Stock Price Prediction Application

Business Needs

1. Accurately predict future stock prices for various publicly traded companies.
2. Provide actionable insights to help investors, traders, and financial professionals make informed decisions.
3. Identify companies with high investment potential.
4. Detect stocks prone to significant price fluctuations and analyze market trends.
5. Offer personalized portfolio optimization suggestions based on predicted stock prices.

Strategy

1. **Data Collection**: Gather and preprocess historical stock price data from publicly available sources.
2. **Algorithm Selection**: Use Long Short-Term Memory (LSTM) networks for time-series forecasting, leveraging their ability to learn temporal dependencies.
3. **Web Integration**: Develop a user-friendly interface using the Streamlit web framework for real-time predictions and analysis.
4. **Model Training and Evaluation**: Train the LSTM model on historical data and fine-tune it for optimal accuracy.
5. **Insights and Recommendations**: Use AI to provide clear insights into trends, investment opportunities, and portfolio management strategies.

Business Benefits

1. **Enhanced Decision-Making**: Provide reliable stock price predictions, enabling informed investment decisions.
2. **Wider Accessibility**: Make advanced financial analysis tools accessible to non-experts.
3. **Trend Analysis**: Highlight expected market patterns and investment opportunities.
4. **Portfolio Optimization**: Help users maximize returns by optimizing their investments based on AI-driven insights.
5. **Competitive Edge**: Use AI to identify trends faster and more accurately than traditional methods.

Difficulty Before Requirement

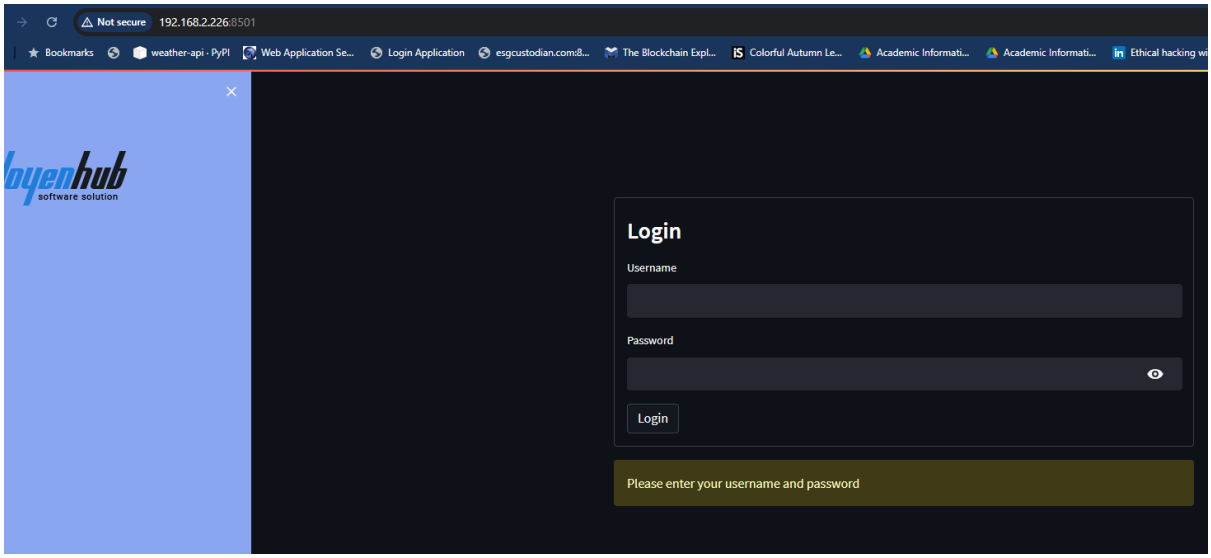
1. Dependence on manual analysis by financial experts, leading to time delays and subjectivity.
2. Limited accessibility to sophisticated forecasting tools for ordinary users.
3. Challenges in identifying and leveraging historical data effectively for multi-company analysis.
4. Inability to predict trends accurately due to lack of advanced algorithms.
5. Difficulty in optimizing investment portfolios without comprehensive insights.

