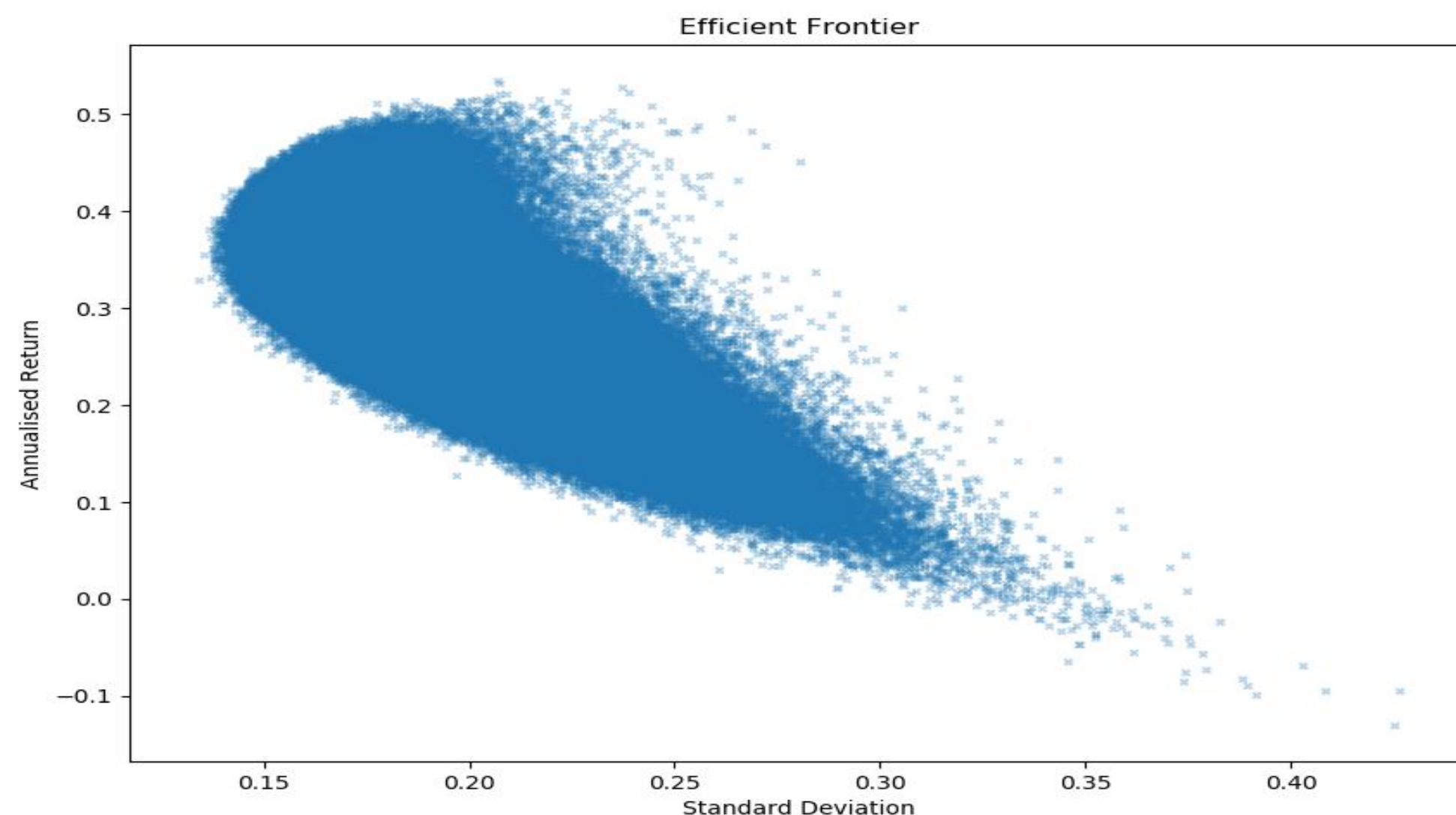


Risk Optimisation of a Momentum Strategy Stock Portfolio Using Time Series Forecasting

Dax Levey
MSc in Computing for Financial Markets

Introduction

Modern Portfolio Theory (MPT) concerns optimising asset allocation to maximise expected investment return for a desired level of risk, on the basis that diversifying, or spreading investments over multiple assets, results in less risk than investing in only one. The aim of this project is to create a series of models that use various forecasting techniques with momentum investment strategies to predict the potential returns and risks of a set of stocks, then optimises the allocation of funds for maximum expected return for a given level of risk. The model will run over a set period of historic data, stopping at regular intervals to remodel and rebalance the portfolio.



Approach

The models are built using the Python programming language with the Scikit-Learn open source machine learning library. Analysis will be conducted on a series of test portfolios consisting of 10 randomly selected American stocks. Historical price data was obtained from a community run financial database, containing price data for over 3000 stocks, freely accessible through the Quandl API. The performance of the model will be evaluated by comparing the tested portfolios against standard portfolio evaluation metrics such as market index performance and MPT weighted portfolio.

Data Preparation

Data used in the forecasting models consists of technical indicators derived only from historical price data. These include:

- Simple and Weighted N-day Moving Averages
- N-day Momentum
- Relative Strength Index
- Stochastic Oscillators
- Williams R%



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