

Advanced Features of Netlogo

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Netlogo Tools and Advanced Techniques

- Behavior Space
- Shapes Editor
- Network Models
- Importing Network Data, Images, & 2D Data Files
- Audio Feedback
- Mouse Interaction
- Systems Dynamics Modeler
- Hubnet
- Java Extensions
- Mathematica Link
- Netlogo 3D
- Geographic Information Systems



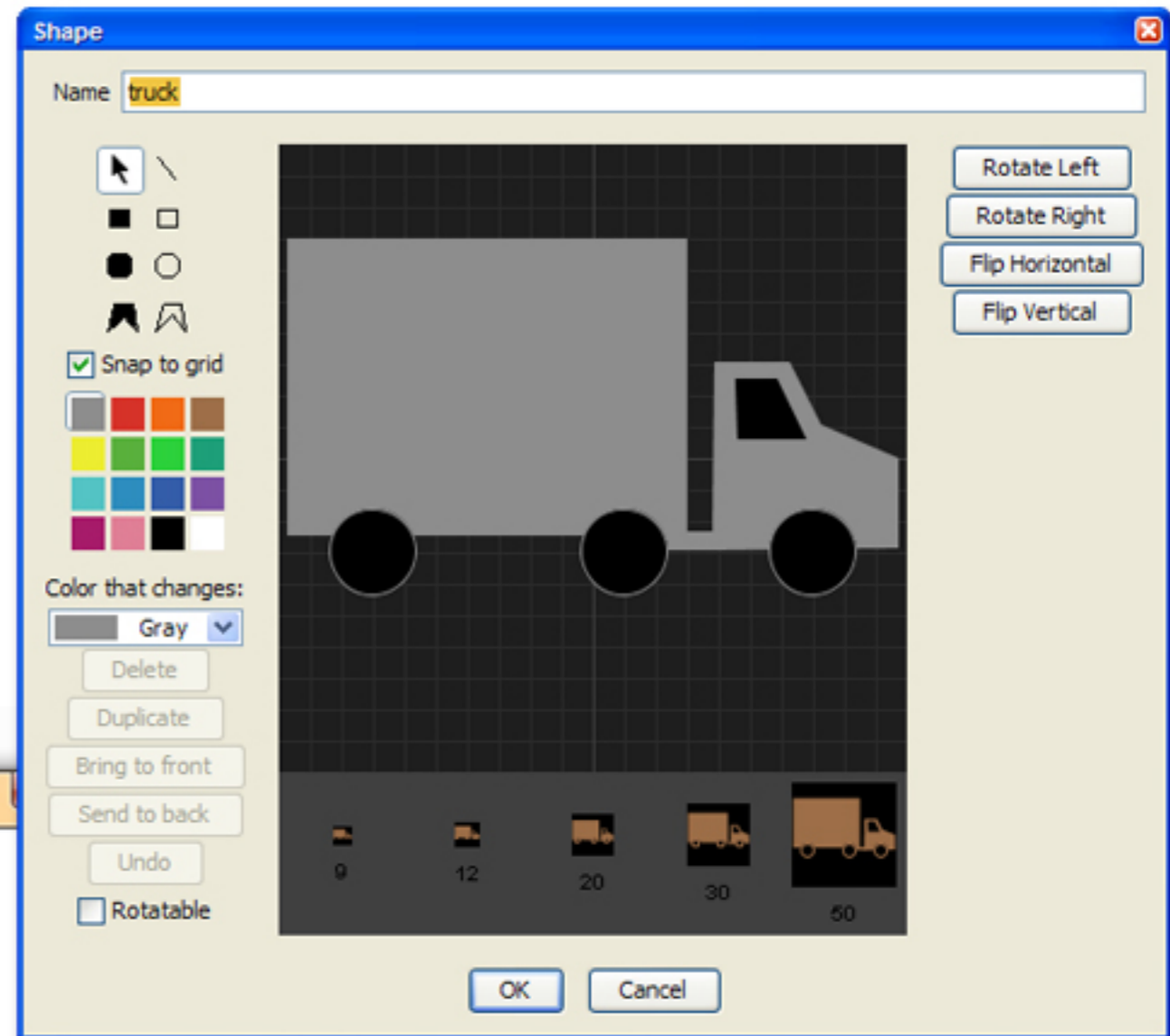
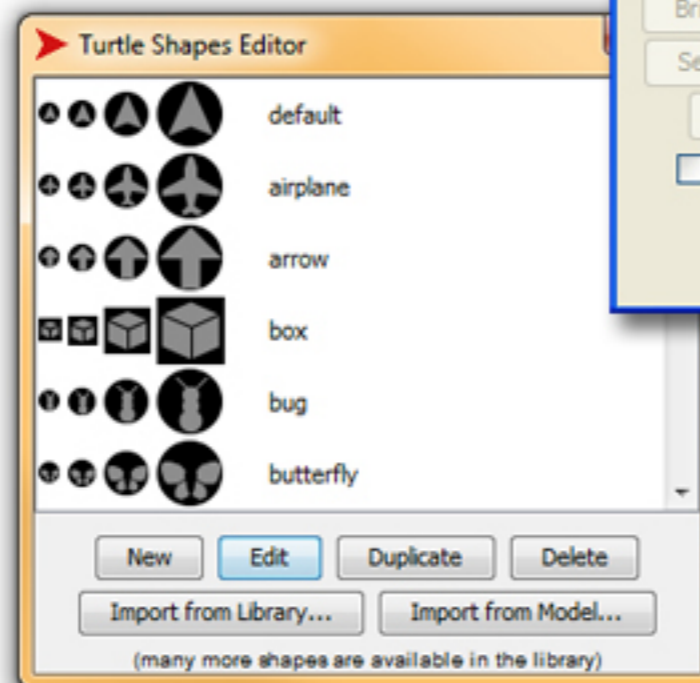
Behavior Space Tool

