DELHI TECHNOLOGICAL UNIVERSITY

DISCRETE STRUCTURES

(IT-205)

PROJECT DOCUMENT

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PROBLEM STATEMENT:

IMPLEMENTATION OF DISCRETE STRUCTURES IN CREATING A STOCK MARKET DATA ANALYSIS APP.

DESCRIPTION:

Usage of Python is increasing with more and more user friendly libraries getting added to python in the field of Finance. One of the usage is Data analysis, manipulation and visualization with the help of propositional logic.
Logic is the most fundamental thing that leads the flow of the program.
This project focuses on helping an individual to quickly take decision to buy a stock.

ACKNOWLEDGEMENT:

We take this opportunity to express my gratitude to our Swati Sharda ma'am, faculty of Discrete Structures, who gave ideas and guidance in this project. I would also like to express gratitude towards my University Administration for including the projects in the curriculum. We acknowledge here that we are thankful to all those who had to lend their support to us in this project and also the online communities like Stackoverflow, Documentation websites, for helping us in tracing a path in the times of ambiguity during the project. We take full responsibility for any mistake in the project.

SUMMARY:

This simple user-friendly project seeks a user input of a company name or company code(ticker) that seeks historical data from Yahoo Finance for that particular company in the form of a csv file. With the help of the logics that we use normally while selecting a company for buying the stocks, we have created lines of code with if-else to manipulate and interpret the imported data and present the analysed result to the user to help him make a quick decision. The results shown to the user are the necessary details that one has to catch out at himself/herself from the technical data to see if the share can potentially generate some profit to him/her in a short span of time. This is determined by the use of propositional logic in analysing the Reward-Risk ratio. If the user does not prefer to take huge risks, then he/she is recommended to buy shares at a good Reward-Risk ratio.

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INTRODUCTION

Finance is one of the emerging fields in India presently. People are consuming a lot of content regarding personal finance, investing, trading, buying Mutual Funds and Long Term Returns schemes. Stock Market gives everyone an opportunity to learn investing, trading and to learn how to make money work for you.
On the basis of span of time, investing is categorized into-

a) Trading
   Where you buy the shares at a lower price and sell them when they are at a higher price and book your profit.

b) Long Term Investing
   Where you buy shares of companies that excite you the most and over time, their value increases every year(only when there are no economic crises in the country like wars, etc.)

This project is focussed on Trading concepts that reduce the user's efforts in analyzing a stock's performance over the time. This project generates the result as per the technique that I usually follow during my analysis.

Project Overview: This project tells you whether the current price is the right price to buy the stock or not. This is determined with the help of critical points from the historical data. The points are filtered with the help of propositional logic applied on the Moving Averages that are again calculated with the help of the same dataset imported from Yahoo Finance.

Scope: The demand for learning Personal Finance is found to be increasing every year. In such a case, the demand for online tools available that ease the process of analyzing is also increasing. This project is also a tool that a user can use for determining the chances that a given stock can generate profit to him/her.
As the coding has initiated revolution with automation in many fields, this is also one of the key areas where the users are served better with it.
So, in the near future, the demand for such tools will keep on increasing.

THE TRADING CONCEPTS

Trading is simply BLSH- Buy Low Sell High strategy. For interpreting that the stock is at the correct price to buy or sell, we do technical analysis. The terms associated with technical analysis are mentioned below-

a. **Resistance:** It is a price that leads to decrease in the demand of the stock after which the price is expected to fall down. It is the price near which we should sell our shares.

b. **Support:** It is a price level that leads to increase in the demand of the stock and that results in increase in the price of the share in the near future. It is the price to buy the shares also called the entry time for trading.

c. **Moving Average:** It is the continuous average of the price for a given number of days that keeps on changing for every day as a new value is added in the dataset.

d. **Current Market Price:** It is the price at which 1 share is currently available in the Stock Exchange.

e. **Reward:** It is the Near Resistance - CMP that is potentially your income per share when you have sold the shares at the resistance level.

f. **Risk:** It is the CMP - Near Support that potentially can be your loss per share while doing this business.

g. **Reward-Risk ratio:** It is the ratio of the above 2 terms that is an analyzing ratio and helps us in taking a stand whether to take the entry or not. Generally, it is preferred to pick stocks with RR ratio > 2 but also not very high at the same time.

h. **Stop Loss:** It is a price near around the Support level at which you would like to sell the shares if the market goes down to stop your loss from exceeding the certain

FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

Required website is to provide online details to the customers of the specified products. The system should satisfy the following requirements:

General Aspects:

1. Gives the user update about today's Sensex and Nifty index.
2. Requires an input of company/ticker name from the user.

