Spatial-ABMs

Utilizing Netlogo GIS and CSV Extensions
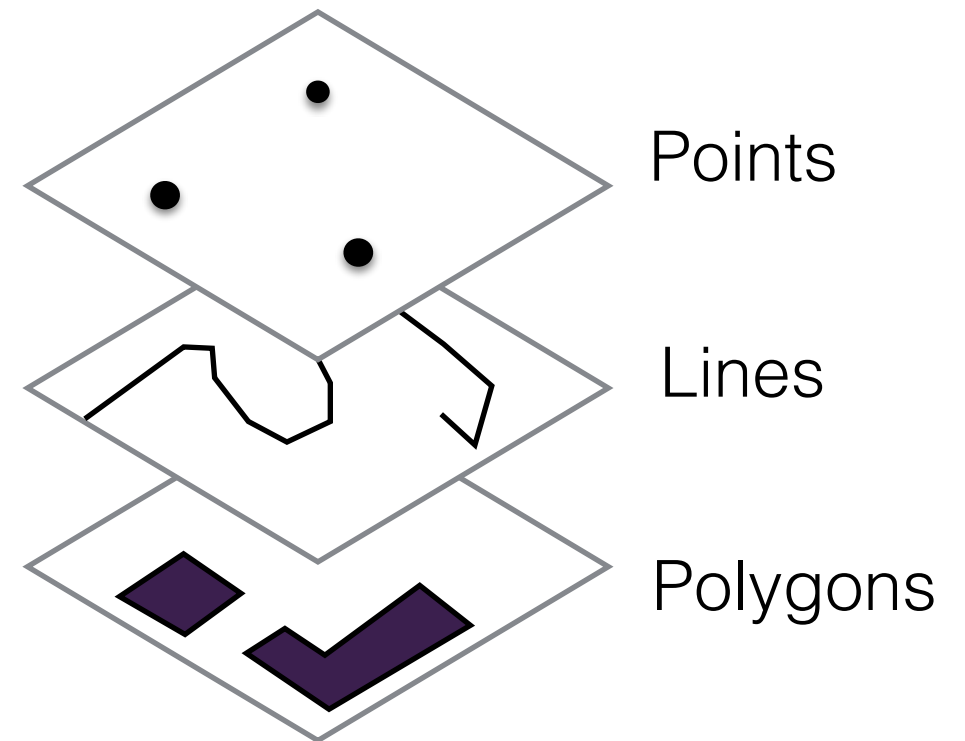
GIS data

Data: GIS data (shapefile)

Using the GIS extension, you can use geographic data that is vector format as shapefiles or raster data as ASCII and .tif
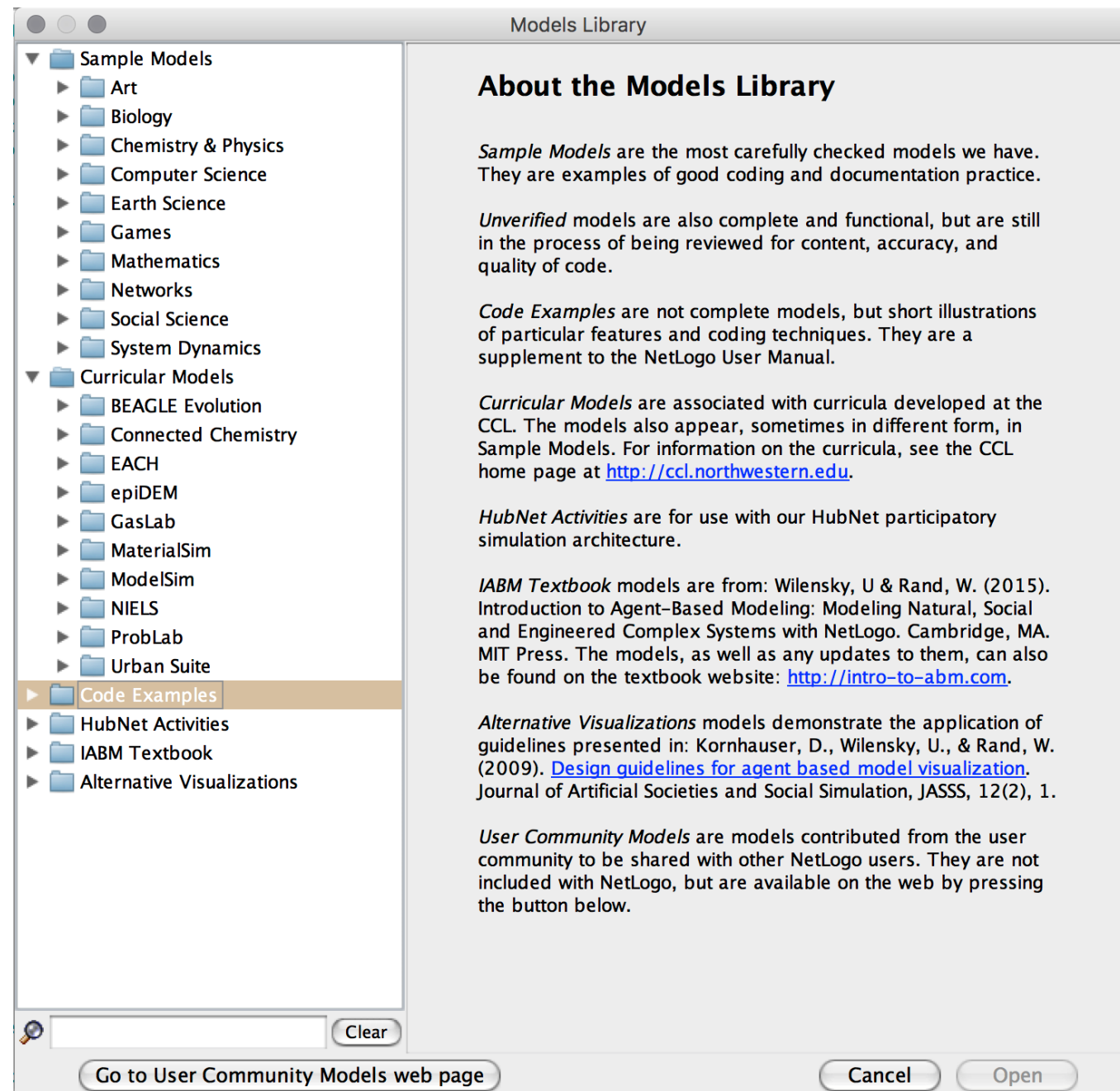
Vector datasets (shapefiles): For example, cities as points, roads as lines, buildings as polygons

