Dynamic libraries as a means for the management of information browsing in networks

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1. INTRODUCTION

The WWW has changed the concept of interactivity in applications, and dramatically also reduced the influence of direct manipulation (Shneiderman 1983) on the interfaces. A web page typically consists of a large number of links — clickable — where each one accomplishes different actions. Each of these links contains a large amount of information, and often a link is regarded as a means of putting together different pieces of knowledge into knowledge networks. Unfortunately, this knowledge is hidden in the linkage itself.

This inherent meaning of a link, i.e. the action that the link performs does not influence the link layout on the page, which effectively means that the purpose of the link is not transparent. So, when an end user uses a link he or she cannot know before clicking, what kind of event will take place. The user, when clicking on the link, does not know the semantics of his or her action. The link has to be actively followed to disclose the action. If the link were transparent, it would announce the event to the end user. The end user could, depending on this information, easier decide whether the link is a valuable and/or interesting resource.[1]

Traditional search engines are technically advanced but conceptually often very simple. The search mechanism will search within large link databases to find topics that match the specified keywords. The pages are then presented to the end user as a list of links to documents (sometimes combined with a small amount of explaining text). The trouble is that the search engine all too often returns with a very large and useless number of hits, i.e. links. The end user has to follow the most (seemingly) interesting links, to be able to extract what is relevant. This is rather difficult since it is hard to judge from link names, and the (occasionally) accompanying texts, whether the information that follows is relevant.

Direct manipulation in a network needs to be fundamentally redefined if some of the more protruding problems shall be solved. In essence the end user moves around in a basically *conceptual navigation network*, but where the *physical structure* is more or less guiding the experience. The physical computers, on which the pages are located, are spread all around the world and connected through the global (or internal) network. The network could (possibly) be easier to understand if the information were to be gathered from a few local pages, but usually the links to a large extent lead to distant servers far away.

The physical structure of web-sites is often imposed on the user. When a certain link has been used, it is not easy to determine exactly where a link has taken the end user in the conceptual network. It is even difficult to tell whether we are still further down in the original document, or if we have opened a completely new document. This may not be much of

[1] Some browsers support the use of link titles that appear if the link is right-clicked. These link titles are, however, clumsy devices that to a large extent depend on the www-programmer's feel for the site.

a problem if only the physical location of the file[2], is considered but conceptually this is a special problem. This conceptualisation may not be a problem if only a few links have been used, but if several links are used the user could be "lost in hyperspace" and it could be difficult to navigate further to get the desired information. Especially if the end user is using links that give a bad impression of the pages contents. A page developer gives the link a name that complies with the intended purpose, which may not be the, desired information for the end user.

Currently, in order to accomplish a safe and efficient navigation through the information space, a user needs to have substantial knowledge also about the physical topology of the network. Thus, it could be complicated for different end users to know how to navigate in the network in order to get significant and relevant information.

2. A SUGGESTED SOLUTION – A DYNAMIC LIBRARY

One way to approach these problems, is to consider the problem of introducing direct manipulation in networked applications. We suggest that the users activities should be transferred from the physical network structure to a conceptual "knowledge management" network structure. In this paradigm the network should provide individual structures which give the end user opportunities to create a sets of personal knowledge links. This means that instead of using only the direct, physical links, as they are implemented in HTML-coding, the network of the future should provide the user with tools[3] that allow the user to navigate the knowledge space in a user-oriented and more convenient way. In this "conceptual" navigation, the previous issues such as conceptual searching and semantic transparency of the links will be a matter that needs a great deal of design considerations.

Ideally the conceptual networks should be centred and oriented around the individual *user's knowledge space*, rather than the imposed structure of the information available. For this purpose, the interface needs to incorporate a local intelligent agent that in some way searches and categorises the information available dynamically and according to the user's preferences. This will facilitate dynamic adding of new knowledge nodes to the user's knowledge space. In this way the future interaction with the networked world will be more individual, and focussed on acting on content rather than searching for physical documents and links.

The end user interests have to be gathered and stored in combination with the interesting knowledge nodes. The user interest profile is designed as a kind of library, containing topics that have proven to be interesting for the end user. The library also contains "keywords" where each keyword would join with a "topic". The topics can then be described in terms of conceptual structures, which together define the meaning of a topic (Sowa 1984). These topics are used when the user searches for relevant information.

A dynamic library should be used since if the library is designed to be static, it tends to be "out of date" rapidly, and it will thus quickly lose its significance. The dynamics are achieved by allowing the end user to change the content by, e.g., adding new topics, deleting non-relevant topics, and updating topics whenever needed. Different topics should be presented using different levels of details or abstraction.

3. HOW TO USE THE DYNAMIC LIBRARY

The topics within the dynamic library should be actively used as a support for the conceptual model of the content in the pages. Whenever the end user is fetching a page on the Internet, the topics within the library will be compared to the content of the page to make the end user attentive to the relevant keywords. Even the links could be projected to the end user if they were transparent in some manner. Some transparency can be received by using the filename in the links or by controlling the contents in the page (that a link is linked to) by using the dynamic library. E.g. the number of keywords in that page, which corresponds to the topics, can be presented to the end user. The library would also be used to find interesting topics through a search engine. The search engine has to be modified so that it can use the keywords to acquire the links that really relate to the topic. Therefore, the topics in the library have to be defined to be both narrow and specific, i.e. at a detailed level to simplify the search.

[2] Among physical problems that are not negligible we can find long response times, local time zones, etc.

[3] The term tools is used for any means that will support the user's interaction.

4. REFERENCES

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