



CoMSES Digest: Winter 2014

Volume 2, No.4 September 16, 2014 – December 15, 2014

Dear CoMSES members,

We round out the year with this, the final 2014 volume of the CoMSES Digest, which includes important CoMSES news and a generous collection of new models.

First, the models. During the past quarter, one model has gone through our certification process: Josh Watts's model of Hohokam Trade Networks allows for the simulation of pottery trade via networks that exhibit a variety of structures, and a comparison of the resulting patterns of deposition with the archaeological record. The interest is in understanding the dynamics of these trade networks, and hence the evolution of trade networks in general- an important process in prehistory and in modern times as well. The certification assures that the model conforms to best practices and will be easy to review, evaluate, and explore.

Newly published- and, we hope, someday certified- models include models of critical transitions in systems of innovation; inequality and evolution; cooperation and defection in harvest games on an abstract landscape; cooperation using a 'resource-blind' norm; social influence and collective action; marriage patterns and social cohesion in immigrant families; creativity and urban development; foraging in a coastal environment, voter turnout, and- a perennial favorite- the supply chain 'beer model'. Special appreciation goes to Moira Zellner and colleagues for publishing two models: one on collective action and ecological decisionmaking, and the other on the use of public transit.

The most downloaded models reflect the continuing interest in archaeological simulation (the Artificial Anasazi model) and in the evolution of cooperation, but also some modern domains: a model of smart utility meters is in the top list, and two models of the diffusion of innovations (including one replicated by Sean Bergin, who produces and mails these Digest issues).

Now, the news. First, a journal article has been published describing the OpenABM library and the CoMSES Network that supports it:

"A Computational Model Library for publishing model documentation and code" Nathan Rollins, C. Michael Barton, Sean Bergin, Marco Janssen, and Allen Lee. *Environmental Modelling and Software*, volume 61, number 4, pp. 59-64. November 2014.

Congratulations and thanks to Nathan Rollins and his colleagues for this effort.

Second, the Interim Executive Board will soon be replaced with a full-term Executive Board. The elections for this are underway; look for the results soon, and be sure to vote if you have not already done so. The Executive Board will consist of officers occupying the posts for staggered terms of 1, 2, and 3 years, and will be responsible for moving the CoMSES Network forward into the second half of this decade and beyond.

It has been a productive year for CoMSES, for the modeling library, and for the researchers who support and use it. I'm looking forward to this continuing in 2015- Happy New Year to all!

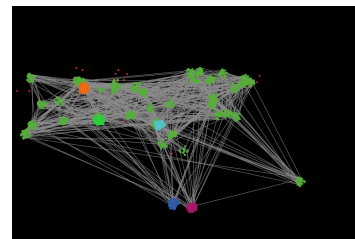
Best Regards,
John T. Murphy
CoMSES Digest Editor
Member, CoMSES Interim Executive Board

Newly Certified Models in the Model Library

Hohokam Trade Networks Model

Joshua Watts

The Hohokam Trade Networks Model was developed (and implemented in NetLogo) to refine conceptual models of economic exchange networks using a computational agent-based model. The Hohokam of central Arizona, for at least part of their long sequence (circa A.D. 200-1450), have been identified as a middle-range society that probably traded pottery in a market-based economy, but the structure of their trade networks is not well understood. Agents in the Hohokam Trade Networks Model produce pottery (specialist producers) and trade that pottery to farmers within open, scale-free, or spatially-restricted scale-free networks.



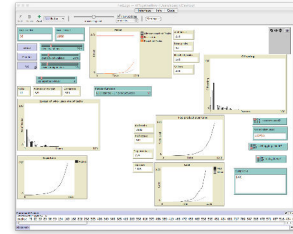
More Information About Model Certification

Newly Published Models in the Model Library

ALL Together Adder

J. Kasmire, Janne M. Korhonen

Transition experiments attempt to understand and influence radical innovations, system innovations and transitions. However, if these desirable outcomes are governed by self-organising criticalities or other chaotic effects, then they are unlikely to be influenced in any positive way by the typical system interventions of a transition experiment.



Societal Simulator v203 fertility graph fix

Tim Gooding

This is the evolutionary multi-agent model designed to capture the key forces in global society. Specifically, it allows the agents to grow more powerful with wealth which creates a wealth aggregation evolutionary imperative.

Collective Decision Making for Ecological Restoration version 2.0

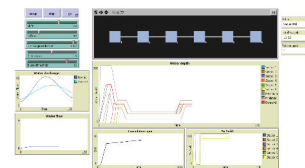
Moira Zellner, Dean Massey, Cristy Watkins, Lynne M. Westphal, Kristen Ross, Jeremy Brooks

Ecological restoration actions generally result from collective decision-making processes and can involve diverse, at times contentious, views. It is critical to understand these processes and the factors that might influence the resolution of diverse perspectives into a set of coordinated actions. This model uses ethnographic data to advance theory on how decisions emerge in the context of ecological restoration in the Chicago Wilderness.

