COP 290

~Assignment 1~

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Subtask 2

Content:

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1) Introduction

1.1)Problem Discription

This subtask is aimed at creating the user interface. You need to develop the user interface for the following features:

1. Plot the graph of a given stock on a defined time scale (daily, weekly etc)

2. Plot multiple stocks on the same graph to visually compare the prices.

3. Apply technical filters to get a list of stocks passing the filters (P/E ratio, average price etc.)

1.2)Libraries Used

- Flask Framework:
    - Flask framework is chosen for its simplicity, flexibility and ease of use in building web applications.
    - The lightweight nature of Flask enables seamless integration with various Python libraries.

- SQLAlchemy ORM

    - Basically used for interaction with SQLite databases.
    - SPecifically used because of its object-relational mapping Enabling seamless work with database models and Python Queries

- Charts.Js Library

    - Selected for data visualization due to its interactive charting capabilities.
    - Provides a wide range of chart types and various formatting options for displaying the information.

2) Design

2.1) Design Choices

We decided to go with a simplistic design for the web page. There are four tabs given on the webpage , and for the graph plotting we require the user to select one of the options for the column as well as the duration.

The idea behind the design was to not make things very difficult for the user, and the person using the website himself can easily navigate and interact with the website.

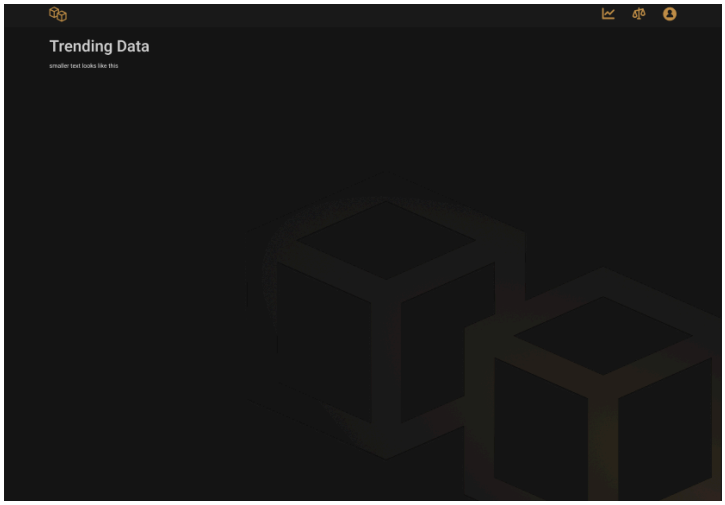
To get ideas about the features like indicators and filters we looked at a few very popular trading websites like Grow.

Throughout the design i tried to maintain three fundamental concepts in design

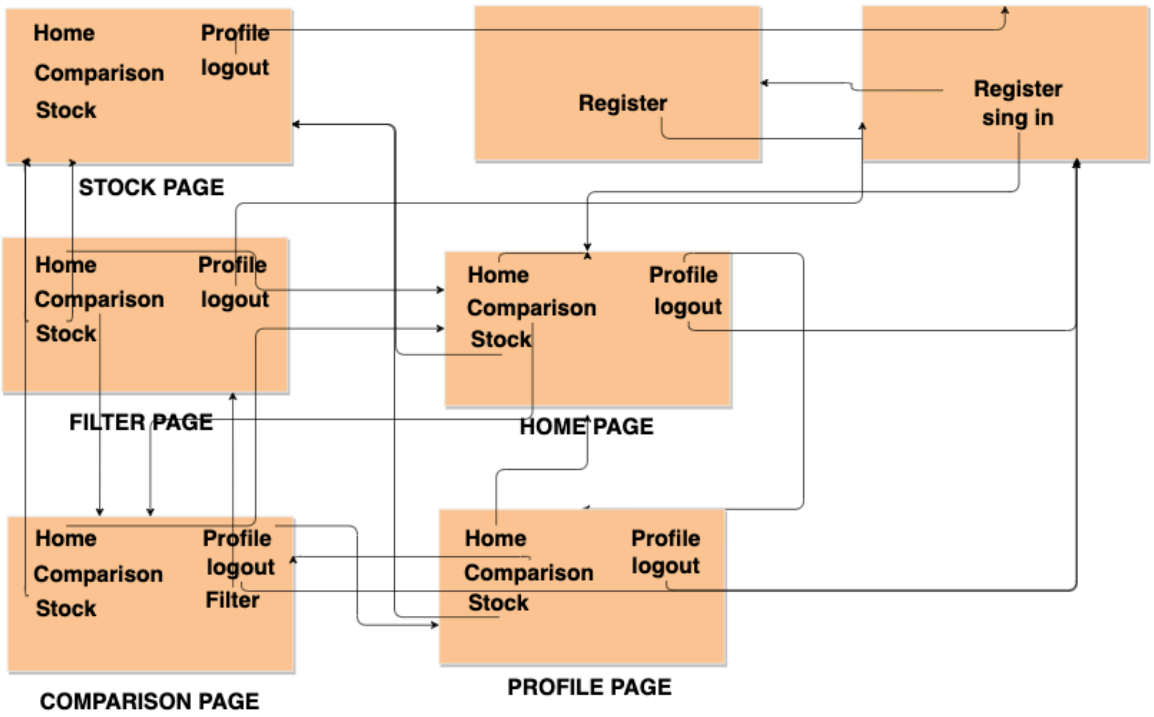
1) KISS (Keep it simple and Stupid)
2) Contrast
3) Hierarchy

