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CSCI 5722 Computer Vision

HW1 – Task 1.7 Analysis

1. Change the length of the target phrase

Longer target phrase requires more generations with same population size. Adding 10 more characters could make the number of generation increase from 100+ to 500+. The exact number of generations varies a lot, since there are many random processes such as generating the population and randomly mutating the child.

1. Change the number of population members

Increasing the number of population members will speed up the process. But because of the problem of overfitting, we shouldn’t have to many population members in our experiment.

1. Change the mutation rate

The larger the mutation rate is, the more generation it will take. Larger mutation rate could make the generating process unstable. Since we have a small individual and a relatively big population size. We don’t need much mutation rate to improve the process.

1. Change the range of possible characters being considered

The more different characters we have in the target string, the longer time it will take to generate the target, because in every reproducing process, it is less possible for a random character to match the character. So it is better to limited to a smaller range of possible characters.

1. Try changing between the two breeding methods

The second method, which is randomly choosing characters from each parent, requires less time to find the target. It converges faster and more stable then the first method.

1. Change the mating factor

Larger factor makes “better parents” gets more tickets. With mating factor 10, the number of tickets of “good parents” and “bad parents” varies from 0 to 10. So if we have larger mating factor, it is more clear when we try to distinguish the pixels. On the other words. “good parents” new have more advantage or is more likely to be chosen than “bad parents”.

1. Change the maximum generations

If you don’t want to wait too long, make this small. But this short string usually won’t take too long. The trend of fitness is important while determine whether to increase the max generation or not. If the max fitness stops growing, increasing the max generation won’t improve anything.

1. Which function takes the longest to run

The breed function takes the longest to run, especially the second method. It needs to randomly put two parents together, so it involve many for loop to complete. Vectorization would improve the speed.