Adaptive Hypermedia:
Student modeling in e-learning systems

Hauptseminar “E-Learning” – Sommersemester 2008

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Overview

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- User Models
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  - Deviation Model
  - Stereotype Model
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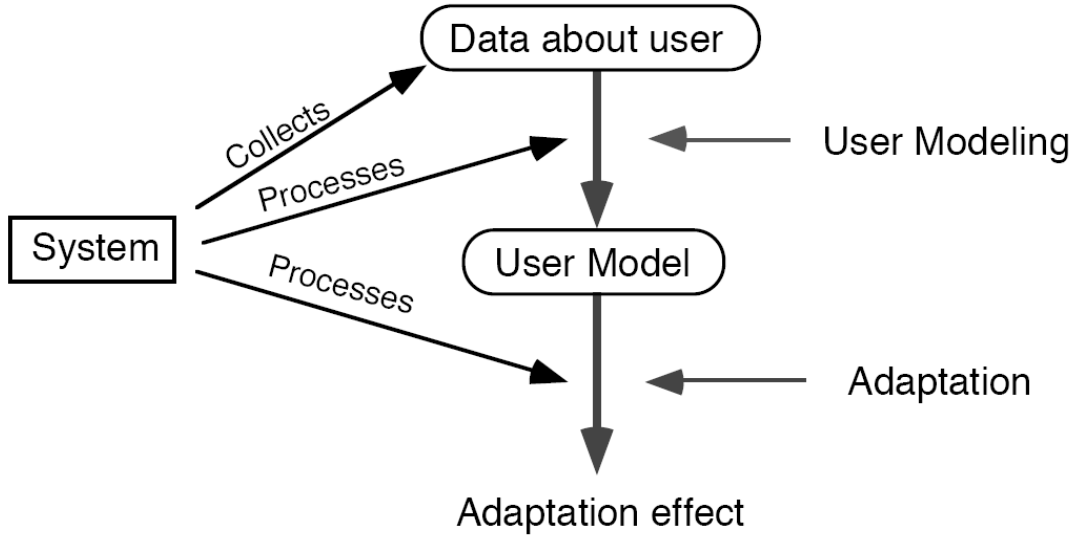
  - User Modeling Servers
  - Agent Based User Modeling Systems



© Brusilovsky, 1996

Introduction

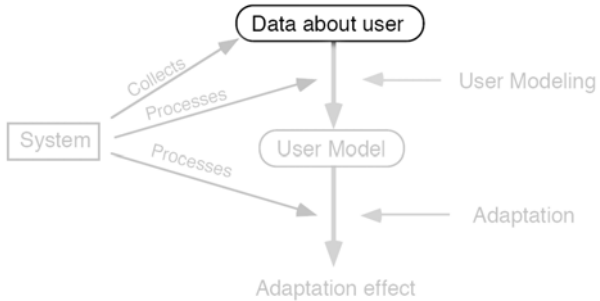
- What is an adaptive hypermedia system ?
- *All hypertext and hypermedia systems which reflect some features of the user in the user model and apply this model to adapt various visible aspects of the system to the user."* Brusilovsky, 1996
- Functions:

  Personalize communication

  Accelerate the learning process

  Plan lessons

User Data

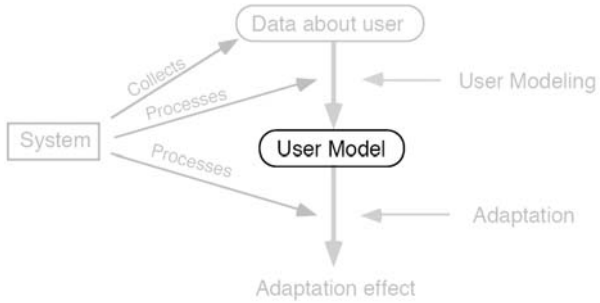


- Indirect
  - User`s Knowledge
  - User`s Goals
  - User`s Background
  - User`s Experience
  - Learning Speed
  - User`s Preferences

  >> Danger of interpreted data. Often too unreliable for educational systems.
- Direct
  - Excercises and Questionnaires
  - Collaborative User Modeling: User can apply changes in his user model