2.2) webpage layout

(Colour palette/theme color)



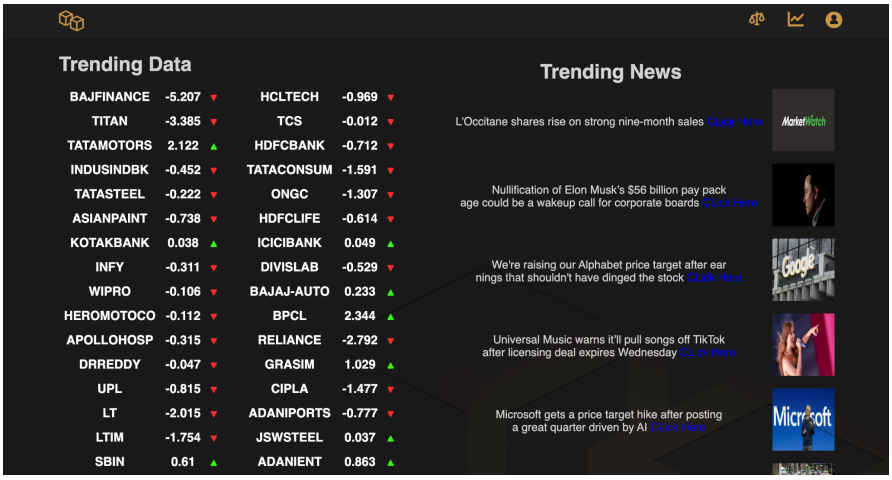
(The basic design of the webpage)



2.3) Interaction

1)Home page

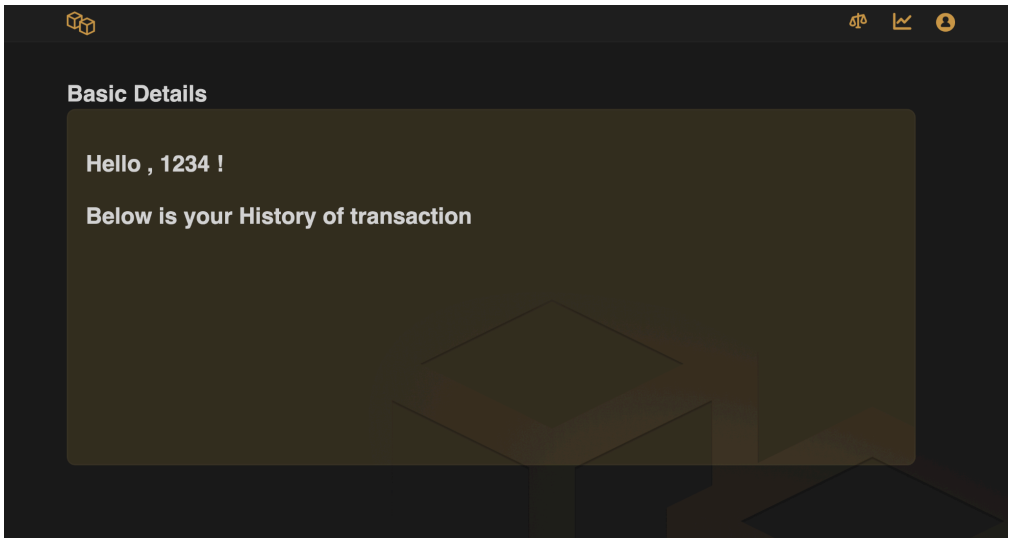
In the home page we provide the user with the current trending data showing the ups and downs in the stock as well as the trending news. The trending news is displayed in a table format whose data is fetched using api calling.All the news link are given just beside theheadlines The user can navigate to any other page using the buttons in the header



2)Profile page

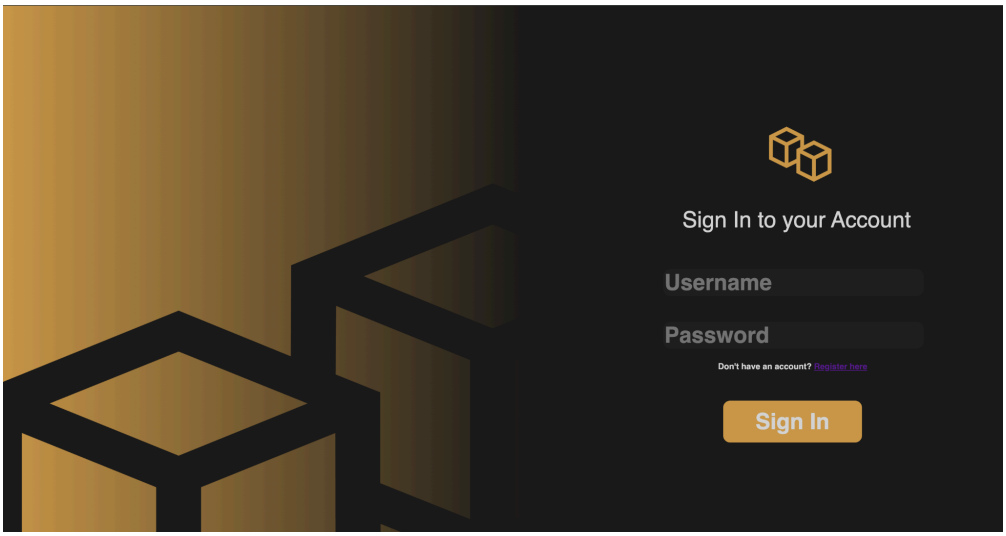
Here we show the current username. At first he idea was also to implement buy and sell option for each stocks , but we figured that it would be tedious work for part 2 alone and maybe we would add this feature in part3 of the assignment

Here also we can navigate to another webpage through buttons in the header.



