Because multimedia is becoming ubiquitous, we will soon be able to count on access to any multimedia content, from anywhere in the world. This special issue of *IEEE MultiMedia* addresses the most recent developments in this area and looks at the current technologies enabling mobile and ubiquitous multimedia. In particular, this special issue presents articles that discuss novel and future-oriented research that focuses on the architectures, protocols, and algorithms developed to cope with mobility. The articles presented in this special issue cover not only novel application domains, but also a wide variety of methods, including case studies, field trials, and evaluations of new applications and services; research in novel mobile user interfaces; and research in design and use of intelligent, aware, proactive, and attentive environments.

Mobile and ubiquitous multimedia is an expanding field of research that covers middleware and distributed-computing support for mobile and ubiquitous multimedia; mobile computer graphics, games, and entertainment; and mobile and ubiquitous multimedia in intelligent transport systems. This area also covers novel, adaptive, context-aware, and wireless multimedia applications and systems, along with mobile media management and mobile and ubiquitous multimedia in ad hoc networks. This special issue outlines the trends, major challenges, and perspectives related to these exciting topics.

The research community

In December 2008 we organized the 7th International Conference on Mobile and Ubiquitous Multimedia (see http://www.mum2008.org/). Held in cooperation with ACM SigMobile, the 2008 conference took place in Sweden as a collaborative event between Umeå University and Luleå University of Technology. This research-focused conference addressed current technologies enabling mobile and ubiquitous multimedia, and in particular presented novel and forward-looking research focused on the architectures, protocols, and algorithms designed to cope with mobility. MUM 2008 included presentation of case studies, field trials, and evaluations of new applications and services, as well as research in novel mobile user interfaces and in the design and use of intelligent, aware, proactive, and attentive environments.

While keeping the single-track tradition of the technical program of the MUM conferences, the 2008 program included two tutorials given by experts. Timo Ojala from the University of Oulu presented “Theories and Case Studies on Mobile Interactive System Design and Evaluation;” while Kostas Pentikousis presented “Mobility and Multiaccess in Emerging Internet Architectures.”

The MUM 2008 conference included two distinguished keynote speakers. The first keynote speaker, Martin Körling of Ericsson Research, came from the telecommunications industry. The second keynote speaker, Rikard Lindgren of the University of Gothenburg, came from academia. Such a balance of industry and academia is indicative of how the area of mobile
and ubiquitous multimedia spans academic research and extends to commercial applications and industrial research and development.

As a point of departure from the MUM 2008 conference, we developed this special issue to highlight and acknowledge quality work in this area. Through a call for papers that followed the general scope of the MUM 2008 conference, we searched for a set of interesting articles that could serve as cornerstone examples of the state of the art in this area. The call for papers resulted in several high-quality articles submitted for this special issue. Out of these, we were able to accept five articles for publication following a double-blind, peer-review process.

**Making the case**

Working as cornerstones for marking out important examples of the high-quality research currently conducted in this field, we believe that the following five selected articles for this special issue make some interesting cases for MUM.

The first article, “Visual Navigation for Mobile Devices,” presents a study on integrating improved camera-pose data into the landmark-based visual navigation system for mobile devices developed jointly at three institutions: University of Washington, Seattle; Nokia Research Center, Palo Alto, California; and George Mason University, Fairfax, Virginia. The novelty of the approach is in rendering new views without the addition of new images. The researchers measured the performance, accuracy, and usability of the prototype to implement improvements and add value to the navigation application.

The second article, “Social Surroundings: Bridging the Virtual and Physical Divide,” addresses the recent phenomenon of social networks and describes an approach from the University of Oulu, Finland on how to create dynamic, entertaining, and useful applications that bridge the physical and online worlds. The authors present Social Surroundings, an application that pulls content already available in online services into public places such as cafés and pubs. Social Surroundings is designed to enable and encourage face-to-face social communication using digital media.

The third article, “Picture Context Capturing for Mobile Databases,” describes a system that uses GPS and compass sensors integrated with a camera for associating picture contents with the environment. This technology—developed at the Technical University of Crete, Greece; the Advanced Systems Group, Switzerland; and Ricoh, Japan—allows for fairly accurate identification of the location of the visible semantic objects within the picture, which in turn allows for personalized database functionality that includes semantic content retrieval, interaction, and visualization. The system, called SPatial Image Management, exploits semantic contextual knowledge for its retrieval functionality.

