Chapter 14
Smartphones to Access Hybrid Information Spaces

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ABSTRACT

This chapter presents how mobile phones nowadays can be used as a handy and always around medium to interact with information collections of both physical and electronic form. It presents their evolution into powerful computing devices capable of communicating with other computing infrastructures, like the World Wide Web, and assisting them in finding the information of interest in the most convenient form, right when the need arises. It also provides a description of the current interaction modes between users, devices and information objects as well as some examples of first and second-generation mobile services. Furthermore, the authors hope that understanding the potential introduced by mobile phones in the modern information landscape can bring some insight to new information seeking strategies, that enhance exploration and not just querying. This understanding can be used to create new, innovative and novel services to enhance the seeking experience while interacting with hybrid information spaces.

INTRODUCTION

The total number of mobile phone users in the world is currently estimated at 3.3 billion, accounting for nearly 50% of the population on Earth (Reuters, 2007). Nearly 90% of the world’s population is expected to be using mobile phone services by 2010. As broadband wireless communications become available, voice telephony is at the same time converging with electronic...
services. This integration enables mobile phones to access a range of data services. On the other hand, computer evolution and electronic publishing created a wealth of information, available in electronic form. In the mid 90s, the advances in computer networking technology made the Web and the Internet a new medium to distribute electronic content and access content which was not locally held. The success of Internet led to the creation of on-line resources, like magazines and web pages, as well as the wider use of digital libraries and other collections that were universally accessible. The new resources strongly affected the users’ seeking behaviour and strategies. As a result, nowadays there is a strong demand for advanced searching and browsing in diverse sources of information, which enhances its completeness, validity and currency.

The need to access electronic sources, anytime available, combined with the potential raised by the wide spread of mobile phones, which can be used as terminals to receive electronic information in almost any place, has been recognized worldwide. Mobile Computing (MC) is a term to describe the ability of using anywhere a portable computing device by means of wireless or wireline communications. This chapter focuses on utilizing MC in hybrid information spaces, i.e. environments that hold information both in physical and electronic form. Mobile interaction with hybrid spaces can be applied in areas such as advertising, tourism and museum guides, peer-to-peer information sharing and remote control of public resources, like printers and displays.

In the rest of the chapter we describe the usage of portable computing devices as a means of interaction with physical and digital spaces. We first provide some background information on smartphones, on the challenges of mobile computing and an overview of a web-based architecture. We then discuss interaction issues with the device and describe their usage in hybrid spaces. Finally we outline the future trends and conclusions.

BACKGROUND: SMARTPHONES AND MOBILE COMPUTING

Apple released the first personal digital assistant (PDA) in 1993 and it was a pocket-sized mobile device used for Personal Information Management (PIM). Typical applications included were calendar, address book, calculator, world-clock and note pad. At the same time, IBM released Simon, the first smartphone, which besides PIM functionalities could support mobile telephony and SMS texts over 2G digital cellular telephony networks. In 1995 infrared and wire-line serial communication with nearby devices was implemented as an alternative for data exchange and synchronization. In addition, smartphones could connect to proxies and join other computer networks to retrieve data such as e-mail. The need to transfer quickly and display bigger amounts of data led to faster communication protocols (Bluetooth, EDGE) and 3G telephony networks in early 2000. At that time, cameras and colourful screens were considered standard equipment. By 2005, many smartphones were enabled with open operating systems, rapid transfer protocols (WiFi, USB), touch screens, and solid-state memory cards. Besides telephony, they could support web browsing/email, instant messaging, document viewers and multimedia playback. Nowadays, smartphones are equipped with GPS receivers, multi-touch screens and advanced interaction modalities, such as handwriting recognition and proximity sensing. Smartphones have evolved into powerful communication and computing devices capable of collecting and processing data, anytime/anywhere, and seem to become a universal mobile terminal for communication, control, entertainment and location-based services.

Smartphones’ increasing popularity and current computational capabilities meet the mobile application requirements and they compare well against other portable devices, such as PDAs and laptops. However, mobile computing introduces new challenges and constraints, inherent to mobi-