Machine Learning Engineer Nanodegree

Investment and Trading Capstone Project

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Description

Investors make their decisions to buy or sell stock of a company relying on their analysis of stock market indicators, in order to make the best investment. Therefore, observing the behavior of the stock price indicator every day will always be in tune with the current trend.

For an investor to look for the path that leads him to predict the behavior of the stock price would give him the knowledge that would place him in advantage to make a satisfactory investment. However Burton Malkiel, in his influential 1973 work, A Random Walk Down Wall Street and Warren Buffett, respectively state that:

"that stock prices could therefore not be accurately predicted by looking at price history. As a result, Malkiel argued, stock prices are best described by a statistical process called a "random walk" meaning each day's deviations from the central value are random and unpredictable" (Burton Malkiel). [1]

Stop trying to predict the direction of the stock market, the economy, interest rates, or elections (Warren Buffett). [2]

In the last two decades, the desire to make predictions about the actions of values has been the subject of study. Prediction methodologies are divided into three broad categories: [1]

1. **Fundamental analysis**
2. **Technical analysis**
3. **Machine learning**

The technology in these categories has an important role because of this depends speed, consistency, timeliness, security and trust, such characteristics can support to observe and analyze thousands of transactions every day.

With the advent of the digital computer, stock market prediction has since moved into the technological realm. For this project the main objective is Implement stock predictor and builds a model of stock behavior using a method called Long short-term memory (LSTM) which are units of a recurrent neural network (RNN). Today is considered the best model to perform this task.

Problem Statement

The challenge of this project is to build a model to predict the adjusted closing price of the stock price, taking the daily operations data in a certain range of dates as input, and generate projected estimates for certain consultation dates. Machine learning provides a suite of tools that support a data-centric way to build predictive models. Therefore the data for this project will be obtained from Yahoo Finance, which is a free open source. We will have that the inputs will contain multiple metrics such as opening price (Open), highest price the stock traded at (High), how many stocks were traded (Volume) and closing price adjusted for stock splits and dividends (Adjusted Close).

The proposed solution is an analysis of the input data with different periods of time, such as two months, three months, four months and their behavior during those periods to predict the adjusted closing price.

Metrics

The way to evaluate the performance of the model is with a metric called RMSE (Root Mean Squared Error). It is calculated as the root of the mean of the square differences between the forecasted value and real values of the target stock at the adjusted closing price.

Project Design

For this project it will be implemented in three parts. the first part consists of Data preprocessing in it We will import the Libraries, we will obtain our data set that we will use as the training set and will contain the multiple metrics such as opening price (Open), highest price of the stock traded at (High), how many stocks were traded (Volume) and closing price adjusted (Adjusted Close).

In the second part we will build a Recurrent Neural Network (RNN). The first step of this second section will be to import the libraries that we will use to build the architecture of the RNN, in this case they will be imported from keras models and keras layers.

In the third part we will make the predictions obtaining the real stock price of range determined as input and we will obtain a prediction over a desired time range, later we will visualize the results.

References

1.- Wikipedia "Stock market prediction" Available fromWorld WideWeb at (https://en.wikipedia.org/wiki/Stock_market_prediction) on 09/11/2018

2.- Serenity Stocks Available fromWorld WideWeb at (https://www.serenitystocks.com/blog/quotes-warren-buffett-and-benjamin-graham) on 09/11/2018

3.- Wikipedia "Stock market prediction" Available fromWorld WideWeb at (https://en.wikipedia.org/wiki/Stock_market_prediction) on 09/11/2018