Tools & Technology

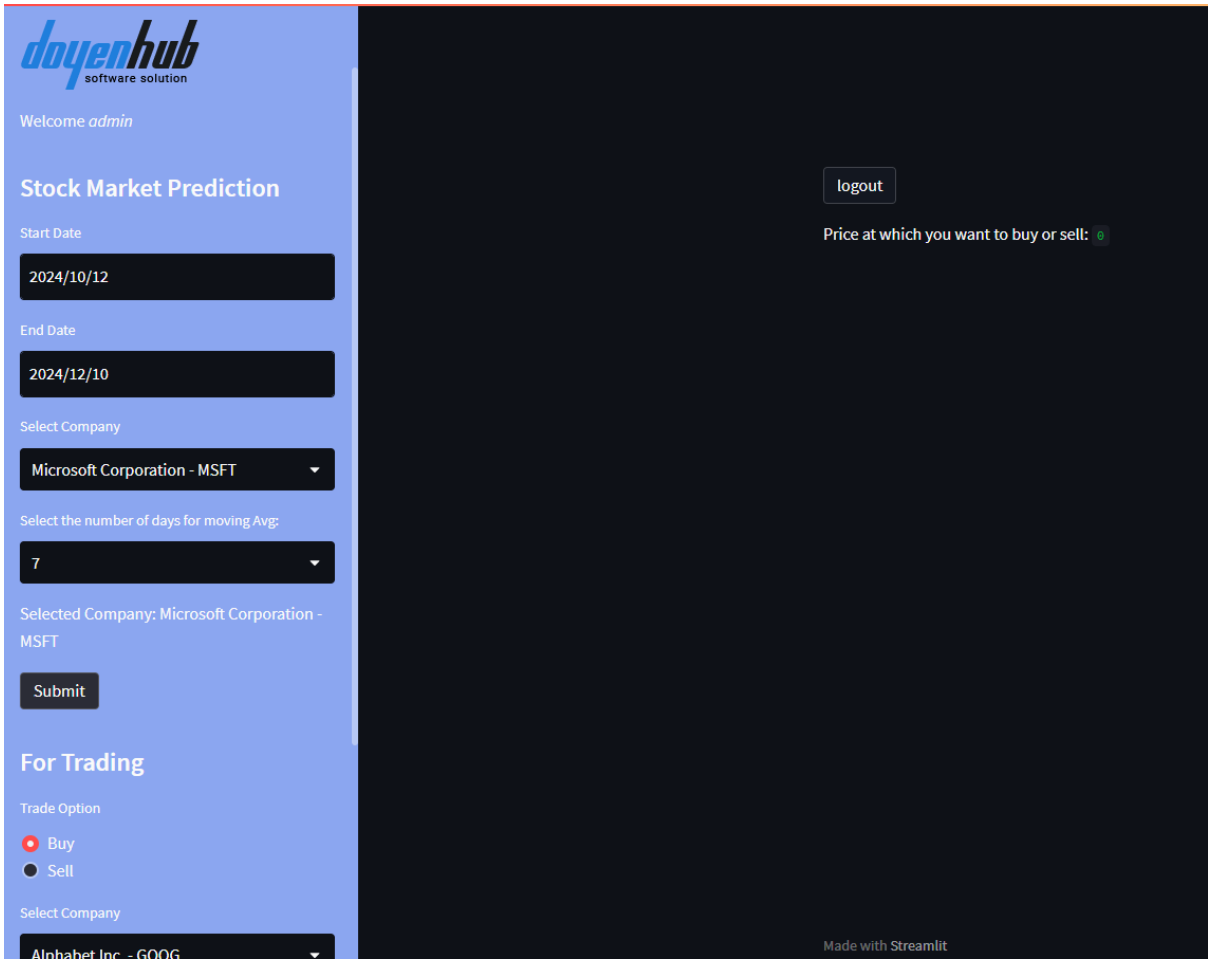
1. **Programming Language**: Python
2. **Machine Learning Frameworks**: TensorFlow, Keras
3. **Model Type**: Long Short-Term Memory (LSTM) artificial neural network
4. **Web Framework**: Streamlit
5. **AI Techniques**: Machine Learning, Time-Series Analysis
6. **Data Sources**: Historical stock price datasets and financial market APIs.