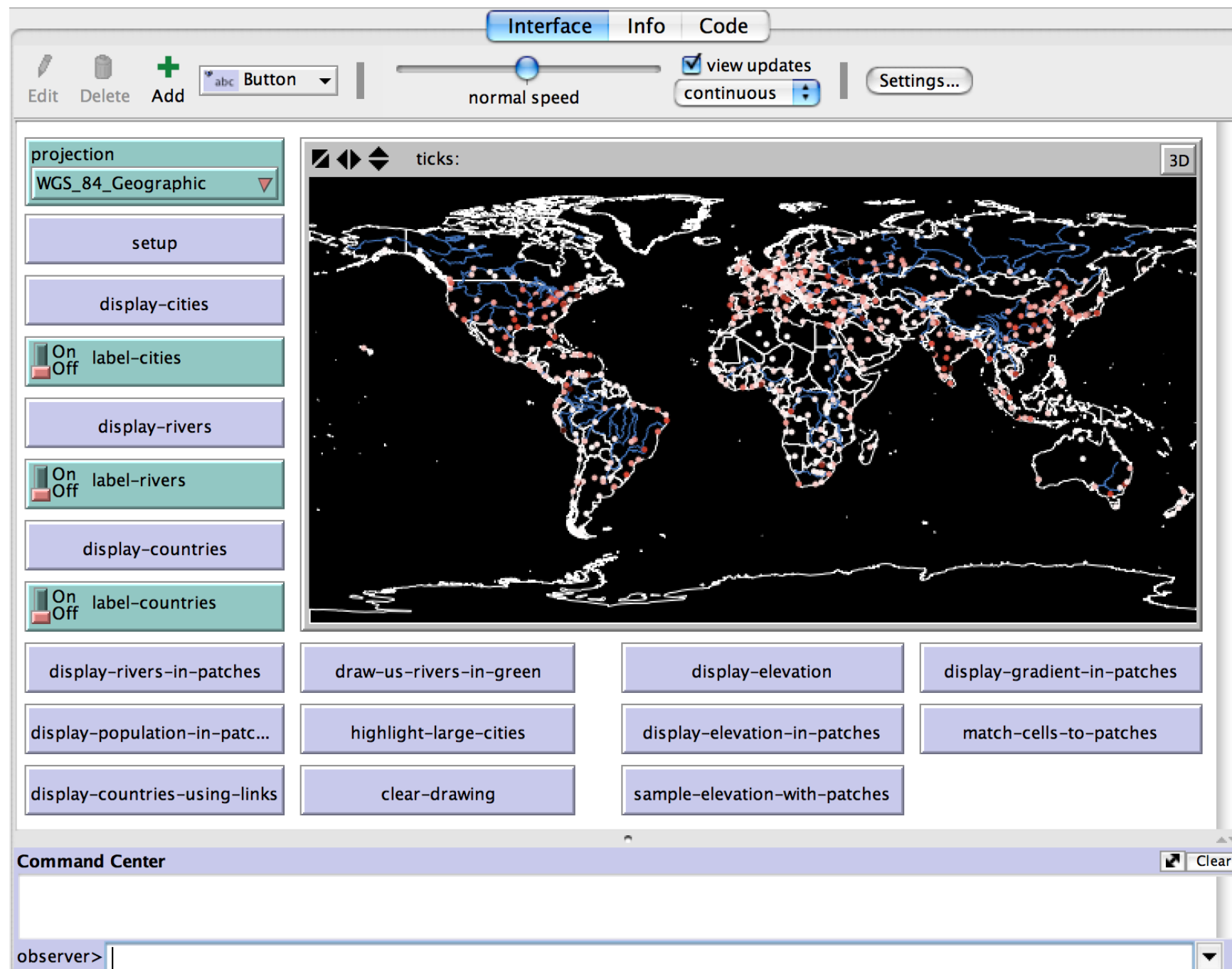**Raster datasets** (ASCII, .tif): For example, elevation data or imagery

Points

Lines

Polygons

Netlogo models w GIS

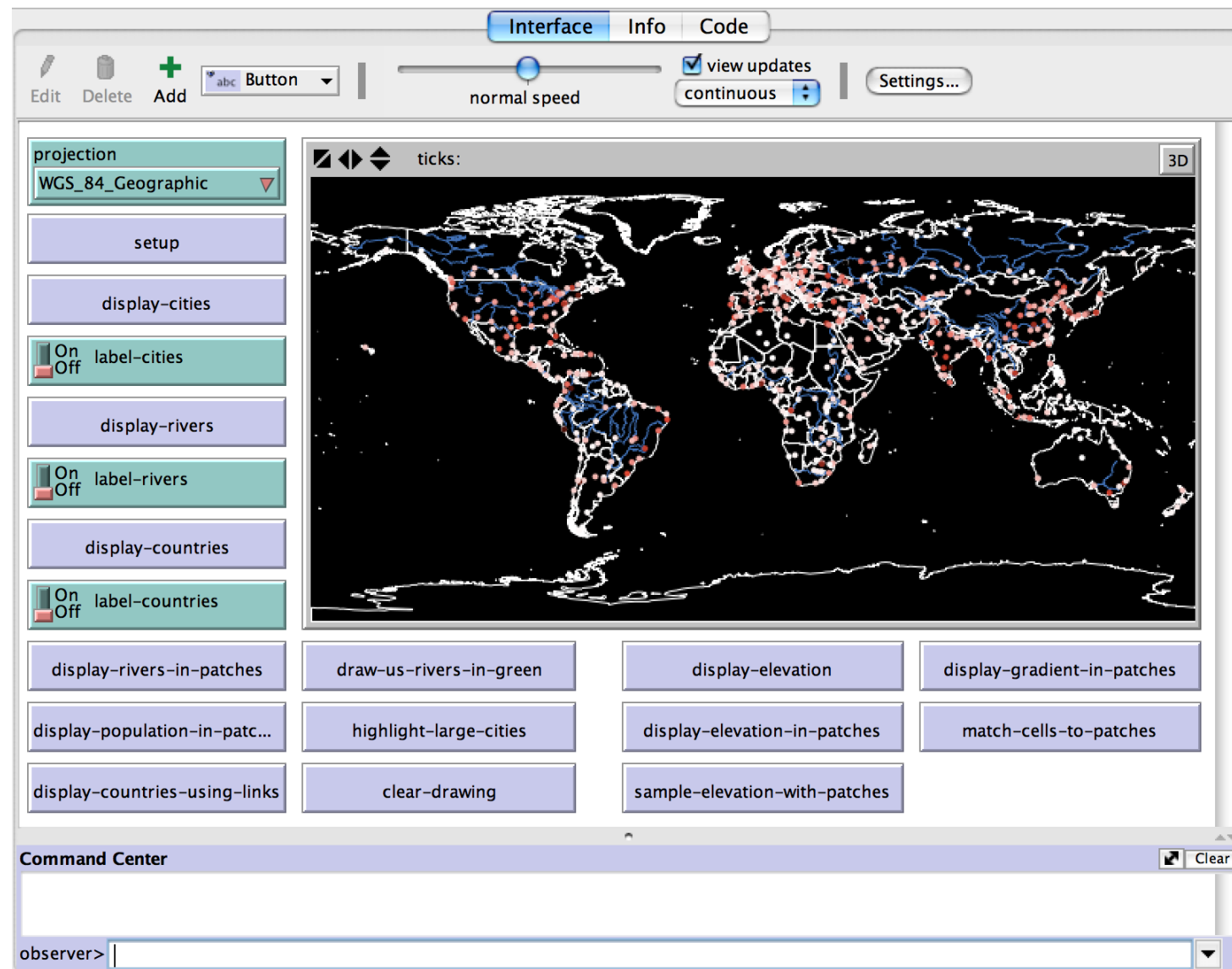**Netlogo>Model Library>Code Examples> GIS>GIS General Examples**

