

Mobile Computing and Ambient Intelligence: The Challenge of Multimedia

Preface to the online proceedings of Dagstuhl Seminar 05181

Mobile computing gains in last years an increasing importance. It penetrates into new areas of everyday life. With increasing computing power that is available in recently developed mobile devices the mobile computing approach is used in new areas (where its use would not be possible few years ago). Due to specific properties of mobile devices the traditional approaches to the traditional schemes for communication between users and the devices are not applicable. This fact requires both development of new approaches for the design of user interfaces and also new approaches how the new possibilities of mobile computing should be used in particular applications, should be explored.

Another important issue that is linked with new applications in the field of mobile computing is derived from the fact that portable information appliances are pervading the everyday life and ambient intelligence is starting to surround us. Personal mobile guides and intelligent meeting rooms are examples of future smart environments that provide us with information and assistance, tailored to our individual needs, anytime, and anywhere. However, this also means that future infrastructures for multimodal interaction with multimedia information will be distributed and heterogeneous. Adapting multimedia applications and services to these delivery environments and enabling ensembles of multimedia appliances to organize themselves spontaneously and ad hoc will be major technical issues that have to be solved in near future. These problems were discussed during the Dagstuhl Seminar 05181 that took place in Schloss Dagstuhl from 01.05.05 to 04.05.05.

The papers presented during the seminar covered wide spectrum of issues related to the name of the seminar. In principle the papers could have been divided into three categories:

- theoretical issues (related mainly to models on the base of which the concepts in the given area could be developed)
- application oriented solutions covering specific conceptual problems
- use of mobile computing in particular applications (the new fields of application of mobile computing were discussed).

Into the first category the following papers could be included:

Balfanz discussed the problems of development of general concept for mobile knowledge management (mKM) by means of which a reference architecture for mKM systems could be defined. Forbrig presented transformation scheme by means of which it is possible to transform analysis model into navigation and presentation models (what plays an important role in mobile computing applications). Heider and Kirste discussed in their papers the use of ambient intelligence for support of unsupervised spontaneous cooperation of an ensemble of devices (e.g. located in smart environments). Luyten showed in his paper how the Model-Based User Interface Development methodology can be applied for ambient intelligent environments. Nilsson presented concept by means of which it is possible to dynamically adapt user interfaces using generic middleware. Reichart proposed a model-based approach that combines task, object and dialog models to specify platform-independent user interfaces.

Into the second category the following papers could be included:

Butz introduced survey of various concepts for interaction techniques in ubiquitous computing together with ideas how to create an interaction scheme that could be generalized in such an environment. Clerckx discussed an Integrated Development Environment that

supports the design, prototyping, evaluation and deployment of context-aware interactive systems. Hellenschmidt presented the application of the SodaPop model for distributed device ensembles to physical heterogeneous devices as well as the distributed implementation of conflict resolution strategies that guarantee the data-flow even if there are competing components. Malaka gave an overview of some present research work on rich semantic services for mobile users (various techniques ranging from resource-adaptive middleware to semantic analysis of texts were presented). Mikovec presented ontology-based model by means of which it is possible to construct speech interfaces that allow the user to communicate with devices without restrictions present in traditional models. Slavik discussed in his talk the possibility of simplification of interaction with 3D scenes in mobile environment. Stary reported about his findings that lead to a more comprehensive understanding of adaptation in multi-user, multi-device and multimedia environment.

The third category of papers was covered with the following papers:

Bomsdorf discussed in her paper the fact that ubiquitous learning is supported by ubiquitous computing and as such represents the next step in the field of e-learning. Fuchs presented Focus Context techniques that make efficient use of displays with low resolution and size. Rauschenbach's paper was concentrated both on the portable use of mobile devices in order to complement the TV set in the home and the use of mobile TV services while on the move using mobile broadcasting technology. Schnelle discussed problems of audio information retrieval system that allows the user to access information stored in audio form. An outline of the future use of mobile devices in specific environment was given by de Boer when he presented possible future scenarios that presented visions dealing with development of infotainment and telematics systems for the use in cars.

The total number of workshop participants was 23. The participants came from 7 countries (Germany, Austria, Belgium, United Kingdom, Norway, Czech Republic, Sweden). Each talk was followed by very intensive discussion. As the workshop had multidisciplinary flavor the topics in the discussion were discussed from different points of view. A conclusion could be made that problems that are combination of issues in the field of multimedia, mobile computing and ambient intelligence deserve much higher attention than up to now (both in research and in application community). One of the main results of the seminar is the fact that links between professionals coming from different (sometime slightly overlapping) fields came into personal contact that may be used in further research activities.

Organizers of the seminar:

N. Davies (Lancaster University, United Kingdom)

T. Kirste (University of Rostock, Germany)

H. Schumann (University of Rostock, Germany)