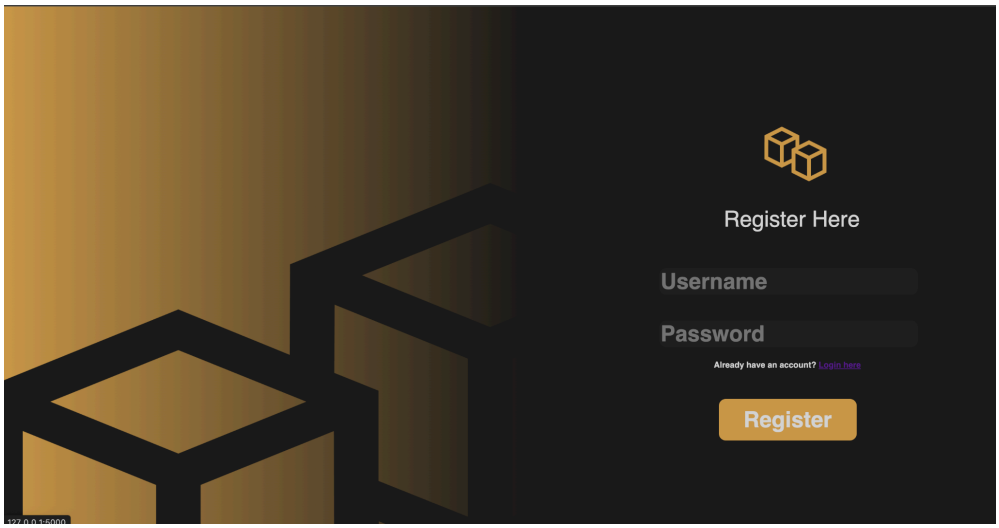
3)login page

This is a very starting page asking the user to enter their username and password, if the datadoes not match they are redirected to login page. They can register using the “register here “ link. If the username and password are correct they can click on sign in to access the home Page



4)register page

User can register on this webpage by entering their username and password , once register they can login by going to login page using “Register” button



5)coparison page

This page allows user to select the company name, add them to their list , and display the graph according to the required column as well as duration.

We provide 8 columns category to choose from and duration scales varying from 1 week to 10 years.The user can also go to fitler subpage using “filter” button and get list of the company names satisfying ceratin criteria columns

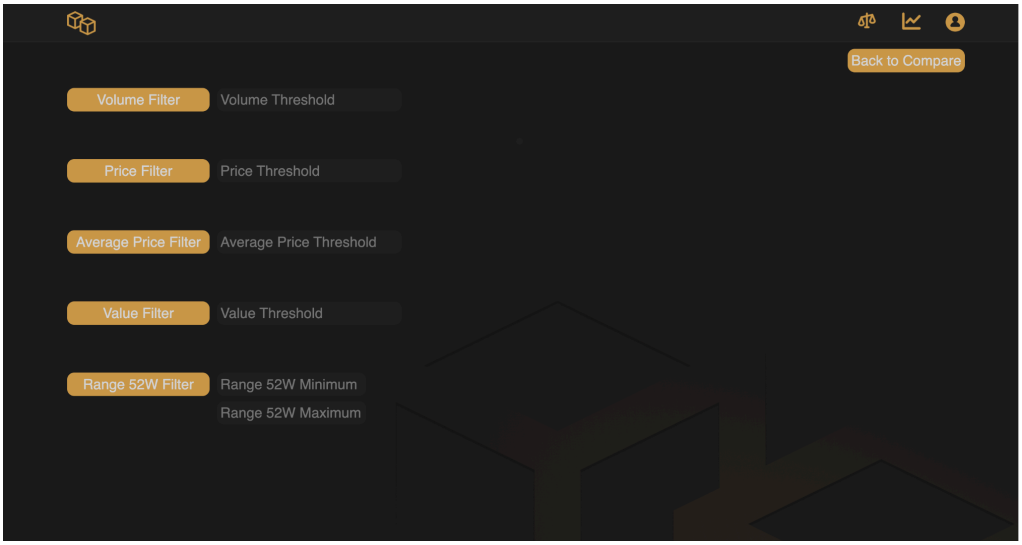
The multiple graphs are plotted on the same x and y axis so that the user can compare them easily

6)stock page

This webpage allows user to show graph for a particular stocks for certain fields and duration , the user can also apply ceratin indicators which makes it more interactive.

7) FIlter page

The user can fill in the required input fields and select the requiered filter to get the list of stocks that satisfy the criteria



3) IMPLEMENTATION

3.1 Graphing Techniques

The website employs a set of sophisticated graphing techniques to present stock-related information effectively. These techniques are deeply embedded in the codebase, leveraging technologies such as JavaScript and the Chart.js library. Following is the complete description of the techniques used:

1. Dynamic User Interaction

The JavaScript functions “setTime” and “setcolumn” allow users to dynamically control the timeframe and select columns for data visualization. These functions manipulate the appearance of the user interface by updating the selected values. The real-time responsiveness is achieved through Asynchronous JavaScript and XML (AJAX) requests, ensuring that users can interactively explore different timeframes and columns without a full page reload.

