CoMSES Digest: Winter 2019

Volume 7, No. 4 September 16 – December 15, 2019

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Editor's Note

Welcome to the Winter 2019 Issue of the CoMSES Digest! This past quarter has been an especially active one for the CoMSES Model Library, with more model uploads than any previous quarter and a high number of downloads as well.

Below you will find information about several significant events and advancements in the COMSES network: a new journal, a catalog of

publications, and an account of the COMSES 2019 virtual conference. You will also find an opportunity to add your voice to a call for open standards in socio-ecological science modeling, a key component of making modeling a full part of modern computational science.

Warmest wishes for a happy 2020!
Best,

John T. Murphy
CoMSES Digest Editor

CoMSES News

CoMSES 2019

In October CoMSES held its third virtual conference with 17 presentations. These presentations are still available on the CoMSES Net forums and cover a diverse array of topics ranging from modeling dystopian science fiction worlds, establishing community standards for access, documentation, reuse, and interoperability of computational models, and including psychological knowledge in agent-based models. So far the presentations have received more than 3000 views - feel free to check them out if you missed them the first time around!

Catalog of IBM/ABM publications

A new catalog of publications of agent-based and individual based models is now available at https://catalog.comses.net/. CoMSES team members have created a curated database of more than 7000 publications with additional metadata on model code availability, types of model documentation (e.g., ODD, ontologies, flow diagrams, etc), and more. An initial analysis of this dataset can be found at the following presentation from CoMSES 2019: https://forum.comses.net/t/the-catalog-app-cataloging-individual-and-agent-based-models/7920

Open Letter - Signatures requested

The Open Modeling Foundation wrote an open letter calling for international cooperation on standards for next generation modeling of coupled human and

natural systems. Please consider signing the letter! You can find it at https://openmodelingfoundation.org/open-letter/

Socio-Environmental Systems Modeling (SESMO)

The first inaugural issue of SESMO (https://library.wur.nl/ojs/index.php/sesmo/issue/view/2690) is out. SESMO is an open-access journal owned by the scientific community that aims to advance model-grounded learning and decision processes and their wider application to a new level that leads to innovations in thinking and practice to support resolution of grand challenge problems; including generating policy insights and evidence, and reducing and managing critical uncertainties (assumptions, model structure, parameterizations, inputs including future drivers, and boundary conditions).

Calendar of Events

Submission Deadlines

FOODSIM 2020
Submission Deadline: January 10th, 2020
Conference: April 5-9, Ghent, Belgium
https://www.comses.net/events/558/

GI_Forum2020: Session on Spatial Simulation
Submission Deadline: February 1, 2020
Conference: July 6-9, 2020
Salzburg, Austria
https://www.comses.net/events/554/

SBP_BRiMS
Submission Deadline: February 21, 2020
Conference: July 14-17, 2020
Washington D.C., USA
https://www.comses.net/events/564/

Special Issue of Mind & Society on Advanced Modelling of Organizational Behaviour
Submission Deadline: April 1, 2020
https://www.comses.net/events/560/

Call for EoI: proposal for a Lorentz workshop on 'Othering and polarization'

Submission Deadline: May 19, 2020

https://www.comses.net/events/538/

Conferences and Workshops

World Conference on Natural Resource Modeling 2020: Decision support methods for natural systems at risk

Submission Deadline: October 15th

Conference: January 8-10, 2020

Valparaiso, Chile

https://www.comses.net/events/541/

iCROPM 2020: Crop modelling for agriculture and food security under global change

February 3-5, 2020

Montepellier, France

https://www.comses.net/events/557/

Research Software Engineer Workshop (US-RSE)

April 21-22, 2020

Princeton, New Jersey, USA

https://www.comses.net/events/562/

Courses

eX Modelo

Application Deadline: January 15th, 2020

Conference: May 25-29

Near Paris, France

https://www.comses.net/events/556/

Winterschool ABM of SESs

January 5-11, 2020

Tempe, Arizona

https://www.comses.net/events/543/

Agent-based Modelling for the Social Scientist

February 10-12, 2020

University of Surrey, Guilford

https://www.comses.net/events/561/

Earth Surface Processes Modeling Institute (University of Colorado - Boulder)
August 13-21, 2020
Boulder, Colorado, USA
Registration Deadline: April 1, 2020

Model Library

New Model Uploads

This quarter a record 30 models were uploaded. There were a number of contributors who submitted more than one model, but the total number of distinct submittors (23) was greater than the previous record for models uploaded (22). The lion's share of the models were again in NetLogo, but there were submissions in AnyLogic, Repast, MatLab, Python and C++.

