Predictive Modeling of Short-Term Stock Evolution

Background

When investing and speculating in the stock market, several candidate strategies can be applied. For instance, placing the capital in a global index fund is a common passive method that has historically paid off well over larger time horizons and serves as a benchmark against which other strategies are evaluated. However active management of capital requires informed decisions to be successful over time, where fundamental and technical analysis (TA) play a key role.

In fundamental analysis, the objective is to determine a company's "fair" market value based on the performance of the company and its future prospects. Technical analysis focuses on historical price development to predict the future. The hypothesis is that the markets often follow recurring patterns; one can leverage the variations in price and trading volume over time in order to make forecasts.

Goals

The aim of this project is to develop a model that can anticipate future short term price movements (e.g., confirmation of a trend continuation or a trend reversal) better than pure chance from previous time series.

Features of interest consist of common TA-indicators such as moving averages, relative volume, average true range, index comparison, simplified candlestick patterns and other set of rules that can be quantified.

The analysis is data-driven in nature and provides a fertile ground to apply machine learning. In particular, time series models such as long short-term memory neural networks, and regression models such as Gaussian processes are of particular interest.

The dataset to be used in the project is composed of companies belonging to the S&P 500 (a stock index in the USA consisting of most major companies), since the US market in general influences all other Western stock markets.