Agent-Based Modeling: Week 3

Winter 2023

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Agenda:

- ODD + D framework
- Visualization:
  - Server file
  - Elements
-

Grimm and Volker: ODD + D

- Puzzle / question
- Theory / reasoning
- Framework
- Do I buy it / so what?

GV: ODD + D Framework

Overview	Purpose
	State variables and scales
	Process overview and scheduling
Design Concepts	Design concepts
Details	Implementation details
	Initialization
	Input
	Submodels

GV: ODD + D Overview

- **Purpose** Who is the model for? (e.g. scientists, students / teachers, stakeholders, decision makers?)
- **Entities, state variables, and scales**: What kinds of entties are in the model, what state variables an dparameters do they have?
- **Process overview and scheduling** Describe scheduling, names for the processes, how the update process works.

GV: Design Concepts

Here, give an overview of all the pieces that come together to create the model. For example, you will want to discuss What the agents are, how they interact with their environments, any learning they are able to (particularly w/r/t their environment), and what random processes exist within the model.

GV: Details

This is where you provide the technical details of the model. Think of it as the actual recipe: **can someone read this component and recreate the model themselves?** *If the answer is no, you need to provide addtional detail*

Visualization: How do you want to represent your model?

We had some experience with this last week and we're going to think about it a bit more formally now.

Focus on how you want the user to interact with your model *Later, we'll talk about exporting data but that will also factor in*

Plan ahead!

Think about what you are hoping to use the model for, what you want to communicate, and what pieces you'll need.

LIFE IS EASIER WHEN YOU HAVE A PLAN

One last consideration: Batch and Single runs

In our class, we've so far been doing what's called a *'single run'* vs a *'batch run'*. We'll dive into this more, but essentially a single run is just what it sounds like -- one run of the model.

When we move to exporting data and doing different sorts of analyses on the model, we'll transition to batch runs. In the batch run scenario, the visualizations will play a small role but **the parameters you allow the user**

Server file

Relevant elements:

- Header: what we import
- Agent portrayal
- Any reporting elements to display
- Canvas / grid
- Elements in the vizualization

Server

As you know, there are different ways to import this

```
from mesa.visualization.modules import CanvasGrid
from mesa.visualization.ModularVisualization import ModularServer
from mesa.visualization.modules import ChartModule, TextElement
from mesa.visualization.UserParam import UserSettableParameter

from model import SegModel
```

Elements of design

- Grid: how the elements appear
- User-inputs: parameter values the user can set
- Reporting elements: displayed statistics
- Graphics: in-the-moment graphs

We'll take these each in turn, but consider these factors when you're setting up your model.

Documentation

For mor information and detail, you can find Mesa's documentaion on this here:

Mesa Documentation

Note that it's not always the most user friendly in how it's described or displayed.

Grid

The grid is how the actual model appears.

User inputs

Reporting

Graphics

How nice should it be?