Interaction networks predict optimal harvester ant foraging behavior - Update 4

Ethan Sudman  
Summer 2021  
ethanjsudman@lewisu.edu

# INTRODUCTION

T

HIS week I completed the last portion of my epidemic model. (This section now focuses primarily on the SIS model, with a separate model discussed in the proposal likely not being included). I also focused on the section on the network properties of the graph as a whole.

# Method

The new section focuses on descriptive statistics of the network as a whole well as inferring ants’ role in the colony. I used NetworkX and Gephi to generate a variety of descriptive statistics (such as the average clustering, betweenness centrality, hubness and authority, network diameter, etc.) from my data set.

For the classification, I am using Random Forest and Neural Network classifiers in the Orange software package.

# Plans for the upcoming week

For this week, I will obviously be focusing on assembling the final draft as well as the remaining portions of the classification logic (which is somewhat behind schedule). I also intend to focus in particular on adding more details about the significance of the graph metrics.

# Conclusion

The Epidemic Model portion is complete (with the exception of a model that was discussed in the proposal but was eventually de-scoped), but due to this being somewhat delayed the classification and descriptive statistics portion, which will be a key focus for this week (along with the draft of the project).

References

1. Barrat, A., Barthélemy Marc, &amp; Vespignani, A. (2013). *Dynamical processes on complex networks*. Cambridge University Press.