The fourth article, “A Mobile Multimedia Technology to Aid Those with Alzheimer’s Disease,” by researchers from the University of Ulster, Northern Ireland, and Belfast City Hospital reports on the technical developments and patient evaluations of a mobile-phone-based system for delivering regular memory prompts to people with mild stage Alzheimer’s disease. Through the delivery of regular video-based reminder messages, the system is designed to increase user independence and alleviate some of the pressures endured by caregivers. The article describes evaluation challenges, and details users’ experiences and the corresponding proposed changes.

The fifth article, “Intelligent Multimedia Presentation in Ubiquitous Multidevice Scenarios,” addresses the potential to enhance the user experience in terms of flexibility and interactivity using multidevice environments. Researchers from four institutions—the University of Surrey, UK, Alcatel-Lucent, Bell Labs, and Centrum Wiskunde & Informatica—propose a novel, multimedia adaptation and delivery framework that focuses on mobile users in daily situations. The article describes a working prototype and reports on user testing outcomes that highlight benefits of the approach.

**Future challenges and directions**

We hope these articles will generate some thought about the challenges and directions for future research. We believe that the articles presented in this special issue, along with all of the papers annually accepted at the MUM conference, serve as good indicators of how this unique field is developing.

On a general level, future challenges will be to further develop methods and tools for design-oriented approaches. Through such approaches, we can not only describe and
envision future technology use, but also actually build, try out, test, and evaluate the performance of such technologies, as well as capture user experiences of novel technologies in use. Related to this design-oriented and future-driven agenda, we can identify another challenge to find ways and methods to work more precisely with theory construction, enabling us to see and identify how different design efforts contribute to our current body of knowledge.

In terms of technology, there is a need for further research on the current transition from user-generated content to participation-driven innovation across media and media platforms. We need to look into the current development of new, dynamic materials and how these materials can be integrated in design to provide applications, platforms, devices, and services that are more advanced, simpler to use, and more elegant. In addition, the possibility of integrating our physical and digital world through a range of technologies that rely on geolocated information and context-aware services presents us with yet another set of specific research challenges for the future.

When all of these challenges are addressed, the next research challenge will of course be to explore and develop new strategies in the emerging interaction landscapes—including open standards, service integration, and so on—and to envision new tools designed to enable people to actively participate in these new multimedia worlds. These are an interesting set of future research challenges for the field of mobile and ubiquitous multimedia.

Mikael Wiberg is an associate professor at the Department of Informatics, Umeå University, Sweden. He is also the research director at Umeå Institute of Design, where he is responsible for the applied and basic research programs in design and acts as director for the PhD and post-doc program in design. His research interests include mobile interaction design, computer-supported cooperative work, and interactive architecture. Wiberg has PhD in informatics from Umeå University. He served as general conference chair for MUM 2008. Contact him at mikael.wiberg@informatik.umu.se.

Arkady Zaslavsky is a chaired professor at the Department of Computer Science and Electrical Engineering, Luleå University of Technology, Sweden. He is also an adjunct academic staff member at Caulfield School of IT, Faculty of Information Technology, Monash University, Melbourne. His research interests mobile and pervasive computing, wireless networks, and distributed computing and database systems. Zaslavsky has a PhD in computer science from Moscow Institute for Control Sciences. He served as technical program chair for MUM 2008. Contact him at arkady.zaslavsky@ltu.se.
JANUARY-MARCH
Current Multimedia

A broad selection of articles on current multimedia technology and practice will present current advancements to those interested in using multiple media types to create new experiences.

APRIL-JUNE
Mobile and Ubiquitous Multimedia

Because multimedia is becoming ubiquitous, we will soon be able to count on access to any multimedia content, from anywhere in the world. This special issue addresses this development and looks at the current cutting-edge technologies enabling mobile and ubiquitous multimedia. Articles in this issue will present novel and future-oriented research that focuses on the architectures, protocols, and algorithms developed to cope with mobility.

JULY-SEPTEMBER
Multimedia Innovations

Each article in this general issue will add to the notion that multimedia is a compelling field that provides a driving force behind most of today’s technology innovations.

OCTOBER-DECEMBER
Knowledge Discovery Over Community-Contributed Multimedia Data

This special issue will present efforts in knowledge discovery over large-scale social media, and in particular the opportunities and challenges given the nascent status of this arena. Articles will include both surveys and original research on emerging theoretical and practical deployments as well as illustrative applications for annotation, indexing and search, mining, recommendation, advertising, and visualization over social media. This issue also focuses on the rich context information and its mobile usage for social media.

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