# Machine Learning for Long Term Stock Price Prediction

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# INTRODUCTION

Stock market is very versatile and fluctuates with time. Technically, this fluctuation can be explained by fundamentals of organization, industry and economy. Long term stock price is determined by various financial analyst using amalgation of reading news, balance sheets and financial ratios. The stock market prediction using news or personal opinion has attracted much attention of academician and business.

The main challenge is the prediction of stock market values to extract meaningful characteristics from news articles and decide which stock to buy, hold and sell. The news articles generally contain both positive and negative aspects of stock market values, which make it difficult for financial analysts to predict the underlying truth. Such analysts have to deal with vast information available in newspapers, magazines and other resources in order to investigate the stock trend movement to make a prediction model.

Text mining technology has increasingly becoming important for easy and quick availability of news information which can be accessed due to sheer volume of opinion rich web resources. In recent years, our social and political system has a great impact of public sentiments and emotions. Similarly, the postings of social media have helped reshaping businesses. Text opinion mining is designed to help investors to predict the hidden patterns from the data available in digital form.

Opinion Mining and sentiment analysis are the techniques used to detect and extract subjective information from text documents. The sentiment classification is the main challenge in opinion mining which depends on mood, judgment or evaluation of any object like film, book etc. in the form of a text document, sentence or features which can be labeled as positive or negative.

We are conducting a study on predicting the long-term stock prices using Fundamentals, Text mining, Machine Learning, & ICE analysis. The need of the study is to come up with a one-stop shop for long-term stock prediction.

Our study is organized into following sections: Data collection used for generating historic data, fundamental analysis, sentiment analysis techniques, prediction algorithms used to predict the stock movement and the evaluation measures. Last section concludes the overall survey and discusses some future aspects of research.

**Industry** - The study will be conducted on multi-industry stocks. Approx. 30 stocks are selected from different Industries.

**Need of Study** - Stock market has become one of the major components of economy not only in the developed countries but also in the developing countries. Making decision in stock market is not really easy because a lot of factors are involved with every choice we make. Therefore, a lot of analysis is required to make an optimal move on stock market which may involve price trend, market’s nature, company’s stability, economy, different news and rumors about stocks etc. The objective of the study is to extract fundamental information, technical factors (Inflation, Economy, Market strength, Demographics), Market sentiments, news and use them to analyze and forecast the stock market from the company’s investor viewpoint.

# PROBLEM STATEMENT AND OBJECTIVE

* To study the fundamental, technical & sentiment analysis of a universe of 30 US companies.
* To build a model for stock prices prediction.
* Text mining to be done on Twitter, business news website scrapping and a few other sources.
* Fundamental data extraction.
* Automation of fundamental extraction.
* Applying fundaments on historical data, sentiment analysis and building model to forecast the stock prices.
* Impact of ICE analysis on the stock prices.

# DATA SOURCES

* ***Stock Data***: NYSE and NASDAQ, Quandl API
* ***News Data***: Money control, News websites.
* ***Social Media Data***: Twitter and few others.

# ANALYSIS METHODOLOGY

**RATIO ANALYSIS:**

Over the years, investor and analysts have developed numerous analytical tools, concepts and techniques to compare the relative strengths and weaknesses of companies. These tools, concepts and techniques for the basis of fundamental analysis.

Ratio analysis is a tool that was developed to perform quantitative analysis on numbers found on financial statement. Ratios help link the three financial statements together and offer figures that are comparable between companies and across industries and sectors. Ratio analysis is one of the most widely used fundamental analysis techniques.

Financial Ratios fall into several categories. For the purpose of this analysis, we have picked one or two ratios from each four categories: activity, liquidity, solvency and profitability.

For company’s fundamental ratios we have taken data from the Quandl API and ran on a Python code to get the required ratios.

**SENTIMENTAL ANALYSIS:**

1. **TECHNIQUES USED**
2. **PROGRESS & INSIGHTS**
3. **NEXT STEPS**