2. Multi-Stock Comparison

The “generateGraph” function facilitates the comparison of multiple stocks on a single graph. It iterates over the selected stocks, making separate AJAX requests for each, and then combines the datasets to create a unified line chart. This approach allows users to visualize the performance of multiple stocks simultaneously, providing a comprehensive analysis tool.

3. Column Selection for Comparative Analysis

The “setcolumn” function dynamically updates the chosen column for visualization. Users can switch between various columns, such as opening prices, closing prices, or trading volumes. The selected column is then used as a parameter in AJAX requests, ensuring that the graph is updated based on the user's preferences.

4. Randomized Colors for Clarity

The “getRandomColor” function generates random colors for each stock line, enhancing visual clarity and differentiation. This technique ensures that each stock has a distinct and easily **recognizable color on the graph, even when multiple stocks are being compared.**

5. Indicator Tracking

For the stocks page, the code includes a “setIndicator” function that allows users to switch between different technical indicators. The “generateGraph2” function specifically handles the tracking of Bollinger Bands (TRACK_BB). Where Both Upper and lower Bollinger Bands are simultaneously plotted on the same graph.

6. Real-Time Updates

AJAX requests play a crucial role in achieving real-time updates. The “makeAjaxRequest” function is responsible for making asynchronous requests to the server, obtaining the necessary data, and updating the chart dynamically. This approach ensures that users always have access to the latest market information.

These code-centric graphing techniques collectively contribute to an interactive, customizable, and informative platform for analyzing stock data, enhancing the user experience and decision-making capabilities.

3.2) Technical Indicators

In the realm of financial markets and trading analysis, Technical Indicators play a crucial role helping traders and investors make informed decisions . These Indicators are mathematical calculations based on historical available data of the stocks. They help in giving insights about potential risks, price reversals and volatility in the market.

Moving Averages

Simple Moving Average (SMA)

The simple moving average is a commonly used indicator. Which is essentially used to provide updated price average to the user. This enables users to observe the trend of a particular stock and analyze the potential reversal points.

Exponential Moving Average (EMA)

Similar to the moving average EMA renders more weight on the recent prices to compute the average. Therefore it’s basically utilized more in short term analysis.

Relative Strength Index (RSI)

RSI basically acts as an momentum oscillator, which speeds and changes the price movement.

RSI values range from 0 to 100 where above 70 is identified as overbought and below 30 is considered as underbought.
Highly used to identify reversal points in the market.

Bollinger Bands (BB)

Bollinger Bands basically consist of two lines : the upper band and the lower band . The bandwidth that is the range between upper bollinger band and lower bollinger band indicates the volatility in the market. High bandwidth implies a high volatility ,while a small bandwidth indicates low volatility.

Average True Range (ATR)

The Average True range is a volatility indicator that measures the volatility in the market by considering the trade range between high and low prices. Here the measure of magnitude of ATR is directly proportional to the volatility in the market.
Traders highly use ATR to set up Stop-level losses.

Moving Average Convergence Divergence (MACD)

This is a trend following momentum indicator that shows the relationship between two moving averages of an asset's price.
MACD is mathematically computed by subtracting the 26 period EMA from the 12 period EMA . The result of this calculation is the MACD line, which the 9 day average of the MACD line is called a signal line.

Implementation In Trading Website

In our trading website, we have incorporated these technical indicators to provide users

with valuable insights into the NIFTY 50 stocks. Users can analyze historical price data, track trends, and identify potential entry or exit points using these indicators. The intuitive visualizations and interactive charts enhance the user experience, making it easier for both novice and experienced traders to make informed decisions.

Whether users are interested in tracking the rolling mean, exponential moving average, RSI, Bollinger Bands, or Average True Range, our platform empowers them with the tools necessary for comprehensive technical analysis.

By leveraging these indicators, our trading website aims to offer a robust platform for users to enhance their market analysis and trading strategies.

3.3) Stock Filters

In our trading website, we understand the importance of allowing users to apply various filters to narrow down their stock selection based on specific criteria. These filters empower users to focus on stocks that meet their preferred conditions. Below are some key filters integrated into our platform:

1. Volume Filter

- Function Name: Volume_Filter(threshold)
- Description: This filter identifies stocks with trading volumes above a user-defined threshold within the last day. It helps users spot stocks that have seen significant recent trading activity.
- Implementation: The filter considers the volume of each stock and presents a sorted list of stocks with their respective volumes.

2. Price Filter

- Function Name: Price_filter(threshold)
- Description: This filter identifies stocks with closing prices above a user-defined threshold within the last day. It assists users in focusing on stocks with specific price levels.
- Implementation: The filter considers the closing price of each stock and presents a sorted list of stocks with their respective prices.

3. 52-Week Range Filter

- Function Name: Range_52W_filter(minimum, maximum)
- Description: This filter identifies stocks with 52-week high and low prices within a user-defined range. It enables users to filter stocks based on their yearly price performance.
- Implementation: The filter considers the 52-week high and low prices of each stock and presents a sorted list of stocks within the specified range

4. Value Filter

- Function Name: Value_filter(threshold)
- Description: This filter identifies stocks with total trading values above a user-defined threshold within the last day. It helps users identify stocks with high market values.
- Implementation: The filter considers the total trading value of each stock and presents a sorted list of stocks with their respective values.

