Towards Automatic Behaviour Synthesis of a Coordinator Component for Context-Aware Mobile Applications

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Outline
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Introduction(1)

- Centre of information and communication is moving from the providers to the users
- Users more demanding and with stronger expectations than in the past
- Service providers have to develop a wide range of enriched services in a rapid, low-cost and user-centric way
- Continuously evolving technologies
- Disruption of the traditional discrete structure of the industry
- Increasing competition
- Shorter service’s lifecycle (weeks)

Introduction(2)

- How these services should be?
  1. Ubiquitous
  2. Mobile
  3. Context-aware
  4. Personalized
  5. Composable
- How to provide these services?

Motivation

- Need to work on the methodological support of the development process by using approaches that facilitate re-use, increase flexibility, reduce costs and time-to-market in services development

Goal

- To combine the benefits of SOA and MDA in order to define a comprehensive methodology that supports the development process of high-value services (context-aware mobile services)
Conclusions

General contribution
- Use of model transformations that address behaviour correctness issues systematically throughout the service's design process
- We first apply these transformations manually in order to learn how they could be automated
- We use the acquired knowledge to select existing tools or eventually create new tools to automate these transformations

Specific contribution: Transformation T2 (SDRM → SDCM)
- State machines-based approach for behaviour synthesis of a coordinator component
- This approach is based on Labeled Transition Systems (LTSs), Modal Transition Systems (MTSs) and safety properties

Conclusions (1)

- We defined an MDA-based approach for behaviour modelling of context-aware mobile services
- This approach divides the PIM level in
  - tree models:
    1. Service specification, SS
    2. Service design refined model, SDRM
    3. Service design component model, SDCM
  - two transformations:
    1. SS → SDRM
    2. SDRM → SDCM

Future work

- Extension of our behaviour synthesis approach from properties and scenarios to cover the whole case study
- Testing with other context-aware mobile applications
- Alternative formalisms (process-oriented techniques)
- Selection of the most suitable formalism
- Investigation of existing tool support for the chosen formalisms (eventually creation of new tools)
- Automation of the transformation