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EECS 372

Designing and Constructing Models with Multi-Agent Languages

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The below progress report is a duplicate of last week’s, May 13th. Due to being out of town for a conference, I did not have as much time as I had hoped to work on schoolwork and have fallen behind. Although I do not have any updated model to upload to the Commons tonight, I plan on making progress and uploading something during the day tomorrow – it just won’t be by 9am.

In order to ensure that I am on an appropriate track and to determine what measures I will need to take to get back on schedule for this course, I plan to meet with Arthur during his office hours tomorrow. I have already contacted Arthur requesting some meeting time and will show up on time anyway, but I wanted to warn him in case many students will be attending office hours – I don’t want to dominate the time slot.

Final Project Progress Report

Admittedly, I have not made much progress at all on my proposed project in the past week, since I was exploring an alternative proposal. Since I am working with Kinect to develop a game in another class, after bringing up the idea of creating a tangible learning experience through NetLogo with Kinect and brainstorming a bit with Professor Horn for his course (LS 451: TIDAL), I talked to a couple of the TAs (Bryan and Arthur), as well as Corey Brady from the Learning Sciences department, who does research in a similar field and had an interesting project for LS 426 last term. I was really hoping to combine my efforts and information learned across these two classes to make a more interesting NetLogo model. Though some good ideas were mentioned (like potential extensions to the Gas Lab models controlled by gestures, or physics simulations), none of them seemed adequate to satisfy both sets of requirements for both classes – specifically, it was hard to think of an emergent phenomenon to model from scratch that would be meaningfully controlled by input from a Kinect.

So, with some reluctance, I will return to my original plan of modeling the spread of sexually transmitted infections through a NetLogo model, as well as a HubNet activity (even though I am not a 472 student, I fear the development of the NetLogo model alone will not be sufficient for the final project, and the information may be better conveyed when individuals are able to put themselves in the shoes of the agents).

The feedback that I got from peers during the class discussion of proposals affirmed my feeling that a HubNet model would be a good way to engage users of the model and make them consider how the outcomes might affect their own life. They also suggested that when I present parameters that affect model outcomes, make them as relatable to “real life” as possible – rather than having some sort of probability for each tick, phrase the questions in a way that could relate to real life, such as the number of times over a certain time period an individual may have sex, or how likely they are to use protection. My peers also recommended that other factors might be at play – for instance, if a female is on birth control, is the couple less likely to use protection? What about couples that are monogamous, or students that don’t engage in sex? My comments on my original design document from the TA Arthur brought up further considerations, such as factors influencing probability of using protection, including alcohol use and knowledge of STIs. I am still pondering how I could potentially include these behavioral characteristics, and what data I might be able to use that would support their inclusion in the model.

Discussing the model and the ways it could expand made me realize that I will likely remove sexual orientation as an adjustable factor in the model, in order to focus on other parameters and not have too many options that would overwhelm the user.

Both my peers and the TA pointed out the relevance of using networks in this model, and after learning more about them in the past assignment, it seems to be a good match for this subject area that I will include into the model. Incorporating network connections could potentially be a reasonable way to model friend circles, which could influence behavioral choices and attitudes towards sex and using protection.

I had originally been primarily interested in seeing how an STI that is symptomatic for only one gender travels through the population and potentially reaches some sort of stable state. However, based on the feedback I have received, I think I will focus more on the sexual attitudes and behaviors of agents in relation to the spread of STIs. Hopefully this will also more clearly distinguish my model from the AIDS or Virus model, which was a concern that both the TA and I had. I still need to find some supporting articles/other research in order to root some of the assumptions of my model.

The updated plans for my model are as follows:

System behavior:

The NetLogo system will model the spread of sexually transmitted diseases (STIs) between young adults (male and female), based on their attitudes and behaviors regarding safe sex.

Agent behavior and rationale:

Turtles will move around randomly mostly within a specified area, in order to try to recreate circles of friends or divisions of populations. This has not yet been implemented, but the NW extension or links may be used to confine movement. If a turtle is closely linked to another turtle of the appropriate gender to mate with, there is a probability they will mate. If they mate, there is a probability they will use a form of protection. This probability will be influenced by attitudes and behaviors towards safe sex that a given turtle has, and these attitudes/behaviors are influenced by the other turtles (“friend group”) that the turtle is linked with. If the coupled turtles use protection, there is a probability of using it correctly – if protection is used correctly, it is assumed that the disease will not be passed on. If the protection is used incorrectly or no protection is used, there is a higher probability that the infection will be passed to the partner of the agent.

Depending on the disease and whether an agent is male or female, the agent will feel symptoms. It will be assumed that if the agent detects symptoms, they get checked by a doctor, are diagnosed, and are gradually cured of the infection. Additionally, there is a chance that a turtle will randomly get tested, despite whether they are currently symptomatic – this probability may also be impacted by their attitudes towards safe sex.

I am still trying to determine appropriate parameters to choose for the HubNet model. My plan is to ask HubNet users to answer a couple of survey questions (worded in ways that are relatable to real life, as discussed above) that will influence who their agent is linked to (based on similar attitudes towards safe sex), and their agent’s probability of mating with or without protection. However, since most HubNet models that I have seen demonstrate more control (specifically, the ability to move the agent) and I am not yet fully aware of HubNet’s capabilities (like if you can even ask users to answer questions before participating in a simulation), I may have to reevaluate this portion of the project further.

Model output:

There currently is no model output to compare to the described ideal system behavior.

Questions and Next steps:

Since I spent last week trying to investigate other possible models, I will likely schedule an appointment with one or more of the TAs this week to address the new scope of this proposal, and will likely run into questions as I begin to implement it.