... a node in the CoMSES Network

CoMSES Digest: Summer 2015

Volume 3, No.2 March 16, 2015 – June 15, 2015

Welcome to the Summer 2015 issue of the CoMSES Digest. Summer is in full swing here in the U.S.: the weather is beautiful and every kind of sport is underway (including, oddly, ice hockey, which has technically just ended but still echoes as I write here in Chicago).

One of CoMSES's core messages- that models should be transparent and reproducible- is spreading. A recent publication* has highlighted the ODD protocol and its role in model reproducibility. In the June 2015 issue of IEEE *Control Systems Magazine*, Ted Pavlic of Arizona State University has argued that the control systems community can learn from the life sciences ABM modeling community. He argues that the ABM community has in the creation of the ODD protocol established and followed a better strategy for documenting computational methods than is the current practice in the control systems community. In addition to recommending the rigor of the ODD protocol, Pavlic also mentions model archiving and sharing on OpenABM. This kind of dialogue shows two things: that the message of transparency and reproducibility of scientific models is an important one, and that through the efforts of CoMSES and its members, the socio-ecological sciences are in no way behind other computation fields, and in fact are at the vanguard of establishing and promoting best practices.

The CoMSES network is looking forward to the fall, when it will sponsor a special session at the Conference on Complex Systems 2015. The session, "Computational Transparency in Modeling Complex Systems," will permit invited speakers and authors of contributed papers to discuss the broader issues of transparency that inhere in the modeling of socio-ecological systems and that cross all domains of scientific computing. More details are available at http://www.ccs2015.org/satellite-computational-transparency-in-modeling-complex-systems/.

Since the last Digest, one model has newly achieved 'Certified' status in the model library: André Grow, Andreas Flache, Rafael Wittek have contributed a model of status construction occurring in task-focused groups. Their model expands on earlier work examining dyadic interactions, and looks at the factors that might lead to or discourage the

rise of status within the dynamics of these groups. Certified status means that the model has been confirmed to meet the following four standards:

- The code is well-formatted and thoroughly commented.
- The model is documented using the ODD standard or equivalent.
- The model runs correctly with the instructions provided.
- The model correctly simulates the processes claimed.

See https://www.openabm.org/faq/what-model-certification-and-how-does-it-work for more details. Model certification is an important part of the growth of the socio-ecological science modeling community, as it encourages modelers to engage in a collective process to review and improve the reliability and reproducibility of SES model code.

In the same time period, four new models have been contributed to the OpenABM model library- a return to the mean after the heavy contributions (15) in the first quarter of 2015. Michael Barton and colleagues have contributed a coupled ABM and cellular automaton framework for modeling smallholder agropastoral households. Raví Rojas and colleagues have modeled a complex game that governs the dynamics in the production, consumption, and import of potatoes and potato seeds in Venezuela. A team led by Benjamin Camus has examined the impact of mutual influences among individuals and groups on the formation of groups and on collective motion. And Takao Sasaki and others at Arizona State have re-implemented an earlier model by Goldstone that examines how information sharing on differently structured networks affects the discovery and exploitation of resources in environments with varying levels of uncertainty.

The most downloaded models for the month are listed below, including a newcomer to the list, a model by Ammar Malik, Andrew Crooks, Hilton Root, and Melanie Swartz, modeling urban dynamics and the balance between investment in infrastructure, economic growth, and social equity.

In addition to the “top five” list given here, many other models were downloaded numerous times. We can show the following statistics:

Downloads	Number of Models
>=40	7
30-39	9
20-29	26
10-19	106
1-9	194

In all there were over 3,500 downloads- a reminder that if you publish your model in the archive, it will reach other interested scholars in the SES modeling community.

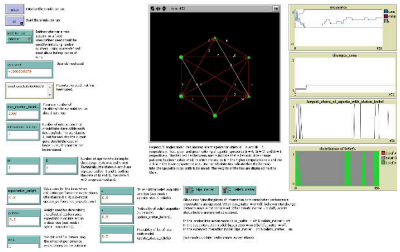
Warm (summer) regards,
John T. Murphy

CoMSES Digest Editor

* Pavlic, Theodore (2015) “From a Noncontrol Perspective.” *IEEE Control Systems Magazine*, June 2015, pp. 19-20.

