



Proposal for Stock Prices Predicting Project

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30-12-2020

Domain Background

Investment firms, hedge funds and even individuals have been using financial models to better understand market behavior and make profitable investments and trades. A wealth of information is available in the form of historical stock prices and company performance data, suitable for machine learning algorithms to process.

Can we actually predict stock prices with machine learning? Investors make educated guesses by analyzing data. They'll read the news, study the company history, industry trends and other lots of data points that go into making a prediction. The prevailing **theory** is that stock prices are totally random and unpredictable but that raises the question why top firms like MorganStanley and Citigroup hire quantitative analysts to build predictive models.

This project seeks to utilize below models to predict stock prices:

- **Long-Short Term Memory (LSTM) Neural Network algorithm,**
- **ARIMA .**

For time series data recurrent neural networks (RNNs) come in handy but recent researches have shown that **LSTM networks** are the most popular and useful variants of RNNs.

Problem Statement

The challenge of this project is to accurately predict the future closing value of a given stock across a given period of time in the future. By using various libraries, build powerful predictive models trained on massive datasets. For this project I will use a decade of close price data from Yahoo Financial for the stock of Apple, Facebook, Google, Amazon.

Goals

1. Explore stock prices.
2. Implement basic model using linear regression
3. Implement LSTM.
4. Implement ARIMA.
5. Add social sentiment features to the exploration stock price data (FB, twitter, Reddit etc.)
6. Compare the results and submit the report

Datasets and Inputs

I'll be using the daily close prices of Amazon, Google, Apple, Facebook, from 2010 onwards till January 2020, this is a time series of data points indexed in time order. My goal will be to predict the closing price for any given date after training. All of the necessary data for the project will come from Yahoo Finance.

Solution Statement

For this project according to my research so far the best possible solution is to utilize a LSTM Neural Net, ARIMA. These models are capable of learning from time series data. This project will be programmed in a Jupyter Notebook (iPython) and will be supported by Pandas DataFrame library for convenient time series data schema. The measures of performance will be based on the predicted stock ticker price in comparison to both the actual price and the model's predicted price.