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

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Outline

- Introduction
- Motivation
- Goal
- Our approach
- Case study
- Conclusions
- Future Work

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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)

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Introduction(2)

How these services should be?

1. Ubiquitous
2. Mobile
3. Context-aware
4. Personalized
5. Composable

How to provide these services?

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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

Service-Oriented Architecture (SOA)

Model-Driven Architecture (MDA)

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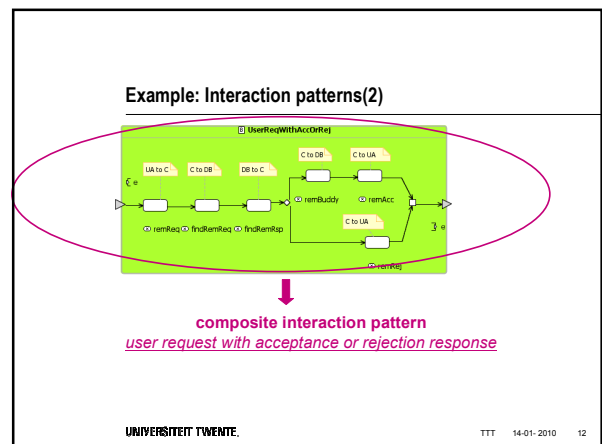
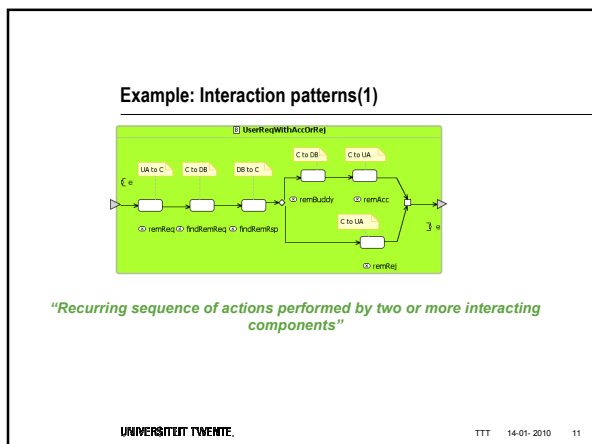
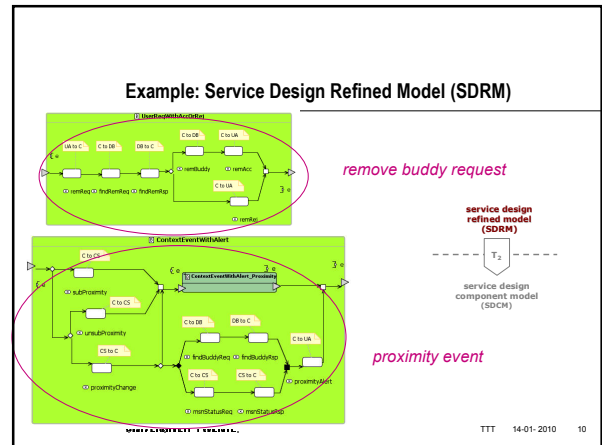
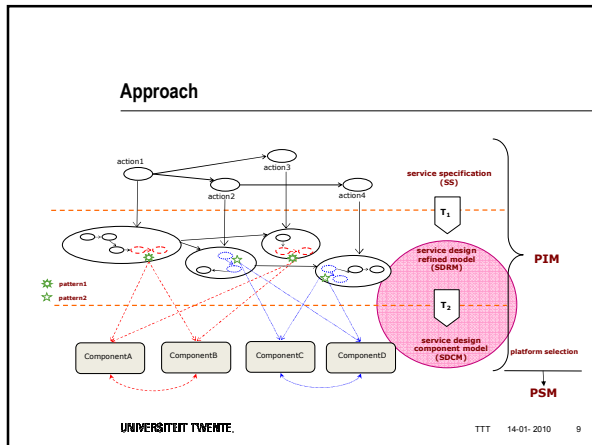
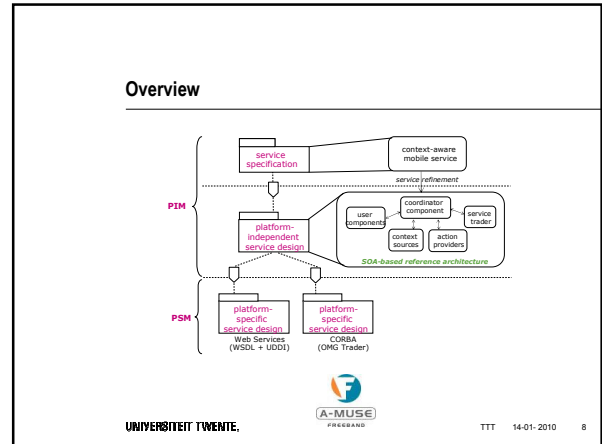
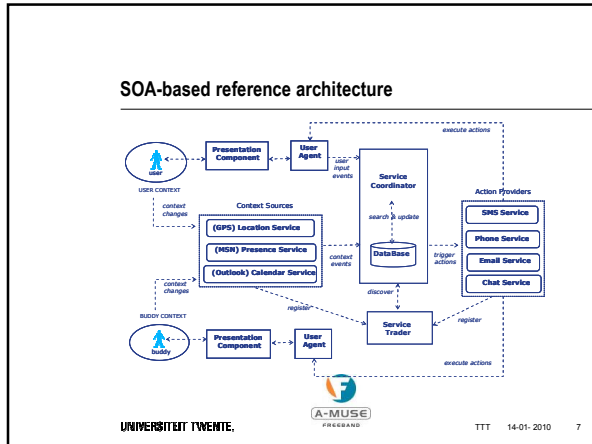
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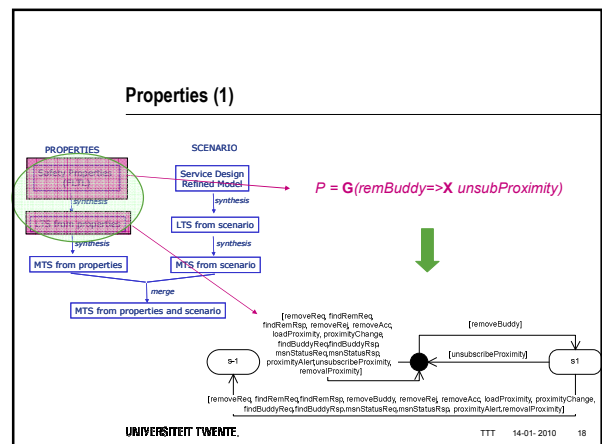
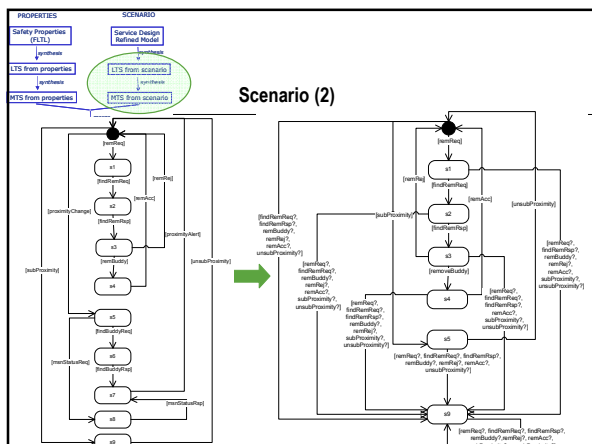
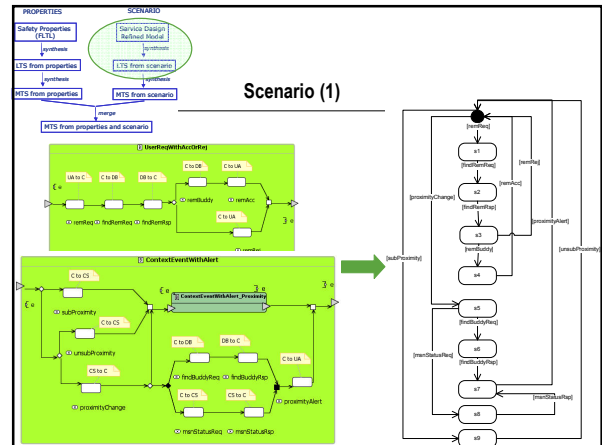
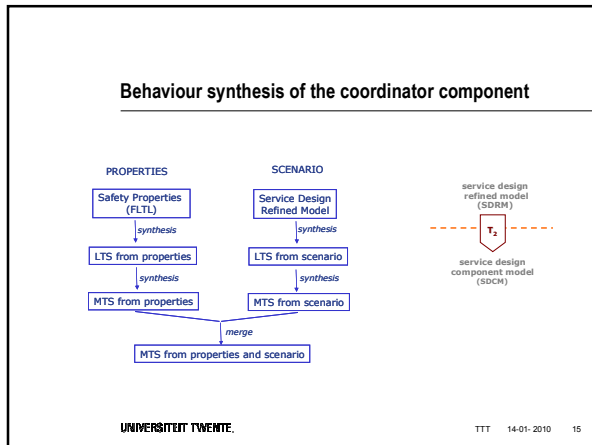
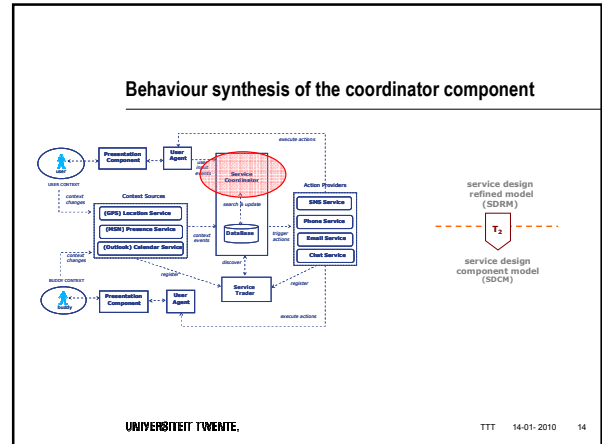
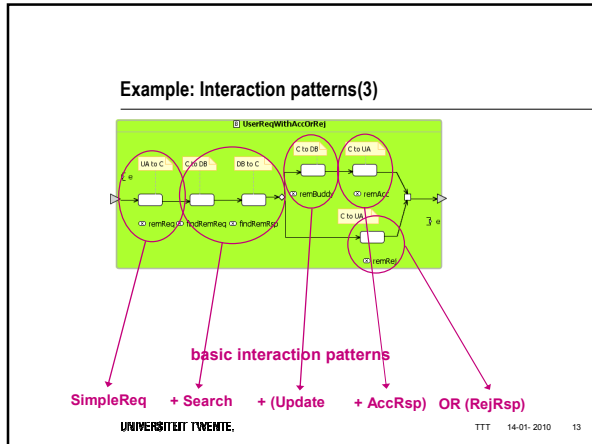
Goal