5. Average Price Filter

- Function Name: Average_Price_filter(threshold)
- Description: This filter identifies stocks with average prices (VWAP) above a user-defined threshold within the last day. It assists users in focusing on stocks with specific average price levels.
- Implementation: The filter considers the VWAP of each stock and presents a sorted list of stocks with their respective average prices.

These filters collectively provide users with a versatile toolkit to tailor their stock selection based on specific quantitative criteria. Whether users are interested in trading volume, closing prices, 52-week performance, total trading values, or average prices, our platform offers a customizable and user-friendly experience for efficient stock filtering.

3.4) API Calling for trending News

In our continuous effort to provide a comprehensive and informative user experience, we have integrated a real-time news feed on the home page of our trading website. This feature aims to keep users updated with the latest financial news and market trends. The trending news section is powered by the Finnhub API, a reliable and versatile financial data provider.

1. API Integration

- API Used: Finnhub
- Function Name: news_list(api)
- Description: This function interacts with the Finnhub API to retrieve the latest general news. The API key is utilized to authenticate and access the required data.
- Implementation: The function fetches trending news articles from the 'general' category, ensuring that users receive timely and relevant updates.

2. Real-Time News Updates

- Purpose: The real-time news feed is strategically placed on the home page to provide users with instant access to breaking news and market developments.
- User Benefit: By integrating the Finnhub API, users can stay informed about global financial news, enabling them to make more informed decisions in their trading activities.

3. Dynamic Content

- Dynamic Display: The trending news section dynamically updates to reflect the latest news stories. This ensures that users are always presented with current and impactful information.
- Enhanced User Engagement: Keeping users engaged with dynamic content fosters a more interactive and immersive user experience.

