A Framework for Requirements Engineering for Context-Aware Services

Anthony Finkelstein        Andrea Savigni

University College London
United Kingdom
The Goal

Providing a framework for engineering requirements in the area of context-aware services, especially when targeted at mobile devices

- What we mean by context awareness:
  - the ability of a particular service to adapt itself to a changing context
  - e.g., m-commerce applications, that should run on mobile phones, desktop computers, PDAs, ...
The Problems

- RE + context-awareness = many problems!

- changing location
- changing bandwidth (and general connection attributes)
- changing display characteristics
- changing usage paradigm
- target platforms unknown in advance
- new economy (short time to market)
A Framework for Requirements Engineering for Context-Aware Services

The Influences

- Goal-oriented RE (van Lamsweerde et al.)
  - goals vs. requirements

- Michael Jackson
  - world vs. machine

- Computational reflection (Maes)
  - Allowing a program to reason upon, and possibly change, itself

- Requirements monitoring (Fickas, Feather et al.)
  - are any requirements being broken?
A Framework for Requirements Engineering for Context-Aware Services

The Framework

Environment is reified into context information...

... that influences requirements that, in turn, operationalise goals

The external environment (bandwidth, availability, location, ...)

The actual service provided

The immutable system goals

The service monitoring activity (is the service meeting the requirements?)

Key: Run-time
A Framework for Requirements Engineering for Context-Aware Services

The Challenges

• Capturing environment into context
  • how to sense the environment?

• Representing context information at run-time
  • context is continuously changing

• Bringing requirements information to run-time
  • monitoring against runtime requirements violations

• Bringing architecture information to run-time
  • in normal practice, such info does not exist at run time
Where Does All This Belong?

• Should every single service take care of this on its own? Or can some of the framework be collected in a separate product?

• Several separate issues:
  • a service-independent mechanism for representing context information
  • populating context with device-dependent info
  • reflective middleware for representing service description?
Current Activity

• Seeking appropriate representation mechanisms
  • XML, XSLT, rule-based systems, xlinkit

• Combining RE with customisation issues

• Exploring present and future mobile devices capabilities