Homophily as a process generating social networks: insights from Social Distance Attachment model

Szymon Talaga Andrzej Nowak | Published Tue Sep 17 13:27:34 2019

This is code repository for the paper “Homophily as a process generating social networks: insights from Social Distance Attachment model”. It provides all information, code and data necessary to replicate all the simulations and analyses presented in the paper. This document contains the overall instruction as well as description of the content of the repository. Details regarding particular stages are documented within source files as comments.

MIOvPOP

Aniruddha Belsare | Published Wed Sep 18 01:23:57 2019

An ABM simulating white-tailed deer population dynamics for selected Michigan counties. The model yields pre-harvest and post-harvest realistic population snapshots that can be used to initialize the surveillance model (MIOvPOPsurveillance) and the CWD transmission dynamics model (MIOvCWD) respectively.

TIMELY

ModelPia Backmann | Published Thu Sep 19 07:54:28 2019

An individual-based model to evaluate, whether time delays in plant responses to insect herbivory can be beneficial for the plant.

Policies to reconnect a city and the countryside

Tim Verwaart Gert Hofstede | Published Mon Sep 23 23:21:50 2019

The agent-based model captures the spatio-temporal institutional dynamics of the economy over the years at the level of a Dutch province. After 1945, Noord-Brabant in the Netherlands has been subject to an active program of economic development through the stimulation of pig husbandry. This has had far-reaching effects on its economy, landscape, and environment. The agents are households. The simulation is at institutional level, with typical stakeholder groups, lobbies, and political parties playing a role in determining policies that in turn determine economic, spatial and ecological outcomes. It allows to experiment with alternative scenarios based on two political dimensions: local versus global issues, and economic versus social responsibility priorities. The model shows very strong sensitivity to political context. It can serve as a reference model for other cases where “artificial institutional economics” is attempted.

NetLogo model of USA mass shootings

Smarzhevskiy Ivan | Published Tue Sep 24 09:18:04 2019

Is the mass shooter a maniac or a relatively normal person in a state of great stress? According to the FBI report (Silver, J., Simons, A., & Craun, S. (2018). A Study of the Pre-Attack Behaviors of Active Shooters in the United States Between 2000 – 2013. Federal Bureau of Investigation, U.S. Department of Justice,Washington, D.C. 20535.), only 25% of the active shooters were known to have been diagnosed by a mental health professional with a mental illness of any kind prior to the offense.
The main objects of the model are the humans and the guns. The main factors influencing behavior are the population size, the number of people with mental disabilities (“psycho” in the model terminology) per 100,000 population, the total number of weapons (“guns”) in the population, the availability of guns for humans, the intensity of stressors affecting humans and the threshold level of stress, upon reaching which a person commits an act of mass shooting.
The key difference (in the model) between a normal person and a psycho is that a psycho accumulates stressors and, upon reaching a threshold level, commits an act of mass shooting. A normal person is exposed to stressors, but reaching the threshold level for killing occurs only when the simultaneous effect of stressors on him exceeds this level.

Crowdworking Model

Georg Jäger | Published Wed Sep 25 06:25:58 2019

The purpose of this agent-based model is to compare different variants of crowdworking in a general way, so that the obtained results are independent of

specific details of the crowdworking platform. It features many adjustable parameters that can be used to calibrate the model to empirical data, but also when not calibrated it yields essential results about crowdworking in general. Agents compete for contracts on a virtual crowdworking platform. Each agent is defined by various properties like qualification and income expectation. Agents that are unable to turn a profit have a chance to quit the crowdworking platform and new crowdworkers can replace them. Thus the model has features of an evolutionary process, filtering out the ill suited agents, and generating a realistic distribution of agents from an initially random one. To simulate a stable system, the amount of contracts issued per day can be set constant, as well as the number of crowdworkers. If one is interested in a dynamically changing platform, the simulation can also be initialized in a way that increases or decreases the number of crowdworkers or number of contracts over time. Thus, a large variety of scenarios can be investigated.

