Collegio Carlo Alberto

UNIVERSITÀ DEGLI STUDI DI TORINO

MaDaS

Master in Data Science for Complex Economic Systems

COMPLEXITY ECONOMICS AND AGENT-BASED MODELS

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Learning Objectives

The goal is to introduce the *making of* agent-based simulation models, comparing NetLogo and SLAPP.

Course Content

1st lecture 24.X h.2:00pm-4:00pm - Introductory notes. Preliminary steps with NetLogo and Python.
Homework.
2nd lecture 25.X h.11:00am-1:00pm - initial exercises in NetLogo, with a parallel look at the content of the folders 1, 2 and 3 of SLAPP.
3rd lecture 26.X h.11:00am-1:00pm - exercises in NetLogo, with a deep parallelism with the content of the folders 4 and 5 of SLAPP.
Homework.
4th lecture 27.X h.11:00am-1:00pm - SLAPP, folders 6 (as an agent-based shell).
Homework.
5th lecture 28.X h.11:00am-1:00pm - from SLAPP to AESOP (Agents and Emergencies for Simulating Organizations in Python), and the perspectives of SLAPP-AESOP, with applications.
Pizza.

Course Methodology

Frontal teaching with computer exercises (suggested: having the laptop with you).

Readings

Suggested preliminary readings and activities:

1. a general introductory paper: Paul L. Borrill and Leigh S. Tesfatsion (2010), Agent-Based Modeling The Right Mathematics for the Social Sciences?, http://www.econ.iastate.edu/tesfatsi/ABMRightMath.PBLTWP.pdf;
2. if you do not know Python, have a look to it (being SLAPP built using that language), also to familiarize with the ideas of object oriented programming; a useful starting point is: Allen Downey (2013), Think Python - How to Think Like a Computer Scientist http://www.greenteapress.com/thinkpython/thinkpython.pdf; as an alternative, view the interactive book at http://interactivepython.org/runestone/static/thinkcspy/toc.html;
3. install Python (2.7.x; NOT 3.x.x) from www.python.org and (optional) IPython, from ipython.org;
4. familiarize with the IDLE programming environment, specific for Python and installed with Python;
5. download SLAPP (Swarm-Like Agent Protocol in Python), which is at https://github.com/terna/SLAPP (use the "Download ZIP" button);
6. start to familiarize with the structure of the SLAPP tutorial reported into the .txt files (included in the main folder and in its subfolders, from 1 to 6);
7. install NetLogo, from http://ccl.northwestern.edu/netlogo/ , version 5.2.x or newer;
8. have a look to the Tutorial contained into the installed NetLogo version.

Slides: available during the course with the full recording of the lessons.

Course Evaluation

The homeworks will be considered, without a specific evaluation, but as a participation effort.
A final essay of about 2,000 words will be evaluated.

About the Instructor

Pietro Terna is a retired professor of the University of Torino (Italy), where he was a full professor of Economics. His research work is in the fields of (i) artificial neural networks for economic applications, (ii) social simulation with agent-based models (where he has been pioneering the use of Swarm, www.swarm.org), and (iii) simulation of enterprises and organizations. He has prepared a new agent-based simulation tool in Python (Swarm-Like Agent Protocol in Python), SLAPP. Publications and projects at http://terna.to.it.