Evolution Simulator

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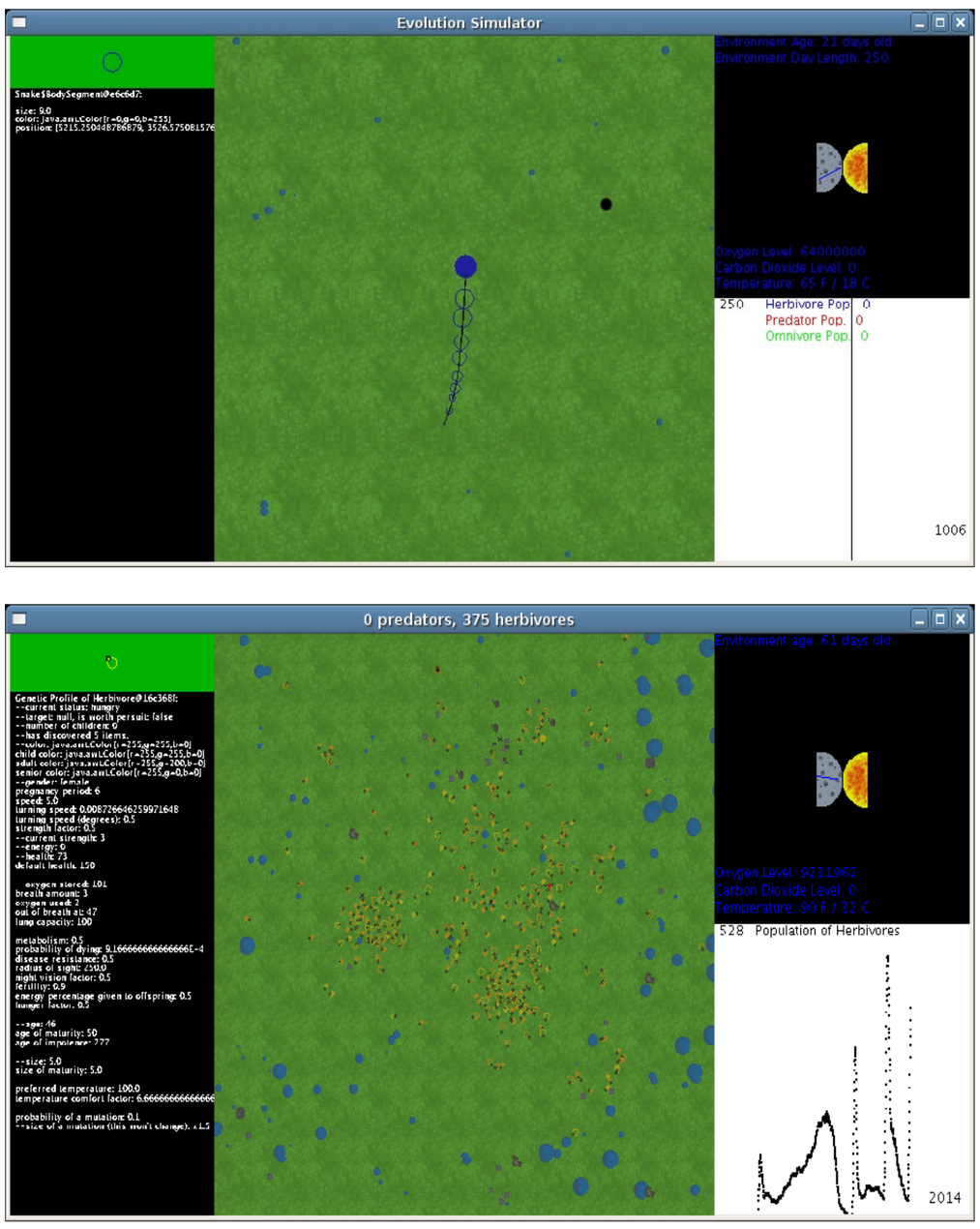
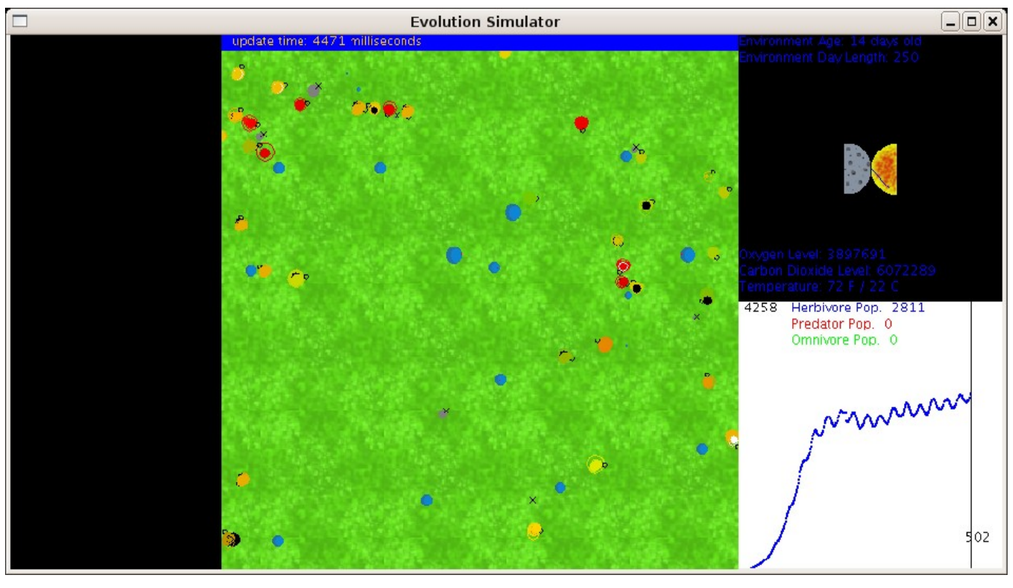
Abstract

This project creates 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 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.





Procedures and Methods

My first goal was to construct the basic user interface and environment system, and just have Organisms be a type of Item in a much more versatile system. Once this was set up, the Organisms are made with two main pieces of code, the genetics and the AI. The genetic data for a given Organism are contained in several dozen global variables that represent aspects such as metabolism, size, etc.

The AI depends slightly on what species the Organism is. All organisms have a target object that they are currently moving to, and a current status that dictates its goals. If its status is hungry, then it will evaluate all potential targets for edibility. How attractive an organism sees different objects in different states is controlled by its species.

Results and Conclusions

For debugging, I included debugging output in the simulator itself. For developing an equilibrium, the program creates graphs of species population, as well as average genetic characteristics and aspects of the environment, in order to alter methodology to stabilize progress, and to compare the output to real-world situations.

I expect to see consistent results between different species as those found in real-life situations. I also expect to see different species of Organisms to have clear evolutionary trends in order to improve their situation. For unchecked populations within a bounded environment, the population curve should follow an exponential trend initially, but then flow into an equilibrium state.