

Portfolio Optimization Using Mean-Variance Model

Sanyam Bhavsar

M.Tech Student in Data Science and Computation VIT Bhopal University

Finance / Quantitative Methods

10 April 2026

Abstract

Making investment decisions is not always straightforward, especially when there is a need to balance risk and return. This project focuses on portfolio optimization using the Mean-Variance model, which helps in selecting a combination of assets that can give better returns with controlled risk.

In this work, historical stock data will be used to calculate important values such as expected return, variance, and covariance between different assets. These values will then be applied to find an optimal portfolio allocation. The idea is to understand how different assets behave together and how risk can be reduced by proper distribution of investment.

Scilab will be used to perform the required calculations and to visualize the results. Graphs like the efficient frontier will be plotted to show the relationship between risk and return for different portfolio combinations.

Overall, this project aims to give a practical understanding of how basic mathematical and statistical concepts can be used in financial decision-making. It also shows how tools like Scilab can help in analyzing data and supporting better investment choices..

.

References

Selected Research Paper: Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, 7(1), 77-91.

Link: <https://onlinelibrary.wiley.com/doi/10.1111/j.1540-6261.1952.tb01525.x>