Explore the GIS Model

Netlogo>Model Library>Code Examples> Extension Examples>gis>GIS General Examples
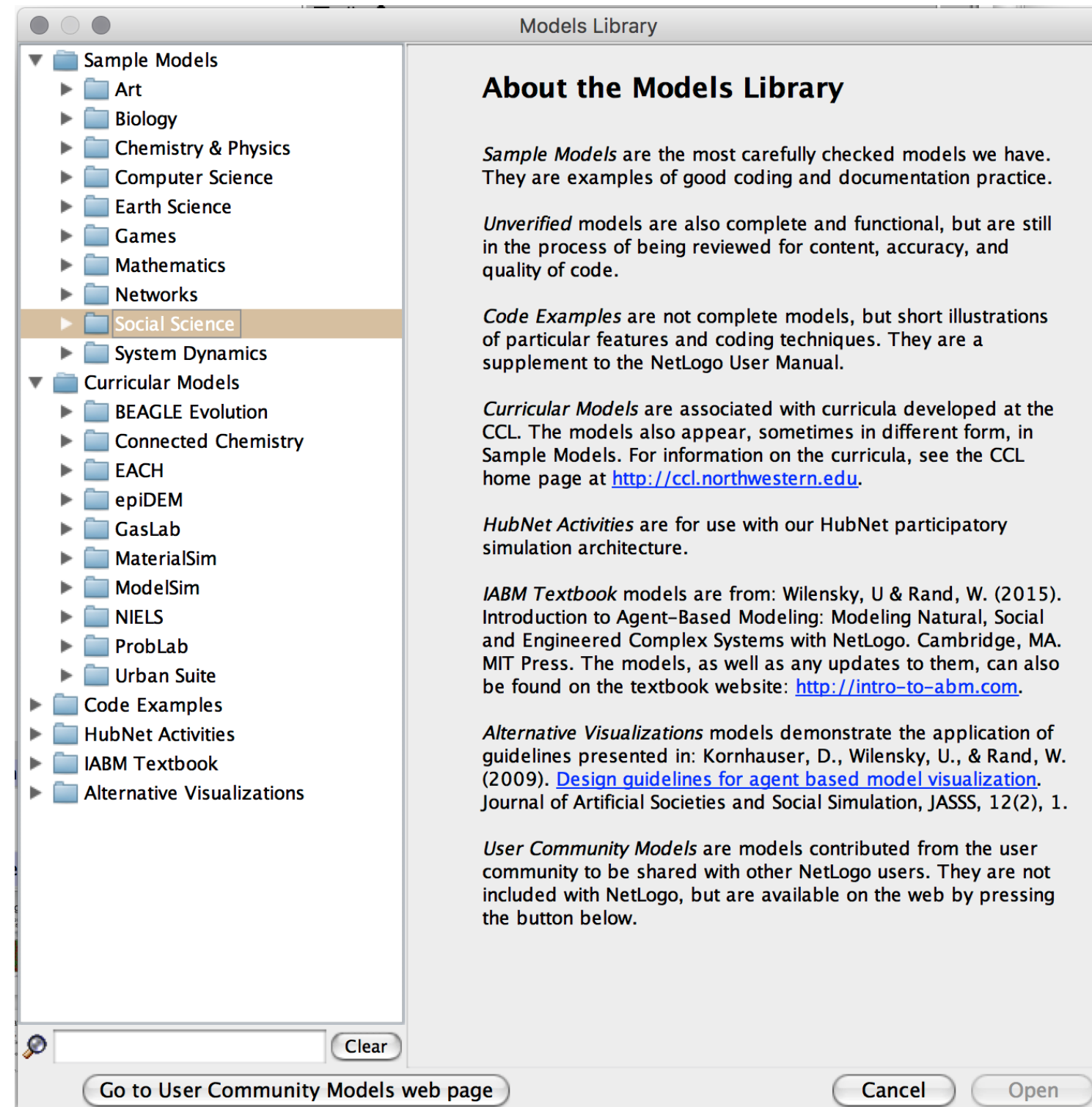
Explore the GIS Model

- What does this model show?

- What is this a model of?

- Is this a model or a visualization?

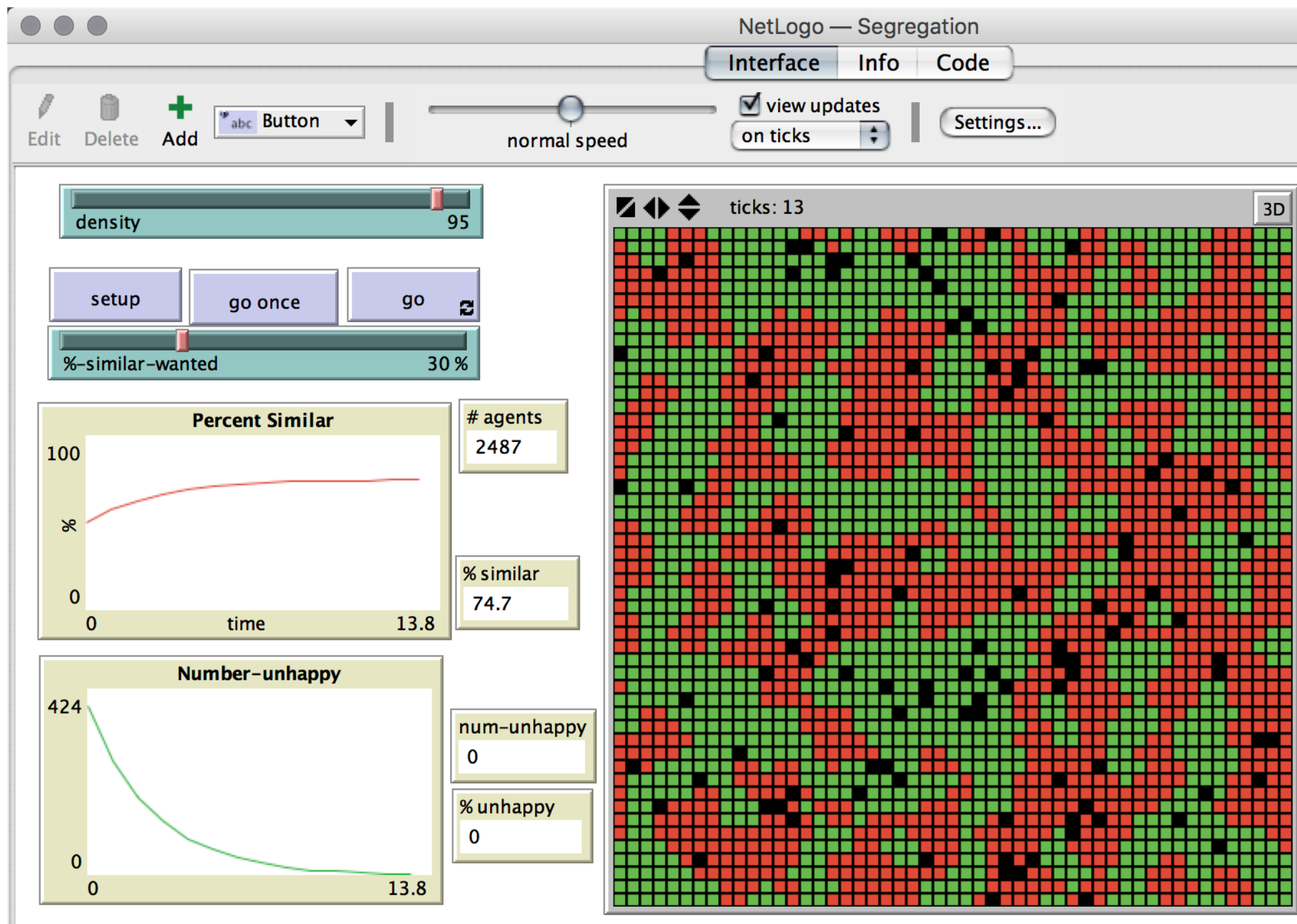- What else could we add to the model to extend it?

