

Evolution Simulator

Eric Turner
Period 3

September 19, 2006

Abstract

My area of interest is in artificial life, specifically artificial evolution.

1 Purpose and Scope

The purpose of this project is to create an AGENT-based model that simulates the evolution of different organisms within an environment. These organisms will be a basic simulation of real-world organisms, with the need for food, the ability to breed and die, and so on. Their function and lifespan will be based on dozens of genetic characteristics, such as metabolism, eyesight, etc., and these characteristics will be passed on to offspring. There will be a genetic variability that will allow the organism species to evolve, or devolve. The hope is a demonstration of natural selection, and after several generations the collective gene will be more advanced than the original. To give an incentive to evolve, there will be dangers in the environment, and predator-organisms and herbivore-organisms, both of which will evolve.

2 Background

Several models that have resemblance to this idea have been looked into, as well as multiple books on artificial societies and modeling scenarios.

3 Procedure and Methodology

Since I already have a basic program with the final user-interface, the rest of the time will be spent expanding genetic characteristics and artificial intelligence of the organisms, in order to better simulate real-world situations. Once there is an acceptable organism character, then traits and environments will be altered to experiment with an equilibrium scenario, where the predator/pray relationship will have a negative feed-back loop.

4 Testing and Analysis

For debugging, I plan to either create testing programs for sub-parts of the simulator, or include debugging output in the simulator itself. For developing an equilibrium, I plan to create graphs of species population, as well as average genetic characteristics, in order to alter methodology to stabilize progress.

5 Expected Results

I expect to see a stable balance between plant-life, Herbivores, and Predators. I also expect the genetic variables of both the herbivores and predators to advance in order to compete with others.