An Individual-Based Mechanistic Model of Mussel Bed Boundary Formation and Intensity

Matthew Schumm | Published Sat Sep 28 18:21:32 2019

Individually parameterized mussels (Mytilus californianus) recruit, grow, move and die in a 3D environment while facing predation (in the form of seastar agents), heat and desiccation with increased tide height, and storms. Parameterized with data collected by Wootton, Paine, Kandur, Donahue, Robles and others. See my 2019 CoMSES video presentation to learn more.

1984 social computation model

Harun Šiljak | Published Mon Sep 30 16:27:46 2019

A system of nonlinear differential equations, modelled in MATLAB Simulink, simulating the world of George Orwell’s 1984.

Waste separation in small-world networks

František Kalvas Michaela Kudrnáčová | Published Mon Sep 30 17:43:57 2019

The model answers the question how homophily and number of close-links in small-world network influences behavior of consumats. The results show that the more close-links the more probable the consumat follows the major behavior, but homophilly blocks the major behavior and supports survival of the minor behavior.

Exploration and Exploitation: Persistence with local exploration under varying resource distribution, resource availability over time and cost of relocation

Arpan Jani | Published Mon Sep 30 21:01:48 2019

Organisms, Individuals and Organizations face the dilemma of exploration vs. exploitation
Identifying the optimal trade-off between the two is a challenge
Too much exploration (e.g. gaining new knowledge) can be detrimental to day-to-day survival and too much exploitation (applying existing knowledge) could be detrimental to long term survival esp. if conditions change over time

The purpose of the model is to investigate how the amount of resources acquired (wealth/success) is related to persistence with the strategy of local exploration under different resource distributions, availability of resources over time and cost of relocation.

06b EiLab_Model_I_V5.00 NL

Garvin Boyle | Published Sat Oct 5 08:27:46 2019

EiLab - Model I - is a capital exchange model. That is a type of economic model used to study the dynamics of modern money which, strangely, is very similar to the dynamics of energetic systems. It is a variation on the BDY models first described in the paper by Dragulescu and Yakovenko, published in 2000, entitled “Statistical Mechanics of Money”. This model demonstrates the ability of capital exchange models to produce a distribution of wealth that does not have a preponderance of poor agents and a small number of exceedingly wealthy agents.

This is a re-implementation of a model first built in the C++ application called Entropic Index Laboratory, or EiLab.

00b SimEvo_V5.08 NetLogo

Garvin Boyle | Published Sat Oct 5 08:29:38 2019

In 1985 Dr Michael Palmiter, a high school teacher, first built a very innovative agent-based model called “Simulated Evolution” which he used for teaching the dynamics of evolution. In his model, students can see the visual effects of evolution as it proceeds right in front of their eyes. Using his schema, small linear changes in the agent’s genotype have an exponential effect on the agent’s phenotype. Natural selection therefore happens quickly and effectively. I have used his approach to managing the evolution of competing agents in a variety of models that I have used to study the fundamental dynamics of sustainable economic systems.

Vole-Mustelid model

Viktoriia Radchuk Harry Peter Andreassen Rolf Anker Ims | Published Mon Oct 7 07:51:26 2019

The model reflects the predator-prey mustelid-vole population dynamics, typically observed in boreal systems. The goal of the model is to assess which intrinsic and extrinsic factors (or factor combinations) are needed for the generation of the cyclic pattern typically observed in natural vole populations. This goal is achieved by contrasting the alternative model versions by "switching off" some of the submodels in order to reflect the four combinations of the factors hypothesized to be driving vole cycles.

07 EffLab_V5.07 NL

Garvin Boyle | Published Mon Oct 7 15:42:48 2019

EffLab was built to support the study of the efficiency of agents in an evolving complex adaptive system. In EffLab, blind seekers wander through a forest looking for energy-rich food. In this multi-generational world, they live and reproduce, or die, depending on whether they can find food more effectively than their contemporaries. Data is collected to measure their efficiency as they evolve more effective search patterns.

Sharing economy in the short-time accommodations market

Bruna Bruno Marisa Faggini | Published Wed Oct 16 15:25:25 2019

We present an agent-based model for the sharing economy, in the short-time accommodations market, where peers participating as suppliers and demanders follow simple decision rules about sharing market participation, according to their heterogeneous characteristics. We consider the sharing economy mainly as a peer-to-peer market where the access is preferred to ownership, excluding professional agents using sharing platforms as Airbnb to promote their business.

