

Artificial Intelligence Goes Mobile

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One trend in computer technology over the last decades was definitely that of devices becoming smaller and personal. Monolithic main-frame systems with many users are almost extinct and personal computers were the first milestone in this evolution. But the PC was not the end of the line. The personal computer is still getting smaller and portable computers such as powerful laptops and less powerful but lighter personal digital assistants (PDAs) are now getting extremely popular. But even this is not the end of this process. The next step are wearable computers that are carried by the user like cloths and where new display technologies like head-mounted displays, allow new ways of augmenting the user's reality. The preliminary end of this development seems to be the disappearing computer where computers are not perceived as technical devices any more, but rather form a computing environment in the user's world, embedded into cloths, cars, items like TV sets, but also into microwave ovens and even milk bottles. According to the vision of the pioneers of these new computerized infrastructures, people may be reminded to buy milk when they come along the dairy shelf in the supermarket, because of a message that has been sent to the user's wearable computer from the refrigerator that has monitored its content. There are many other scenarios where users can receive personalized information adapted to the actual situation.

Even though, the computerized milk bottle still seems to be a research gadget, today's information technology is rapidly moving small computerized consumer devices and hi-tech personal appliances from the desks of research labs into sales shelves and our daily life. Mobile phones, PDAs, portable computers seem to merge and a new generation of smart devices with mobile communication access and reasonable computing power is now already available. New communication protocols and techniques like UMTS as a high bandwidth wireless network standard or WAP as a protocol for mobile application allow information access everywhere. Combined with localization through the satellite navigation system GPS or through triangulation methods using the mobile phones, services may become aware of the user's location.

But light and powerful hardware together with wireless networking do not yet guarantee the usefulness of these mobile systems. Traditional software and services can be used in a mobile scenario, but some software will just not be usable when a keyboard is not available or the display is too small for extended graphical output. Therefore, the main challenge for the success of mobile systems is the design of smart user interfaces and software that allows ubiquitous and easy access to personal information and that is flexible enough to handle changes in user context and availability of resources.

There is a number of hard problems that have to be solved in order to built new and useful information infrastructures for mobile users. Among these are solutions needed for

- location awareness
- context awareness
- interaction metaphors and interaction devices for mobile systems
- smart user interfaces for mobile systems
- situation adapted user interfaces
- adaptation to limited resources

- fault tolerance
- service discovery, service description languages and standards

Artificial intelligence has investigated the problems of making user interfaces smart and cooperative for many years and is attacking the challenges of explicitly dealing with limited resources lately. Thus AI methods may provide a range of solutions for those problems. But AI methods do not only seem to be useful but rather to be the most promising tools for building location and situation aware mobile systems that support users at their best and behave cooperatively in unobtrusive ways.

In the field of building intelligent mobile assistance systems, AI is not only a nice add-on but a necessary pre-requisite. Moreover, not just one AI technique is needed here. As we can see in the contributions to this workshop, a whole set of different techniques are to be integrated in order to reach a satisfying goal. Learning, for instance, is crucial for user-adapted services. Both symbolic AI learning methods and sub-symbolic AI methods from the field of neural networks can provide the necessary flexibility for a system that adapts to the user's preferences in different contexts. But also spatial reasoning becomes a central component of location aware systems. Here, these methods are challenged with real world environments and it can be shown that they are not only useful in some toy-environment of a block world simulation. Other techniques may be used for resource adaptive services and for smart localization of the user, e.g. through decision-theoretic planning of navigation instructions.

This new workshop Artificial Intelligence in Mobile Systems (AIMS) brings together researchers working in the sub-fields of AI described above and those working with the design of mobile applications and devices. The workshop provides a platform for presentations and discussions on these various topics related to mobile systems.

On behalf of the organizing committee, I want to thank everyone who helped to make this workshop possible, the contributors, the members of the program committee, and the ECAI conference organizers.