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Subsymbolic User Modeling in Adaptive Hypermedia

Can we identify groups of similar students based on their browsing behavior?

How can tutorials adapt to these groups?

- **Domain**
 - Informatics
- **Research Context**
 - Adaptive Educational Hypermedia
 - Social Navigation
 - CS Education
 - Recommender Systems
 - Clustering

Significance

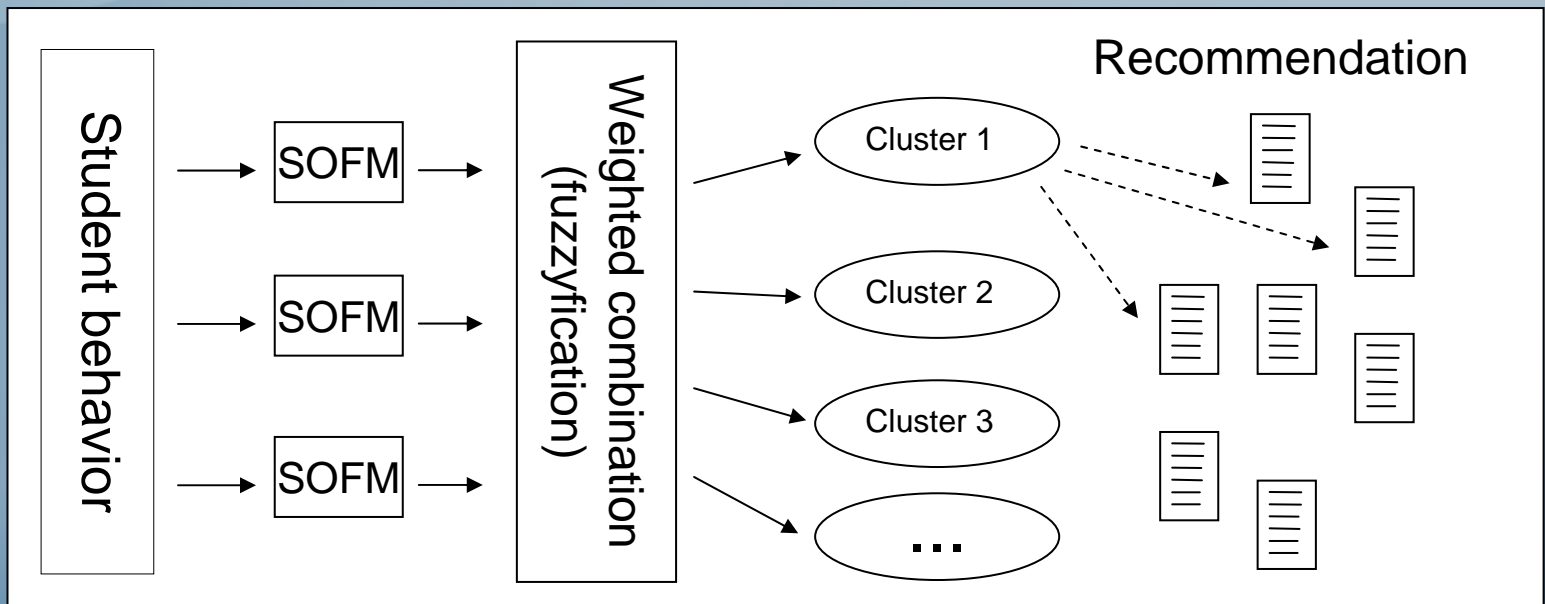
- Metaphor: Apprenticeship (e.g. Office-hours, labs, internships, research assistantship)
 - Contrast: Lecture-based or textbook-based AIWBES
- Zone of Proximity: We learn best from students with similar learning style and/or knowledge level
 - Identify those groups of similar students
 - Providing adaptation based on groups of similar students is analogous to peer-advising

Objectives

1. Automatically cluster students into groups based on:
 - Online learning style (activity pattern: use of tools, browsing pattern)
 - Preferred document characteristics (metadata, e.g. Level of detail, images, etc.)
2. Identify features based on whether and how clustering correlates with the students' face-to-face learning style and background knowledge
3. Adaptive presentation based on clustering

Approach

- Record student's browsing behavior
- Cluster browsing behavior using Self-Organizing Feature Maps (unsupervised clustering)
- Fuzzify SOFM outputs (classifier combination)
- Find documents other students of this group found most helpful



Current Step: Data Collection

- Use existing Adaptive Collaborative UNIX Tutorial (ACUT)
 - Just-in-time learning
 - Social navigation



The screenshot displays the ACUT web interface. At the top, a pink banner says "Welcome, katja!" with a "logout" link. Below is a green header "Delete Files". A left sidebar lists navigation options: "Accessing Unix System", "Login", "Logout", "Changing Password", "File Management", "Listing Files", and "Copying Files". The main content area is titled "Overview" and contains sections for "Removing Directories", "Removing Files", "Man rm", "man rmdir", and "Removing Files and Directories". A vertical sidebar on the right includes a "Write Notes" icon and the text "Click on the footprint to view footprint of others".

1. Conduct focused interviews to collect qualitative data
2. Larger data set (quantitative data) extracted from usage statistics + questionnaire

Future work

- User control – let students choose relative importance of document characteristics, online learning style
- Research relationship between face-to-face and online learning styles
- Integrate this approach with existing student models / adaptation mechanisms

Questions & Answers

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Data Collection

Interview Protocol

The interview begins with questions about basic statistics and the participant's experience with UNIX and the use of online tutorials. Following are examples for the questions that will be asked:

- What is your academic level (college year)?
- Rank your knowledge about UNIX on a scale from 1 to 6.
- How often do you use the UNIX operating systems?
- Have you ever learned how to use UNIX in a class? Which? How much time was spent learning about the use of UNIX?
- How much time per week do you spend surfing the Internet?
- How often do you use search engines to find information on the Internet? Which search engines do you use?

After answering these questions the participant will be asked to answer three questions on UNIX. The participant will be asked to use the tutorial to answer the questions and to explain her thought process while solving the problem.

- What is a "home directory"?
- How do you change the access rights of a file?
- How can you display all files in your home directory that contain the phrase "Hello, World!"?

Different tasks of different difficulty will be used. The tasks presented to an interviewee will be matched with the participant's experience in UNIX. Finally, I will ask the participant to assess the difficulty of the tasks she had to solve, and the perceived usability of the overall system:

- Rank the difficulty of each of the tasks you performed.
- Rank the difficulty of finding the required information within this tutorial.

Screenshot: ACUT

Welcome, **katja** ! [logout](#)

File Management

- Accessing Unix System
- Login
- Logout
- Changing Password
- File Management
 - Listing Files
 - Copying Files
 - Delete Files
 - Compare Two Files
 - Control Access Files
 - Linking Files

Overview

Everything in Unix is a file. So it is very important to understand Unix file system and learn how to manage the files.


Definition

The following links help you to learn defenition related to file system and file management

- [File Systems in Unix](#)
Explain simply how files are organized in Unix and what are the different type of files in Unix. It has couple of useful graphs to explain the concept of file system
- [Linux Filesystem](#)
Closely enough to Unix file system. A lesson about file system with some questions at the end.
- [The Unix File System](#)
Explain what is so specific about Unix file system

Quiz

After you have finished different section of file managment you can take the following quiz to find out how much you have learned



Write Notes

Click on the footprint to view footprint of others