



User Manual

Artificial Life

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Installation

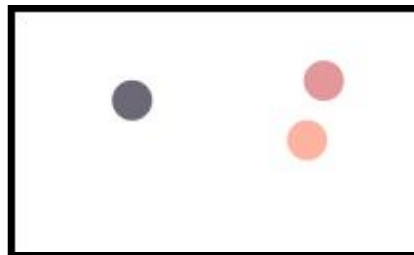
This project runs entirely using HTML and javascript. To run it simply clone the git repo and open index.html in your favorite (GUI) browser. This project should work in most modern browsers. Alternatively, as of 18/05/2019 it is also hosted at the following URL:

<https://www.redbrick.dcu.ie/~vexation/2019-ca400-craigd2/src/index.html>

The Simulation

Diglets:

This simulation generates a number of “single celled” organisms called Diglets which wander on a 2D plane. Diglets are round and have a number of properties that differentiate them from each other; namely a “cell thickness” and “likeliness to cooperate”. Cells have a “Health” value which decreases over time, but is inhibited by a Diglet’s ability to generate energy, which can occur in a number of ways. When a Diglet’s health reaches zero it dies.



Cell Thickness:

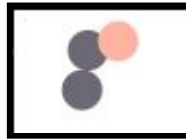
Cell thickness is a Diglet’s ability to generate energy versus their ability to consume other Diglets for energy. Cell thickness is visually represented as their color in the simulation. Diglets with a lighter thickness/color generate energy faster than their darker counterparts, where as darker cells can consume lighter cells for energy. Passive energy generation occurs every frame while consumption occurs when two Diglets touch.

Likeliness to cooperate:

Likeliness to cooperate is a hidden value which represents that Diglet’s likeliness to cooperate with other Diglets(there will be more on this later). In short this value determines how friendly Diglets are.

Digritos:

Digritos are simply a group of Diglets that work together; in our simulation they represent “multicellular” organisms. Digritos Digrito’s can be any size and are formed when two Diglets come into contact and decide to cooperate. They share energy with each other whether it be energy generated passively or energy generated from consuming another Diglets. While Diglets in a Digrito live together, they do not die together and instead die individually. Diglets of different cell thicknesses can join the same Digrito.



Natural Selection:

Natural selection is a core feature of the simulation. It can occur by generation or continuously. If it occurs by generation every Diglet in the population is replaced every ten seconds by a new “generation”, which are the children of the most successful Diglets of the previous generation. If it occurs continuously, then every Diglet has a chance to mate with another Diglet to create a child while it stays alive. Like with the previous option the chance for a Diglet to create a child is based on their success, however Diglets that stay alive longer have longer to create children therefore giving them a higher chance to procreate. Success in the world of Diglets is measured by the amount of energy they were able to generate in their lifetime.

Mutation:

Mutation occurs in a small percentage of the population every time new Diglets are born. This is to ensure a level of variation in the simulation. Mutation is simply randomising a Diglet’s cell thickness or likeliness to cooperate instead of inheriting them from their parents.

The Menu

Run: Begin a simulation.

Pause/Unpause: Pauses and unpauses the simulation.

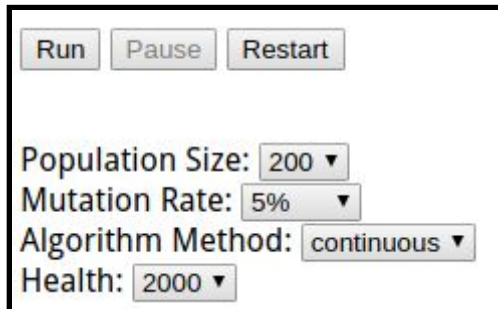
Restart: Restarts simulation with the desired variables.

Population size: The number of Digritos to add to the simulation.

Mutation Rate: The % chance for a new Diglet to become mutated.

Algorithm Method: Whether Natural Selection should occur continuously or by generation.

Health: The “Health” value of Diglets. The lower the health the faster Diglets die.



Run Pause Restart

Population Size: 200 ▼

Mutation Rate: 5% ▼

Algorithm Method: continuous ▼

Health: 2000 ▼