Aikuchi: Marking-based Social Navigation System

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Abstract

We propose a social navigation system called *Aikuchi* that enables users to link from a marked string in a web page to another web page and share it with others. Aikuchi highlights a marked string in the web page. It functions as a link anchor that includes two kinds of links: *footprint links* that users have linked from marked strings in web pages to other web pages and *recommendation links* suggested by the system based on four algorithms. Users can jump from the link anchor on the web page to other web pages. We presented the system at a conference. Based on analysis of user logs, users preferred footprint links to recommendation links. We found that sharing links that users attached from marked strings in web pages to other web pages is useful for social navigation.

Keywords

Social navigation, web browsing, marking

1. Introduction

Search processes can be very frustrating, especially if we spend a lot of time seeking information. Although people constantly use the web to find information, their experiences are rarely captured and used to guide or inform others. In a social navigation system, such as amazon.com [1], when users access a page for an item, they can get related items based on the history of previous purchases. The term "social navigation" was originally introduced by [3] to describe how user navigation through an information space is guided and structured by the activities of others within that space. A social navigation system enables users to exploit the activities of others, to become aware of others' interests and knowledge, to get recommendations of relevant information based on the opinions of others, and use web navigation as a kind of communication channel [2]. It also promotes knowledge and information exchange among users on the web.

We proposed a social navigation system called *Aikuchi* that enables users to move from one web page to other web pages by links established by other users from marked strings in web pages to other web pages. In the following sections, we introduce our system, describe its architecture, and analyze

user logs.

2. Outline of the system

We use markings as user interactions in our social navigation system called *Aikuchi*. When people read books or documents, they often underline words or sentences on pages of interest. We call them marked strings; marked strings on a page differ by users, since they have different viewpoints. If they could share the marked strings on pages, they might discover pages that they would not have found by themselves.

Our system enables users to link from a marked string on a web page to another web page and share it with others. The system shares links called *footprint links* for social navigation. Users can move from page to page using the traces of others based on footprint links.

When users link from a marked string on a web page to another web page, the system highlights the marked string that serves as a link anchor. If the user places her cursor over the link anchor on the web page, a window pops up and displays footprint and recommendation links (Fig. 1). To investigate whether users prefer links they added or links the system recommended, we prepared *recommendation links*. The system displays footprint and recommendation links on a window based on algorithms A-D. We explain these algorithms as follows.

A) Similarity-based recommendation:
we employed calculated page similarity based on TFIDF [5]. If a user places her cursor over link anchors on a web page, the system recommends high-similarity pages regardless of the marked string and link anchors.

B) Collaborative filtering:
The system recommends pages with collaborate filtering [4] using the number of link anchors on a web page as user evaluations of that page. The system recommends web pages with a high predictive value using the number of link anchors.

C) Marking-based matching:
If a word in the marked string matches one in the link anchor strings on other pages, the system recommends the matched page.

D) Query-based matching:

　　If a word in the marked string matches one in other web page strings, the system recommends the matched page.

The system displays at most five footprint links and two recommendation links for each algorithm. Footprint links are ordered from newly added one to the order, and recommendation links are mixed and ordered randomly. The system does not inform users about these algorithms. Users can jump from the link anchor on the web page to another web page.
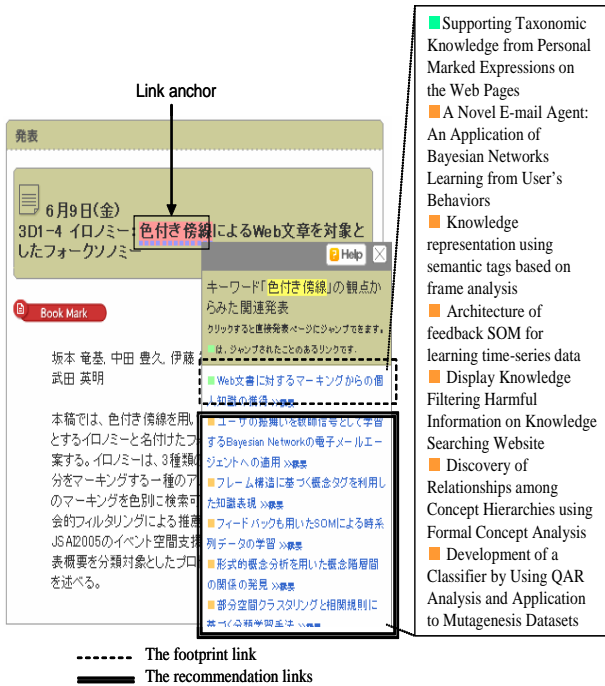

Fig. 1: *Window after cursor placed over link anchor (Word balloons show English translations of footprint and recommendation links.)*

3. Analysis

We presented Aikuchi at the Japanese Society for Artificial Intelligence 2006, which was held from June 7th to 9th, 2006. Target web pages comprised 276 pages that included paper titles, authors, and abstracts. After completing the experiment, we obtained 324 link anchors on web pages. The results revealed 88 users who placed their cursors over link anchors once or more, and 33 users who jumped from link anchors to other pages.

　We investigated which links users preferred when placing their cursor over link anchors. Before and during the conference, footprint links were most often selected (Fig. 2). We found that people preferred footprint links to recommendation links for moving from web page to another web page. This means that users trust links added by other users more than links recommended by the system. Therefore, sharing links that users linked from marked strings in web pages to other web pages was useful for social navigation.
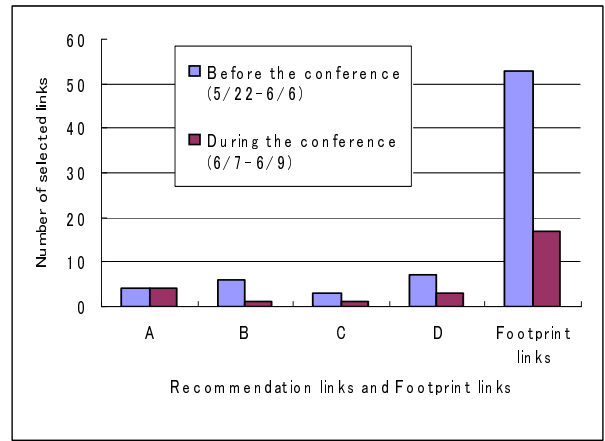

Fig. 2: *Number of selected links when users placed cursors over a link anchor*

4. Conclusion

We developed a system called Aikuchi in which users can link from a marked string in a web page to another web page and share it with others. The system highlights a marked string that functions as a link anchor, and users can get information to see the web page that includes them. We found that link anchors are useful for users to move pages because footprint links are frequently selected by users. Footprint links left effective traces of users moving from web page to other pages. Consequently, we believe that sharing them with users is appropriate for social navigation.

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