Newly Certified Models in the Model Library

An Agent-Based Model of Status Construction in Task Focused Groups



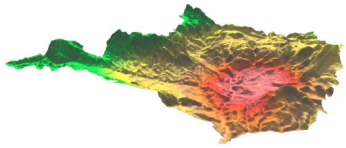
André Grow, Andreas Flache, Rafael Wittek

Modeling work in status construction theory suggests that interactions in small, task focused groups can lead to the spontaneous emergence and diffusion of status beliefs, which link social distinctions to assumptions about competence, in larger populations. This earlier work has focused on dyads as the smallest possible groups in which status beliefs might emerge from face-to-face interaction. In today’s societies, however, many task focused interactions take place in groups larger than dyads. Our model therefore focuses on interactions in groups larger than dyads and enables us to study factors that might facilitate or hinder the emergence of status beliefs in such group contexts.

More Information About Model Certification

Newly Published Models in the Model Library

MedLanD Modeling Laboratory v.1



C. Michael Barton, Isaac Ullah, Gary Mayer, Sean Bergin, Hessam Sarjoughian, Helena Mitasova

The MML provides a hybrid modeling environment that couples an agent-based model of small-holder agropastoral households and a cellular landscape evolution model that simulates changes in erosion/deposition, soils, and vegetation. he ABM is written in Java and uses DEVS Suite (all needed files are included). The landscape evolution model is written in Python and requires installation of GRASS GIS v.6. Java jar, Java source code, Python source code, and sample data files (as a GRASS spatial database) are available

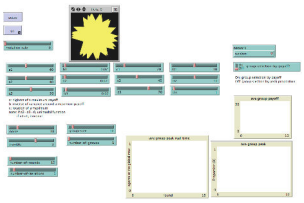
Model of the social game associated to the production of potato seeds in a Venezuelan region

Raví Rojas, Lisbeth Alarcón, Liccia Romero, Oswaldo R Terán
Like many regions of the world, in Latinamerica, and in particular in Venezuela, consumption and production of potatoes (and potato seeds) is highly important. This work aims at representing the (social) game of power around the potato seeds in this region. Such a game involves not only private entities but also the Venezuelan state, which seems to have contradictory strategies and actions.

A Multi-level Multi-model of Collective Motion

Benjamin Camus, Christine Bourjot, Vincent Chevrier
This multi-model (i.e. a model composed of interacting submodels) corresponds to a multi-level representation of a collective motion phenomenon. In this example, we consider individuals evolving in a toric space and forming groups. A group is defined here as a set of close enough individuals with similar orientation. This model was designed to study the impact of the mutual influences between individuals and groups on the formation of groups in a collective motion.

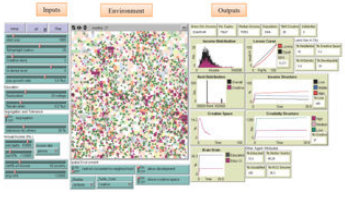
Environmental uncertainty affects the optimal structure of information-sharing networks



Takao Sasaki, Marco Janssen, Stephen Pratt, Zachary Shaffer
The purpose of this study is to explore optimal network structures in situations where group members receive unreliable information about their environment. Our model is based on the SSEC (self-, social-, and exploration-based choices) model developed by Goldstone et al 2008 & Mason et al., 2008. In short, we measured how well different network structures (fully connected, small world, lattice, and random) find and exploit resource peaks in a variable environment.

Most Downloaded Models in the Model Library

(March 16, 2015 – June 15, 2015)



1. (52 Downloads) Exploring Creativity and Urban Development with Agent-Based Modeling ***by Ammar Malik, Andrew Crooks, Hilton Root, Melanie Swartz***

2. (50 Downloads) Artificial Anasazi ***by Marco A. Janssen***

3. (47 Downloads) MayaSim: An agent-based model of the ancient Maya social-ecological system ***by Scott Heckbert***

4. (44 downloads) (Policy induced) Diffusion of Innovations - An integrated demand-supply Model based on Cournot Competition ***by Martin Rixin***

5. (42 downloads) A model of circular migration ***by Martin Rixin***

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