Let's look at another model

- File>Models Library

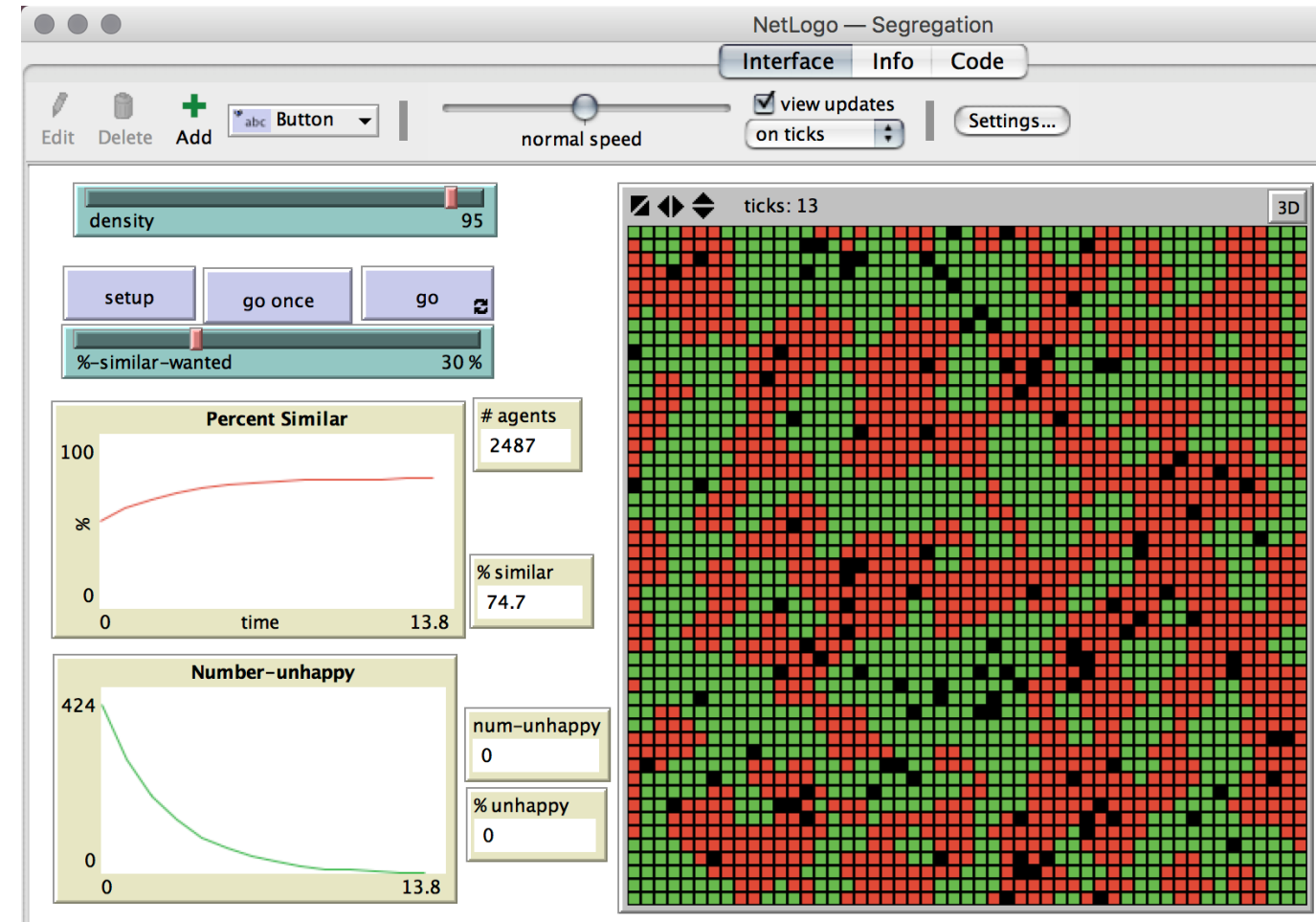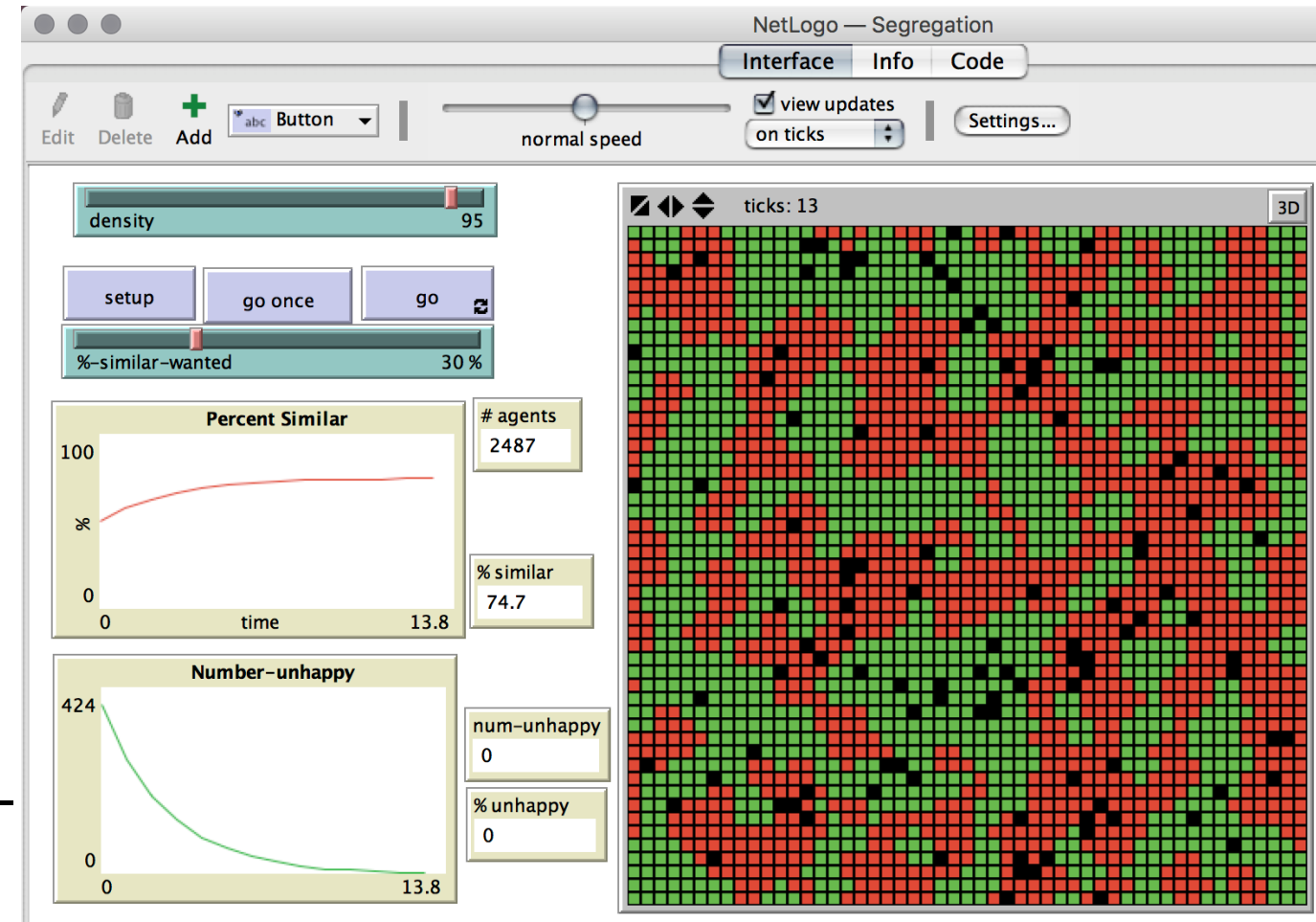- Social Science>
  Segregation

