Multiagent Systems Design (MASD)

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Introduction

Knowledge Engineering and Machine Learning Group
UNIVERSITAT POLITÈCNICA DE CATALUNYA
https://kemlg.upc.edu

Multiagent Systems Design (MASD)

Aims of the course

- To provide the student with the knowledge to design and program **distributed multi-agent systems** using **intelligent agents**.
  - What is an agent?
  - What is an intelligent agent?
  - How can intelligent agents be used in distributed problems?
- During the course we will see how to:
  - apply several Artificial Intelligence techniques in Agents,
  - model knowledge in distributed problems,
  - design systems able to distribute decision making and tasks among agents.

Course Contents (1 of 6)

Course Contents (2 of 6)

Course Contents (3 of 6)

3. Agent-Oriented Methodologies
    - 3.1. Introduction to Agent-Oriented Software Engineering
    - 3.2. GAIA methodology
    - 3.3. Prometheus Methodology

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Course Contents (4 of 6)

4. Coordination and Social Models
    - 4.1. Introduction to Coordination.
    - 4.2. Coordination Models (I): Social Models
        - 4.2.1. Reputation and Trust. Social Roles.
        - 4.2.2. Electronic Organizations
        - 4.2.3. Electronic Institutions
    - 4.3. Coordination Models (II): Non-social Models
        - 4.3.1. Explicit Coordination
        - 4.3.2. Implicit Coordination

Course Contents (5 of 6)

5. Situated Agents (robots)
    - 5.1. Perception Problems
    - 5.2. Problems on action execution
    - 5.3. Situated Agents' Architectures
        - 5.3.1. Reactive Architectures
        - 5.3.2. Deliberative Architectures
        - 5.3.3. Hybrid Architectures
    - 5.4. Knowledge Representation and Uncertainty
    - 5.5. Planning and Uncertainty
    - 5.6. Multi-Robot Systems

Course Contents (6 of 6)

6. Other applications for SMA
    - 6.1. Interacting with humans
        - 6.1.1. Adjustable Autonomy
        - 6.1.2. User Modelling
    - 6.2. Simulations
    - 6.3. Multiagent Sistems for videogames

Course Material

- No need to buy books, but if you want to buy one:
  - **Wooldridge, M. "Introduction to Multiagent Systems (Second Edition)". John Wiley and Sons, 2009.**
- If you feel that your knowledge on AI is not in good condition, have a look to:
  - **Russell, S. & Norvig, P. "Artificial Intelligence: A Modern Approach (3rd. Edition)" Prentice-Hall, 2009**
- References to papers and other on-line documents will be provided during the course.
- Most of the material will be made available at the course's website:
  - *http://www.lsi.upc.edu/~jvazquez/teaching/masd/*

Who am I?

- **Javier Vázquez-Salceda**
  - Doctor in AI at UPC
  - Associate Professor at the Knowledge Engineering and Machine Learning Group (KEMLg)
- Research interests: theoretical and applied issues of **Multiagent Systems (MAS).**
- specially interested in
  - the conflict between Autonomy and Control in agents,
  - the relation between agent goals&behaviour vs. the social expectations and/or regulations,
  - the use of norms to provide flexible specifications of accepted behaviour
- Where am I?
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Who are you?

References

- Luck, M., McBurney, P., Shehory, Onn, Willmott, S. "Agent Technology: Computing as interaction. A Roadmap to Agent Based Computing". Agentlink, 2005. ISBN 085432 845 9
- Wooldridge, M. "Introduction to Multiagent Systems (Second Edition)". John Wiley and Sons, 2009. ISBN: 978-0470519462
- Russell, S. & Norvig, P. "Artificial Intelligence: A Modern Approach (3rd edition)" Prentice-Hall , 2009. ISBN 978-0-13-604259-4
- Weiss, G. "Multiagent Systems: A modern Approach to Distributed Artificial Intelligence". MIT Press, 1999. ISBN 0262-23203