Analysis:

1. Imports data from Yahoo Finance.
2. Manipulate the dataset by adding a column for Moving Averages.
3. Compares the prices with the adjacent Moving Averages for calculation of critical points.

Software Interface

1. Django-Framework
2. HTML, Bootstrap CSS, Javascript(Plotly).

Reliability

1. The results are a subset of the historical data.
2. It’s not a guarantee that the stock will move according to our results as the markets move with public sentiments.

Availability

1. The web application should be available anywhere and anytime.
2. The name that the user will input should be real, i.e. it should exist in the list with NSE.

Performance

The process becomes quite time consuming as the data is present in the server of other websites that takes some time. It can show errors also if try-except statements were not present at the time of sending the request to the external servers.

Technologies

The sections list all the technologies for the web based system. This project is a web based application that is developed in the Django framework.

- Coding (Python)

- Software System Attributes
    1. Usability: The user who wants to start trading can easily use it provided that the user knows the trading terms like Resistance, Support, etc.
       Security: The app doesn't require any personal information of the user and neither does the app access any illegal source of information for the stock historical data. So, the web app is 100% secure to the user.
    2. Availability: The app is functional when the number of requests made to the Yahoo server are less than 5 pers hour.

CONSTRUCTION OF APP

The App can be bifurcated into two ends, front and back.

The Frontend:
The Front End was implemented with the help of HTML, Bootstrap CSS and Javascript.

The Backend:
The code was written in Python. Framework chosen for creating the web-app was Django. Django comes with inbuilt libraries including methods and attributes that minimized the efforts of writing the code on our own.

Details:
The Project was to implement Implication Propositional Logic and generate a report to see if you should trade for a stock or not. After repeated usage of Implication operation throughout the algorithm, the result gives a recommendation whether to buy the stock or not in the last statement.

(snaps from the project)

Fig1: When the reports are not in the favor of the stock.

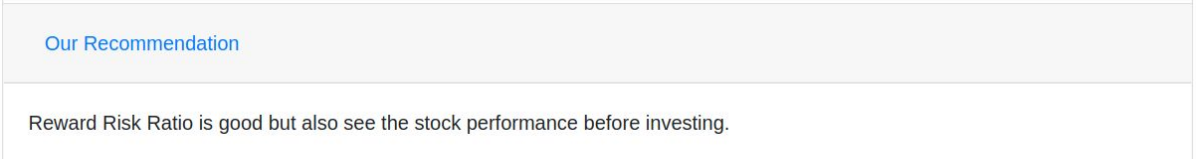


Fig2: When the reports are in the favor of the stock.

The Input: The Dataset imported from Yahoo Finance is ultimately the fundamental input of our project. It includes Columns like Date, High, Low, Open, Close, Adj Close, Volume and their respective values for a duration set by us. We imported the monthly as well as daily data from the site.

The Algorithm: The Algorithm is a group of many UDF's all written in *functions.py.* The functions are listed below-

a. **`find_ticker():`** -takes input as the keyword given to the server by the user.
   -does a linear search in the file names 'coname&tickers.csv) for the ticker name related to the keyword.

-returns the proper ticker name with '.NS' in the end.

b. `create_csv()`: -takes ticker name as the input, sends request to the YF to get the data. In case, YF does not respond to the request, the server generally gives a timeout error. To deal with that error, we use **'try-except'** statement (a form of implication operation, where the server works on a try statement first, and incase if it leads to any error, then the server works on an except statement. *If p is True then {p's compound block} else {q's compound block}.*In the except statement, the server passes the already present ICICI Bank csv file to the code. The last value of Close price in the imported dataset is the Current Market Price.
-It also adds a new column of 10 days and months moving average in both of the dataset.

c. `criticalpoints()`: -takes monthly dataset as the input.
- With the help of propositional comparison and implication operations, it determines various Resistance and Support levels.
For hint, it takes out the prices as a list whenever they sequentially go above or below the Moving Average. Whenever a list by such means is created, the highest or lowest point is saved in the Resistance or Support List.
- Then, the similar prices are replaced by their average and the list contains the filtered elements.

d. `closest_criticals()`: - takes array of critical points generated from the previous functions and the buy price as the input.
-returns you the nearest monthly support and resistance.