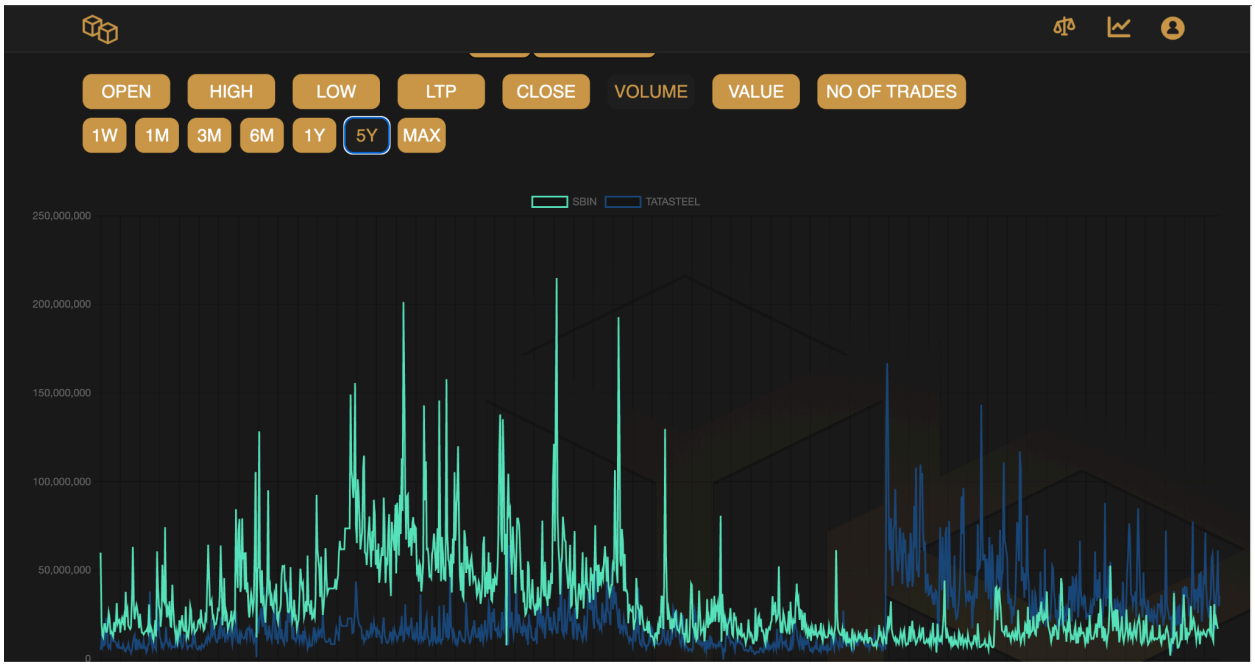
4. Strategic Placement

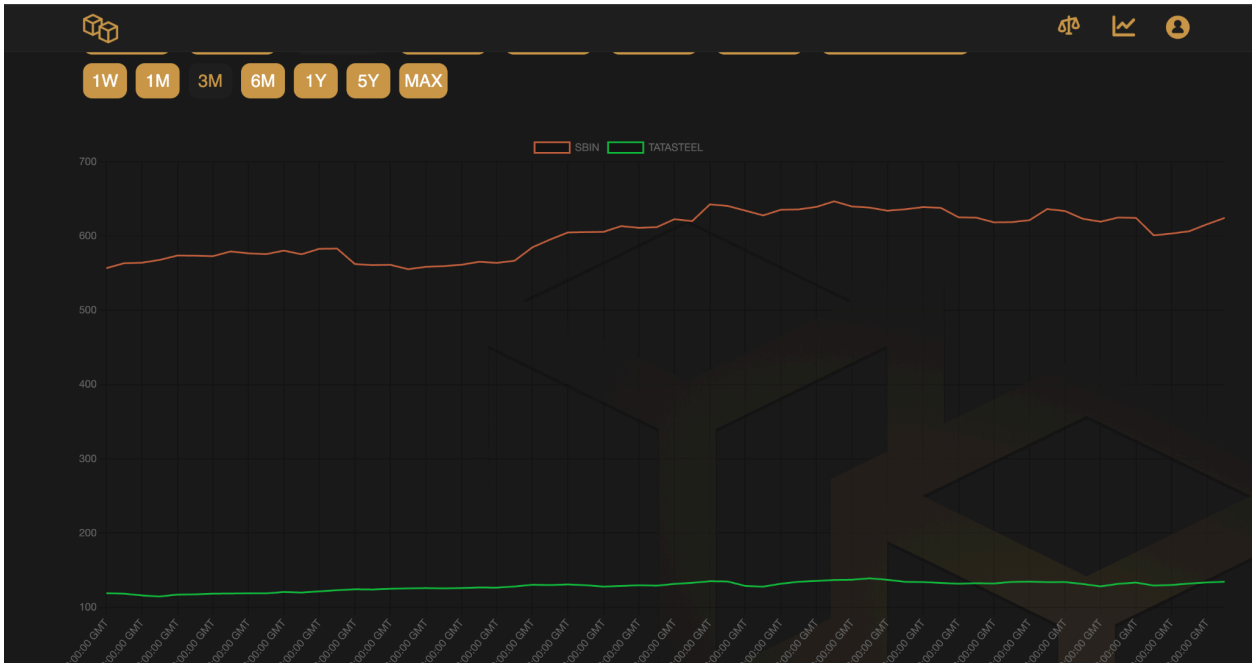
- Homepage Integration: Placing the news feed on the home page acknowledges the importance of news in the financial decision-making process. It serves as a valuable resource for users seeking up-to-the-minute insights.