- Using the Behavior Space Tool for “drone” runs:
- Sweeps Variables Setable from Interface
- Can Run Different Experiments on the Same Model
- Specify How Many Repetitions for each Variable Combo
- Specify Output Variables
- Specify Setup, Go, Stop and Post-Run Commands
- A Time Limit Can Be Specified Separately
- **NOTE:** for Excel specify “Table” format for output

The screenshot shows the 'Experiment' dialog box in Netlogo. The 'Experiment name' field contains 'experiment'. The 'Vary variables as follows' section contains a list of variables in brackets: ["learning?" false], ["%-similar-wanted-red" 30], ["number-yellow" 660], and ["%-similar-wanted-green" 30]. Below this, there are instructions on how to specify values for variables, including examples like ["my-slider" 1 2 7 8] and ["my-slider" [0 1 10]]. The 'Repetitions' field is set to 1. The 'Output variables' section is empty. The 'Setup commands' field contains 'setup', and the 'Go commands' field contains 'go'. The 'Stop condition' and 'Final commands' fields are empty. The 'Time limit' field is set to 0. The 'OK' and 'Cancel' buttons are at the bottom.

Turtle Shapes Editor

- Refer to user manual.
- Vector driven.
- Large shapes library.
- Choose rotatable or not.
- Only one color changes.
- Simple shapes are best.
- Limited, but good enough.



Network Models

- Edges are called “links” in Netlogo.
- Can be directed or symmetric.
- Built in support for multiple layouts, accessing link-neighbors, multiple link “breeds”, and few other things.
- No native network measures, limited visualization, and can be slow because links are agents.
- Improvements are on the way.



Audio Feedback with Sound Extension

- Create sound effects and alerts
- Auralization of data stream
- Preinstalled - see Extensions section of user manual
- MIDI method simulates a 128-key electronic keyboard with 47 drums and 128 melodic instruments
- Supports 15 instruments and one percussion channel
- Pitch and volume adjustable on 0 to 127 scales
- Plays a recorded sound file, e.g. your voice!
- It supports WAV, AIFF, and AU files.



