Self-Extending Systems for Context-Aware Mobile Computing

Research Abstract

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The problem

How to develop software for context-aware mobile computing systems that can adapt to changing requirements at run time?

Challenges:
– inherent distribution
– changing set of available components
– different types of I/O hardware
– usability is paramount
– requirements elicitation is difficult
– ideas for new functionality come from experience in the field

Solution can address both:
– Adaptability at run time
– Rapid iterations during development
Proposal: Self-extending systems

Architecture: *self-organizing services*
- Peer-to-peer *services* on mobile and stationary computers cooperate based their *needs* and *abilities*
- Supports mobility; integration of different hardware

Middleware: *dynamic contracts*
- Decentral reflective middleware maintains descriptions of services and negotiates dynamic contracts between them
- Allows context-aware self-organization according to users' desires and environmental change

Process: *design at run time*
- Developers can add new services to running system and test with existing services
- System gathers context information for user feedback

...New functionality will emerge that no single user or developer had anticipated.
Where am I now?

• Timeline:

• Results to date:
  – Concept of how to build self-extending systems
  – DWARP: Distributed Wearable Augmented Reality Framework as test platform for these concepts
  – Working middleware platform, several debugging and testing tools
  – Six fairly large systems (6-60 developers each) built to date

• What is still missing:
  – Validation in industrial projects
  – Detailed comparison with other approaches
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Thank You for Your Attention!
Any Questions?

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