CSSE375 Team 5 Requirements Document

1 Introduction

1.1 Purpose

This software requirements document defines the Genetic Algorithm Visualizer software functionality. Outlined in the following sections is an attempt to record the functionality as completed in the Winter of 2021. Furthermore, this document will record the purpose and features of the system, the constraints under which the system will work, as well as how the system will react to external stimuli.

1.2 Scope

This software system aims to provide users with a way to visualize a genetic algorithm which itself is a way of mimicking natural selection. Genetic algorithms are often used to solve optimization problems.

1.3 System Description

The Genetic Algorithm Visualizer functions by mutating a group of Chromosomes. These Chromosomes go through a series of modifications per generation in the hopes of improving each generation.

2 Needs

There is no easy to visualize natural selection. (N1)

There is more than one way to define fitness. (N2)

Users have a hard time deciding which factors impact natural selection the most. (N3)

3 Recorded Features

Ability for a user to set the mutation rate: approximately how many genes in each chromosome will be flipped. (N1, N3)

Ability for a user to choose the selection method: the way in which chromosomes are selected from the current generation to form the new generation. (N3)

Ability for a user to define the max generations: number of generations the simulation will run for (N1, N3)

Ability for the user to define the genome length: the number of rows in a 10 x rows array of bits representing genes. (N2)

Ability for the user to enter the population size: number of chromosomes in a population. (N3)

Ability for the user to enter a number for elitism: number of highest-ranking chromosomes to be kept into the next generation, immune to selection methods. (N2, N3)

Ability for the user to define the fitness method: how the fitness of a chromosome is determined (N2)

Ability for a user to enable crossover: the merging of two chromosomes gene arrays. (N3)

4 Future Features

Ability for a user to select the display of the simulation. (N1)

Ability for the user to select from a broader range of input options. (N3)