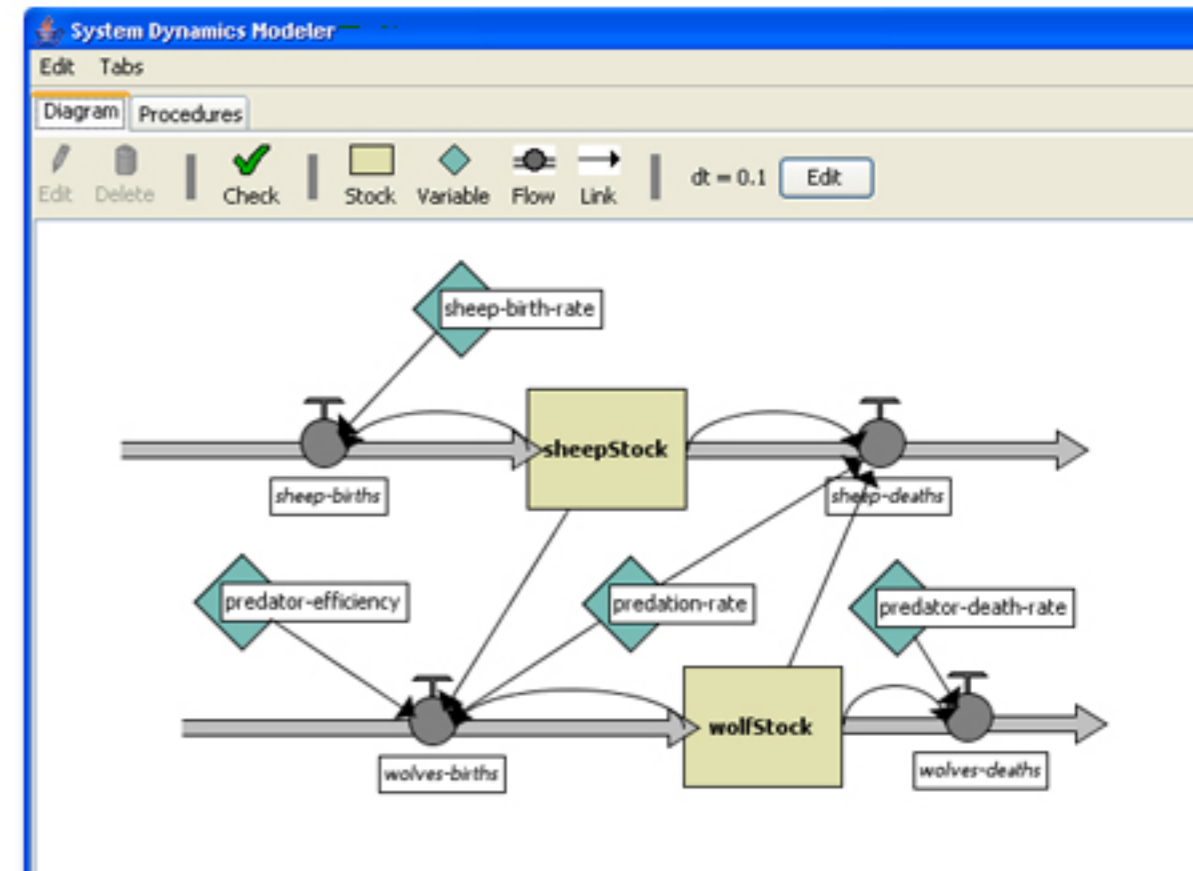
Mouse Interaction

- Select, drag, add, remove, etc agents and other model features.
- Draw aspects of the world that agents see.
- Manually position agents, objects, and patch values.
- User interaction with a computer...like a game.
- And what else?



System Dynamics Modeler

- Population-based dynamics; not ABM.
- Define stocks, flows, variables, and links.
- Intuitive Netlogo interface (variables and plots).
- Generates code for you.
- Port and compare with ABM.
- See user manual and examples.



HubNet Participatory Models

- Allow humans to control agents and/or parameters.
- Support for computers, calculators, cell phones, PDAs.
- Remote data collection and model integration.
- Teach concepts on distributed action and emergence.
- Run social science experiments.
- Still limited and somewhat difficult to set up and use.



