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A Study on the Characteristics of Users' Information Retrieval Behavior on WWW

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The purpose of this study is to analyze the characteristic of users' information retrieval behavior on the WWW (World Wide Web) by conducting three experiments.

In the preliminary experiment, the information retrieval behaviors of 9 subjects including their talk and their browsing histories were recorded. The data was analyzed except one inadequate subject. The profiles of the subjects vary in terms of their WWW navigation experience (0.4~10years) and access frequency (1hour/month~ full-time connected). The given task contained 9 search requests, which covered several domains, such as entertainment, hobby and daily news. Each session was terminated in 30minuites, but the subjects are allowed to finish their search by their judgement. 72 cases were recorded in this experiment. In 65 cases, subjects could find their answers. The total number of the pages, which the subjects actually browsed, can be thought of as a measure of the difficulty of the requests. The average steps for each subject ranged from 13.5 to 34.4. The average steps for each request were 4.5~61.1. In 64% of the total steps, subjects used hyperlink navigation, and in 28% for search engines. The average number and kinds of the key words in each query was 1.51 and 3.28. Only one subject explicitly used boolean operators. The proportion of the revisited pages to all visited pages was 26%. In addition to the use of hyperlink navigation (64%), the

fact that subjects did not use many key words, in terms of their number and suggests that the users cannot obtain the correct result without hyperlink navigation. In the hyperlink navigation, choosing the next action is important for effective search, and the users can guide the behavior based on their experience and/or the information available in the situation they are in. The experience alone cannot work for all hyperlink navigation tasks, because there are huge amount of information on WWW, which cannot be covered by the experience in principle. Thus we focus on examining the information which can facilitate effective hyperlink navigation.

Experiment 1 was conducted to examine the information for effective navigation. 31 subjects tried to select a link of the Web page from search engine results, each contained only one correct answer. Users' selection behavior and the eye marks were recorded. The subjects were divided into two groups by their WWW experience: the experienced group (more than 1 year, n=15), and the novice group (less than 1 year, n=16). Each subject was assigned three experimental conditions regarding the difference of the available information. (1) Title-Summary-URL condition (5 experienced/novice subjects), (2) Title-Summary condition (5 experienced subjects and 6 novice subjects), (3) Title-URL condition (5 experienced/novice subjects). The 15 experienced subjects could select significantly more correct answers than 16 novice subjects (t(29)=5.14,p<.05). The eye data are compared between the subjects who got more than 6 correct answers and those who got less correct answers (1~3 correct answers). Three characteristic eye-movement patterns were observed. The subjects who got less correct answers (1) read screen exhaustively, (2) selected a link before they finished scanning to the bottom of the page, (3) scanned to the bottom of the page, but did not spot specific information available to them.

Experiment 2 was conducted to confirm the effect of eye fixation on useful information by increasing its accessibility. The subjects were selected from the novice group in experiment 1. To shake off the effects of the previous experiment, the experiment 2 was conducted at least two weeks after the experiment 1. In this experiment, the part of the URL (domain name) was translated into Japanese for improving their accessibility. The results were compared between the experimental group (n=4) and the control group (n=3). The subjects who turned their gaze on the URL improved their scores, but not all subjects in the experimental group turned their gaze on the URL. These results suggest that the

Japanese translation of the URL could not improve its accessibility, but the fixation on the useful information is shown to be a key to selecting the correct answers.