An agent-based model to simulate meat consumption behaviour of consumers in Britain

Andrea Scalco | Published Fri Oct 18 13:00:21 2019

The current rate of production and consumption of meat poses a problem both to peoples' health and to the environment. This work aims to develop a simulation of peoples' meat consumption behaviour in Britain using agent-based modelling. The agents represent individual consumers. The key variables that characterise agents include sex, age, monthly income, perception of the living cost, and concerns about the impact of meat on the environment, health, and animal welfare. A process of peer influence is modelled with respect to the agents' concerns. Influence spreads across two eating networks (i.e. co-workers and household members) depending on the time of day, day of the week, and agents' employment status. Data from a representative sample of

British consumers is used to empirically ground the model. Different experiments are run simulating interventions of application of social marketing campaigns and a rise in price of meat. The main outcome is the average weekly consumption of meat per consumer. A secondary outcome is the likelihood of eating meat.

Spatio-Temporal Dynamic of Risk Model

J Jumadi | Published Tue Oct 22 11:01:04 2019

This model aims to simulate the dynamic of risk over time and space.

A replication of Abelson's and Bernstein's community referendum simulation

Klaus Troitzsch | Published Fri Oct 25 12:31:58 2019

This is a replication of Abelson’s and Bernstein’s early computer simulation model of community referendum controversies which was originally published in 1963 and often cited, but seldom analysed in detail. The replication is in NetLogo, accompanied with an ODD+D protocol and class and sequence diagrams.

NetLogo HIV spread model

Wouter Vermeer | Published Fri Oct 25 16:51:17 2019

This model describes the tranmission of HIV by means of unprotected anal intercourse in a population of men-who-have-sex-with-men.
The model is parameterized based on field data from a cohort study conducted in Atlanta Georgia.

A network agent-based model of ethnocentrism and intergroup cooperation

Ross Gore | Published Sun Oct 27 19:16:04 2019

We present a network agent-based model of ethnocentrism and intergroup cooperation in which agents from two groups (majority and minority) change their communality (feeling of group solidarity), cooperation strategy and social ties, depending on a barrier of “likeness” (affinity). Our purpose was to study the model’s capability for describing how the mechanisms of preexisting markers (or “tags”) that can work as cues for inducing in-group bias, imitation, and reaction to non-cooperating agents, lead to ethnocentrism or intergroup cooperation and influence the formation of the network of mixed ties between agents of different groups. We explored the model’s behavior via four experiments in which we studied the combined effects of “likeness,” relative size of the minority group, degree of connectivity of the social network, game

difficulty (strength) and relative frequencies of strategy revision and structural adaptation. The parameters that have a stronger influence on the emerging dominant strategies and the formation of mixed ties in the social network are the group-tag barrier, the frequency with which agents react to adverse partners, and the game difficulty. The relative size of the minority group also plays a role in increasing the percentage of mixed ties in the social network. This is consistent with the intergroup ties being dependent on the “arena” of contact (with progressively stronger barriers from e.g. workmates to close relatives), and with measures that hinder intergroup contact also hindering mutual cooperation.

Fertility Tradeoffs

Kristin Crouse | Published Tue Nov 5 04:36:42 2019

Fertility Tradeoffs is a NetLogo model that illustrates the emergencent tradeoffs between the quality and quantity of offspring. Often, we associate high fitness with maximizing the number of offspring. However, under certain circumstances, it pays instead to optimize the number of offspring, having fewer offspring than is possible. When the number of offspring is reduced, more energy can be invested in each offspring, which can be beneficial for their own fitness.

The Hawk-Dove Game

Kristin Crouse | Published Tue Nov 5 04:51:09 2019

This model simulates the Hawk-Dove game as first described by John Maynard Smith, and further elaborated by Richard Dawkins in “The Selfish Gene”. In the game, two strategies, Hawks and Doves, compete against each other, and themselves, for reproductive benefits. A third strategy can be introduced, Retaliators, which act like either Hawks or Doves, depending on the context.

The PARSO_demo Model

Davide Secchi | Published Tue Nov 5 10:27:02 2019

This model explores different aspects of the formation of urban neighbourhoods where residents believe in values distant from those dominant in society. Or, at least, this is what the Danish government beliefs when they discuss their politics about parallel societies. This simulation is set to understand (a) whether these alternative values areas form and what determines their formation, (b) if they are linked to low or no income residents, and (c) what happens if they disappear from the map. All these three points are part of the Danish government policy. This agent-based model is set to understand the boundaries and effects of this policy.

