Measuring User Performance in Online Searching: Plan For an Experiment

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ABSTRACT

This is a preliminary report of a portion of a study of the interaction of information retrieval systems and users. The overall project is sponsored by the Council on Library Resources and is a collaboration of the Universities of Toronto and Maryland. Its major purpose is to learn the most effective way to design user interfaces to computer systems to help user find information by searching online information system. Till now we have finished experiment design and some data have been collected.

In our experiment subjects recruited from professional searchers and end users will search online bibliographic database through two different interfaces: native DIALOG and OAK, a front end software developed to facilitate online information retrieval. Three levels of data are to be collected:

(1) information automatically recorded by monitoring the message stream between user and system. Some self-developed programs (OAKDEC, TREE, DIAL2, etc) and a commercial program PROCOMM are used in our project to collect and analyze search process data.

(2) information taken from the subjects by questionnaire or interrogation at the time of the search.

(3) information taken after the search in a discussion setting primarily concerned with overall attitude and recommendations for change.

This paper addresses one aspect of the problem: the measures to be recorded and analyses based on the data collected. The design of the experiments and problems encountered in conducting them will be the subject of a future paper.

Quantitative data are used in online information retrieval user behaviour study in many previous researches. There are four categories of measures: 1) environmental measures; 2) measures about users; 3) search process measures; 4) search outcome measures. Search process represents the actual stage of online information retrieval and is able to provide objective and accurate information about how the users behave when they search information using online information retrieval systems. It lies between other two aspects of the whole information searching (user and search outcome) and links them together.

A search session is composed of one or more online connections as well as search tasks. Search process measures introduced and defined in our project fall into three groups: 1) measures of each search session; 2) measures of each search task; 3) measures of each online connection. Listed here are some of the measures defined in this paper: total number of steps, number of steps of different types, total number of terms, number of terms of different types, set size, time (overall time, connect

time, error recovery time, time used by different types of steps), score, number of errors, number of records viewed, number of cycles, number of different types of states, number of chains (Markov chain), averaging measures, etc.

To compare search processes based on two different interfaces, we developed a state set, each state in the set representing certain stage of a search process. This set can fit both command language of DIALOG and menu options of OAK.

Search process data can be analyzed in many different ways to meet individual investigators' requirements. In this paper a dynamic approach is emphasized in search process data analysis which means change of the value of certain measures is traced to reveal how a user develops his search strategy and moves to meet his information needs. In particular, change of the value of measures relating to time, cycle (length of cycle, terms used and set size retrieved in a cycle) and Markov chain of different orders is discussed.

Statistical tests will be used to compare search behaviour between different user groups and between different treatments.

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