Assignment 1

CS 790K: Genetic Algorithms
Fall 2021
Max Score: 100

Black box function optimization

Hill climbing or gradient ascent

Write a simple hill climber implementing along the lines of the pseudocode from class.

Solve the following black box problems using your hill climber. The black boxes are provided as precompiled .o files that implement an `eval` function. Both `eval` functions take a 100 length array of integers (ints) and return a double between 0 and 100 inclusive. Only the values 0 and 1 are allowed as the members of the integer array. Solving the problem means setting each element of the array to either a 0 or a 1 such that the evaluation function returns 100.

- First black box evaluation function .
- Second black box evaluation function.

Easy Function

Write a function that is easy for your hill climber to optimize. Implement this function, run your hill climber on it and show that the function is "easy" for your hill climber to optimize. Make the function publicly available.

Hard Function

Write a function that is difficult or impossible for your hill climber to optimize. Implement this function, run your hill climber on it and show that the function is hard or impossible for your hill climber to find the global optimum. Make the function publicly available.

Questions)

Describe your hill climber (pseudo-code) and discuss its strengths and weaknesses. When describing your algorithm's strengths, use your "easy" evaluation function as an illustrative example to ground your discussion. Similarly, use your "hard" or "deceptive" function to explain your algorithm's weaknesses. Specifically, what assumptions made by your hill climber are being violated by your hard function?

Turning in your assignment

Write a report that contains the following sections

1. Answer the question above (18 points)
2. Provide links to your easy and hard functions (2 points)
3. For each of the four evaluation functions (20 points each), provide
   (a) The average wall clock time taken to find an optimum (4 points)
   (b) The average number of evaluations needed to find an optimum (4 points)
   (c) The string (or vector) corresponding to the optimum (4 points)
   (d) The reliability of your hill-climber (4 points)
   (e) The quality of your hill-climber (4 points)
4. Use canvas to turnin in this assignment report.
5. Your FULL name and email address, should be on all submitted files.

Note, that I do not require source code or transcripts of running code. Email me with questions.