Collegio Carlo Alberto

UNIVERSITÀ DEGLI STUDI DI TORINO

MADAS
Master in Data Science for Complex Economic Systems

COMPLEX NETWORKS

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Learning Objectives

Goal: to explore network analysis via the agent-based model lens.

Course Contents

1st lecture, Nov.16th, 11:00am-1:00pm - Introductory notes. Preliminary steps with NetLogo and NW Python. A fist look to SLAPP/production (reference: see 4. above).
Homework.
2nd lecture - Nov. 17th, 11:00am-1:00pm A deep look to SLAPP/production. Experiment with SLAPP/production with nodes/factories creation or deletion.
Homework.
3rd lecture Nov. 22nd, 11:00am-1:00pm – Using NetworkX library (in Python).
Homework.
4th lecture Nov. 23rd, 11:00am-1:00pm – Putting agents into the networks.
Homework.
5th lecture Nov. 24th, 11:00am-1:00pm – From agent-based simulation to network analisys (and return).
Pizza, Homework.

Course Methodology

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

Readings

Suggested preliminary readings and activities:

1. compare the contents of:
   i) http://en.wikipedia.org/wiki/Social_network_(disambiguation);
   ii) http://en.wikipedia.org/wiki/Social_networks;
   iii) http://en.wikipedia.org/wiki/Social_network_analysis;
   iv) http://en.wikipedia.org/wiki/Complex_network;
2. familiarize with the NetLogo NW extension, at https://github.com/NetLogo/NW-Extension;
3. familiarize with NetworkX library: http://networkx.github.io;
4. if you missed it, study the online material of my course on Agent-Based Models.

Slides: available during the course, also 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.