

“Short Term Memory in Flocks: an Agent Based Model” Matthew Turner, Katherine Broadfoot

Objectives

To better understand the role of short term memory in flocking behaviour by building a simple agent based model. This is of interest because an agent based model incorporating this aspect of flocking has not been used before and could lead to models that allow generation of more realistic dynamics. Flocking phenomena are of interest due to the evolutionary advantage this behaviour gives and the potential applications.

Background

The student will familiarise herself with literature relevant to agent based models and will be expected to gain expertise in computing through the development of these models in C++. This will build on the student’s skills in MATLAB, which have included a growth-fragmentation model for a bacteria with branching structure.

Deliverables

A simple agent based model developed in C++ to allow better understanding of the role of short term memory in flocking behaviour. The student has had very little experience with C++, so the opportunity to build on previous experience with MATLAB and learn more about using C++ will likely be highly valuable to her future work.

Impact

This field of research is highly topical at present and it is anticipated that these models will generate considerable academic interest. There are also potential long term applications in swarm robotics and CGI graphics, so the work should be of interest to many industry sectors such as defense and aerospace.

Data analysis

None.

Basis for extension to PhD Project

This has good prospects for a follow-on PhD project, with potential to start with more complete analysis of similar agent based models which typically have some parametric or structural freedom, requiring more exhaustive analysis. Generalisations to longer term memory are also possible.

Non-RCUK co-funding/External Partners

None.