Terms of Reference

Project title

Neural Networks with Python and TensorFlow

Stakeholders

Alexander James Johnson (Student),
Dr Stephen Lynch (Project supervisor).

Project Background

Artificial Intelligence (AI) is at the forefront of scientific research.

Agent based modelling is a simulation approach where autonomous units, called agents, use simple rules to interact with the environment and one another to produce complex behaviours. Because there is no single decision maker, it forms a useful basis for investigating crowd dynamics as the way that agents operate is analogous to that of real life problems; for instance, the formation of a school of fish is not organised, but is maintained by a common set of rules that allow it to act as a single unit.
Similar rules can be applied to create crowds that exhibit independence on the level of the individual agent, yet produce group behaviours such as flow. As noted by **Macal:2010** agent based models have a diverse array of applications such as emulating stock markets and immune systems.

Aims

Objectives

Listed here are a set of objectives, and a suggested date for their completion given as [year/-month/day].

- Reproduce results previously obtained in MATLAB using Python. [2020/02/01]
- Terms of reference submission. [2020/02/01]
- Use TensorFlow to produce results, giving a brief overview of how the TensorFlow library works, and how to use it. [2020/02/15]
- Background of a more advanced subject that will be the main focus of the report. [2020/03/01]
- Precursory results from own research. [2020/03/20]
- Preliminary report submission. [2020/03/27]

- Oral and poster presentations. [2020/05/21]
- Project submission. [2020/05/26]

Project Deliverables

- A selection of programs that perform the calculations.
- A report, providing details of the mathematics and methodologies used.
- An interim report, which will act as a self contained sample of the full report.
- A poster presentation, highlighting key aspects of the project and displaying relevant results.
- An oral presentation, providing an in-depth overview of the report.
- The Terms of Reference, describing the scope and purpose of the project (this document).

Required Resources

- Access to hardware capable of running Python and TensorFlow.
- Access to library and internet resources, for research purposes.
- An implementation of LaTeX, for report writing.

All of the above requirements are already satisfied by the University or otherwise.