

GA Assessment



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Result of Task

- I've arrived consistently at a set of results around the 5.7k range, examples are shown below.
- Consistently getting results around 5701.190(3dp) and 5517.079(3dp) these results occur more when the second weight is the higher out of the four weights.
- Example of one is below.

```
Fitness of best: 5517.079999999994  
Best weight combination: 0.11 0.9309999999999999 0.271 0.4199999999999993  
Max amount to buy: 10 -- Max amount to sell: 1
```

- General consensus was that the largest value of the amount to sell was always one, showing that it's better to buy at the start and hold opposed to selling stocks at the end of the generation.
- The solution was generally achieved within the first 30 generations showing good performance of the GA, however also shows room for improvement.

Difficulties

- Calculating and displaying doubles
 - Several instances of doubles being extremely long when calculating values.
- Several issues of consistency due to this, there was not a set standard for displaying the weights.

```
Best weight combination: 0.088 0.811 0.112000000000000002 0.446
```

Example of inconsistency when dealing with doubles

- In addition to this, the actual implementation of the GA was challenging enough with a lot of background material needing to be covered in order to understand how to implement such an algorithm.
- I also had difficulties extracting the correct values out from the unilever.csv file as not all columns were needed for this, nor does every row have values to begin with as the signals from the calculations had different time periods.
 - Solution to this was to start reading the data from a day where all rows had all columns filled with data.

Tweaks to the GA /Future Improvements

- Majority of the tweaks were to find optimal values for parameters such as the mutation probability or crossover probability
 - If I was to tackle the assignment again, I would find a easier way to find the optimal values or use a method that involved statistical analysis rather than just trial and error.
 - This extends to other values such as tournament size, which could help to improve accuracy or efficiency.
- More possible improvements to the GA to help with accuracy of solution or efficiency:
 - Including two point crossover rather than just one point
 - Bit string mutation rather than standard mutation
 - Introducing roulette selection to pick what values are selected into the tournament
 - As mentioned before find optimal values for values such as the amount to mutate the individual candidate by