Cooperative Agent-Supported Learning with WeLearn

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Agenda

- Introduction
  - Problems of distance education and how agents can help
- The WeLearn platform
- Supporting groupwork through agents:
  - Roadmaps and awareness, tracks, ...
- Agent-oriented design for learning platforms
- Implementation & Evaluation
- Conclusions
Introduction

• Distance Education (DE) is in an intermediate stage: initial problems solved, first standards emerging, but yet no widespread adoption

• Problems:
  ➔ Cost of creating/enhancing/extending material
  ➔ Cooperation between learners is difficult to create
  ➔ Changing role of the teacher
    » From "content creator" to "content explainer" and "coach"
    » Higher ratio learners : teachers

• Solution for some aspects:
  ➔ Autonomous agents
The WeLearn platform

- An online learning platform developed at the FIM
  - In widespread use at several universities, higher and lower schools in Austria and Switzerland
  - Uses the IMS CPS specification for the content
- Main idea: Keep it simple to use
  - Therefore agents to enable more complex tasks!
- Important features:
  - Implemented in Java: Platform independence
  - System + templates for learning settings + example content + offline viewer for creating CDs
- Next version will support agents, workflow, etc.
The WeLearn platform

Cooperative Agent-Supported Learning with WeLearn

Michael Sonntag
Supporting groupwork through agents

- Roadmaps and awareness
  - Graphical representation of a course
  - High-level network structure instead of hierarchical tree
  - Allows adding more information:
    - Physical distance as a measure of topical difference
    - Size to show importance
    - Already viewed elements
    - Progress compared to other learners
    - Other learners in the "vicinity" for questions
    - Coloring nodes and connections to show tracks, ...
    - Three dimensional views are possible
  - Better awareness: One look is sufficient
Supporting groupwork through agents

Roadmap example

- 3 users currently online
- This user is in the area "Graphical UI", two just at the start
- Several branches can be taken (see right part)
- Color intensity shows number of learners in vicinity
Cooperative Agent-Supported Learning with WeLearn

Supporting groupwork through agents

- **Tracks**: Metaphor for different ways through content
  - Either created manually (e.g. designer of the course),
  - or automatically: Derived from the ways students take
    - Observing the users behaviour and deducing new links between items from this
    - Can also annotate them: Lookup (there and immediately back), sidetreck (list of visited items and back to start), etc.
    - Size/color according to certainty of the agent

- **Active Training**: Agents as communication counterparts
  - E.g. When training call-center agents
  - Errors by agents are good here: Users will also err!
Supporting groupwork through agents

- **Asynchronous support:**
  - Remembering complicated visit history (with branches)
  - Notifications of changed/added items, other users, ...
    » According to interest profile of learner

- **Assembling results:**
  - Integrating papers from students into a webpage and/or the learning system
  - Adding simple metadata (last changed, extracting abstracts and keywords, ...)
  - URL rewriting to match the page (relative links, images instead of E-Mail links, etc.)
Supporting groupwork through agents

- **Simple personal coach:**
  - Recommending areas to visit, other learners to ask
  - Based on tracks, metadata and user observation

- **Community building:**
  - Finding learners with similar problems for discussions
    - Not necessarily in the same area, but working on related content

- **Task automation:**
  - From relatively simple to more complex tasks
    - Setting up new courses or archiving old ones
    - Notifying coaches of unanswered questions
    - (Pre-) Checking answers for tests
Agent-oriented design for learning platforms

- Very high-level grouping of functionality in design
  - Tasks and entities instead of methods and objects

- Emphasis on coordination of dynamically interacting components
  - Similar to learning platforms: Many independent learners must be coordinated
    - E. g. finishing the course, discussions, observing user behavior
  - No competition between learners/agents for resources

- Agent are also good for implementation:
  - Extending/changing functionality easier
  - Easier modeling: 1 user $\equiv$ 1 agent (e. g. preferences)
Implementation & Evaluation

- Previous version of WeLearn is in practical use
- Next version is currently in prototype stage
  - First working version, not available for public test
  - Roadmaps and minor services (sending E-Mails; or SMS using public webpages) are already implemented, other agent support is in implementation or design phase
- Heavily relies on standards and frameworks:
  - SOAP, WebDAV, JAAS, JDBC, Avalon, Millstone, Axis, Apache, Tomcat, IMS CPS, etc.
- Connection learning-system $\leftrightarrow$ agent-system:
  - Uses SOAP; other clients/servers could be substituted!
Connection
WeLearn - Agentsystem
Conclusions

- Agents can improve cooperation between learners as well as between learners and teachers in DE
  - Introducing bits of intelligence into learning platforms
  - Reducing problems arising from asynchronicity
  - Improving awareness and providing additional functions

- Automating standard tasks to free teachers for coaching their learners

- The concept of "agents" is useful both in design (identifying independent actors and tasks) and implementation (easier change of functionality)
Questions?

Thank you for your attention!

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