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EECS 372

25 May 2015

Progress Report 2

**Agent Behavior**

In the previous version of the model, the SETUP button and SEED-TREND button were separate. Now both procedures are combined into the SETUP button. This gets rid of errors caused by a user pressing the buttons in an order not intended, and it also gets rid of an unnecessary intermediate step. So now SETUP establishes the POPULATION of randomly distributed people, and randomly networks them together. The degree of each turtle still corresponds with its POPULARITY field. One turtle at random is made the designated TREND-SETTER.

The turtles have been given a couple of new fields, the most important to behavior being INTEREST-CATEGORY and TREND-CATEGORY. At setup, each turtle is randomly given an INTEREST-CATEGORY integer value (ranged from 0-9) that corresponds with the type of things they’re usually interested in. The TREND-CATEGORY field is an integer (ranged from 0-9) that represents the inherent type of thing a trend is. It corresponds with the same values as INTEREST-CATEGORY (i.e. on a range 0-9) if a turtle is carrying the trend. The TREND-CATEGORY is first assigned upon setup, set to be the same value of the INTEREST-CATEGORY of the TREND-SETTER.

When the user clicks GO, at each clock tick, if a turtle is TRENDY? , it will try to spread its trend to one of its neighbors. If the target neighbor accepts the trend, will become TRENDY? and turn red. If a trend spreads between two neighbors, the link between them turns red.

A new mechanism controls the probability of a target turtle following a trend passed by its neighbor. Currently, a target turtle has a 1 in “diff” chance of accepting the trend, where “diff” is the difference between the target turtle’s INTEREST-CATEGORY and the current trend’s TREND-CATEGORY. The smaller the difference, the higher the probability of acceptance.

Now, a basic MEDIA? procedure has been implemented. If MEDIA? is turned on, a random patch with turtles will turn white and “become a TV” every 10 ticks. The blue turtles on this patch will have a MEDIA-INFLUENCE probability of accepting the trend and turning red by “watching the TV”.

I have decided that I want to focus on the spread of a meme specifically, rather than a spread of a fashion trend or some other style.

**System Behavior**

 The system behavior has changed in that it clearly now depends a bit more on probability than the previous system in which every turtle accepted a trend with a 100% acceptance rate. Now that the media option has been introduced, the model is a bit more visually interesting. In addition to the turtle-turtle interactions across links, patches and turtles can now interact with each other spatially. The trend seems to spread at an exponential rate, then slows and plateaus once most of the turtles follow the trend, creating a sort of “S” curve.

**Rationale for Agent Rules**

 I thought it was more realistic to make the trend-spreading activity between turtles more reliant on whether or not a certain trend falls within a turtle’s actual interests. For example, a person in real life who is interested in, say, “animals”, would be more likely to accept and spread a picture or video of a cat than a person interested in “business”.

 I also wanted to add in a media component to examine both the intersection of and the trade-off between media influence and friend influence in the likelihood of turtles accepting a trend. The two influences can be examined separately or in tandem. The media influence is a realistic factor since many memes correspond with pop culture references or certain ads.

**Model Output**

 Currently the model has five monitors and two plots. One monitor identifies the POPULARITY of the trend-setting turtle. Another monitor keeps track of the percentage of the POPULATION that is TRENDY?. Two monitors track the percentage of people who learned the trend from a friend, as well as the percentage of people who learned the trend from the media. The fifth model keeps track of the current “trend ID”, i.e. the TREND-CATEGORY of the trend that is spreading.

One plot tracks the number of TRENDY? turtles at each tick. This means the number of turtles who have accepted the trend and have turned red. The purpose of this plot is to show how the trend grows and spreads over time. The second plot is a histogram that describes the INTEREST-CATEGORY of each TRENDY? turtle. The purpose of this plot is to see how closely the interests of the trendy turtles correspond with the current Trend ID.

 The model output provides a pretty good description of the current system’s behavior. It correctly displays the spread of the trend over time, and it shows the percentage of the population of the trend, as well as the degree of influence of media and friend networks. It could do a better job of explaining and displaying the INTEREST-CATEGORY and TREND-CATEGORY aspect of the model, showing the correspondence between trend acceptance and inherent interest in a given category. I think this is a really key idea that needs to be stressed more.