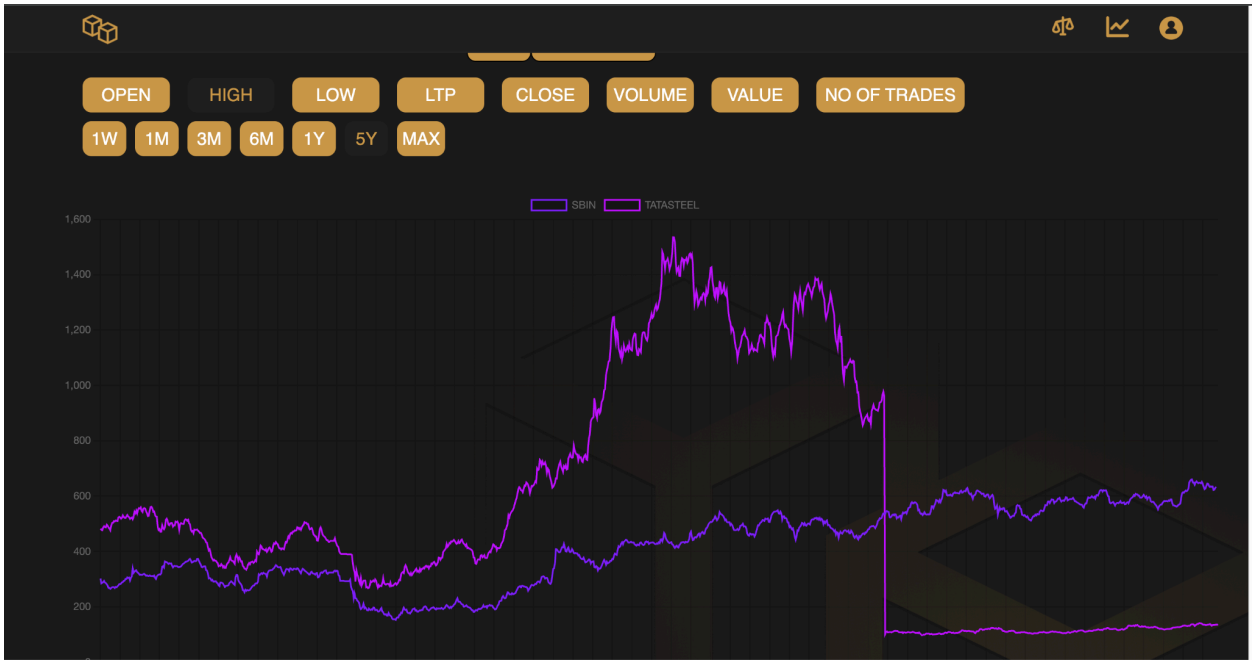
4)Working

4.1)screen shots of various functions

Coparison Page

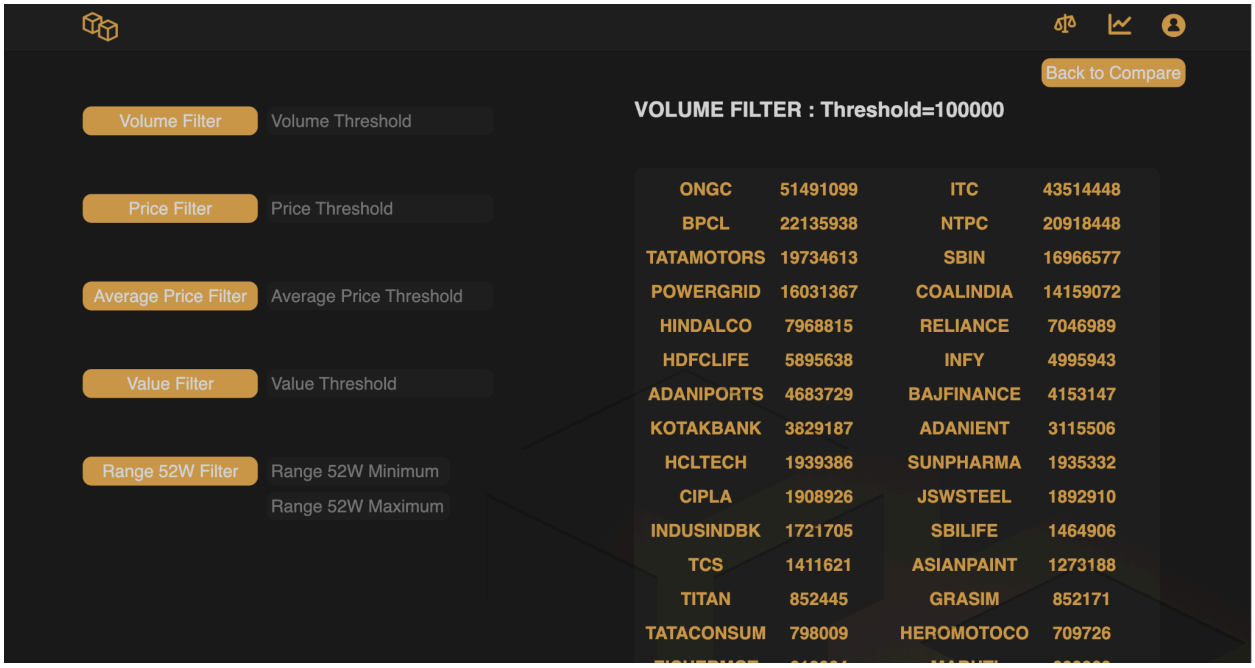


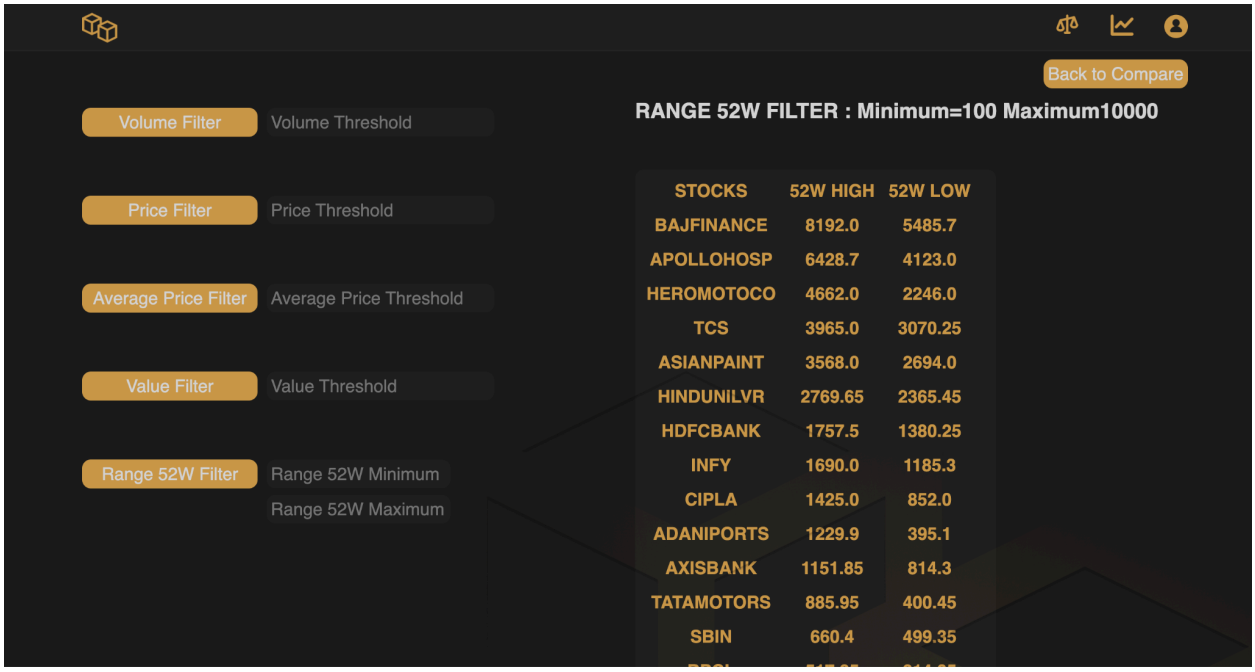



OPEN
HIGH
LOW
LTP
CLOSE
VOLUME
VALUE
NO OF TRADES
1W
1M
3M
6M
1Y
5Y
MAX
SBIN
TATASTEEL
1,600
1,400
1,200
1,000
800
600
400
200


Add Stock Name:
TATASTEEL
SBIN
TATASTEEL
OPEN
HIGH
LOW
LTP
CLOSE
VOLUME
VALUE
NO OF TRADES
1W
1M
3M
6M
1Y
5Y
MAX
SBIN
TATASTEEL
3,000
2,500
2,000
1,500
1,000
500

