Developing Collaborative Learning Environments with Roles

Tommy Kubica
Chair of Computer Networks, Institute of Systems Architecture, Faculty of Computer Science, Technische Universität Dresden

RoSI seminar
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Audience Response Systems
Motivation
Audience Response Systems
Auditorium Mobile Classroom Service (AMCS)

Surveys

Learning questions

Interests: Which topics are you interested in?

- Semantic Web: 30
- Ubiquitous Computing: 12
- Intranet: 19
- Wireless Network: 10
- Other (please specify)

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Auditorium Mobile Classroom Service (AMCS)

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Auditorium Mobile Classroom Service (AMCS) Master thesis

Motivation:

- Audience Response Systems can support various types of university courses (readings, exercises, seminars, ...)
  - different functions appropriate for different course types
  - increasing functional scope

Problem:

- It is hard to select a suitable functional scope for a given course

Solution:

- Guided selection that provides context-sensitive suggestions for suitable functions
  - specify the context for the current course
  - suggest a suitable functional scope
Guided selection of suitable functions

1) Specify context

- Student count
  - 250

- Beamer/Light conditions
  - Beamer with average light conditions
  - 30 min

- Free time during the lecture
  - 20 min

- Time in semester
  - Begin of semester

- Own preparation time for the system
  - Show optional factors
Guided selection of suitable functions
II) Suggest functional scope

- **Answer questions**
  - Course questions
    - +2 Request interests and personal goals.
  - Slide questions
    - +1 Quizzes to test knowledge learned.
      - Questions for evaluation of the lecture/course.
  - Lecture questions
    - -1 Preparation questions for the lecture.
    - -1 Request the (pre-)knowledge of the students.

- **Messages**
  - Metacognitive messages
    - +1 Depending on the student’s preference, strategic information on the preparation / follow-up of the event will be provided.
  - Cognitive messages
    - +1 Students who have incorrectly answered a learning question will be notified when the subject matter covered is repeated.

**sub functions**  **application cases**  **examples**
Auditorium Mobile Classroom Service Recap

• Collaborative system
  • roles are defined in a natural way (*student, lecturer, assistant, admin*)

• Support for different types of courses
  • different types require different functions
  • context-sensitive function selection

• Object-oriented implementation
  • no separation of static and dynamic behavior
  → dynamic use cases are hard to implement
How roles can help to add adaptive behavior in AMCS

Use Case

- **Scenario:** Seminar that is supported by AMCS
- Using learning questions, that require an freetext answer

![Learning question](image)

- **Different opportunities to rate these answers**
How roles can help to add adaptive behavior in AMCS Use Case – Part I

• Lecturer can rate answers

<< Context: Seminar >>

Student

rate answer

Lecturer

• Context can change during seminar: Peer Review part, where *students can rate answers*

<< Context: Peer Review >>

Student

rate answer

Lecturer
How roles can help to add adaptive behavior in AMCS Use Case – Part I

Separation of concerns

• Identify static (core functionality) and dynamic behavior

• In our use case
  • Lecturer and Student are basically static (role) objects
  • Rating is a behavior that can be “played” by different core objects during runtime
How roles can help to add adaptive behavior in AMCS Use Case – Part II

- Behaviors can be implemented in different variants
  - in our use case: different rating variants (thumbs up/down, textual)
  - variants can also be combined (thumbs up/down + textuable)

- it is even possible to add new role variants during runtime (unanticipated adaptation)
How roles can help to add adaptive behavior in AMCS

Recap

- Role-based concepts provide important functions out of the box
  - e.g. changing behavior dynamically during runtime is pretty simple in comparison to object-oriented manner (inheritance from Base Class, test which situation is present, ...)

- Separation of concerns
  - core functionality
  - dynamic behavior is encapsulated in roles that can be played by everyone

- Implementation of different variants for roles, the combination of variants and adding new role variants during runtime
Next steps

- Model Use Case with CROM (first attempt below)

- Implementation using LyRT
Thank you for your attention!

Questions or ideas?

@tommy.kubica@tu-dresden.de