

Self-Extending Systems for Context-Aware Mobile Computing

Research Abstract

Asa MacWilliams

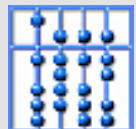
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The problem

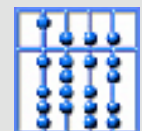
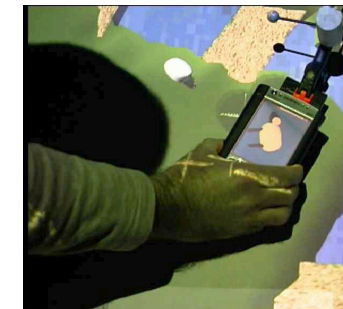
How to develop software for context-aware mobile computing systems that can adapt to changing requirements at run time?

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:

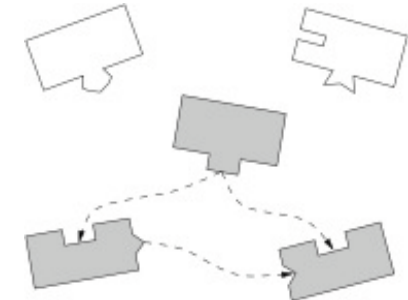
- Adaptability at run time
- Rapid iterations during development



Proposal: Self-extending systems

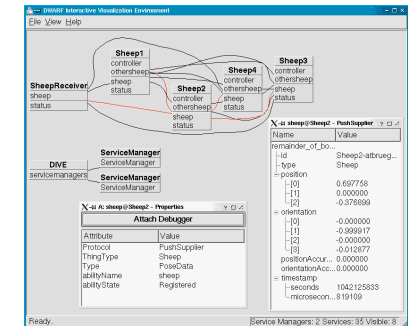
Architecture: *self-organizing services*

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



Middleware: *dynamic contracts*

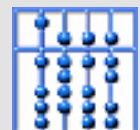
- Decentral reflective middleware maintains descriptions of services and negotiates dynamic contracts between them
- Allows context-aware self-organization according to users' desires and environmental change



Process: *design at run time*

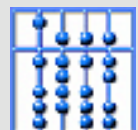
- Developers can add new services to running system and test with existing services
- System gathers context information for user feedback

...New functionality will emerge that no single user or developer had anticipated.



Where am I now?

- Timeline:
 - Master's Thesis: April 2000 – March 2001
 - Ph.D. Thesis: October 2001 – October 2004
- Results to date:
 - Concept of how to build self-extending systems
 - DWARF: 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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