

The statistically significant difference between my EA and my classmate's EA can be explained by one or a combination of the following points.

1. Significant difference in mean and standard deviation

The obvious explanation is because the two EAs generate different means and standard deviations. My mean is 3024 and my standard deviation is 123. My classmate's mean and standard deviation are respectively: 3249 and 223. The next reasons attempts to explain these differences using the EAs themselves.

2. EA algorithms are different

Each student was free to use any EA type. Thus, I used a Genetic Algorithm. The results produced by the two EAs may be statistically significant different if my classmate used a different EA type. This is however less probable since the Genetic Algorithm seems to be the most suitable EA type to the TSP problem. The next points will therefore show that given the same EA type, the different parameter choices may lead to different results.

3. Given the same GA, different parameters

- Qualitative parameters:

The qualitative parameters below may explain the statistically difference between my EA and my classmate's EA.

- Different crossover schemes

I used a crossover scheme that involves some heuristics that allows me to quickly locate and exploit the optima. My classmate have not used a similar crossover scheme, our final EAs may be different since the GA's emphasis is on crossover.

- Different mutation schemes

My EA did not use any mutation operator. This made my algorithm very exploitative. My classmate may have used a combination of exploration and exploitation.

- Different Parent Selection schemes

My EA used tournament selection. My classmate may have used a different scheme such as fitness proportionate selection. This would have resulted in different EA algorithms. Even with tournament selection, the tournament size T may have differentiated the two EAs.

- Different Survival Selection schemes

I used a generational selection as survival scheme. My classmate may have used a scheme which chooses from the parents and the children. This may have given two different EAs.

- Different initialisation schemes: Random vs heuristics

I used a random initialisation scheme without heuristics because my crossover allows fast convergence. Since the problem requires fast convergence, my classmate may have used some heuristics in the initialisation. In case this is true, this may explain the statistically different EAs.

The qualitative parameters define the structure of the EA. In case my classmate and I used the same qualitative parameters, the difference in results may be explained by the quantitative parameters.

Given the fixed parameters such as: population size, the number of generation per run... the following parameters could have made the difference.

- Quantitative parameters

- Mutation and crossover rates

I used 0.00 and 1.00 respectively as mutation and crossover rates. Different rates may lead to different EAs.

- Tournament size T

My tournament value T was set to 20, a different T value may have caused the difference in our EAs.