

Preface

The ongoing migration of computing and information access from the desktop and telephone to mobile computing devices such as PDAs, tablet PCs, and next-generation (3G) phones poses critical challenges for research on information access.

Desktop computer users are now used to accessing vast quantities of complex data either directly on their PC or via the Internet – with many services now blurring that distinction. The current state-of-practice of mobile computing devices, be they mobile phones, hand-held computers, or personal digital assistants (PDAs), is very variable. Most mobile phones have no or very limited information storage and very poor Internet access. Furthermore, very few end-users make any, never mind extensive, use of the services that are provided. Hand-held computers, on the other hand, tend to have no wireless network capabilities and tend to be used very much as electronic diaries, with users tending not to go beyond basic diary applications.

This “state-of-practice” presents a dramatic contrast to the technological vision, and the emerging “state-of-the-art” devices, which are small, very powerful, wireless networked computing platforms. Providing access to large quantities of complex data on such devices while users are on the move and/or engaged in other activities poses significant challenges to the information access community and brings together many classical computing domains, such as information retrieval (IR), human-computer interaction (HCI), information visualization, and networking. This volume contains 21 papers that approach these challenges from different directions. The bulk of the papers come from the Workshop on Mobile and Ubiquitous Information Access that was held as part of Mobile HCI 2003 in September 2003.¹ Other papers were specially invited, to complement the presented papers and extend the volume.

Overview

The 21 papers in this volume have been grouped into the following four parts. Many of the papers fall into more than one category, and sometimes our choice has been somewhat arbitrary, but hopefully still useful.

Foundations: Concepts, Models, and Paradigms

The field is young, so it is not a surprise that some work is being done on basic concepts and visions of the future. In *The Concept of Relevance in Mobile and Ubiquitous Information Access*, Coppola et al. discuss the concept of relevance in the mobile, wireless, and ubiquitous information retrieval arena. In *Conversational Design as a Paradigm for User Interaction on Mobile Devices*, Leong borrows from well-established linguistics research and he presents a design paradigm for user interfaces on mobile devices based

¹ Mobile HCI 2003 was part of the Mobile HCI series (see www.mobilehci.org); its proceedings were published in LNCS volume number 2795.

on Grice's conversational implicatures. *One-Handed Use as a Design Driver: Enabling Efficient Multi-channel Delivery of Mobile Applications*, by Nikkanen, presents several practical and useful guidelines for mobile devices and applications, based on both a literature review and lessons learned at Nokia. In the last paper in this part, *Enabling Communities in Physical and Logical Context Areas as Added Value of Mobile and Ubiquitous Applications*, Pichler discusses how to provide added value to mobile users, maintaining the importance of designing services that are very specific to the context area, and how to foster communities based on both physical and logical contexts.

Interactions

Of course, interaction problems are paramount. One of the key issues when working with mobile devices is how to input data to a mobile device with very poor input devices. The other, symmetrical, key issue is how to fully exploit the small available display area. The second paper of this part discusses the former; the other ones the latter. In *Accessing Web Educational Resources from Mobile Wireless Devices: The Knowledge Sea Approach*, Brusilovsky et al. evaluate the use of Self-Organizing Maps (SOMs) for information access to educational resources. In *Spoken Versus Written Queries for Mobile Information Access*, Du et al. analyze IR effectiveness when the query is input via speech: they present a prototype and its experimental evaluation. In *Focussed Palmtop Information Access Combining Starfield Displays with Profile-Based Recommendations*, Dunlop et al. present two applications using starfield displays on a PDA and exploiting advanced collaborative filtering techniques: Taeneb CityGuide recommends restaurants and Taeneb ConferenceGuide presents the timetable of a conference.

Applications and Experimental Evaluations

Several approaches are used for implementing applications. Following a strong tradition in both the HCI and IR communities, evaluation is deemed a crucial issue and several papers focus on experimental studies of mobile applications. In *Designing Models and Services for Learning Management Systems in Mobile Settings* Andronico et al. propose a survey of previous systems for mobile learning, and describe an ongoing project. Cignini et al., in *E-Mail on the Move: Categorization, Filtering, and Alerting on Mobile Devices with the ifMail Prototype*, present a prototype allowing e-mail categorization, filtering, and alerting on mobile devices, and its first experimental validation. In *Mobile Access to the Físchlár-News Archive*, Gurrin et al. illustrate the Físchlár-News system, processing digital video and audio news stories, which is capable of segmentation, collaborative filtering-based recommendation, and delivery on mobile devices. Mai et al., in *A PDA-Based System for Recognizing Buildings from User-Supplied Images*, describe a prototype providing navigational and informational services to an urban mobile user based on GPS and building recognition achieved through image processing techniques. In *SmartView and SearchMobil: Providing Overview and Detail in Handheld Browsing*, Milic-Frayling et al. overview their SmartView technology, which makes Web pages with complex layout more accessible to mobile devices, and show and evaluate its integration into SearchMobil, to help the users of a small screen display estimate the relevance of retrieved Web pages. The paper titled *Compact Summarization*

for *Mobile Phones*, by Seki et al., deals with the very important (for mobile devices) issue of summarization: these authors present a new summarization method based on the genre of a document and they evaluate it. On the same topic, Sweeney et al. in *Supporting Searching on Small Screen Devices Using Summarisation* discuss and evaluate by means of a user test how summarization can improve IR on small screen devices. In *Towards the Wireless Ward: Evaluating a Trial of Networked PDAs in the National Health Service*, Turner et al. discuss and evaluate, by means of an on-field user study, several important issues on the usage of PDAs in the medical field. Finally, in *Aspect-Based Adaptation for Ubiquitous Software*, Zambrano et al. delve into software engineering issues: they propose Aspect Oriented Programming (AOP) as a solution to deal smoothly with issues that are peculiar to the design of mobile device applications and that are not found when designing standard desktop applications.

Context and Location

A hot issue in mobile device research is, of course, how to take into account and exploit the context in which the user is. In *Context-Aware Retrieval for Ubiquitous Computing Environments*, Jones et al. perform a thorough analysis of context-aware retrieval: they present definitions, links with other disciplines (IR, information filtering, agents, HCI), and a description of their own findings. Nussbaum et al., in *Ubiquitous Awareness in an Academic Environment*, propose and evaluate a prototype that, on a campus, enhances student relationships by fostering face-to-face meetings. In *Accessing Location Data in Mobile Environments: the Nimbus Location Model*, Roth proposes the Nimbus framework, a formal model for location information, integrating physical and semantic information. The paper *A Localization Service for Mobile Users in Peer-to-Peer Environments*, by Thilliez et al., describes a localization service based on a peer-to-peer (P2P) architecture, featuring location-based queries. Finally, in the last paper of this volume, *Sensing and Filtering Surrounding Data: the PERSEND Approach*, Touzet et al. present an application dealing with the issues of distributed databases, proximate environments, and continuous queries.

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