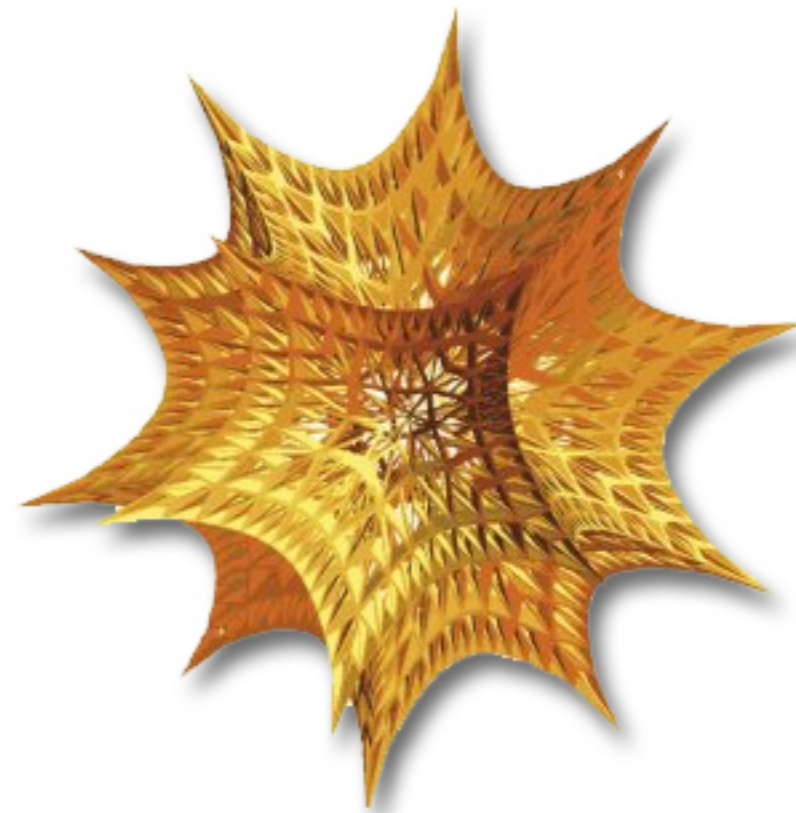
Java Extensions

- Netlogo API for writing Java interfaces (incomplete).
- Extensions now work in applet mode!
- Import existing java capabilities into Netlogo.
- Use Netlogo interface for feedback of Java model.
- Provide access to advanced analytics.



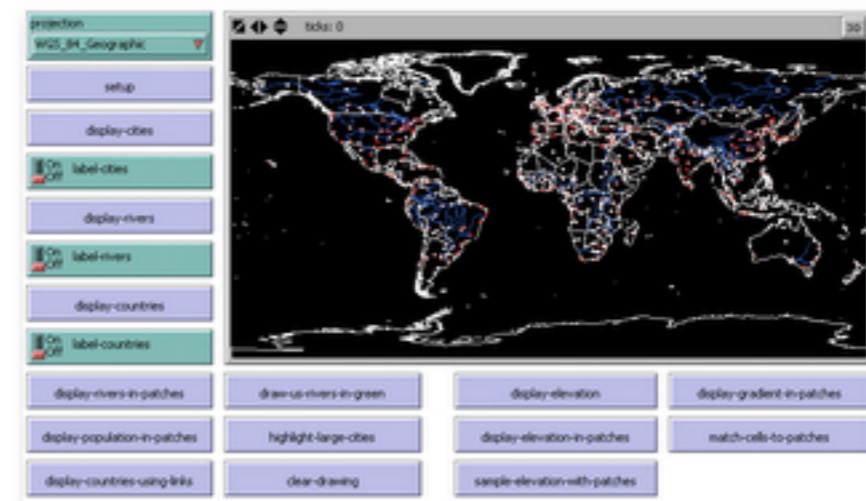
Mathematica Link

- Real-time interaction between applications.
- Provides a highly interactive self-documenting workflow.
- Replace the Behavior Space with adaptive sweeping.
- Useful in model debugging.
- Utilize Mathematica for:
 - data importing
 - statistical functions
 - network analysis
 - document creation
 - visualization
 - and much, much more.