Features we have implemented:

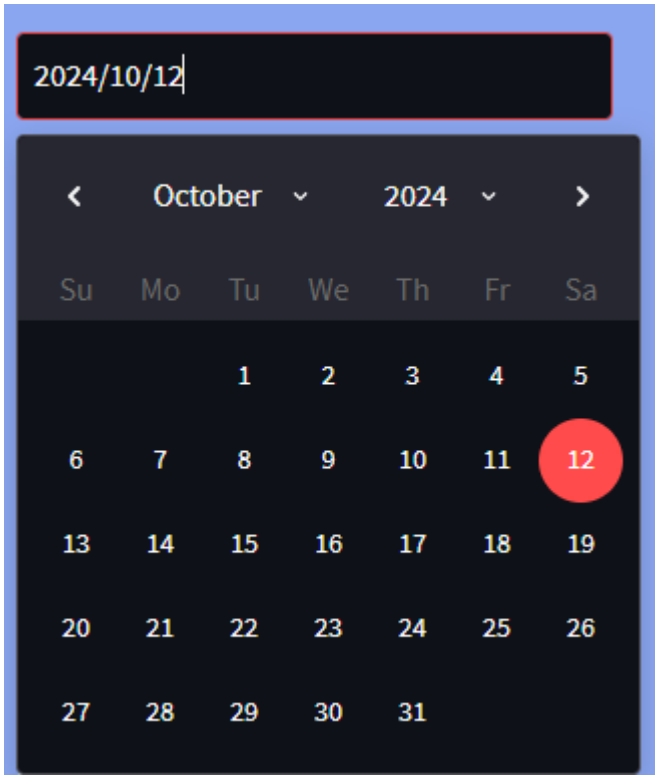
1) Login System: Our web-based system provides users with a secure login interface, ensuring that only authorized individuals can access the platform.



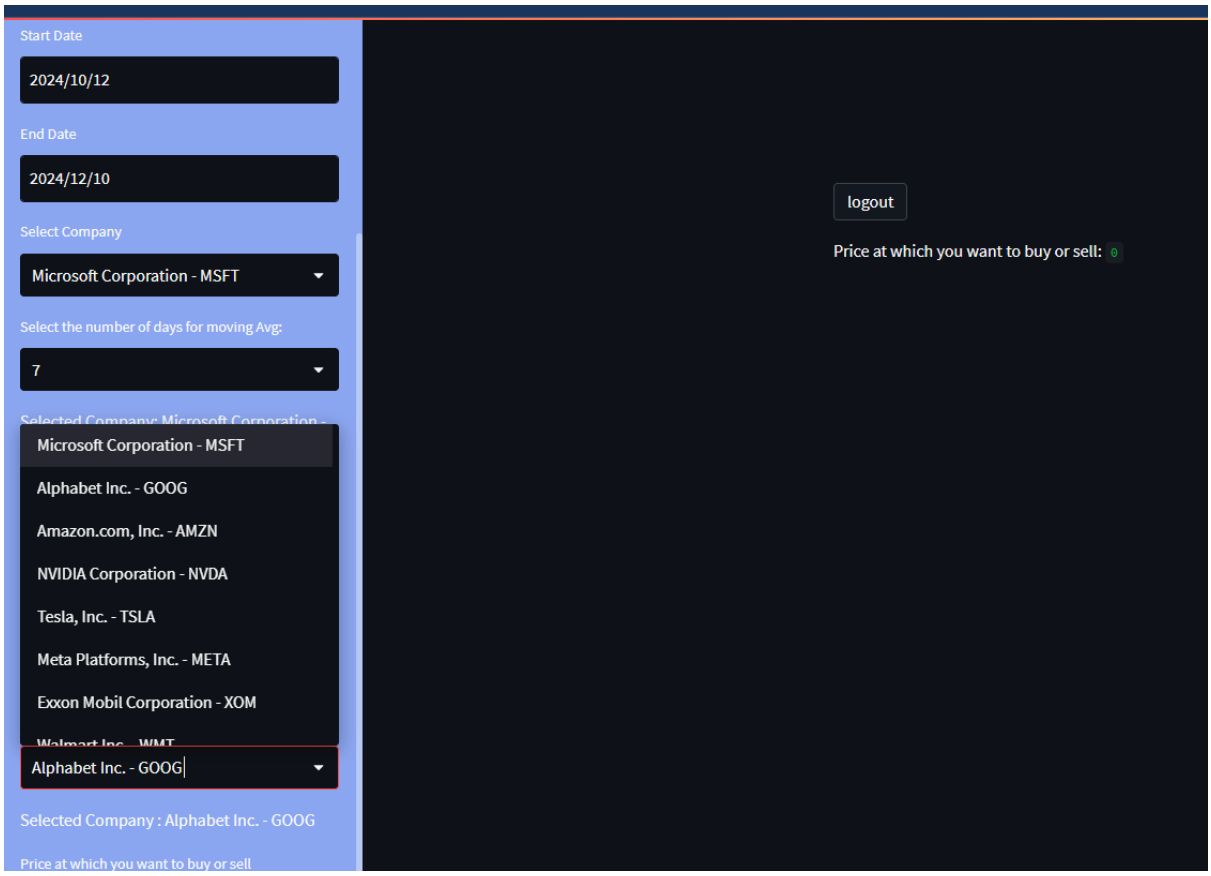
2) Input Facility: Users are equipped with a user-friendly input interface. They can select the desired start date and end date using calendar options, choose a specific company from a dropdown menu, and input the number of days for the moving