BHSPopDy (Bighorn sheep population dynamics)

Aniruddha Belsare Ryan Long E Frances Cassirer | Published Tue Nov 5 17:11:57 2019

This is an agent-based model coded in NetLogo. The model simulates population dynamics of bighorn sheep population in the Hell's Canyon region of Idaho and will be used to develop a better understanding of pneumonia dynamics in bighorn sheep populations. The overarching objective is to provide a decision-making context for effective management of pneumonia in wild populations of bighorn sheep.

Prisoner's Tournament

Kristin Crouse | Published Wed Nov 6 05:39:54 2019 | Last modified Thu Dec 5 08:00:54 2019

This model replicates the Axelrod prisoner's dilemma tournaments. The model takes as input a file of strategies and pits them against each other to see who achieves the best payoff in the end. Change the payoff structure to see how it changes the tournament outcome!

HCAM: A Hybrid Climate Assessment Model

Peer-Olaf Siebers | Published Wed Nov 6 09:09:50 2019

This model is part of a JASSS article that introduce a conceptual framework for developing hybrid (system dynamics and agent-based) integrated assessment models, which focus on examining the human impacts on climate change. This novel modelling approach allows to reuse existing rigid, but well-established integrated assessment models, and adds more flexibility by replacing aggregate stocks with a community of vibrant interacting entities. The model provides a proof-of-concept of the application of this conceptual framework in form of an illustrative example. taking the settings of the US. It is solely created for the purpose of demonstrating our hybrid modelling approach; we do not claim that it has predictive powers.

The PRIF Model

Davide Secchi | Published Fri Nov 8 13:45:51 2019

This model takes into consideration Peer Reviewing under the influence of Impact Factor (PRIF) and it has the purpose to explore whether the infamous metric affects assessment of papers under review. The idea is to consider to types of reviewers, those who are agnostic towards IF (IU1) and those that believe that it is a measure of journal (and article) quality (IU2). This perception is somehow reflected in the evaluation, because the perceived scientific value of a paper becomes a function of the journal in which an article has been

submitted. Various mechanisms to update reviewer preferences are also implemented.

Urban Dynamics

Hideyuki Nagai | Published Mon Nov 11 04:52:04 2019

This is an urban dynamics ABM of abstraction of a city and residents' activities there.

It allows you to evaluate the effects of urban policies, such as an introduction of an open facility for residents with pedestrian-friendly accommodations, promotion of bicycle use, and control of private automobile use in an urban central area, in controlling urban sprawl.

B3GET Classic

Kristin Crouse | Published Mon Nov 11 07:30:59 2019 | Last modified Mon Nov 25 07:25:33 2019

B3GET Classic includes previous versions used in the classroom and for publication. Please check out the latest version of B3GET here, which has several user-friendly features such as directly importing and exporting genotype and population files.

The classic versions of B3GET include: version one was and version three is currently used in undergraduate labs at the University of Minnesota to demonstrate principles in primate behavioral ecology; version two first demonstrated proof of concept for creating virtual biological organisms using decision-vector technology; version four was presented at the 2017 annual meeting at the American Association of Physical Anthropologists; version five was presented in a 2019 publication from the Journal of Human Evolution (Crouse, Miller, and Wilson, 2019).

Mitigating bioenergy-driven biodiversity decline: a modelling approach with the European brown hare

Maria Langhammer Volker Grimm | Published Wed Nov 13 19:29:17 2019 | Last modified Tue Dec 10 09:49:17 2019

The model is designed to analyse the effects of mitigation measures on the European brown hare (Lepus europaeus), which is directly affected by ongoing land use change and has experienced widespread decline throughout Europe since the 1960s. As an input, we use two 4×4 km large model landscapes, which were generated by a landscape generator based on real field sizes and crop proportions and differed in average field size and crop composition. The crops grown annually are evaluated in terms of forage suitability, breeding

suitability and crop richness for the hare. Six mitigation scenarios are implemented, defined by a 10 % increase in: (1) mixed silphie, (2) miscanthus, (3) grass-clover ley, (4) alfalfa, (5) set-aside, and (6) general crop richness. The model shows that that both landscape configuration and composition have a significant effect on hare population development, which responds particularly strongly to compositional changes.

