

Problem Definition

Predicting stock prices and generating alpha (returns above market return) are at the heart of what professional investment managers do. The evolution of professional investment management saw the adoption of quantitative methods that use linear models on factors or characteristics derived from stock prices. These models have tended to have their short comings and don't always perform well. The momentum effect is well known phenomena in stock price movements. This effect occurs when a stock's price moves up or down, and it generally tends to persist in that path for a period of time relative to it's peers.

Research Question

Can this momentum affect be harnessed as a variable within a non-linear machine learning based approach to essentially provide better stock price prediction and assist in portfolio construction? Using an LSTM (Long-Short Term Memory) reinforcement learning approach, this project will determine if there are any improvements to the overall return of individual stock selection in a portfolio using a momentum strategy. The baseline for comparison will be using a basic OLS approach and a basic momentum approach.

Dataset

The model will be applied to a test set of stocks listed on the AMEX, Nasdaq and the NYSE over a period from 1959-2017 obtained from CRSP (Center for Research on Stock Prices <http://www.crsp.com/products/research-products/crsp-us-stock-databases>) via WRDS (<https://wrds-web.wharton.upenn.edu/wrds/>).