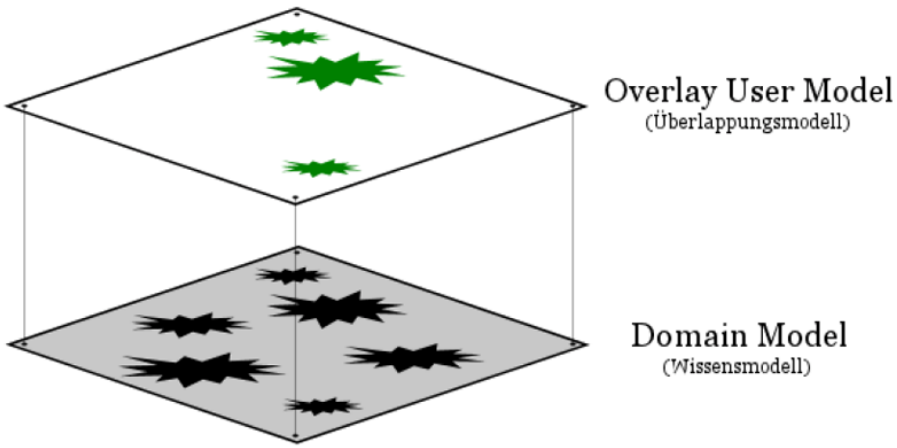
  >> Danger of false input

User Models



Overlay Model

- Precondition: Knowledge is represented in a domain model
- For each attribute of the user a attribute-value pair is saved
- Values can be qualitative, binary or quantitative
- Problem of finding an initial value
- Misconceptions can not be diagnosed



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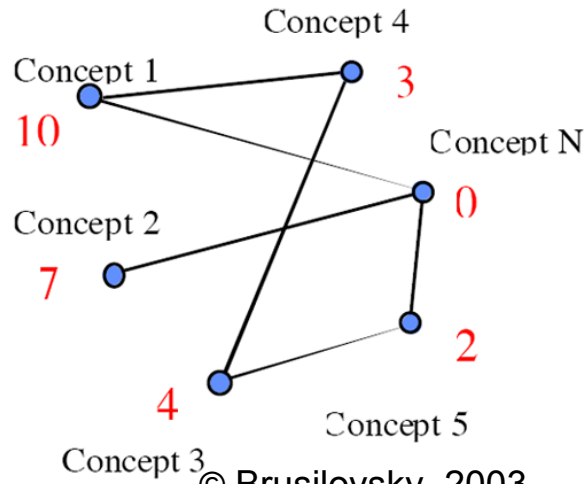

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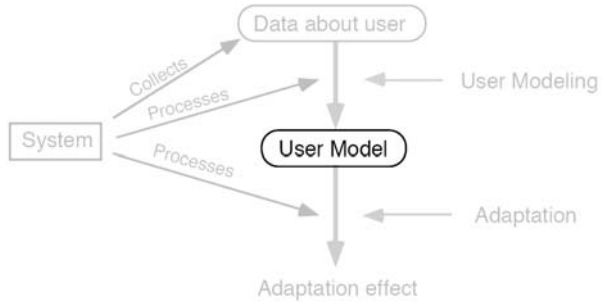
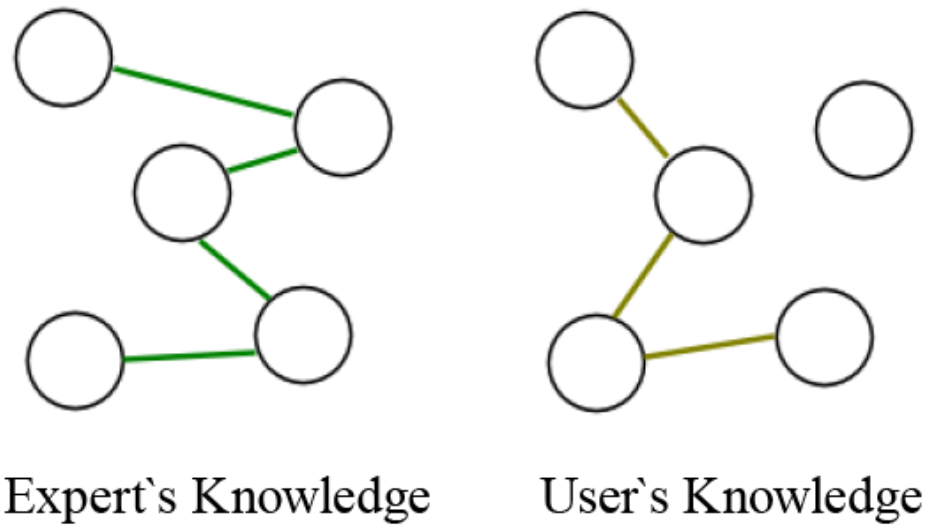
User Models



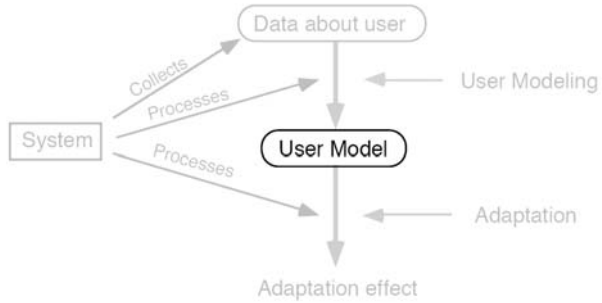
Deviation Model

- Similar to Overlay Model
- Can diagnose Misconceptions
- Knowledge of the user is described as the difference

