Project Proposal Final Version 1st Quarter 2009

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1 Title

Dynamic Complex Ecosystem Simulation / Modeling by Bill Yu, Pd. 3

2 Purpose

The purpose of my research project is to create a simulation of a many-species, non-static, many-variable ecosystem. According to user preferences, many desiredecosystem simulations will be able to be run.

3 Background Research

-Includes articles and program help research

-A jump-growth model for predator-prey dynamics: derivation and application to marine ecosystems

-Cellular Automata Model of Macroevolution

-Northwestern NetLogo Tutorial

-Wolf/Sheep Predation Model from NetLogo

4 Procedure and Methodology

I will be using the NetLogo language first, but this will probably later be turned into Python, using primarily the Tkinter interface.

Testing for verification of my project's performance is if the ecosystem makes sense on a logical basis. (Chance of feeding, predator eats prey, etc.)

A general trend with repeated tests on a certain ecosystem would also show stability of my project.

5 Expected Results Applications

I envision a project in Python that models and can put data into spreadsheets and create charts to be put in documents. In addition, the ecosystem will be both based on chance and species type so that it is more like the real world (no one has a 100 perc prey catch rate). The reproduction algorithm will likely be based on a Punnett square and will be adequate enough to cover for favorable trait accumulation. There will also be random but low chances of natural disasters and species mutations / new species creations. In all, this would make for great testing of hypothetical ecosystem situations.