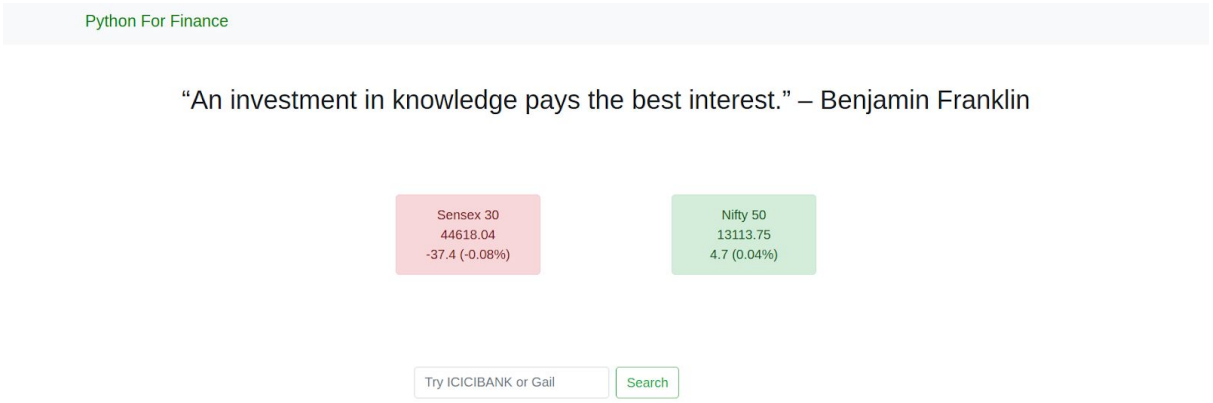
e. `rrratio()`: - calculates the reward risk ratio on behalf of the support, resistance and the buy price.

f. `monthly_trend()`: -takes the monthly data frame as input and analyzes the previous 8 months Close price and returns the current trend as string.

g. `daily_trend()`: -takes the daily data frame as input and analyzes the previous 18 days monthly Close price and returns the current trend as string.

The Functioning:

The front end was designed with the help of HTML, Bootstrap CSS, Javascript library Plotly.



The Home page looks like this.
This is the sensex and nifty record as on 02/12/2020.

Python For Finance

"An investment in knowledge pays the best interest." – Benjamin Franklin

Sensex 30
44512.85
-142.59 (-0.32%)

Nifty 50
13087.95
-21.1 (-0.16%)

Try ICICIBANK or Gail | Search

QUICKHEAL.NS

Current Market Price

159.75

Nearest Monthly Support

160.25

Nearest Resistance Level

172.1999969482422

Data Visualization

QUICKHEAL.NS Monthly Chart (15 years)

QUICKHEAL.NS Daily Chart(6 Months)

Reward-Risk Ratio

Very High

Our Recommendation

Reward Risk Ratio is good but also see the stock performance before investing.

Monthly Trend

The Monthly historical data suggests that the stock is in Uptrend!

Daily Trend

The Daily historical data suggests that the stock is in Uptrend!

The analysis for QUICKHEAL on 02/12/2020.
(No promotions)

Python For Finance

"An investment in knowledge pays the best interest." – Benjamin Franklin

Sensex 30
44535.48
385.76 (0.87%)

Nifty 50
13074.00
105.05 (0.81%)

Try ICICIBANK or Gail | Search

BHEL.NS

Current Market Price

33.049999237060554

Nearest Monthly Support

26.75

Nearest Resistance Level

33.450000762939446

Data Visualization

BHEL.NS Monthly Chart (15 years)

BHEL.NS Daily Chart(6 Months)

Reward-Risk Ratio

0.05098051183363859

Our Recommendation

This is not the right time to buy the shares. Select some other company.

Monthly Trend

The Monthly historical data suggests that the stock is in Uptrend!

Daily Trend

The Daily historical data suggests that the stock is in Uptrend!

The analysis for BHEL on 02/12/2020.
(No promotions)

OUTCOMES:

The project provides a person who wants to play risk free in the stock market. With all the basic information provided to the user, the user just needs to select companies and get simple and safe analysis. The analysis will help the user to make fast decisions whether to trade for the shares or not.

But the stock market investments are subject to many risks. Any news that can change the public sentiments ultimately affects the performance of the market.

LINKS AND REFERENCES

1. Link to the documentation of Django.
2. Link for the project code Github.
3. Link for plotly application rohankewal.