Design more, kludge less

Environments

Transportation Environment (TransportationGraph)
Simulates a generic transportation network
Has a networkx graph to track G(V,E)
Vertices are locations
Edges are connections between the locations
It has node labels for positioning (long,lat)
It has a node label for population
It has a node label describing epidemiological (SEIR alpha, beta, gamma) behavior at that node
It has a node label specifically tracking infected people for display purposes

Air Environment (AirGraph)*
This environment inherits from transportation environment
It (ideally) has edge labels describing the passenger flow between edges
It could instead have edge labels with some estimated passenger flow data
Alternatively, it could use an edge label with the number of flights (I do not recommend this)
- In preprocessing, maybe you could kill airports with <= X passenger flow.

Subway Environment (SubwayGraph)*
This environment inherits from transportation environment
It adds node labels describing what route the node is on
It adds node labels describing the passenger flow in and out of the station
It adds node labels describing what complex the node is part of.
For faster lookup, it also has a dictionary of route to nodes on the route
It has a dictionary that maps station+division to complex *<this is actually not unique /sigh

*While these do in fact 'inherit' from the generic graph, we just straight up completely build the networkx graph during preprocessing and rely on the class labels to track/enforce that we're using it correctly.

Agents

SEIR Agent (SEIR_Agent)
This agent represents the populace at a certain location (node) in our network
It has a way to update its internal SEIR numbers

Subway Agent (SubwayAgent)
This agent inherits from SEIR Agent
It adds a formula to "spread viral load" along its subway line
It takes viral load into account when updating SEIR
It should take average commuting distance into account (but doesn't yet)

Air Agent (Air Agent)
This agent inherits from SEIR Agent
It… does what? Maybe it adds a formula to "spread virus" based on passenger flow edge weights
Alternatively, it could take into account neighboring nodes' infected numbers when updating its SEIR numbers

Models

Transportation Model
This is a basic (and nonexistent, why make it? Proof of concept.) model which would combine the SEIR Agent with a transportation environment. But in such a theoretical

combination of environment/agent, there is not a way to spread disease to a different node/community.
? Ok, it has a use. We can keep common calculations like overall SEIR here.

SubwayModel
Inherits from Transportation Model
This is a model which combines the Subway Agent with a Subway Environment. The agent population is equal to the passenger flow of the station. We use this model with the NYC subway, initializing an outbreak at junction boulevard.

AirModel
Inherits from Transportation Model
This is a model which combines the Air Agent with an Air Environment. The agent population is… what? Perhaps the population of the nearest city? We use this model with the WAN, initializing an outbreak at wuhan tianhe.