  from a expert`s knowledge



User Models



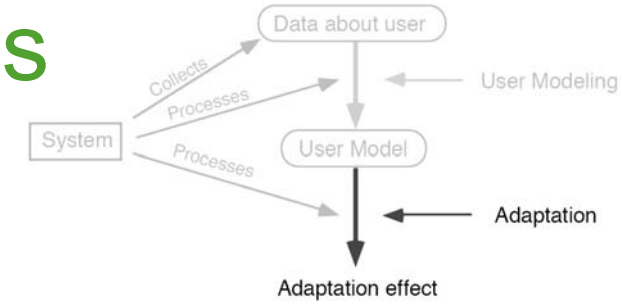
Stereotype Model

- Affi□rms that the user belongs to a group of users
- Pure, mixed and multiple stereotypes
- Classification value can be binary or qualitative
- Gives a fast classification of a user

Mixed Approach

- In the beginning the user is classified by a stereotype model
- Later the model changes to an overlay model for a more individualistic adaption

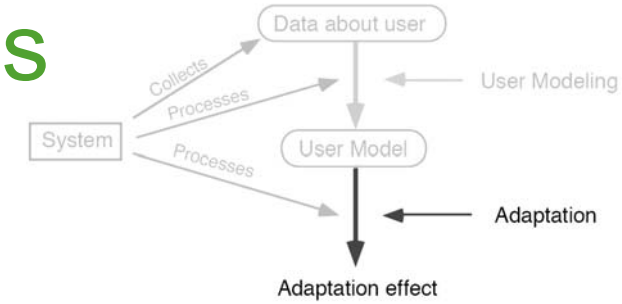
Adaption Techniques



Adaptive Navigation Support

- Help the user to find the best way through hyperspace
- Techniques:
  - Direct Guidance
  - Link Sorting
  - Link Hiding (Hiding/Removing/Disabling)
  - Link Annotation
  - Link Generation

Adaption Techniques

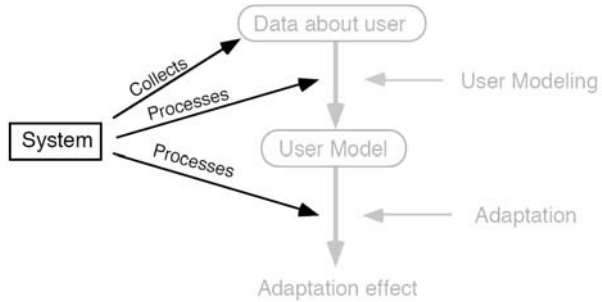


Adaptive Content

- Adaptive Text Presentation
  - Inserting/Removing Fragments
  - Altering Fragments
  - Stretchtext
  - Sorting Fragments
  - Dimming Fragments

- Adaptive Multimedia Presentation
  - Sorting, Inserting or Removing
  - File Size, Quality of the Media according to the output device

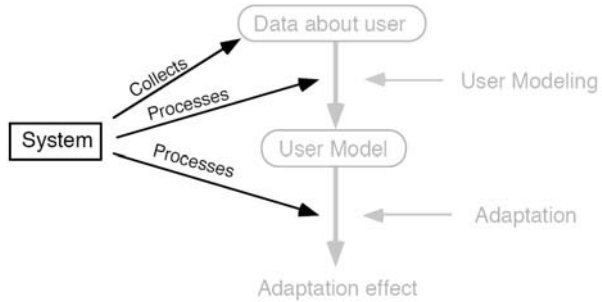
Architectures



User Modeling Shell Systems

- No distinction between system components that served user modeling purposes and components that performed other tasks
- Helps the developer to manage the user model
- Example mechanisms:
  - Stores the values coming from the system
  - Compares it to the held assumptions
  - Informs the application about recognized inconsistencies

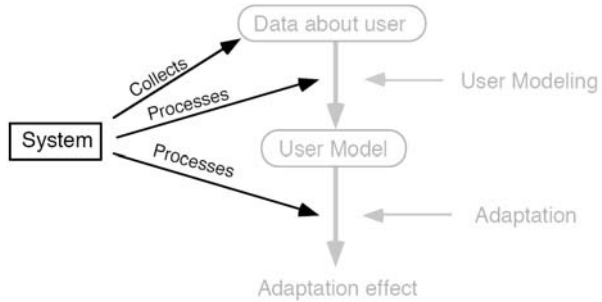
Architectures



User Modeling Servers

- Advantages:
  - Security (e.g. Save Points of Access, Authentication, Access Control)
  - Share the same user model with many applications
  - User can apply changes easily
  - Lower costs for developing an AHS
- Disadvantages:
  - Bottleneck
  - Permanent connection is needed
  - Transmission to the server is a security leak
  - Mirror device in case of a breakdown

Architectures



Agent Based User Modeling Systems

- Used in mobile devices
- System consists of independent and autonomous agents/services
- Interaction is more dynamical and not determined by design
- Mainly used for personalized and location based systems

The End

- Thank you for your attention.
- Any questions?