

Coursework 2: Demography and Culture

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1 Introduction

All of your courseworks are designed primarily to give you experience in developing intelligent control and/or cognitive systems. This course also gives you experience and feedback in writing about research. However, this year we are attempting to make the second and third coursework lighter-touch. Therefore, the writeup for this submission should be at *most* two pages, including the figures, and does not need to have all the normal sections of an academic paper.

2 Approach

There are many different types of social simulation, but in keeping with the emphasis of ICCS, you will be doing a *spatial simulation*, where you are meant to be simulating some approximation of:

- real time,
- real space,
- real animal capacities, e.g. motion, perception, and metabolism.

The idea here is to test whether it is possible to replicate the results of Powell et al. (2009) using more spatial, cognitive agents. A replication means that you should briefly review the scientific reason for the model as well as checking the model's outcomes. In this case, we have given you the code for an existing replication (see Moodle). You are not obliged to use this code, but it will give you a substantial head start if you do. If you want more information than you had in lecture about replication, you may want to read King (1995) or Bryson et al. (2007). The starting-point code for the replication was actually a quite different paper written by an MSc student visiting Bath that was subsequently published, see (Čače and Bryson, 2007).

Note that spatial reasoning is not really necessary in this task, at least for the simulated agents, but for *you*, learning to reason about how agents move in virtual space may help you with the game AI in CW3. More importantly, this helps you learn about social learning, social behaviour and its outcomes.

This coursework is due **24 March 2017**.

3 Results

In this coursework, please just document one hypothesis you had, and show one graph testing that hypothesis. You should probably state your hypothesis and where it came from as an Introduction, and explain your code briefly in the Approach.

NetLogo provides a tool for running experiments (BehaviourSpace) and more tools for drawing graphs. Thus it is pretty easy to get NetLogo to run experiments for you, if you can think of parameters you might like to vary or code you might want to add that would be experimentally interesting.

With respect to your own results, if you describe a reasonably-well working system in a comprehensible manner, you will pass. If you can justify your hypothesis from the literature (e.g. say which result you are trying to replicate, and what you thought was needed to do so) you will get at least 55. Getting a mark over 70 requires demonstrating insight, creativity and/or understanding that goes beyond the basics laid out for you in this document. For example, you could relate your outcome to other scientific articles, or describe further experiments you would like to do if you had time. Doing a little more statistical analysis is another way to get over 70.

4 Discussion and Conclusions

You are not obliged in this coursework to come to a definite conclusion, just to show that you can design and execute an experiment in a social software simulation that might validate or improve our understanding of one of the outcomes in Powell et al. (2009). Of course, ideally, you would conclude that their results could or could not be replicated with more spatially-situated agents.

References

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- King, G. (1995). Replication, replication. *PS: Political Science and Politics*, XXVIII(3):443–499. with comments from nineteen authors and a response, “A Revised Proposal, Proposal,”.
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- Čače, I. and Bryson, J. J. (2007). Agent based modelling of communication costs: Why information can be free. In Lyon, C., Nehaniv, C. L., and Cangelosi, A., editors, *Emergence and Evolution of Linguistic Communication*, pages 305–322. Springer, London.