MUSIC - Applications for mobile users in ubiquitous computing environments

Mobile computing is rapidly invading our lives. Most people already carry a mobile device of some sort wherever they go, and an increasingly diverse set of devices (PDAs, smart phones, GPS etc.) are becoming widely available.

However, as people become more accustomed to using mobile services in both work and leisure situations, their expectations about what services should be available, where they should be available and how well they should perform in different situations become more demanding.

However, with existing methods and tools it is technically difficult to create such applications. The very range of devices and types of infrastructure, the ways in which they can change, the situations in which users can find themselves and the functions they want, introduce great complexity and pose considerable technical challenges. System developers must deal with numerous con-figuration, operational and maintenance issues and provide systems that dynamically and automatically adapt. The high costs associated with this mean that such applications are often not commercially feasible.

To make the vision of the “Information Society” come true in Europe, it will be necessary that a comprehensive set of computer based information and communication services are continuously and ubiquitously available to, and used by, the citizens. However the development is severely hampered by the lack of services truly usable on handheld devices in mobile settings. MUSIC aims to remove this obstacle by providing technology that has the potential to dramatically improve the ease of use of computer based services in mobile settings and thus speeding up the transition.

The benefits will first be demonstrated in trial services that will be developed using MUSIC technology and put into pilot use by the project partners during the project. By adopting an Open Source strategy, establishing an open source community during the project lifetime, and using development methods and tools endorsed by the open source community, MUSIC seeks to ensure continued uptake and evolution of the provided technology.
Focus

MUSIC, an integrated project under FP6, aims to provide an open platform that makes it technically and commercially feasible for the wider IT industry (not just telecom operators) to develop innovative mobile applications which:

- Are context-aware i.e. understand user “context” in the widest sense, including factors related to users themselves (role, location, environmental conditions etc.) and factors related to changing availability of computing and communications facilities.
- Are self-adapting i.e. dynamically adapt functionality and internal implementation mechanisms to changes in context;
- Are inherently distributed in nature, and may involve direct interactions between multiple users;
- Are aimed primarily at mobile users, but may include stationary users too;
- Address extra-functional aspects (e.g. security, dependability, …) according to user needs;
- Can be described as "innovative" either because they provide users with entirely new services or because they make traditional services available in a practical and usable form in a mobile environment.

Project activities

To overcome these difficulties, and promote the development and widespread deployment of innovative mobile applications, MUSIC will:

- Develop an open platform for the development of self-adaptive mobile applications, including methods, tools and middleware.
- Use the platform to develop trial applications, based on a set of challenging application scenarios.
- Use the trial applications to:
  - Drive the R&D work of the project;
  - Assess the technical adequacy of project results;
  - Promote project concepts and results to the wider IT industry.
- Carry out research to produce the conceptual underpinning needed for the platform, including extra-functional aspects of context-awareness and adaptability (e.g. security, dependability, responsiveness).
- Promote standardisation by aligning the work of the project with relevant standards, proposing modifications to existing standards and/or proposing new standards.
- Use an open source approach for core project results, and use this as a key element in the strategy to ensure widespread uptake of results.

Research and technology development will focus on:

- Modelling of adaptable software and context dependencies.
- Mechanisms for implementing adaptable software.
- Automatic adaptation planning and decision making based on exploiting software models at runtime.
- Context awareness, including modelling sensing, and reasoning on both user context and available computing and communication resources.
- Analysis, simulation, testing and tuning of adaptation related behaviour.

![Figure 2 MUSIC technology components](Profile IST - N (Month 2006) Profile IST - N (Month 2006))