

CS250 – ARTIFICIAL INTELLIGENCE LAB

Assignment-11: Multi-Objective Optimization

Short URL: shorturl.at/wJQS4

(Read all the instructions carefully & adhere to them.)

Date: 12th April 2023

Total Credit: 10 (Implementation: 5 Explanation: 5)

Instructions:

- Markings will be based on the correctness and soundness of the outputs.
- Marks will be deducted in case of plagiarism.
- Proper indentation and appropriate comments are mandatory.
- Comments/explanations/intuitions should be provided in a separate text/word etc. document and not the code file.
- Experiment two different state representations.

Problem: Suppose you have a set of 5 possible investments, each with a given expected return and volatility. You want to invest in a portfolio of 3 of these investments to maximize the expected return while minimizing the volatility of the portfolio. You can only invest a maximum of 100% of your budget, and each investment can only be bought in integer quantities (no fractional shares). Using genetic algorithm, find the optimal portfolio and calculate its expected return and volatility. Use a population size of 100, and a mutation rate of 1%, and run the algorithm for 50 generations.

Investment	Expected Return	Volatility
1	10%	5%
2	8%	6%
3	12%	8%
4	9%	4%
5	11%	7%