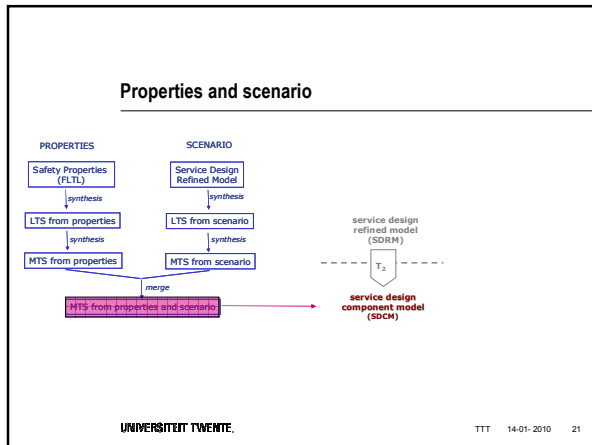
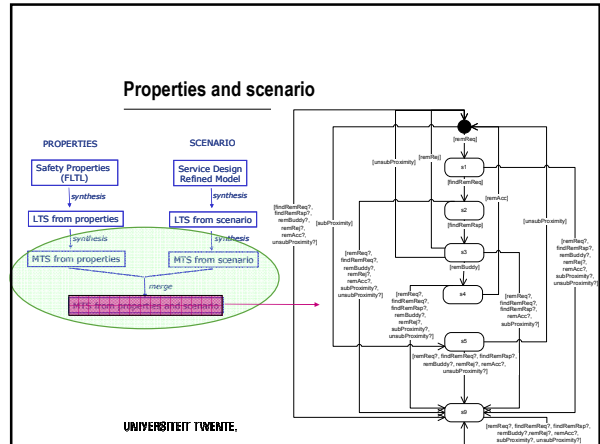
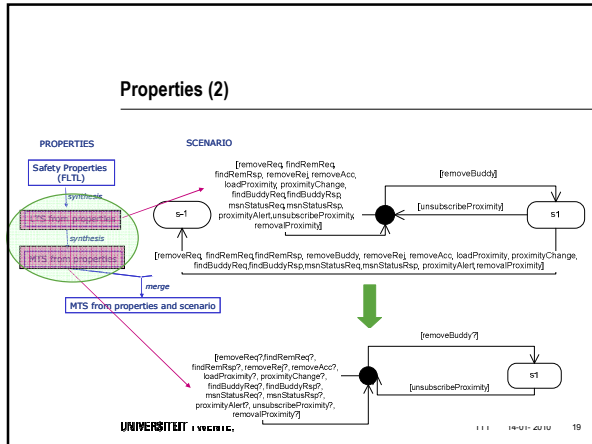
- To combine the **benefits of SOA and MDA** in order to define a **comprehensive methodology** that supports the development process of high-value services (**context-aware mobile services**)

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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

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Conclusions

General contribution

- Use of model transformations that address behaviour correctness issues systematically throughout the service's design process
- We first apply these transformation manually in order to learn how they could be automated
- We use the acquired knowledge to select existing tool 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

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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

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