B3GET

Kristin Crouse | Published Thu Nov 14 20:07:16 2019 | Last modified Tue Nov 19 17:42:04 2019

B3GET simulates populations of virtual organisms evolving over generations, whose evolutionary outcomes reflect the selection pressures of their environment. The model simulates several factors considered important in biology, including life history trade-offs, investment in fighting ability and aggression, sperm competition, infanticide, and competition over access to food and mates. Downloaded materials include a starting genotype and population files. Edit the these files and see what changes occur in the behavior of virtual populations!

A Simulation Model of the Radicalisation Process

Rosemary Pepys | Published Sat Nov 16 11:22:21 2019

This is the code for a simulation model of the radicalisation process based on the IVEE theoretical framework.

Aqua.MORE

Lisa Huber Nico Bahro | Published Wed Nov 20 07:52:39 2019

Aqua.MORE (Agent-based MOdelling of REsources in Socio-Hydrological Systems) is an agent based modelling (ABM) approach to simulate the resource flow and social interaction in a coupled natural and social system of water supply and demand. The model is able to simulate the two-way feedback as socio-economic agents influence the natural resource flow and the availability of this resource influences the agents in their behaviour.

Cultural Evolution of Sustainable Behaviours: Landscape of Affordances Model

Roope Oskari Kaaronen Nikita Strelkovskii | Published Wed Dec 4 09:05:24 2019 | Last modified Wed Dec 4 14:47:01 2019

This NetLogo model illustrates the cultural evolution of pro-environmental behaviour patterns. It illustrates how collective behaviour patterns evolve from interactions between agents and agents (in a social network) as well as agents and the affordances (action opportunities provided by the environment) within a

niche. More specifically, the cultural evolution of behaviour patterns is understood in this model as a product of:

1. The landscape of affordances provided by the material environment,
2. Individual learning and habituation,
3. Social learning and network structure,
4. Personal states (such as habits and attitudes)

Rebel Group Protection Rackets

Frances Duffy Kamil C. Klosek Luis Nardin Gerd Wagner | Published Wed Dec 4 10:12:59 2019

System Narrative
How do rebel groups control territory and engage with the local economy during civil war? Charles Tilly's seminal War and State Making as Organized Crime (1985) posits that the process of waging war and providing governance resembles that of a protection racket, in which aspiring governing groups will extort local populations in order to gain power, and civilians or businesses will pay in order to ensure their own protection. As civil war research increasingly probes the mechanisms that fuel local disputes and the origination of violence, we develop an agent-based simulation model to explore the economic relationship of rebel groups with local populations, using extortion racket interactions to explain the dynamics of rebel fighting, their impact on the economy, and the importance of their economic base of support. This analysis provides insights for understanding the causes and byproducts of rebel competition in present-day conflicts, such as the cases of South Sudan, Afghanistan, and Somalia.

PrioritEvac: An Agent-Based Model of Evacuation from Building Fires

efyoungud | Published Fri Dec 6 21:13:50 2019

This simulation is of the 2003 Station Nightclub Fire and is part of the Interdependencies in Community Resilience (ICoR) project (http://www-personal.umich.edu/~eltawil/icor.html). The git contains the simulation as well as csvs of data about the fire, smoke, building, and people involved.

An Agent-based Model of Firm Size Distribution and Collaborative Innovation

Inyoung Hwang | Published Mon Dec 9 22:42:12 2019

I added a discounting rate to the equation for expected values of defective / collaborative strategies.
The discounting rate was set to 0.956, the annual average from 1980 to 2015,

using the Consumer Price Index (CPI) of Statistics Korea.

Managing networked landscapes: conservation in fragmented, regionally connected world

Jacopo Baggio Michael Schoon Sechindra Vallury | Published Mon Dec 9 23:33:50 2019

Exploring how learning and social-ecological networks influence management choice set and their ability to increase the likelihood of species coexistence (i.e. biodiversity) on a fragmented landscape controlled by different managers.

