting approaches are as follows:

(1) community-based ranking algorithms;

(2) improved visual interfaces; and

(3) document clustering.

Community-Based Ranking Algorithms

A search engine aims to rank a set of web pages in order of the likelihood that they will be relevant to the user's information need, with the document most likely to be relevant appearing first

Document rankings dependent upon term frequency represent a purely arithmetical evaluation of the web pages concerned.

There is no guarantee that a web page that contains a high frequency of the query terms will be any more relevant than a second page containing a lower frequency of those same terms

Solutions

One solution to this problem has been to supplement the rudimentary rankings that can be constructed through statistical observations with more sophisticated sources of information. This has led to the development of a general class of ranking algorithms which implement citation-based metrics for relevance scoring (Garfield 1972; Pinski and Narin 1976). In these algorithms, the relative importance of each web page is a function of the number of other web pages that link to it (Brin and Page 1998).

Improved Visual Interfaces

Hearst (1997) has observed that “long lists littered with unwanted irrelevant material” represent an unwieldy and nonintuitive method for delivering search results to the user.

Solutions

Information visualizer (Card, Robertson, and Mackinlay 1991), has proved surprisingly powerful—in one experiment an organizational hierarchy requiring 80 printed pages was displayed on just one 3D screen (Robertson, Mackinlay, and Card 1991). It seems clear that a visual tool for searching the web which helps the user to “see” a set of search results rather than just “read” them would have considerable utility

Document Clustering and Click Data as Relevance Feedback

Provided the number of clusters is relatively low, this technique quickly reduces the cognitive load of studying the results, allowing a user to “skim” rather than to read

Solutions

The in-links of a web page might be used recognized by Brin and Page (1998) and recognized by Kleinberg (1999) as indicators of latent document human judgment, but there is another, more dynamic and far more populous dataset of implicit human judgment. This alternative form of implicit human judgment is clickthrough data, and the subset of clickthrough data which makes up coselection data.

Click data has been considered as a form of relevance ranking, and while some research show they are not entirely reliable, at least over traditional, text-based search, other research show that they improve the relevance of results from image searches (Ashman et al. 2009). Furthermore, coselection data can further improve search results by being able to cluster search results into sense-singular aggregations; that is, it can be used to disambiguate a search term.

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SEMANTIC WEB

To be Continued

Content yang disediakan tidak sesuai dgn keinginan users

Banyak iklans

Tidak user friendly

Loading

Flash players

Link-link kurang aktive

Jaringan

Desain

Access