CSC 4350 Project Final Report - Web Stock Forecaster

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Abstract

With the fast paced movement of the stock market, it is often difficult for traders to make decisions based on only their knowledge and skill of the market. To tackle this, this project aims to aid the traders by generating a forecast for the stock performance with high accuracy. With added features such as viewing balance sheets, seeing the performance of a stock in a specific time period, etc, the forecaster makes decision making a lot easier. Using the Exponential Moving Average algorithm, we were able to achieve a very high accuracy when compared predictions to the actual data. Hence, our project aims to deliver an accurate web based stock forecaster.

1 Introduction

The top-level objective is to provide a platform that is easy to use no matter your experience and make trades-based predictions that are backed by analyzing trend and utilizing prediction models.

The product's biggest differentiators are that it will gather data and present an easy-to-understand analysis of the data that will make predictions of the stock market.

Our target consumer ranges from the beginners who have no experience in trading but want to get their feet wet; to the seasoned trader who wants to make more accurate trades but does not have time to shift through a lot of data by themselves.

The scope of our product involves analyzing data and trends on the stock market exponential moving average and machine learning to make a forecast for stocks

that is free and easy to use no matter you level of experience with trading stocks.

2 About the Stock Market

A stock market is the gathering of buyers and sellers of stocks, also known as shares, which represent businesses and their divided ownership. Investment in the stock market is mostly done on electronic trading platforms. When a person is purchasing stocks, they are purchasing a company. Stocks go up and down based on many variables such as the environment, whomever the company serves, the industry, the political situation, etc.. When one wants to purchase stock and invest into a company, it could be quite costly, which is why services like the one we are making are useful. If someone invests money into a failing company then they will end up losing almost all their money that they put in, but at the same time, the same risk could be taken, and the payout would be huge. Services like our stock market forecasting product could help a person potentially check to see if a company's prospect is good enough to put money in and to be able to get more money out of it.

3 Dataset analysis

Our application retrieves information on the stock market from the Yahoo Finance API. We can access a plethora of live data ranging from ticker names and symbols, their prices and trade volume, as well as a vast collection of historical data that is used for comparison, analysis, and prediction. Using Pandas, a python 3 library, we connect to our Amazon RDS database and store the raw results. Amazon RDS is set-up to use MySQL, and our database was designed to mirror the data set which the API returns. From there, it is easy enough to project the necessary columns to the back end on a case by case basis for further processing.

3.1 Data Exploration

Most of the functionality of our application relies on simple searching and lookup of ticker symbols, a two to five character string which represents a particular security listed on an exchange or an otherwise publicly traded company. While the database also utilizes integer indexing, tickers are unique identifiers, and it is advantageous to use them in querying. As the space we are working in often deals with massive sums of money, it is wise to avoid integers when possible. Any fields which we expect to represent a monetary value have been cast as doubles or bigints, since the maximum range of an integer is roughly two billion, a value which is frequently exceeded.

3.2 Prediction

As shown on the screen is the prediction of the Netflix stock across a 2000+days period using Exponential Moving Average algorithm. This is best used to see general trends. Traders often use several different EMA lengths. Typically The 12- and 26-day exponential moving averages (EMAs) are the most used and analyzed averages when it comes to short term. When it comes to long term, then in general, the 50- and 200-day EMAs are used as indicators for analysis.

4 Front End

For this project's frontend, we are utilizing Bootstraps, which is a free and open-source CSS framework. Bootstraps contains CSS- and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components. Our back end and front end are both run in Django and makes API calls with python and renders our web page in HTML with Bootstraps on top of it.

4.0.1 Hosting

Our database is hosted using AWS while our back and frontend are supported by the Django framework. Our web page have been tested using the local host of our machines. For our presentation, we also ran our webpage using local host. For testing the app, all you need to do is download the entire folder and run python3 manage.py runserver inside the folder. You will probably be met with 'no-module' error. Just pip3 install 'module' to install the missing module.

5 Comparison

As can be seen from running the code, the prediction is ran against true stock numbers, and the results are great. It is not an exact match, but it is very similar and that is exactly the result wanted for forecasting stocks. If the results are an exact match, then it would be an issue because sudden changes would not be accounted for. the mean squared error for our model is extremely low about, 0.00014. That number is the chance of our prediction being wrong as a whole. As can be seen in the comparison, as the days go on, it becomes harder to predict and so the prediction is further apart from the true model, in comparison to the beginning. That is good because when it comes to stocks and trading them, it is more favorable to see current trends instead of long-term trends, but that is dependent on the user and with our system, both options are given.

6 Understanding

As per the description, this software proves to be a good fit for the prediction of the performance of any stock that the user is interested in.

Conclusion

This project will combines many different systems, in order to work. Getting those systems to work together harmoniously proved to be a technical challenge but it was possible and turned out to be very interesting. It was interesting implementing data from online sources, and data mining it is using different types of algorithms to make various forecasts and predictions. What is different about our approach is to make it a free platform. All the data is public and free, so we just provide a product that analyses the data to make predictions on stocks that can help make trade decisions. This project is compelling and worth developing because it could potentially be very helpful to the people interested in the stock market and it could potentially be very lucrative.