Foreword

Recent years have witnessed a sustained growth of interest in mobile computing and communications. Indicators are the rapidly increasing penetration of the cellular phone market in Europe, or the mobile computing market growing nearly twice as fast as the desktop market. In addition, technological advancements have significantly enhanced the usability of mobile communication and computer devices. From the first CT1 cordless telephones to today's Iridium mobile phones and laptops/PDAs with wireless Internet connection, mobile tools and utilities have made the life of many people at work and at home much easier and more comfortable. As a result, mobility and wireless connectivity are expected to play a dominant role in the future in all branches of economy. This is also motivated by the large number of potential users (a U.S. study reports of one in six workers spending at least 20% of their time away from their primary workplace, similar trends are observed in Europe). The addition of mobility to data communications systems has not only the potential to put the vision of "being always on" into practice, but has also enabled new generation of services (e.g., location-based services).

Mobile applications are based on a computational paradigm, which is quite different from the traditional model, in which programs are executed on a stationary single computer. In mobile computing, processes may migrate (with users) according to the tasks they perform, providing the user with his or her particular work environment wherever he or she is. To accomplish this goal of ubiquitous access, key requirements are platform independence but also automatic adaptation of applications to: (1) the processing capabilities that the current execution platform is able to offer and (2) the connectivity that is currently provided by the network. Mobile services and applications differ with respect to the quality of service delivered (in terms of reliability and performance) and the degree of mobility they support, ranging from stationary, to walking, to even faster movements in cars, trains, or airplanes. A particular challenge is imposed by (interactive) multimedia applications, which are characterized by high QoS demands. New methods and techniques for characterizing the workload and for QoS modeling are needed to adequately capture the characteristics of mobile commerce applications and services.

A fundamental necessity for mobile information delivery is to understand the behavior and needs of the users (i.e., of the people). Recent research issues include efficient mechanisms for the prediction of user behavior (e.g., location of users in cellular systems) in order to allow for proactive management of the underlying networks. Besides this quantitative evaluation user behavior can also be studied from a quantitative point of view (how well is the user able to do her or his job, what is the level of user satisfaction, etc.) to provide information to other services, which can adapt accordingly. This kind of adaptation may for example, include changes in the user interface, but also chances in the type of information transmitted to the user.

From a telecommunications infrastructure point of view, the key enabling technology for mobility are wireless networks and mobile computing/communication devices, including smart phones, PDAs, or (Ultra)portables. Wireless technologies are deployed in global and wide area networks (GSM, GPRS, and future UMTS, wireless broadband networks, GEO and LEO satellite systems) in local area networks (WLAN, mobile IP), but also in even smaller regional units such as a campus or a room (Bluetooth). Research

on wireless networking technologies is mainly driven by the quality of service requirements of distributed (multimedia) applications with respect to the availability of bandwidth as well as performance, reliability, and security of access.

Being provocative, one might state that the situation that the application developers are facing nowadays in mobile computing is similar to the early days of mainframe computing. Comparatively "dumb" clients with restricted graphical capabilities are connected to remote servers over limited bandwidth. Although significant improvements have been achieved increasing the capabilities of networks and devices, there will always be a plethora of networks and devices, and the challenge is to provide a seamlessly integrated access as well as adaptability to devices in application development making utmost use of the available resources.

I am delighted to write the Foreword to this handbook, as its scope, content, and coverage provides a descriptive, analytical, and comprehensive assessment of factors, trends, and issues in the ever-changing field of mobile multimedia. This authoritative research-based publication also offers in-depth explanations of mobile solutions and their specific applications areas, as well as an overview of the future outlook for mobile multimedia.

I am pleased to be able to recommend this timely reference source to readers, be they it researchers looking for future directions to pursue when examining issues in the field or practitioners interested in applying pioneering concepts in practical situations and looking for the perfect tool.

Gabriele Kotsis
President of the Austrian Computer Society, Austria
September 2005