Maze with Q-Learning NetLogo extension

Kevin Kons Fernando Santos | Published Tue Dec 10 03:04:10 2019

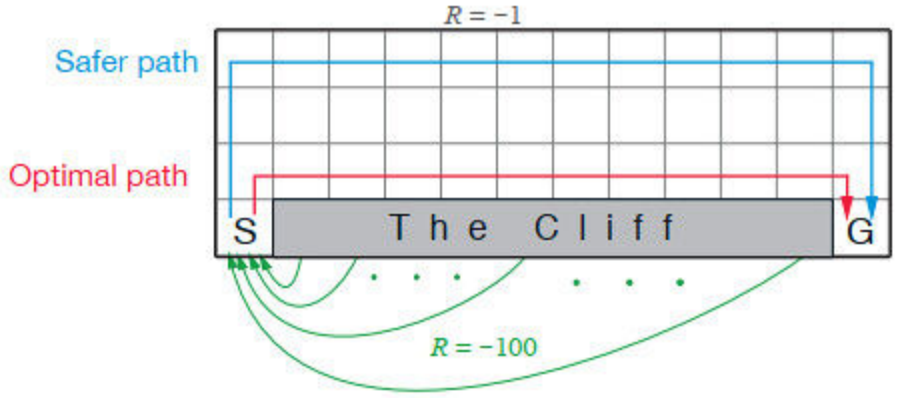
This is a re-implementation of a the NetLogo model Maze (ROOP, 2006).

This re-implementation makes use of the Q-Learning NetLogo Extension to implement the Q-Learning, which is done only with NetLogo native code in the original implementation.

Cliff Walking with Q-Learning NetLogo Extension

Kevin Kons Fernando Santos | Published Tue Dec 10 18:48:10 2019

This model implements a classic scenario used in Reinforcement Learning problem, the “Cliff Walking Problem”. Consider the gridworld shown below (SUTTON; BARTO, 2018). This is a standard undiscounted, episodic task, with start and goal states, and the usual actions causing movement up, down, right, and left. Reward is -1 on all transitions except those into the region marked “The Cliff.” Stepping into this region incurs a reward of -100 and sends the agent instantly back to the start (SUTTON; BARTO, 2018).



The problem is solved in this model using the Q-Learning algorithm. The algorithm is implemented with the support of the NetLogo Q-Learning Extension

TeleABM

Yue Dou | Published Tue Dec 10 20:25:14 2019 | Last modified Wed Dec 11 10:59:31 2019

We construct a new type of agent-based model (ABM) that can simultaneously simulate land-use changes at multiple distant places (namely TeleABM, telecoupled agent-based model). We use soybean trade between Brazil and China as an example, where Brazil is the sending system and China is the receiving system because they are the world's largest soybean exporter and importer respectively. We select one representative county in each country to calibrate and validate the model with spatio-temporal analysis of historical land-use changes and the empirical analysis of household survey data. The whole model is programmed on RePast Simphony. The most unique features of TeleABM are that it can simulate a telecoupled system and the flows between sending and receiving systems in this telecoupled system.

MIOvCWD

Aniruddha Belsare | Published Fri Dec 13 20:24:03 2019

MIOvCWD is a spatially-explicit, agent-based model designed to simulate the spread of chronic wasting disease (CWD) in Michigan's white-tailed deer populations. CWD is an emerging prion disease of North American cervids (white-tailed deer Odocoileus virginianus, mule deer Odocoileus hemionus, and elk Cervus elaphus) that is being actively managed by wildlife agencies in most states and provinces in North America, including Michigan. MIOvCWD incorporates features like deer population structure, social organization and behavior that are particularly useful to simulate CWD dynamics in regional deer populations.

Most Downloaded Models

The most-downloaded models set a new milestone this quarter: all of the top five most-downloaded models were downloaded more than 100 times.

1. **(115 Downloads)** Agent-based Renewables model for Integrated Sustainable Energy (ARISE) by Muhammad Indra Al Irsyad
2. **(109 Downloads)** OMOLAND-CA: An Agent-Based Modeling of Rural Households' Adaptation to Climate Change by Atesmachew Hailegiorgis, Claudio Cioffi-Revilla, and Andrew Crooks
3. **(109 Downloads)** An Agent-Based Model of Flood Risk and Insurance by J Dubbelboer, I Nikolic, K Jenkins, J Hall
4. **(105 Downloads)** RefugeePathSIM Model by Guillaume Arnoux,

Hébert, Liliana Perez and Saeed Harati

5. **(104 Downloads)** CHIME ABM Hurricane Evacuation Model by Joshua Watts

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