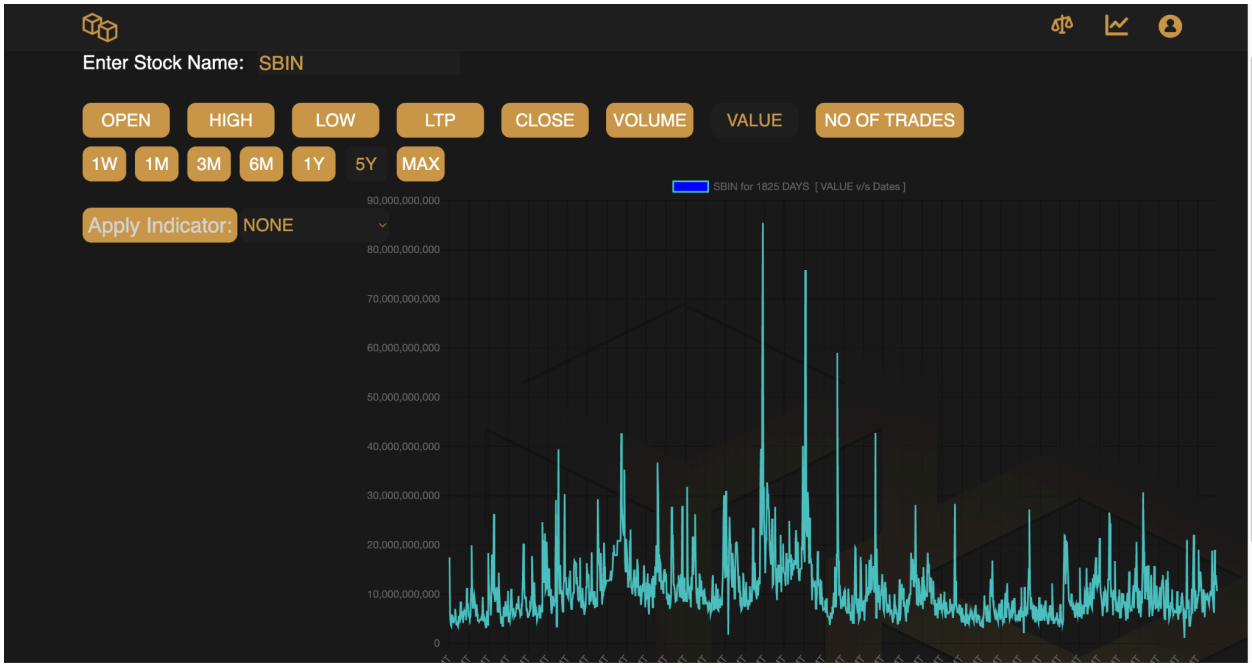
Filter Page


Back to Compare
Volume Filter
Volume Threshold
Price Filter
Price Threshold
Average Price Filter
Average Price Threshold
Value Filter
Value Threshold
Range 52W Filter
Range 52W Minimum
Range 52W Maximum
VOLUME FILTER : Threshold=100000
ONGC 51491099 ITC 43514448
BPCL 22135938 NTPC 20918448
TATAMOTORS 19734613 SBIN 16966577
POWERGRID 16031367 COALINDIA 14159072
HINDALCO 7968815 RELIANCE 7046989
HDFCLIFE 5895638 INFY 4995943
ADANIPORTS 4683729 BAJFINANCE 4153147
KOTAKBANK 3829187 ADANIENT 3115506
HCLTECH 1939386 SUNPHARMA 1935332
CIPLA 1908926 JSWSTEEL 1892910
INDUSINDBK 1721705 SBILIFE 1464906
TCS 1411621 ASIANPAINT 1273188
TITAN 852445 GRASIM 852171
TATACONSUM 798009 HEROMOTOCO 709726


Back to Compare
Volume Filter
Volume Threshold
Price Filter
Price Threshold
Average Price Filter
Average Price Threshold
Value Filter
Value Threshold
Range 52W Filter
Range 52W Minimum
Range 52W Maximum
RANGE 52W FILTER : Minimum=100 Maximum10000
STOCKS 52W HIGH 52W LOW
BAJFINANCE 8192.0 5485.7
APOLLOHOSP 6428.7 4123.0
HEROMOTOCO 4662.0 2246.0
TCS 3965.0 3070.25
ASIANPAINT 3568.0 2694.0
HINDUNILVR 2769.65 2365.45
HDFCBANK 1757.5 1380.25
INFY 1690.0 1185.3
CIPLA 1425.0 852.0
ADANIPORTS 1229.9 395.1
AXISBANK 1151.85 814.3
TATAMOTORS 885.95 400.45
SBIN 660.4 499.35

Stock Page


Enter Stock Name: SBIN
OPEN
HIGH
LOW
LTP
CLOSE
VOLUME
VALUE
NO OF TRADES
1W
1M
3M
6M
1Y
5Y
MAX
Apply Indicator: BB
SBIN for 1825 years [TRACK_BB v/s Dates]
SBIN for 1825 years [VALUE v/s Dates]
700
600
500
400
300
200
100


Enter Stock Name: SBIN
OPEN
HIGH
LOW
LTP
CLOSE
VOLUME
VALUE
NO OF TRADES
1W
1M
3M
6M
1Y
5Y
MAX
Apply Indicator: NONE
SBIN for 1825 DAYS [VALUE v/s Dates]
90,000,000,000
80,000,000,000
70,000,000,000
60,000,000,000
50,000,000,000
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