CAN SEARCH INTERFACE HELP USER?

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ABSTRACT

Today, we discuss control of user and predication of system in the exploratory search. By directing a search engine, problems such as controllability and predictability may arise. We can reduce problems by seeing the effects and by interpreting user's actions.
A user study showed small improvements in user acceptance, perceived usefulness and task performance.

Keywords: feedback, interface, users.

Introduction

In search space, the user searches for information in a page that he is not familiar with. Because of that, search interfaces are faced with a problem: how to help the users with uncertain feedback. If the user were an expert one and the feedback clear, it could be understood in a good manner. If we want to help the user with the search task, there needs to be a big amount of work mixed in.

User models can be used to solve some problems where the user feedback could fit a model. The user is not a passive but an active one so there is a layer between the user and the model. This layer will change the user feedback in to the model and explain the effects user has on the model. Next, we show some related work, discuss our solutions to the problems in more detail and describe the user study results.

Related Work

Before, speaking about research in information retrieval systems focuses on improving the predictive accuracy of recommendations. We speak about recent studies. Recent studies [8, 11] have shown that interaction can improve search process and retrieval system. Some of the initial ways include clustering [3], feedback [6], query suggestion [1], and faceted search [13]. Although, the proposed techniques are rarely used in practice because of high load of providing feedback and browsing through list of suggestions.

[6].There has been also many attempts to engage the user with feedback process by interactive visualizations (learning algorithms, and visualization and pack of results [7]. By these, users have more control. Today's, to facilitate exploratory search reinforcement learning (RL) techniques have been used [4, 5, and 9].

The RL-based systems help the user to exposure to a large amount of information and prevent from being in a context. Although they do not permit the user to know the effects of their actions.

Proposed work

User Feedback as a goal

If we want user feedback have the intended effects, the user feedback values should be predict as points for optimization problems. In this way the user has an automatic assistant that help the system towards the desired target show by the user. So the user is assumed to be an active one trying to help the system, instead of a passive one that is sampled by the system.

Two design choices: which criterion and algorithm to use could solve this problem? They calculate the optimal feedback values.

In our proposed solution, the parts of the model that the user has feedback on are the best criterion that should be changed so that the resulting object agrees with the feedback. For example, if a special keyword has relevance C to user search intent, then the best value for the relevance of that keyword in the resulting is C. A list of relevance feedback values for the keyword In our predicted solution has been chosen by the user.

Feedback and its effect

The user could not predict the effect of the feedback, so he will be less surprised by the effects of the action and is able to choose the action.

Sometimes predicting the effects of different actions has some problems because simulating and visualizing the effects for any action in a real-time fashion is impossible.

Sometimes problems may arise if the system has randomized elements, for example, in support exploration situation the amount of possible future states may be infinite.

It is thus more practical to use approximate prediction. This prediction could allow the user to have a prediction of the effects, while still being feasible to construct in a timely period. Our goal for producing this prediction (the user to have a prediction of the effects) is to produce the possible future post of the system, make a simpler function point and use it for visualizing the possible effects. Making this goal requires making two main points: which subjects to choose and what function similar to use. In our made solution we use the best relevance values for the keyword the user wants to give feedback on and linear interpolation between them.

Building of the system

Proposed improvements can be used in article search engine [4].

In this system the user by keywords and its relevance, interact with the user search intent pattern so he can direct the search. The pattern is showed to the user, where relevant keywords are shown. The closer to the center, the more relevant it is. More keyword suggestions are also presented. The user gives feedback on the user pattern by selecting one keyword at a time or selecting a new one. When the user chooses the keyword, feedback for this keyword will be calculated. Then new results are retrieved and this new work is then will be visualized to the user.

Evaluation

We design a study on users; each user had two search tasks, one on base system and one with improved one. They had two tasks (short and explain exploratory task). Users were not familiar with topics. Familiarity in the topic was rated on 1 to 5 Likert scale and all the users familiarity were less than 5. In the broad task, the questions had multiple correct answers, whereas in the narrowed task the question scopes were more special. The study was semi structured. In the study the interface, task and order were respectable. The answers were done on a 1 to 5 Likert scale to the task questions per question, where 5 related to an excellent answer and 1 to a wrong answer. The average inter-rater reliability based on Spearman was 0.70, which can be adequate. Users were rated relevancy of the keywords and results. P-values were calculated by using the two-sided Wilcoxon rank-sum algorithm.

Results

Based on the results, we saw three users as outliers because they did their task on lowest possible points and the articles (85%) were rated irrelevant. It showed that these tasks were difficult for those users. Those users were excluded from the analysis. We had better performance in the focused exploratory options and worse performance in the focused exploratory options. But these differences were not very important.

In the interviews, 5 out of 8 users said that they thought, when they see prediction, it help them in the work. Users could predict the effects of their actions and it is very important. Although they could see keywords were related to each other.

According to the interviews, most of the users proffered improved system over the base one.

Four users preferred the improved one, 2 users preferred mixed preferences, and users preferred the base one and 3 users had no idea.

Discussion and Future Work

In this writing, we explained a problem with the usability of systems based on user models that are modified by the user. We had a solution for improving the usability of this kind of systems and shown some initial improvements in user acceptance, usefulness for user and performance of system. We did not have significant improvements on the base of the system, with a larger user study the effects would be possible to find out real.

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