Intelligent Software Agents

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Subject Overview

Intelligent software agents have become an important technology in building complex software systems in many areas including business, commerce, industry, telecommunication, and especially in the Web applications. Intelligent software agents are computing entities which act autonomously and interact with each other to accomplish tasks on behalf of their users or other entities. The course introduces the basic concepts and elements of intelligent software agent technology and applications.

Subject Objectives:
By the end of this course the students should be familiar with the concepts and design principles of intelligent software agents, and be able to develop applications with a standard agent development tool.

Content:
The subject includes the following topics:

- Subject Overview and Introduction
- Software Agents, Intelligent Agents and Multi-Agent Systems
- Deductive Reasoning Agents
- Practical Reasoning Agents
- Reactive and Hybrid Agents
- Agent Interactions
- Agent Negotiation
- Agent Communication
- Agent Coordination
- Methodologies
- Applications

Timeline:
The course is planned over 2 weeks as follows:

- Before start
  - Student learning JADE development tool (8 tutoring hours by university tutors and/or self-learning and practicing by students)
- 1st Week
  - Lectures and practice classes (20/8 lecture/practice hours by Prof Kowalczyk)
- 2nd Week
  - Student project work (home and laboratory work by students, 8 support hours by university tutors)
- 3rd Week
  - Examination and final mark (4-8 hours by Prof Kowalczyk)

Learning and Teaching Method:
The subject is structured as an intensive and self-learning course consisting of lectures and practice classes/tutorials, and “hands-on” software development projects as follows:

- 10 Lectures: 2 teaching hours each (in a block)
- 4 Practice classes: 2 teaching hour each
- Examination day
- Assignment/project: team-based (2-3 students)

Assessment:
The students are assessed on the basis of the assignment and examination as follows:

- Assignment/project: Design and implementation of agent components of a simple multi-agent system (e.g. interaction protocol, coordination) and/or a simple software agent-based application (working software demonstration and a short project report)
- Final mark: Project presentation and oral examination

Text Book and Supporting Material:

- "An Introduction to MultiAgent Systems" by Michael Wooldridge, John Wiley & Sons, 2002
- Lecture material posted on the web
- JADE tutorials, documentation and guidelines from http://jade.tilab.com/

Software:

- JADE (Java Agent DEvelopment Framework) available from http://jade.tilab.com/
- Other software as appropriate (e.g. Java, Internet Explored, MS Office, etc)

Other Resources:

- Agent Technology Roadmaps, http://www.agentlink.org/roadmap/index.html
- The Foundation for Intelligent Physical Agents (FIPA), http://www.fipa.org/
- Foundations of Software Agent Technology, http://www.agtivity.com/
- http://agents.umbc.edu/, http://www.aaai.org/AITopics/html/agents.html, and much more available on the Internet

Preparation and Requirements:

- Skills in Java programming
- Working knowledge of software development, data structures and algorithms, distributed software/communication, foundations of artificial intelligence
- Text book and access to resources
- Installed JADE on home/laptop computers (optional)