Chapter 18

An Approach for Capturing Human Information Behaviour

Adam Grzywaczewski
Coventry University, UK

Rahat Iqbal
Coventry University, UK

Anne James
Coventry University, UK

John Halloran
Coventry University, UK

ABSTRACT

Rapid proliferation of web information through desktop and small devices places an increasing pressure on Information Retrieval (IR) systems. Users interact with the Internet in dynamic environments that require the IR system to be context aware. Modern IR systems take advantage of user location, browsing history or previous interaction patterns, but a significant number of contextual factors that impact the user information retrieval process are not yet available. Parameters like the emotional state of the user and user domain expertise affect the user experience significantly but are not understood by IR systems. This paper presents results of a user study that simplifies the way context in IR and its role in the systems’ efficiency is perceived. The study supports the hypothesis that the number of user interaction contexts and the problems that a particular user is trying to solve is finite, changing slowly and tightly related to the lifestyle. Therefore, the IR system’s perception of the interaction context can be reduced to a finite set of frequent user interactions. In addition to simplifying the design of context aware personalized IR systems, this can significantly improve the user experience.

DOI: 10.4018/978-1-60960-487-5.ch018
INTRODUCTION

For the last few years we have been moving away from traditional desktop computing to a ubiquitous environment where information needs change dynamically. The internet is no longer a tool for academics only, but is being used for even the simplest every day activities. It is available not only through desktop computers but also semi-mobile laptops, mobile phones, game-consoles and many other Internet enabled devices. The broader range of Internet applications creates a greater number of information needs which in modern search engines have to be translated into search queries. Expressing our thoughts precisely is very difficult especially if we consider the cultural, linguistic, emotional and situational contexts in which they are placed. Every human being is unique and that makes keyword-based representation, which search engines and Information Retrieval (IR) systems use, very limiting (Ferreira & Atkinson, 2005). Even for experienced users, formulating a good textual query in some situations is a challenging task (Ferreira & Atkinson, 2005). Therefore it is hypothesised that a computer system partially capable of understanding the user’s needs can significantly facilitate Internet search.

Current research aims at understanding a user’s intentions in multiple ways. Techniques such as relevance feedback, user profiling or personalisation are used to improve the context awareness of IR applications (Morita & Shinoda, 1994; Nichols, 1997; Spink & Losee, 1996; Oard & Kim, 1998; Kelly & Teevan, 2003). The most effective algorithms use implicit feedback to improve already existing search and ranking software and has been shown to increase the efficiency of search by up to 31% (Agichtein, Brill & Dumais, 2006; Agichtein, Brill, Dumais & Ragno, 2006) There is also much research that focusses on the validity of the approach in order to prove the theoretical potential of the method (Teevan, Dumais & Horvitz, 2007; Joachims, Granka, Pan, Hembrooke & Gay, 2005). Most modern approaches focus on estimating relevance based on universal patterns of human behaviour. Some approaches are based on parameters which do universally represent relevance, such as reading time (Kelly & Belkin, 2004; Claypool, Brown, Le, & Waseda, 2001) or activity on the page (Claypool, Brown, Le, & Waseda, 2001; Fox, Karnawat, Mydland, Dumais & White, 2005).

Existing IR systems provide some promising results but they have a number of limitations that are listed below.

• Even though factors such as reading time can become very good estimators of relevance and the usage of click through information for pair wise estimation produces promising results (Joachims, 2002; Joachims, Granka, Pan, Hembrooke & Gay, 2005) recent research suggests high variability of human behaviour across various components that are the part of the search process.
