MEME – An Integrated Tool For Advanced Computational Experiments for a Variety of Agent-Based Simulation Platforms

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ABSTRACT

Computational simulations are 'in silico' laboratories where experiments are created and executed inside the computer. Extending this metaphor the application of the high scientific standards of 'traditional' experiments becomes a requirement. The Model Exploration Module (MEME) of the Multi-Agent Simulation Suite (MASS) is an integrated tool designed to assist computational modelers in this task. MEME provides easy-to-use, standardized functions and wizards to work with a selection of advanced designs of experiments (DoE). These methods help the modeler exploring the simulation's parameter space in a methodologically sound fashion and reveal the most important correlations of the model parameters and behavior. MEME offers the above functionality to be executed on single computers, on local computer clusters or on grid platforms. These capabilities are available on a variety of common agent-based simulation platforms, from MASS' internal FABLES language, via Repast J and Repast Symphony, to NetLogo and to other Java-based environments (also including 'home grown' Java-based computational experiments). In addition to the results generation facilities described so far, MEME also offers a set of tools to collect, manage and analyze simulation results. This later set of functionality provides modelers with the common pre-processing operations needed to re-format their results data for analysis. MEME is not a competitor of professional statistical packages like SPSS or STATA. Rather it is intended as a helper tool for those. Therefore, the processed data can be conveniently exported from MEME and external tools like R or GNUPlot, etc. can also be automatically invoked.

The basic results processing functionality of MEME was introduced at Agent 2007, together with an early version of the parameter sweeping wizard. This presentation will discuss novel developments, with special focus on multi-platform support and advanced designs of experiments.

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