**Questions**

* Are the processes of the model as efficient as they can be?
* Are these monitors and plots the most ideal ones to examine and display the behavior of the model? Is there a better way to convey the information to a user?
* The current implementation of INTEREST-CATEGORY and TREND-CATEGORY makes a couple of assumptions: a person can have only one interest, interest values from 0-9 behave like they are on a gradient scale, and there is a small and fixed number of interests.
	+ Is there a better way of representing inherent interests and values of people and trends?
	+ Is this an over-simplification?
* Is it important to display the INTEREST-CATEGORY of each turtle? Or is the histogram a good enough way of doing this?
* Should the media “TV” flashes occur more frequently and in more patches than one at a time? What is the best way to regulate this?

**Next Steps**

* Create a new monitor that shows the percent of trend-followers with the same inherent value (i.e. INTEREST-CATEGORY) as the trend (i.e. TREND-CATEGORY), unless that is too redundant with the histogram.
* Keep track of the number of times each turtle sees a trend. See if the number of times the trend is seen corresponds with the likelihood of a turtle to accept the trend. This could be viewed in a different mode, similar to the Rumor Mill.
* Currently all of the trend-spreading relies on a person being seeded a trend upon SETUP. I want to make it so that a user can choose to either manually seed a TREND-SETTER? turtle (or a few turtles with the same INTEREST-CATEGORY values) a trend, OR they can turn on the MEDIA? switch to automatically seed the TREND-SETTER? turtles.
	+ This will make it easier to see the outcome of purely friend-network influence versus a media-based influence.
* Find a better way of establishing the media frequency and appearance. This could be determined by some sort of MEDIA-FREQUENCY slider. In order to make the TV aspect more obvious, it might be beneficial to increase the area of a TV (i.e. a TV patch will ask its eight neighbors to be a TV patch).
* Perhaps make people who get seeded trends from TV qualify as trend-setters.
* Right now the effect of the TV seems to be miniscule. Almost all of the trend-spreading is due to the spreading from social networks. This should be balanced out.
* Keep increasing the randomness in the model. The “diff” method is a good start to the idea I’m going for, but the actual variance of probability should be within a larger range. Currently, the largest difference a person can have is 9, and a “random 9” probability gives a 1 in 9 chance of accepting a trend, which is still a pretty high probability.
* In the histogram, it would perhaps be better to display the difference between the INTEREST-CATEGORY and the TREND-CATEGORY of TRENDY? turtles rather than the pure INTEREST-CATEGORY. I couldn’t find a great way to do this in the current version of the model, but I might need to make either a new turtle variable or a difference function. I will do this once I better establish the difference method.
* I looked into some literature on the spread of memes, and I found an interesting real-life concept: how memes change overtime. Different people perceive a meme differently, and they may alter it in a way that better adheres to their own personal interests. Perhaps I could introduce some sort of randomness in changing a trend over time. Perhaps, with a certain probability, the TREND-CATEGORY could be altered to favor an accepting turtle’s INTEREST-CATEGORY, showing mutation and evolution over time. Different colors or shades of red could show how far a given turtle’s version of the meme is from the original meme. The farther away from the TREND-SETTER (i.e. source of the meme), the more varied a turtle’s meme might be.

**Model Analysis**

 The model output still indicates that the popularity of the trend-setter is not correlated with the total spread of the trend. It seems that the trend spreads widely regardless of the trend-setter’s popularity value, as long as it has more than one connection. When MEDIA? is turned on, the spread of the trend seems to still rely almost completely on friend networks rather than the media. The number of trendy people grows exponentially until it hits a cap where most members of the population follow the trend.

 According to the histogram, the INTEREST-CATEGORY of the trend-followers often does seem to correlate with the TREND-CATEGORY (i.e. Trend ID) of the current trend. This makes sense due to the implementation of “diff”, which rules that the closer the trend is to a person’s interests, the more likely that person is to accept and spread that trend.