Segregation Model

Segregation Model

- Run the model

- Explore the model

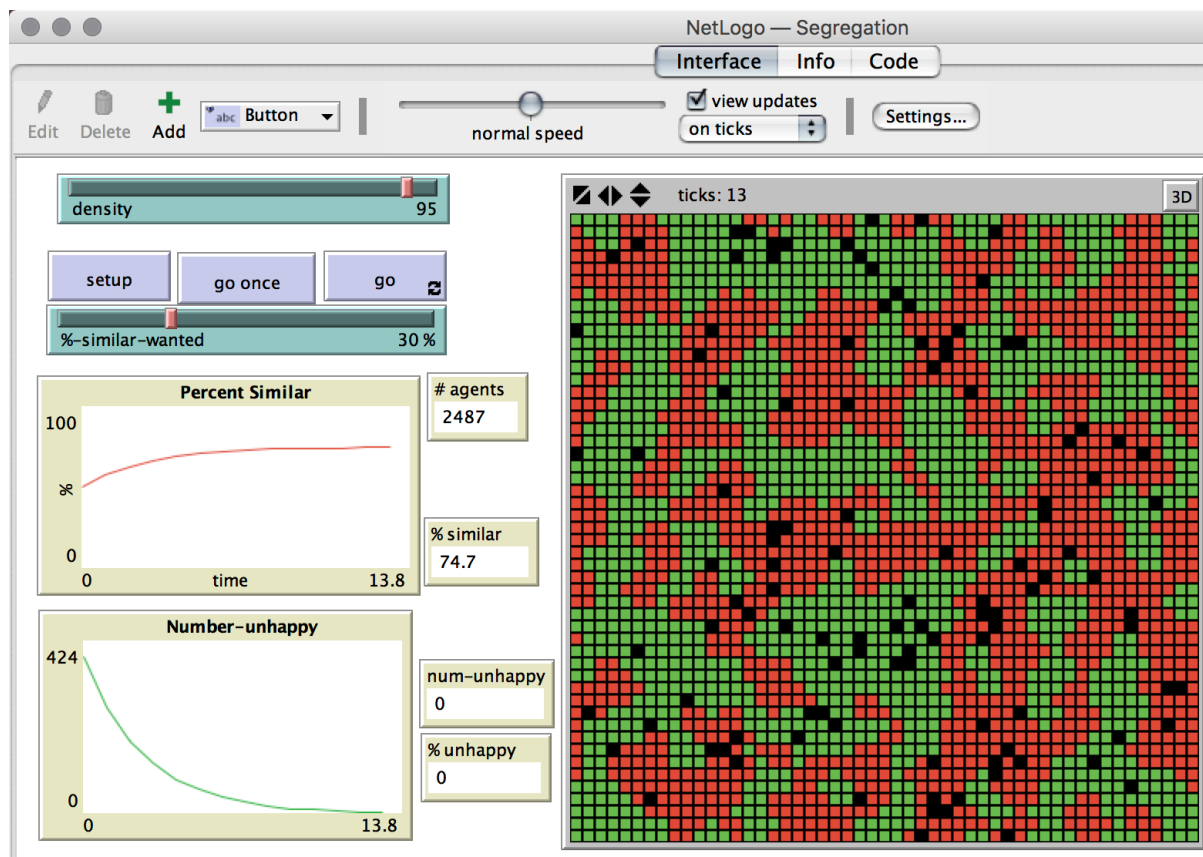- Review the Info tab

- Review the code tab

Segregation Model

- What is this a model of and what does it show?

- What are the attributes and behaviors of the agents and patches?

- Describe the interactions between agents and agents-environment.

