COLYPAN : A P2P Architecture for a Project Management Collaborative Learning System

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OUTLINE

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- Contribution of multi-agents system
- COLYPAN : a Peer-to-Peer Architecture
- Conclusion & Future Work
Introduction (1)

- Collaborative Learning
  - Teacher: learning facilitator
  - Group: information source
- In such environments,
  - Learners are:
    - Information consumer
    - Information provider
    - More active and responsible of their own learning
  - Collaboration is made from:
    - Communication between learners,
    - Coordination of their actions
Introduction

MAETIC Method:
- A pedagogic method instrumented by the ICT
- Objectives:
  - To allow a learner to develop requested knowledge and skills
  - To promote the establishment of a process that will facilitate their educational activities
There is a critical need for tools:
- Supporting collaboration among distributed users with similar interests, or who are part of the same workgroup
- Organizing information for facilitating access in various contexts,
- Managing traces of all interactions related to learners belonging to a given group

The use of MAS is appropriate:
- They are involved in the modeling of interactions in complex societies of artificial or human individuals
- They bring an interesting resolution for knowledge organization and exploitation problems
- And also, for problems of the coordination and communication mechanisms
COLYPAN: COllaboratif Learning sYstem for Project mANAgment

- A system dedicated to project management
- A collaborative learning system where users exchange their information and skills and thus learn from each others
- The knowledge resources exchanged in the COLYPAN environment isn’t differentiated from those exchanged for other purposes:
  - There is a share of physical resources: books, papers, etc.
  - With the growing use of information technology, there are plenty of electronic documents, references, and web links;
  - There is also knowledge found in people’s mind
- The users of this system are learners and tutors
It provides learners tools to accomplish their project.

Learners must join groups to accomplish their activities.

In each group, learners have the same responsibility:
- The commitment to finish the work,
- Time management
- The respect of deadline

There are no predefined roles or division of tasks.
COLYPAN: for Teachers

- It provides teachers with tools to enable them to determine the activity level in groups.
- The learning activity is defined by the teacher.

Tutors support tools interface
COLYPAN: A P2P architecture (1)

- In collaborative learning system, each member must manage and exchange his knowledge and cooperate with others in order to achieve his goals

- P2P systems:
  - Supports autonomy: each member of the system is seen as a peer that manages and has control over a set of local technologies, applications and services;
  - Is decentralized: the community of peers is able to achieve its goal independently from any specific member or component;
  - Is cooperative: in order to join and use the system, each member must provide resources or services to the others;
  - Is dynamic: peers and resources can be added or removed at any time.
COLYPAN: A P2P architecture (2)

- The multi-agent system is an appropriate framework for realizing a P2P application

- The characteristic that they have are needed in P2P application:
  - Their capability to allow the sharing or distribution of knowledge;
  - They assemble a set of agents and coordinate their actions in an environment to accomplish a common goal
The system objectives

Before the system modeling, it is interesting to identify the objectives of the system

1 System management

1.1 System tools management
1.2 Groups management
1.3 Save Data in the DB
1.4 Teachers management
1.5 Data extraction from the DB

1.2.1 Traces management
1.2.2 Learners management

1.2.2.1 Give the state of learners
1.2.2.2 Give the state of activities realization
1.2.2.3 Give effective work time

1.4.1 Comment groups activities
1.4.2 Provide documents for activities realization
System agentification

➢ System Modeling with Aalaadin
   • Aalaadin is an organizational method developed by Gutknecht and Ferber (1)
   • It is, first, a background for developing multi-agent systems, providing methodological guidance
   • and secondly, a prototyping and running environment for agents based on notions of group and role through the AGR (Agent/Group/Role) model

➢ It is necessary to identify:
   • The roles
   • The agents
   • The groups

Overview of the System

- a_TEACH
- a_DB
- a_KB
- Chat, Email, ...
- a_TOOL
- a_LEARN
- a_GROUP
- a_LEARN
- a_ACTIV
- DB
- KB
- GROUPE 1

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System implementation

- **Madkit**
  - Is a modular and scalable multiagent platform written in Java and built upon the AGR (Agent/Group/Role) organizational model:
    - agents are situated in groups and play roles.
  - Allows high heterogeneity in agent architectures and communication languages.
  - MadKit communication is based on a Peer-to-Peer mechanism, and allows developers to quickly develop distributed applications using multiagent principles.
  - Site: www.madkit.org
Groups working way

- To communicate, each group must have a member in common

Legend:

- Peer
- Commun Peer
- Inter-groupes communication
- Intra-groupe communication

Group 1

Group 2

Group 3

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A case study

The a_Activ notification for late group

- Supervises Peer’s activities
- Reminds learners about deadline

- Notifies late groups by sending alerts

Stage 1
- Group formation
- Project choice
- Pay attention to deadline

Stage 2
- Weblog opening
- Graphic charter realization
- 1 Pay attention to deadline
- 2 Notification

Stage 3
- Planning
Conclusion

- An agent-based architecture that allowed the implementation of MAETIC method
- The system consists of a population of autonomous agents in interaction
- P2P is chosen to link up the agents between them
Future works

- We have to develop a scalable negotiation-oriented coalition formation method
  - Specifically tailored for large-scale distributed systems
  - Nodes may crash and every agent has a partial view of the system and can only communicate with the agents in its own view
Thank you