ID2209 Distributed Artificial Intelligence and Intelligent Agents 7.5 credits

Distribuerad AI och Intelligenta Agenter

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for ID2209 valid from Autumn 2008

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Specific prerequisites

Computer Science courses 30 hp

Operating Systems courses 7,5 hp

Computer Programming courses 7,5 hp

English "level B" (from Swedish Gymnasium) or similar

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The main goal of the course is to give students knowledge about basic methods and techniques of Distributed AI and agent technology which, in particular, can be applied to:
- solving problems with decentralized control
- providing solutions to inherently distributed problems
-providing solutions to problems where expertise is distributed

Students should learn from the course:
1. What an agent and multi-agent system are. This means that students should get a good understanding of intelligent agent properties and how agents are distinct from other software paradigms.
2. Have a good overview of important agent subjects:
2.1. Agent Coordination, Agent Negotiation, and Agent Communication. This means that students should learn basic principles, protocols and languages related to these agent issues.
2.2. Agent-Oriented Software Engineering. This means that students shoul learn methodologies related to developing agent-based systems and be able to apply them in biulding agent-based systems.
2.3. Micro (intra-Agent) and Macro (agent systems) agent architectures. This means that students should learn princilples of building architesctures for agents and multi-agent systems
2.4. Agent Intelligence Mechanisms. This means that students should learn foundations of agent theory and get understanding of BDI-architecture
3. Get valuable hands-on experience in developing agent systems. This means that students should be apble to apply knowledge obtained during the course to design and implementation of an agent-based system

Course contents

Introduction and basic concepts of DAI. Coordination methods: general models, common coordination techniques, organizational structures, meta-level information exchange, multi-agent planning, explicit analysis and synchronization. Negotiation methods: principles, protocols, production sequencing as negotiation, conventions for automated negotiation. Interoperability: approaches to software interoperation, speech acts, KQML, FIPA. Multi-agent architectures: low-level architecture support, DAI testbeds, agent-oriented software engineering. Agent theory: basics of modal logic, BDI-architecture. Agent architectures: deliberative, reactive and hybrid architectures. Mobile agents: requirements, implementation, security for mobile agents, environments for mobile agents. Agent typology and technology issues. Applications.

Practical part of the course includes exercises and a project involving implementation of a multi-agent system.

Course literature

M. Wooldridge: An Introduction to Multi-Agent Systems. John Wiley and Sons (Chichester, England). ISBN 0 47149691X, 2002, 340 pp approx;
+ selected papers (an additional listing of literature will be provided in the course)

Examination

- ANN1 - Assignment, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Written examination (TEN1 4.5 hp.), Grading: 3, 4, 5Homework and project assignments (ANN1 3 hp.)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.