- What kind of data could we add to the model to extend it?
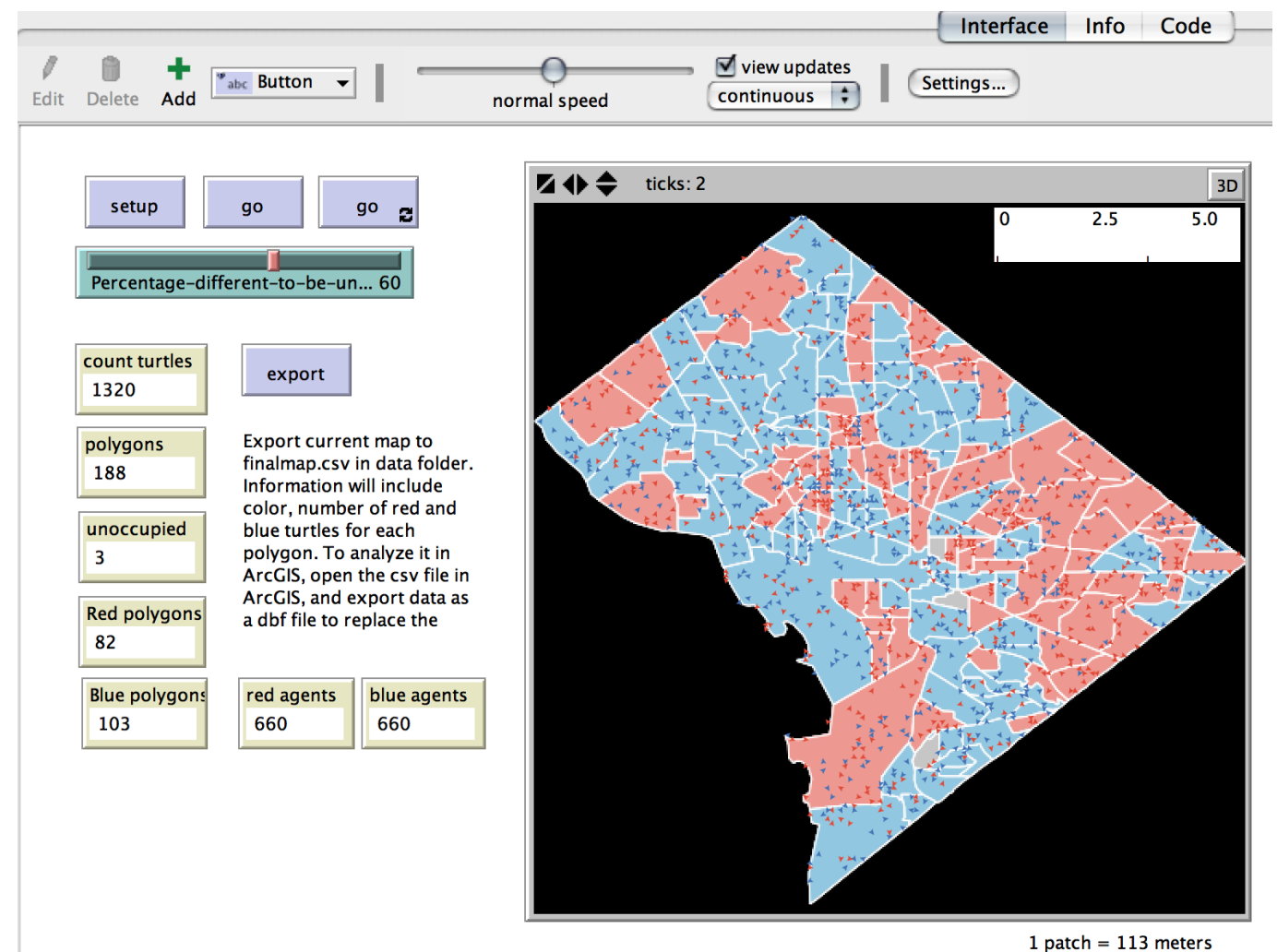
Netlogo models w/out GIS

Abstract Model without GIS

Netlogo>Model Library>Social Science>Segregation

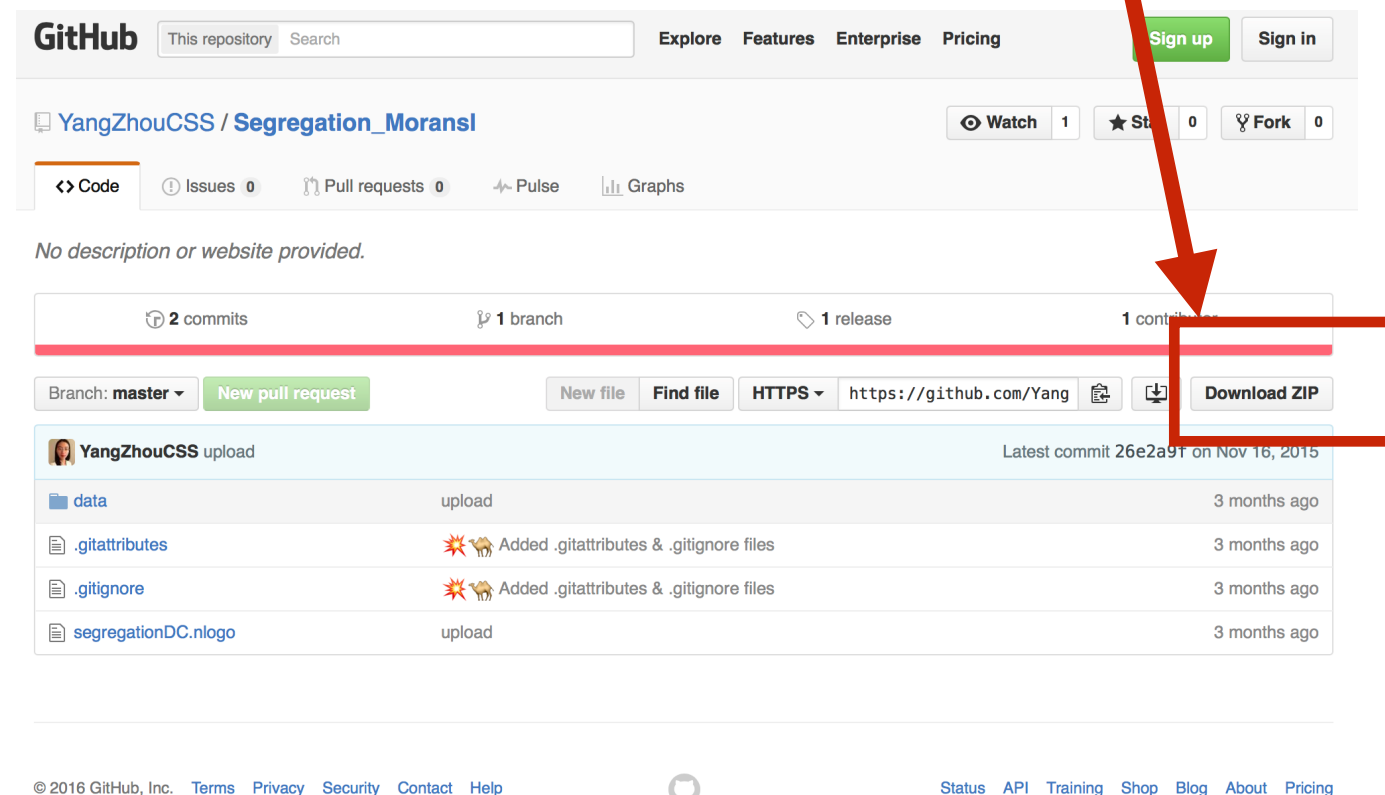## Same model applied to case-study area by incorporating GIS

