April 30, 2018

Abstract

1 Introduction

The Santa Fe Institute Spring 2018 Challenge, [**?**], models the behaviour on investors.

2 Previous Work

Brian Arthur [1] investigated the behaviour of a group of people deciding whether or not to visit the El Farol Bar [2] in Santa Fe, guided only be attendance data from previous weeks .

Kolkata Paise Restaurant [3] [4]

3 The model

I developed model, *testbed.nlogo*, [5], using Netlogo, [6].

3.1 Behaviours

What general behaviors arise in this system? How does the wealth of the agents change over time? At the aggregate level? At the individual level?

3.2 Diversity

How does the diversity of strategies influence the dynamics of the system?

3.3 Behaviours

Are there generally classes of agent behavior (say, based on what data they use, how they process it, or the agent's overall sophistication) that lead to better performance?

3.4 Violate Assumptions

What happens to the system if you violate one of the original assumptions of the problem and allow the agents to alter their strategies over time by observing the performance and strategic details of the other agents?

3.5 Mete-Agents

Suppose that meta-agents exist that can coordinate the behaviors of a subset of the agents (and split the resulting payoffs equally across the subset)—how does this impact the system's behavior?

3.6 Changes

How do the answers to the above questions change as:

- tau is altered?
- you change the total number of agents in the world?

4 future

5 References

[1] W Brian Arthur. Inductive reasoning and bounded rationality. *American Economic Review*, 84(2):406–11, 1994.

[2] El farol restaurant website. https://www.elfarolsantafe.com/.

[3] Bikas K. Chakrabarti. Kolkata restaurant problem as a generalised el farol bar problem. *in Econophysics of Markets and Business Networks, pages 239-246, Eds. A. Chatterjee and B. K. Chakrabarti, New Economic Windows Series, Springer,Milan (2007)*, 84(2):239–246, 2007.

[4] Arnab Chatterjee and Manipushpak Mitra Anindya-Sundar Chakrabarti, Bikas K. Chakrabarti. The kolkata paise restaurant problem and resource utilization. *New Journal of Physics*, 12(7):075033, 2010.

[5] Simon A. Crase. Complexity explorer challenge 2018 april. https://github.com/weka511/201804, April 2018.

[6] Uri Wilensky. Netlogo. http://ccl.northwestern.edu/netlogo/, Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL, 1999.