Genetic Algorithm

Members:

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Project Description:

The genetic algorithm is a method for solving both constrained and unconstrained optimization problems that is based on natural selection, the process that drives biological evolution. This algorithm uses several genetic operations such as crossover, selection, and mutation in order to obtain an optimal output. The algorithm takes a population and uses these genetic operations to generate a new population, which represents a set of solutions to the problem, which is better in terms of fitness value compared to the previous population. A predefined fitness function will evaluate the individuals and calculate their fitness score to determine how optimal a solution is in solving the current problem.

We will be using this genetic algorithm to find the shortest route between two places. To solve this problem, an initial population which forms the first set of chromosomes to be considered in the genetic algorithm is randomly created. The chromosomes with the higher fitness score will be selected (using the selection operation) and then mutated over. Their fitness score will then be recalculated and the individuals with the higher scores will be selected to be considered for the next generation. This process is repeated until the best possible solution to the problem is achieved.

Project Outcome:

List down the project outcomes that you are going to demonstrate in the interim and final submissions

The outcome of the project will be the shortest distance between two places found after a number of generations. The progress of the algorithm can be visualized by the graphs plotted for each generation.

Libraries/resources to be used:

- math
- numpy
- mathplotlib
- Tkinter
- PyGUI
- Pandas