

# COGNITIVE TRAVELING IN DIGITAL SPACE

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**Abstract.** We explore some of the key concepts related to web search. There are many attempts to improve key word search. The concept of exploratory search, which represents a shift towards a more complex view of the interested fellow's role, widening her options, is one of the important research directions. We propose a more radical shift towards viewing information seeking as cognitive traveling in the digital information space involving both web and digital libraries.

## 1. Introducing a vision

The purpose of this research is to outline some possible future directions of fundamental research in area of information retrieval based on search in large information spaces. Cognitive metaphor of traveling in the digital space describes an interested (often curious) fellow who travels in the web or visits digital libraries, sometimes purposefully, sometimes even without a specific objective, in order to obtain interesting information to augment her knowledge or learn something new [6] or just to get entertained. The range of possible cognitive experience does not seem to have limits.

By describing the interested fellow's endeavour as traveling we suggest that acquiring some information from the digital space as we experience it now is not a single act, but rather a process. It may involve several steps. But this is not surprising. Several steps may be necessary in order to improve the quality of the acquired knowledge beyond results from a "standard" search.

Traveling in general usually requires some kind of navigation. Traveling in digital space can make much use of navigation. It can be based on signs and officially provide information or it can be based on observing and imitating others or there can be investigated other ways.

Interested fellows leave traces in the digital space, sometimes even without being aware of it, e.g. evaluations, recommendations, annotations, inscriptions on a virtual wall. Interested fellows communicate with others, forming communities of those sharing inter-

ests. They express their views, write emails, blogs or microblogs [5]. Even a track record of a journey in the digital space is an important information, especially if complemented with knowledge of how successful this traveling was.

So far, the known search methods do not provide sufficiently precise results and results sufficiently covering the relevant subspace (cf. precision, recall). This is largely a consequence of the way how people use the search engines - what queries they submit. Moreover, the amount of information on the web increases rapidly. Therefore there is a permanent demand to improve methods for searching and accessing information. Nowadays, unstructured text is still the prevailing form of storing data in the Web. Such a method of content storing does not support automatic processing. There are several research directions that focus on accessing of the web content using various engines and tools in order to enable automatic processing of the content (the semantic web). However, the results have a limited scope for specific domains and specific applications.

We formulate a working metaphor of cognitive traveling in digital information space, covering web and digital libraries. The concept of a digital (information) space is a useful abstraction, because any activity in space is usually associated with some movement and moving in space can be seen as traveling. Even those interested fellows, who know what they are looking for, can find themselves in a situation that before they find what they originally have been seeking, they encounter an interesting link or information and unconsciously start searching in a new direction albeit with less accurate search target. However, there are also such interested fellows who do not know exactly what they want, but they like wandering in the information space, leaving navigation to immediate evaluation of interestingness of what they see or read.

## 2. Related works

There have been attempts to go beyond the keyword search paradigm even in the pre-web age. Bates [3] introduced the berrypicking approach to information seeking. The approach can be viewed as a precursor to exploratory search. By encountering new information in the currently read document (by eating the recently found and picked berry) the interested fellow gets new ideas and directions to follow, and also new conception of the query.

Obviously, the outlined view of traveling in digital information space is just one of several views presented or emerging. A very comprehensive view of interactive information retrieval is presented in [4], stressing a conceptual framework of an interactive information retrieval.

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