

# Chapter II

## Case Studies in

### Adaptive Information Access: Navigation, Search, and Recommendation

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#### **ABSTRACT**

*Everyday hundreds of millions of users turn to the World-Wide Web as their primary source of information during their educational, business and personal lives. The Web is an essential source of business-critical information but has also changed our personal lives, influencing the way that we learn, play, shop and socialise. During the course of a typical day an increasing number of us will interact with a variety of information services on the Web as we hunt for the information that we need. Very often these services will offer a number of alternative modes of information access and associated interfaces— navigation, search, and recommendation being the most common — each designed to help the user to efficiently fulfilling their current information needs. Navigation, search, and recommendation each have their own set of challenges when it comes to facilitating fast and efficient information access. In this chapter we will consider a number of these challenges and describe how they can be addressed by using techniques that allow information services to respond more intelligently to the needs and preferences of individuals and groups of users. Each challenge will be addressed in the form of a case-study focusing on one particular mode of information access (navigation, search, and recommendation) and an application scenario (mobile portals, Web search, and e-commerce), to describe how user profiling, personalization, and adaptive interface design can be combined to produce a more efficient and effective information service.*

## INTRODUCTION

The Web is an essential source of business-critical information but has also had a significant impact on our personal lives, influencing the way that we learn, play, shop and socialise. During the course of a typical day an increasing number of us will interact with a variety of information services on the Web as we hunt for the information that we need. Very often these services will offer a number of alternative modes of information access and associated interfaces—navigation, search, and recommendation being the most common—each designed to help the user to efficiently fulfill their current information needs.

One familiar mode of information access sees users *navigating* or *browsing* through pages of content, following an appropriate sequence of links to locate the particular item of content that they are seeking. Indeed, for a long time navigation was the dominant form of information access, especially during the early years of the Web, when most users began their information quest at the home page of a major portal such as Yahoo or AOL; information access on the Mobile Internet is still largely dominated by navigation-based portal access (Church, Smyth, Cotter, & Bradley, 2007). Today however, with significant advances in search engine technologies, navigation has largely given way, at least on the traditional Web, to query-based *search*, which is now the primary form of information access for most Web users. In contrast to navigation, search-based information access aims to engage the user in a more targeted information access session, requesting their current information needs, up-front, in the form of a query, and using this to select and rank pages that are known to be relevant to this query.

Navigation and search are examples of *reactive* modes of information access, in that they both respond to explicit user input (link selection or search queries). The third mode of information access, *recommendation*, provides an more *proactive* information access strategy in which

content is automatically suggested to a user in the form of a set of recommendations or suggestions. Recommendation interfaces are now a routine part of many information services, especially e-commerce services, where they are used to make product suggestions to users based on either their past purchase histories or on feedback as an effective mode of cross-selling and up-selling.

Navigation, search, and recommendation each have their own set of challenges when it comes to facilitating fast and efficient information access. In this chapter we will consider a number of these challenges and describe how they can be addressed by using techniques that allow information services to respond more intelligently to the needs and preferences of individuals and groups of users. Each challenge will be addressed in the form of a case-study focusing on one particular mode of information access (navigation, search, and recommendation) and an application scenario (mobile portals, Web search, and e-commerce), to describe how user profiling, personalization, and adaptive interface design can be combined to produce a more efficient and effective information service.

The first case-study will focus on navigation in mobile portals and highlight how today's mobile users are faced with a significant navigation hurdle when it comes to accessing mobile content. We will describe recent research that speaks to the scale of this problem and describe an effective solution in the form of a technique that automatically adapts portal structure in response to user behaviour. Moreover, this particular solution has now been commercialised by *ChangingWorlds Ltd.* and is used by leading mobile operators to reduce portal navigation times by 50%, resulting in a significant improvement in the overall user experience and an increase in mobile portal usage by up to 30%.

The second case-study will focus on a critical challenge in Web search, namely how to help existing search engines cope more efficiently with the vague queries that are commonplace in Web

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