ABM mobility

Irene Pérez Ibarra, Marco A. Janssen

The MOBILITY model is a stylized representation of a dynamic population of agents moving and harvesting a renewable resource. Cooperators (harvest an amount close to the maximum sustainable yield) and selfish agents (harvest higher levels of resource) are simulated in the model.



SEDIBASES

Sebastian Rasch

We model cooperative behaviour based in form of a “resource-blind” norm. Agents restrain from excessive resource abstraction due to social embeddedness and norms of reciprocity. The model was parameterized according to survey data from a village community in South Africa, Sediba. Parts of the ABM decision making utilizes a generic

classifier library by Klaus Hufschlag.

Last Mile Commuter Behavior Model

Moira Zellner, Dean Massey, Yoram Shiftan, Jonathan Levine, Maria Arquero

Transit in the United States often suffers from the problem of inability to deliver travelers all the way from their point of origin to their destination. This “last-mile” problem is thought to deter transit use among riders with auto access, even when high-quality transit service is provided for the majority of the trip distance. We developed an agent-based model representing the commuters and their preferences for different aspects of transportation disutility, namely cost, time and safety.

An Agent-Based Model of Collective Action

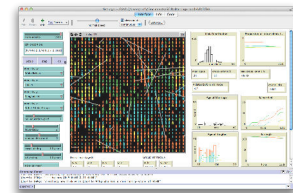
Hai-hua Hu

We provide an agent-based model of collective action, informed by Granovetter (1978) and its replication model by Siegel (2009). The model is rather simple: actors have different threshold randomly drawn from a normal distribution with a mean and a std. Actors will participate in an activity if social influence exceeds threshold.

DITCH --- A Model of Inter-Ethnic Partnership Formation

Ruth Meyer, Laurence Lessard-Phillips, Huw Vasey

The DITCH (“Diversity and Inter-ethnic marriage: Trust, Culture and Homophily”) model has been designed to explore inter-ethnic marriage, but also to move towards adding layers of sophistication to the way such processes have previously been modelled. Utilising research and evidence from quantitative and qualitative sources from across the social sciences, we seek to develop a complex model of emergent processes of differentiation and change in the marriage patterns and social cohesion of migrant communities.



A Mathematical Model of The Beer Game

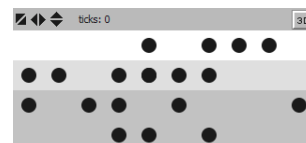
Mert Edali, Hakan Yasarcan

We coded the mathematical model given in the paper “A Mathematical Model of The Beer Game” using R (R 2013). The aim of this code is to ease the simulation replications of the model provided in the paper. Additionally, [code for a different version](#) of that code, which is created for verification purposes.

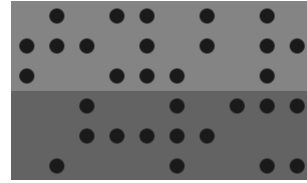
Simple Coastal Exploitation in the American Samoa

Chloe Atwater

This purpose of this model is to distinguish between anthropogenic and climate-driven patterns of shellfish



exploitation over the last 1500 years at Tutuila Island, American Samoa. The model employs optimal foraging theory principles to generate predictions of which habitats are exploited in climatically stable versus variable environments.



Exploring Creativity and Urban Development with Agent-Based Modeling

Ammar Malik, Andrew Crooks, Hilton Root, Melanie Swartz

Scholars and urban planners have suggested that the key characteristic of leading world cities is that they attract the highest quality human talent through educational and professional opportunities. They offer enabling environments for productive human interactions and the growth of knowledge-based industries which drives economic growth through innovation.

A Complex Model of Voter Turnout

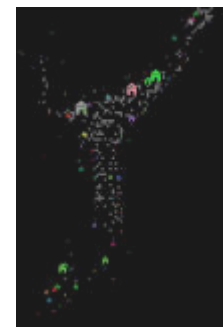
Bruce Edmonds, Laurence Lessard-Phillips, Ed Fieldhouse

The purpose of this model is to enable the exploration of some social processes behind voter turnout, including demographic trends in household size and composition, social influence via the social networks the individuals are embedded within, wider social norms such as civic duty, personal habit and identity, as well as individual rationality. Thus this model is an explanatory model - it demonstrates the plausibility of (complicated) explanations of outcomes from the initial set-up.

Most Downloaded Models in the Model Library

(September 16, 2014 – December 15, 2014)

- 1. (60 Downloads)** *Artificial Anasazi* **by Marco A. Janssen**
- 2. (51 downloads)** *A consumer-demand simulation for Smart Metering tariffs (Innovation Diffusion)* **by Martin Rixin**
- 3. (50 downloads)** *(Policy induced) Diffusion of Innovations - An integrated demand-supply Model based on Cournot Competition* **by Martin Rixin**
- 4. (50 Downloads)** *A simple Multi-Agent System of the Tragedy Of the Commons (MASTOC-s)* **by Julia Schindler**
- 5. (42 downloads)** *Evolution of altruistic punishment* **by Marco A. Janssen**
- 6. (42 downloads)** *Torsten Hägerstrand's Spatial Innovation Diffusion Model* **by Sean M. Bergin**



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