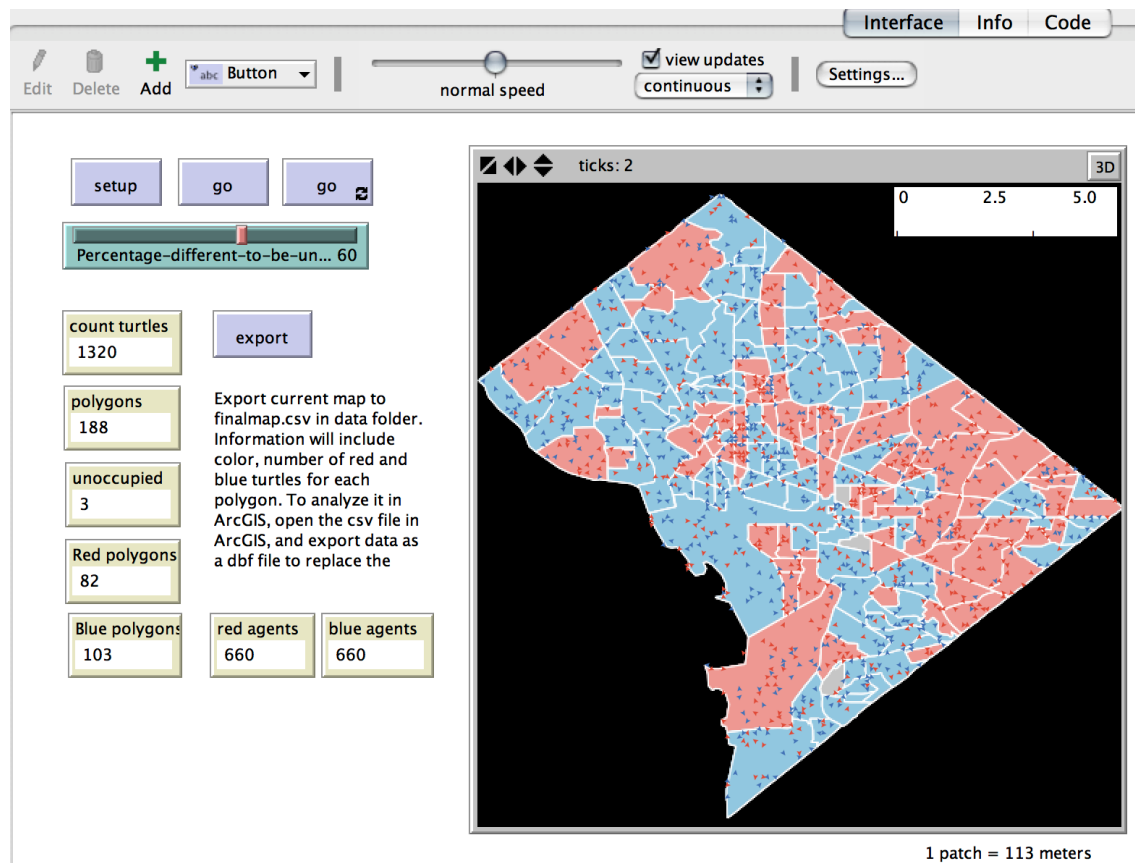https://github.com/YangZhouCSS/Segregation_MoransI

Download Segregation Model from github

https://github.com/YangZhouCSS/Segregation_MoransI

Download ZIP

Explore Segregation Model

https://github.com/YangZhouCSS/Segregation_MoransI
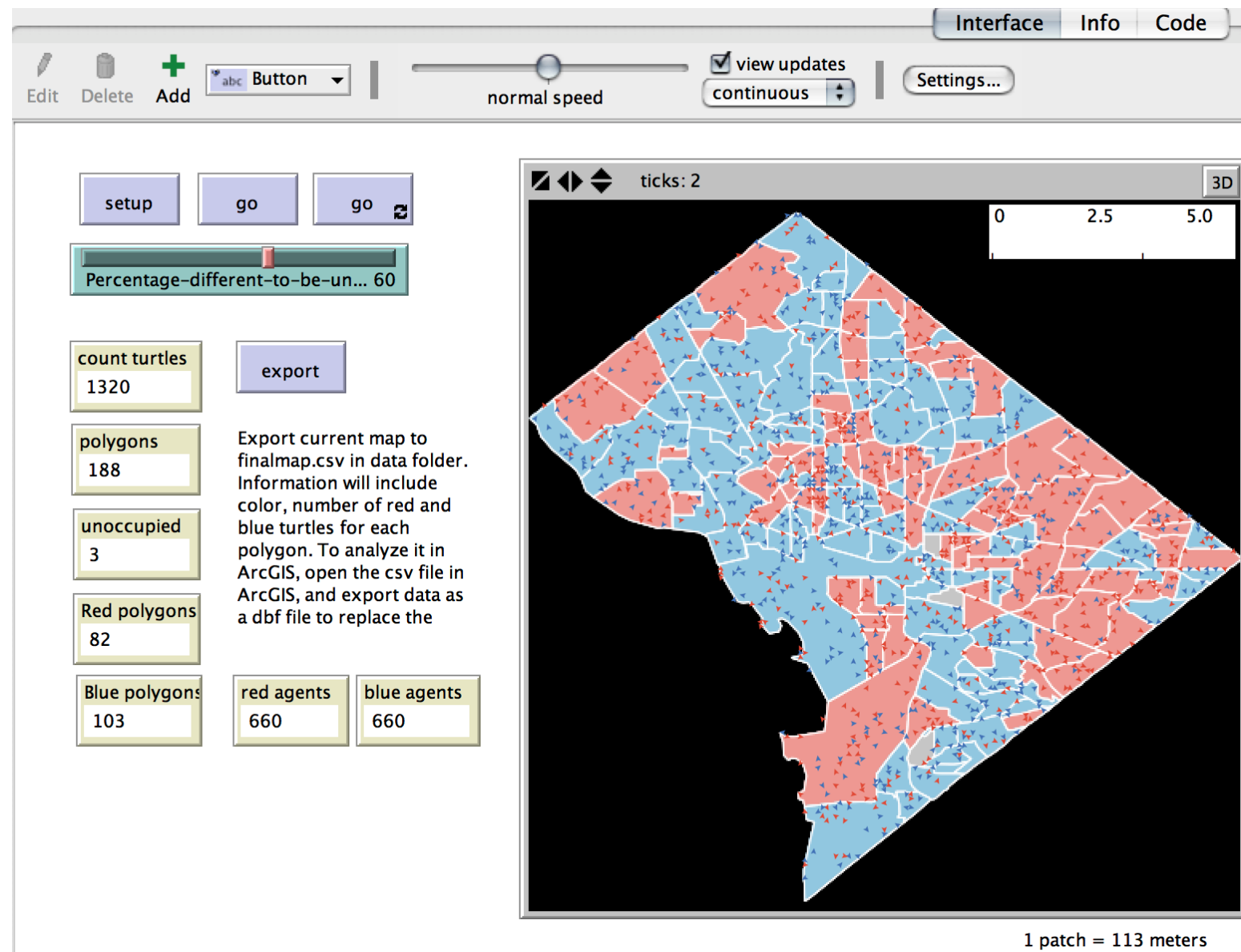
Compare Netlogo models

