Agent-based Model of Helping Using NetLogo

Mark Jay A. Nicolas and Shiela Mae T. Julianda

I.   Introduction

"Helping behavior is providing aid or benefit to another person [1]." There are a lot of factors that affect helping but age and gender play the biggest roles [2]. Some of the variables that affect helping are: helping capacity, cost of helping, health condition, helping scenario, and group size [2].

Social experiments take a lot of time in order to gather data. It is also difficult to get perfect timing and situation to make social experiments happen.

The creation of an agent-based model of helping using NetLogo will cut the amount of time that is needed to gather initial information or idea regarding the phenomenon. It can also give users flexibility by allowing them to model different situations by just tweaking the sliders and choosers for the variables needed in the simulation.

This model generally aims to develop an agent-based model of helping using NetLogo. Specifically, it intends to do the following:

1) To load a raster map of the University of the Philippines - Los Banos (lower campus);
2) To simulate helping in the loaded environment;
3) To create a plot for the gender of helpers;
4) To create a plot for the gender of helped needy persons;
5) To create a histogram for the age of helpers and;
6) To create a histogram for the age of the helped needy persons;

II.   Methodology

A. Initialization

Currently, the turtles are being randomly spawned in the world. Links are formed if the turtles are within the radius of 2 from each of other turtles. If the turtles are linked together, they will be tied so that they will move in a direction together. The map is initialized after loading the raster data file.

B. Breeds

The turtles are divided into two breeds: "helpers" and "needys". Helpers will roam around in the world and will help the needys if they can (as determined by their helping capacity and helping probability).

C. Computation of Helping Probability

Each helper will look for its potential target needy and will calculate their own helping probability using the equation: helping-probability = help-capacity - cost-of-helping The helping probability will be further computed by looking at the helper's attributes and the needy's attribute. Currently, each turtle will have a random help-capacity from 0.1 - 0.5. The factors that will be checked from the needy side are age, gender, health-condition (true if has, else false) and the scenario (fainting, carrying, or accident). On the other hand, the factors that will be checked from the helper side are age, gender, and the number of links connected to it (the number of people in a group).

D. Actual helping

Helping probability will be checked, and if it is greater than the value of helping threshold, it will help, else not. If can help, the needy and the helper will move at the same patch (as if the helper is helping the needy) for a while and the patch beside them will become green as an indicator that help is happening. The count of help from male and female is updated and the count for helpers who received helped is also obtained. The distribution of age from both helpers who helped and needys who received help are also being monitored.

III. Conclusion

After running the model several times and adjusting the variables for experimentation, as shown in figure 1, there is almost no difference between the number of women and men who help but as

shown in figure 2, there is an evident gap between the number of helped needy according to gender.
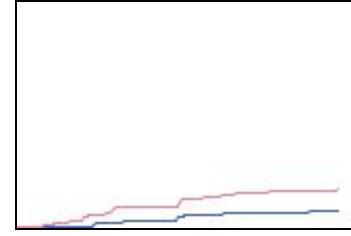

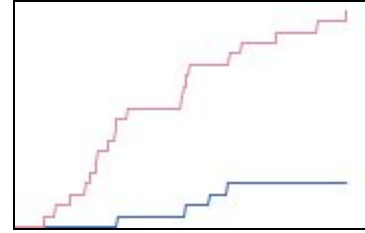Fig 1. Number of helpers according to gender

Fig 2. Number of helped needy according to gender

Given this results, we can say that as long as people have the capacity to help, it will help and its gender will not become a deciding factor whether he/she will help. On the other hand, we can say that people have a bias when it comes to helping, they help women more than men even if the number of needy men is significantly many than those of needy women. Moreover, the model also reported in figure 3 that the age of helpers show greater number at 20 - 30 years old, it supports the study of Delamater and Mayers [1], that people help at their early adulthood stage but gradually lose the sense of helping as they grow old because aside from self, adults also think of their family and work as a factor whether they will spend time in helping or not.
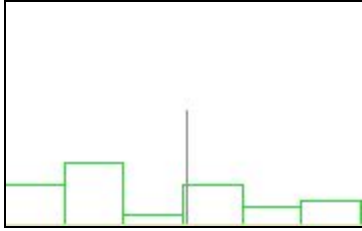
Fig 3. Age histogram of helpers

Furthermore, it is also observed in the model, as shown in figure 4, that kids and teens aged 10 - 16 years old and old people aged 50 - 75 years old are helped more probably because of their lack of capacity to help themselves due to young or old age.
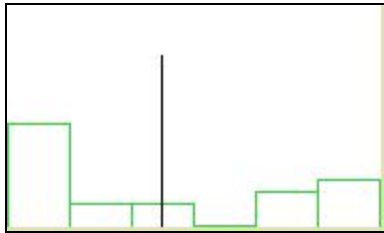

Fig 4. Age histogram of helped needy

REFERENCES

[1] Helping Behavior (SOCIAL PSYCHOLOGY) - IResearchNet. Psychology.iresearchnet.com, 2018. http://psychology.iresearchnet.com/social-psychology/prosocial-behavior/helping-behavior/.

[2] SOC 130 - Social Psychology Lecture Slides, 2017.