Consuming Spatial Data in NetLogo using the GIS Extension

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The NetLogo multi-agent modeling environment provides a public Application Programming Interface for adding functionality to the environment using custom "extensions". I present an extension for integrating spatial data from a Geographic Information System (GIS) with NetLogo models. The GIS Extension implements a loose coupling between the modeling environment and a GIS, allowing them to exchange data by reading and writing files in standard formats. Vast amounts of data on physical geography (such as elevation and land cover) and human geography (such as census data), are publicly available online, and more data is being made available all the time. I will demonstrate techniques for bringing this data into NetLogo to build richer models.

The central design goal of the NetLogo environment is to have a "low threshold" of entry for novice users, and "no ceiling" of limitations on expert users. This design goal has also informed the development of the GIS Extension, which has been designed to require as little specialized knowledge of GIS concepts and techniques as possible. For example, data from multiple projections and coordinate systems can be seamlessly combined with minimal intervention by the model builder. But the methods used by the Extension for converting data between GIS data models and NetLogo's data model have also been designed to be sufficiently flexible and customizable to meet the needs of experienced GIS users.

I will present several examples of how GIS data can be used to build richer multi-agent models in NetLogo, ending with a live coding demo of how to enrich an existing, abstract NetLogo model with real-world data from a GIS.