ASSIGNMENT REPORT
EVOLUTIONARY COMPUTATION

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1 Introduction

The world population is increasing regularly. After a while, natural resources will be insufficient and their lifetime will expire. For these reasons, the use of renewable energy is becoming widespread day by day. A project has been proposed to make the use of renewable energy sources more effective. With the help of genetic algorithm, a population was created from latitudes and longitudes in Turkey. The most ideal points will be selected from these populations and the areas where renewable energy will be established, will be presented as a report.

2 Choosing Ultimate Positions for Renewable Energy

It was decided to use the optimization method in the genetic algorithm. First of all, parameters, population number, generation number, crossover and mutation rates were determined. Parameters have been chosen as the latitudes and longitudes of Turkey.

Afterwards, 2 different functions were written for our operations. Our first function is written to calculate fitness values and it includes mathematical operations. Our second function consists of 3 nested functions. Since the populations are chosen from random numbers, population values can go out of latitude and longitude values of Turkey. For this reason, functions are written to check whether the values are out of this range and if they are out of this range, they are written to put them back into the range.

In our optimization method, we want the highest fitness values. That's why we take the ones with the highest values in each generation. Then we ensure that crossover and mutation events occur. Each time this event occurs, 3 off-springs are taken from the generation. This process continues until the most ideal points are found. The 3 off-springs found in each transactions are printed as results.

The aim of the project is to calculate the ideal points using genetic algorithm and to calculate the areas where renewable energy will be installed in the best way.

3 Conclusion

What I learned in this task is that we can perform optimization or minimization operations using genetic algorithm. As a result of these processes, by calculating the ideal points, reducing the areas to be established to a more ideal range and starting the research from this point will save our time.