Abstract Model without GIS

Same model applied to case-study area by incorporating GIS

Netlogo>Model Library>Social Science>Segregation
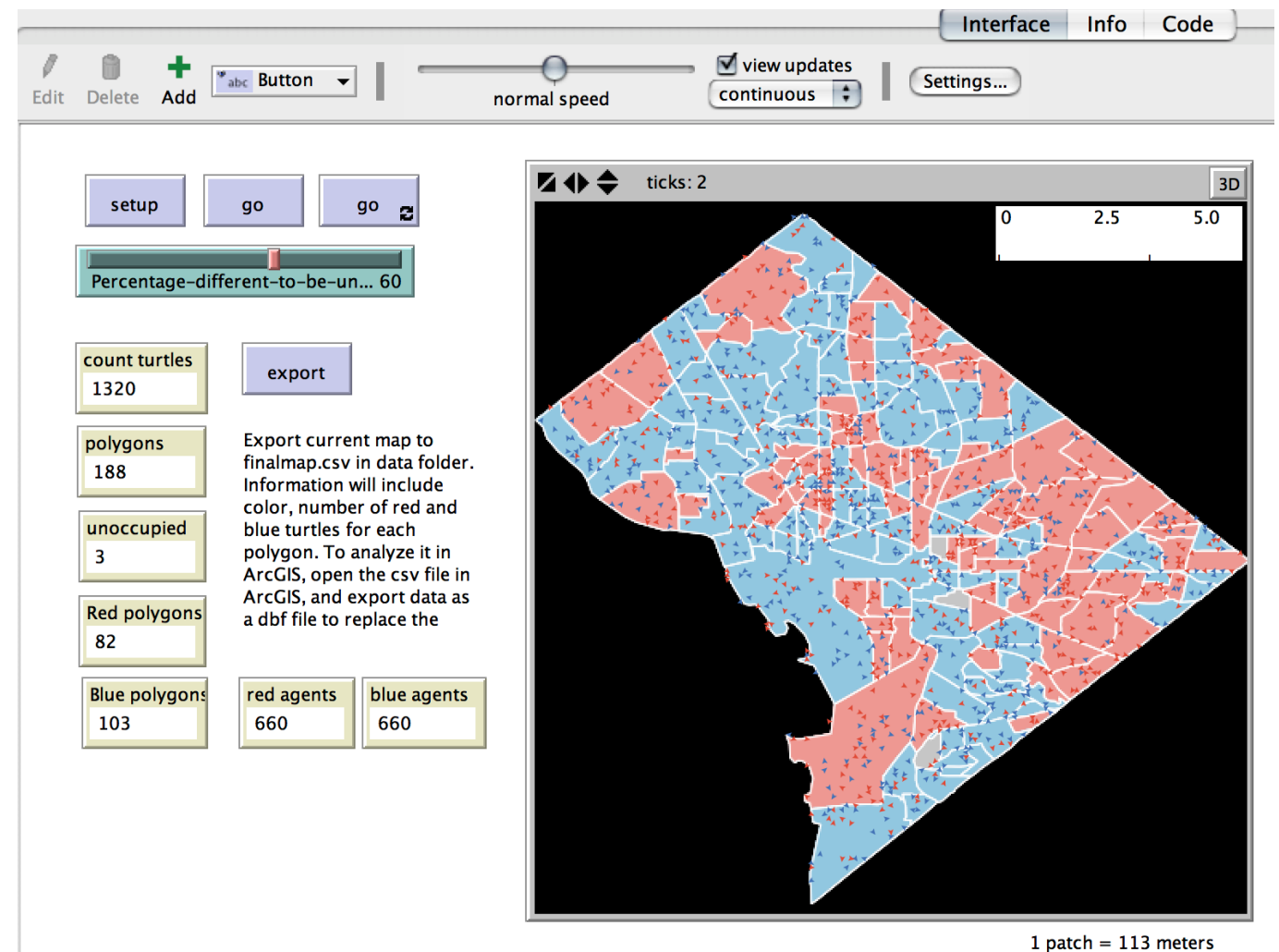
https://github.com/YangZhouCSS/Segregation_MoransI

Compare Models
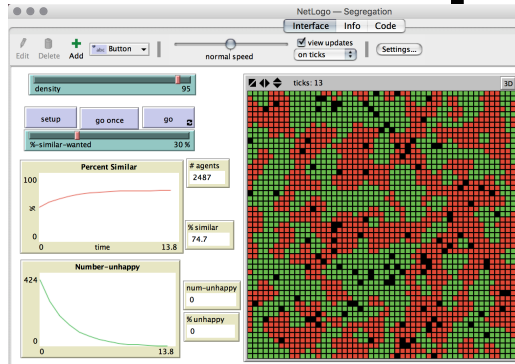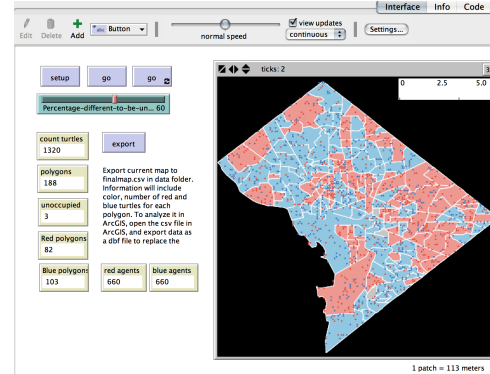
Abstract	Model with Data	
		Pros
		Cons
		Challenges

Pros/Cons of Using data

Pros

- Support more **"realistic" models** and tie model to a specific place

- It is **not challenging** to add GIS and CSV data to Netlogo

- Can be more **visually appealing** with layers of information displayed in Netlogo

- GIS data can **provide attributes** that can be used by patches and agents that would be too time consuming to manually code

Cons / Challenges

- **Need realistic agent behavior** to correspond with spatial scale of model with GIS

- GIS and data acquisition/cleaning/processing may be **time intensive** and require tools like QGIS and Open Office

- GIS data **may slow down model** load time and run time

- **Scale matters**. At detailed map scale, challenge to get spatial reference system to match Netlogo reference such that 10 km = distance of 1 patch, for example.

Things to consider when thinking about using GIS data in a Model

Tip 1: Models can be effective and efficient without incorporating GIS

Tip 2: If you use GIS data, you raise the expectation that your model represents realistic behavior. This means your audience may have less tolerance for inconsistencies with a GIS based model than if they were viewing an abstract model.

Tip 3: If you use GIS data, try to also visually represent the layers in a meaningful, and pretty, way.

Tip 4: If you create a model with GIS data, you have to send the model and the folder of GIS data to the end user as a zip package. Or you can export Netlogo world and send this as the base data to import into the model.