Adaptive and Intelligent Learning Systems

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Adaptivity and Personalization in Learning Systems

How can we make learning systems more adaptive, intelligent and personalized

- In different settings such as desktop-based, mobile and ubiquitous settings
- Based on a rich student model that combines learner information and context information
- Supporting learners as well as teachers
- Using techniques from artificial intelligence, data mining, visualization, etc.
- Develop approaches, add-ons and mechanisms that extend existing learning systems
Adaptivity and Personalization

- Step 1: Identifying information about learners and their learning context
- Step 2: Use this information in order to provide learners with adaptive courses, personalized recommendations and intelligent feedback
Research Topics

- Adaptivity based on learning styles
  - Automatic identification of learning styles based on students’ behaviour
  - Dynamic identification and updating of learning styles
  - Adaptive course provision based on learning styles [Collaboration with Leibniz University Hannover, Alberta Distance Learning Centre; Ting-Wen Chang, Jeff Kurcz] → DEMO
  - Adaptive recommendations for teachers to make their courses better support students with different learning styles [Moushir El-Bishouty, Kevin Saito] → DEMO
Research Topics

- Adaptivity based on cognitive abilities [Ting-Wen Chang, Jeff Kurcz]
  - Automatic identification of cognitive abilities based on students’ behaviour in an online course
  - Dynamic identification and updating of cognitive abilities
  - Providing teachers with recommendations about how to consider students’ cognitive abilities → DEMO
  - Adaptive course provision based on students’ cognitive abilities
Research Topics

Adaptivity based on motivation [Keri Baumstark, Biswajeet Mishra]

- Integrating techniques for motivating students in learning systems
- Investigating effectiveness of motivational techniques for students with different characteristics, situations and contexts
- Providing adaptive functionality for motivating students
Research Topics

- Adaptivity based on students’ context
  - Identification of students’ context through sensor technology
  - Identification of device functionalities and their usage [Renan Lima, Moushir El-Bishouty]
  - Providing adaptivity based on students’ context
Research Topics

- Combining adaptivity based on students’ context with adaptivity based on students’ characteristics
  - Providing adaptivity based on learning styles and context information for mobile devices [Richard Tortorella]
  - Combine students’ characteristics, context, and learning behaviour [Hazra Imran]
  - Providing adaptive recommendations based on pedagogical rules, student’s history, and collaborative filtering [Hazra Imran]
  - Provide visualization of identified data
Research Topics

**Learning Analytics**

- Identification of at-risk students
  - What features are relevant for at-risk student identification [Darin Hobbs]
  - Learning styles vs. course content support [Moushir El-Bishouty]

- Enhancing the Accessibility of Educational Log Data for Investigating Effective Course Design and Teaching Strategies [Stephen Kladich, Harza Imran, Jeremie Seanosky]

→ DEMO