MAS-SOC: a SocSim Platform Based on Agent-Oriented Programming

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Summary

- MAS-SOC
  - Agent-Speak - ***Jason***
  - Communication - SACI
  - Environments - ELMS
  - Current & Future Works

MAS-SOC

- Multi-Agent Simulation for the SOCial sciences
- Objective:
  - To provide a framework that allows the creation of multi-agent simulation without extensive programming skills;
- Modules
  - ***Jason***: AgentSpeak (Hübner &Bordini, 2003)
  - ELMS: Environment Description (Okuyama, 2003)
  - SACI: Communication (Hübner, 2000)
  - Simulation Manager: GUI (under development)

AgentSpeak

- Definition of agents using BDI concepts
- Proposed by Rao(1996)
- Well Defined Operational Semantics (Bordini, et al. 2004)
- The Agent is defined simply by means of:
  - Beliefs
  - Plans

Jason

- Interpreter for an extended version of AgentSpeak
- Open-Source
- Very Extensible and Customisable
- Debugging tools
- Infrastructure (SACI) allows to:
  - run distributed
  - use of speech acts

ELMS

- Context: SocSim implies situated MAS
- Environment Language for Multi-agent Simulation
- Provides the means for the definition of quite complex environments
  - Dynamic, Partially observable, Sequential, Stochastic, and Discrete (mainly)

ELMS

- Concepts used to define Agents:
  - Agent Bodies
    - Attributes; Actions; Perceptions; Constructor;
  - Agent Sensorial Capacities (Perceptions)
    - Pre-conditions; Attributes of the environment
  - Agent Effective Capacities (Actions)
    - Pre-conditions; Values assignments; objects

ELMS

- Concepts to define the Environment
  - Objects (Resources)
    - Attributes; Reactions; Constructor;
  - Spatial Representation (Grid)
    - Cells
      - Attributes; Reactions;
- Operational Concepts:
  - Observables (list of environments attributes)

Current Work

- Explicit Organisational Model
  - Electronic institutions
  - Study the emergence of organisational structures
  - Norms
  - Interactions models

Future Work

- Ontologies
  - For simulation specification
  - Within agents' reasoning
- Develop more simulations/applications

Thank You

Bordini, Rafael H., Costa, Antônio Carlos da Rocha, Hübner, Jomi F., Moreira, Álvaro F., Okuyama, Fabio Y. and Vieira, Renata (2005). 'MAS-SOC: a Social Simulation Platform Based on Agent-Oriented Programming'. *Journal of Artificial Societies and Social Simulation* 8(3) <http://jasss.soc.surrey.ac.uk/8/3/7.html>.

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