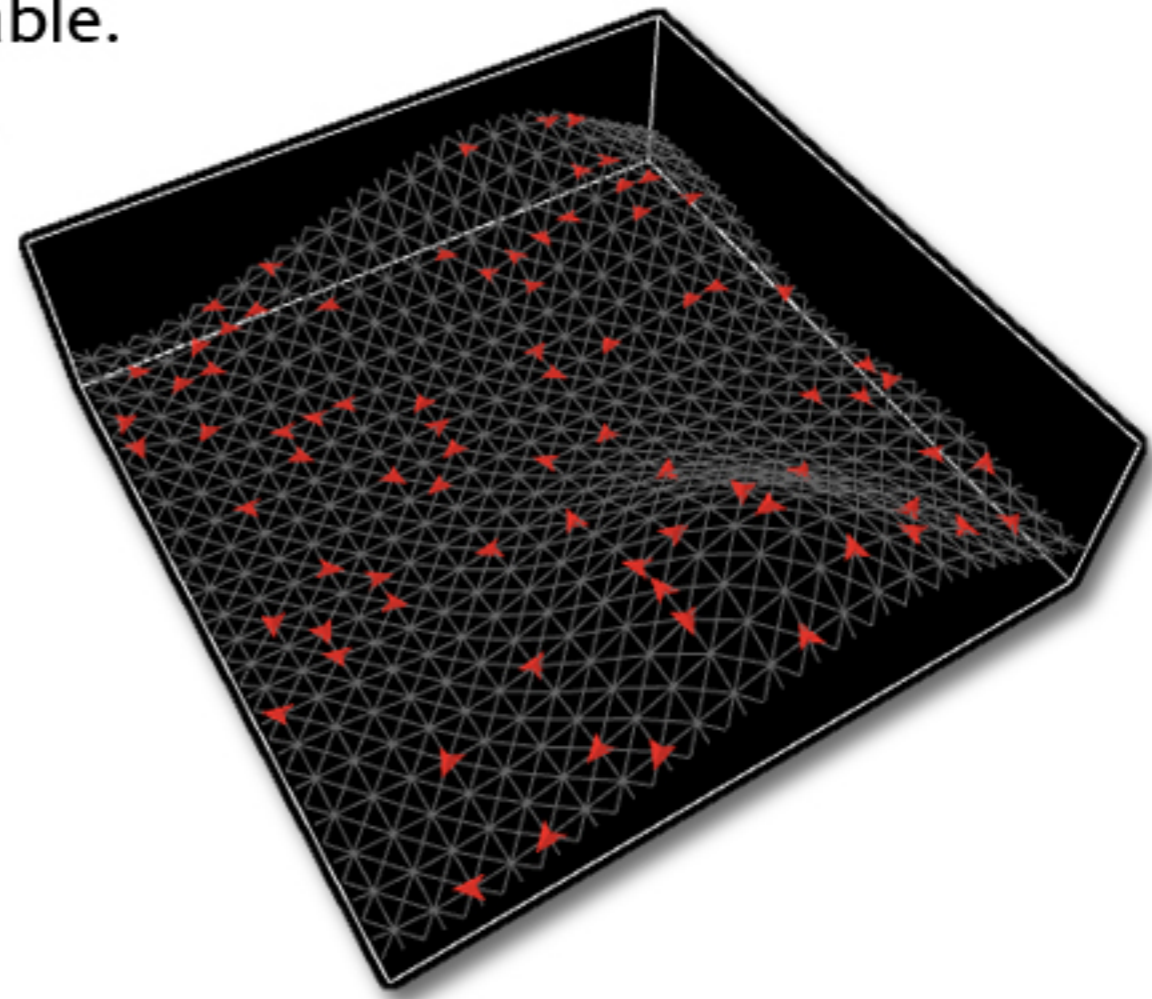
Geographic Information Systems

- Import and Interact with GIS Data.
- Import real-world geographic and demographic data.
- Supports ESRI .shp files to import vectors.
- Supports ESRI .grd and .asc files for raster grids.
- Not just converting to patch values (though that's possible).
- Maintain and manage vectors directly in Netlogo.
- Extract features to assign values, create agents, etc.
- Still young, but quickly growing.



Netlogo 3D

- Add another spatial dimension to your model.
- Separate program but downloaded together.
- 3D world and interface/procedure tabs in separate windows.
- Most commands are the same, but no real manual.
- No shapes editor GUI, but generatable.
- Transparency for turtles supported.
- No applet support.
- Full integration planned.



There's More Where That Came From!

- Netlogo is constantly expanding, and new extensions are constantly being developed.
- Netlogo is now open source, meaning that many more people are participating in development.
- The joy of computer programming is that the combination of components is much more powerful than any one capability.

