User Modeling in Exploratory Search

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ABSTRACT
Here we'll describe the content of our essay.

Author Keywords
Exploratory Search; Information Retrieval; User Modeling.

ACM Classification Keywords
H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

General Terms
Human Factors; Design; Measurement.

INTRODUCTION

Context who needs, what needs, why that is a problem in current situation

We'll describe here the roles of further chapters.

USER MODELING

Shortish explanation of user modeling key concepts. [17], [5]

To build a good system where machine and a human cooperate to perform a task it is important to take into account some significant characteristics of people [17]. User model is built of these characteristics and traditionally it has been a model of a typical user [17]. In reality often the users vary so much that a traditional user model is insufficient and there is a need for a user model of an individual.

User models can be categorized in a three dimensional space (IMAGE?), where the axes are: single model vs. collection of models, explicitly specified models vs. models inferred by the system on the basis of user behaviour and long-term vs. short-term user models rich99.

Sterotypes

Modeling stereotypes. [3], [16] Traditional user models have been constructed by collecting data on an average user on various tasks and environments [17]. An example of a sterotypical user model is Fitt's law that suggests that the speed on which the user operates the machine can be increased by increasing the size of targets the user must hit. The major weakness of these kind of models is that they assume that all the users constitute a homogenous set. In most cases for the majority of users the system is better adapted to them taht would be without any adaptation, but it isn't likely the best system that could be produced [17].

How to Collect and Analyze User Information

[15], [23]

Personalization

Individualization of user models, Adaptive/Adaptable User Interfaces, intelligent user interfaces [2], [4], [1]

[21]: "Personalized system's output or appearance differs for every user or user group in every context. The adapted output has the potential to be a great benefit for users; it is geared towards the user's preferences, behaviour or needs and it can make interaction easier and a lot more fruitful." The evaluation of a personalized system is problematic because it is unclear if the results gathered from a few individuals who all used system personalized for them can be generalized to entire population of users.

[21]: The writers are researchers at University of Twente, Netherlands. They took a look at scientific articles about user-centered evaluation (UCE) studies of adaptive and adaptable systems. The articles they reviewed are from 2007 and before. They reviewed 63 studies. Of the systems in the studies, 37 % were adaptive, 27 % adaptable and the rest, 36 %, were both adaptive and adaptable. As a result of their literature review, they have modeled a process that can be used in evaluating a personalized system. The model they present, the iterative design process for a personalized system, has four phases based on how ready the system is. Based on their findings in the studies they reviewed, they connect the most useful methods to use and most appropriate variables to investigate in each phase. Overall, the article notes that the current UCE practice of personalized systems was found to be sloppy at times. They found that some of the questionnaires they reviewed were poorly designed and suggest that all the questionnaire data and log data as well should be made available so that a reader can judge the quality of the study. One reason they mention for low quality evaluations is that most evaluators of personalized systems are computer scientists and not specialized in evaluation.

EXPLORATORY SEARCH IS A SUBTOPIC OF INFORMATION RETRIEVAL

Information retrieval

There are many goals in information retrieval and exploratory search is one of them. [6], [10]

Information seekers often express a desire for a user interface that organizes search results into meaningful groups, in order to help make sense of the results and to help decide what to do next [7]. There two ways of grouping search results; clustering and hierarchical faceted categories. Clustering is grouping of items based on some similarity and is fully automated process. It is good for clarifying a vague query but the clustering algorithms aren't yet perfect and the clustering can be unpredicted [7]. Category system is a set of labels that are organized to mirror the domain. Hierarchical faceted categories are a set of hierarchical categories that each represent a different dimension. Categories are usually created manually but can be partly automated.

Exploratory Search

Introduction to exploratory search. [13], [27], [20]

The user interface of an exploratory search system should be designed to fulfill the needs of most of its users. More information on what works and doesn't work can usually be collected from system evaluations.

However, evaluating exploratory search systems is difficult, because users have different starting positions. Their knowledge of the domain varies, they are interested in different aspects of the topic and they have previously encountered different information. [12]

USER MODELING IN EXPLORATORY SEARCH

Generally [14], [19], [24], [11]

[11]:The writers had done a user experiment to find out what the searchers are looking at in a faceted search UI. The test participants were university students and the system of interest was a library system. As a result of the eyetracker test the writers found out that participants looked a lot at the facets and 47,4% of the eye movement was between facets, breadcrums summarising the selected facets and the result list. In an interview the participants told they used facets to help organize their view on the topic domain and select sub-topics for further investigation. Of these results the researchers deduced that the facets played an important role in the exploratory search process. The article summarizes related study on faceted search and exploratory search and has many interesting leads on articles for our essay topic.

Exploratory search is a complex information seeking task and to support this it has become accepted to use faceted search or categorized overviews [11]. Structured metadata is used to provide the user with an overview of the results and clickable categories. With this UI approach the user doesn't have to reformulate the query to narrow and browse the results. Faceted search is used in practice in library catalogs, web search, online shopping and other domains [11]. Faceted search enables the user to change fluidly between search and browsing and searchers with partially defined or changing information needs can use the overview to understand the knowledge domain and refine their needs. It has been shown that when using faceted search the users explored their results more broadly than without facets and felt more organized about their searches. Still though the faceted search interfaces make the search more efficient the subjects don't always prefer it [11].

Exploratory search tasks can be characterized as either learning oriented or investigative and they have common aspects like uncertainty, ambiguity and discovery distinguishing them from look-up oriented tasks [11].

User Model Construction Methods

Utilizing the User Model

Search interface and search results, how they are affected by User Model?

Stereotypes used? Personalization used?

[21]: In order to accomodate to differing needs of users or usergroups over time, a system may use one of three basic approaches. System is called adaptive if it alters it structure, functionality or interface on the basis of a user model generated from *implicit* user input. Adaptable systems use *explicit user input* and need user's active participation. Personalized system is a hybrid of the two aforementioned.

Experience

How has user modeling been used in supporting exploratory search, example cases? What challenges have emerged?

- Cases

Analysis

- Challenges - Success - Failures

Recommendations, Future improvement needs etc.

See Cases: Conclusions

CONCLUSION

Goal, solution summary

Our goal was to explore the field of Exploratory Search and User Modeling. We found several articles that have some contribution to the topic.

Summary of results and their reliability

We found that: - Usage - Success - Failures

How much is it used in the real world, really?

Research impact - What has the research brought into software development?

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