Main Goal and Research Questions

Our main goal is to investigate user behavior in exploratory search when a recommendation engine for browsing paths is provided along with a browsing system.

RQ1. What is the effect of providing browsing path recommendations on user browsing behavior in exploratory search?

RQ2. Does browsing path recommendation assist users in exploratory search?

Case Study System

Data Collection: Dutch parliamentary proceedings, 21,547 debates (1994 - 2014)

Exploratory Political Search (ExPoSe) Browser

A sample expanded hierarchy for exploring Dutch parliamentary proceedings in search of "European union". The left panel provides the hierarchy of topics based on the Wikipedia categorical structure. The right panel displays the entities and speeches related to the selected topic.

An example for a visited speech in search of "European union". The page contains meta information about the speech as well as its full content. The searched entity is highlighted in the text.

Browsing Path Recommendation (BPR):

Experimental Setups

12 participants, 4 male and 8 female
- Average age of 27 (SD = 2.14)
- 3 undergraduate students, 9 graduate students
- Fairly high ability of online search but inexperienced in the political domain
- 8 general search tasks without concrete answer
- Summarize the attitude/opinion of the Dutch parliament on specific topics: Immigration, Islam, World War II, Tax, Holocaust, Dutch Golden Age, EU membership of Greece
- Every task was completed three times with the baseline system and three times with the featured system, each time by different participants — 48 search sessions
- All interactions of the participants with the systems were logged

Effects of Browsing Path Recommendation

Users could move back-and-forth across the hierarchy. We capture their navigational behavior by counting their level jumps and level visits.

- breadth-first: In the baseline system, the users tend to explore the nodes at one level (high percentage of zero level jumps) and then choose one of them to go to the next level.
- depth-first: In the system with BPR, the users quickly descend in the hierarchy but backtrack a lot (high percentage of negative level jumps).

According to the distribution of level visits, BPR encourages the users to quickly narrow down their search space and deepen their exploration path.

We investigate the likelihood of an edge being followed by the users according to its rank given by the BPR.

- Although the top-ranked edge was selected in almost 40% of cases, the users also tried paths with lower ranks.
- BPR does not decrease the chance of exploration!

Providing BPR decreases:
- average number of nodes expanded in the hierarchy
- average number of requests for displaying more detailed information like the list of entities, the list of speeches, or content of speeches under each node
- average duration of search sessions

Summaries written by users judged by experts on a 10-point scale get higher ratings using the system with BPR (M=7.73, SD=2.10), compared to the baseline system (M=5.36, SD=3.31) → BPR leads to higher task success

Main Findings

Using the baseline system the users tend to explore the data in a breadth-first-like approach by visiting different data points at the same level of abstraction to choose one of them to expand and go deeper.

Conversely, with BPR as a feature, the users tend to drive their search in a more depth-first-like approach by quickly going deep into the data hierarchy.

While the users still incline to explore different parts of the search space by using BPR, they can restrain or augment their search focus more quickly and access smaller but more promising regions of the data. Therefore, they can complete their tasks with less time and effort.

Read more: http://dx.doi.org/10.1145/3020165.3022155