Calendar Option to select dates



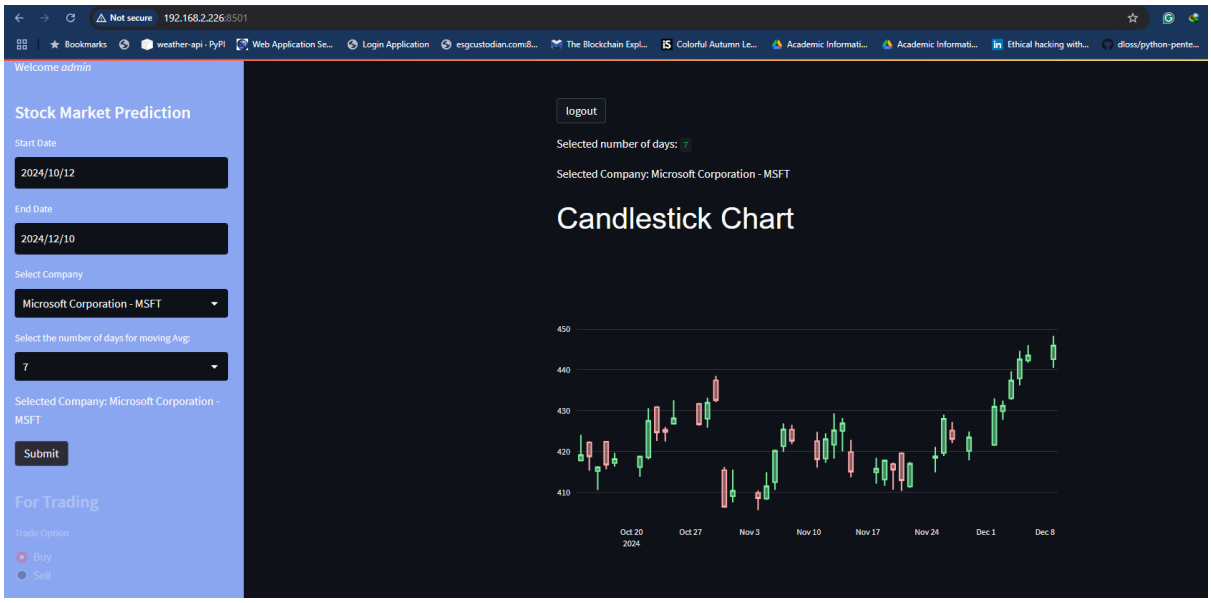
Multiple companies list in drop down menu.



Moving average: select from drop down menu day.

3) Historical Data: Our system retrieves historical data from Yahoo Finance, allowing users to analyze and visualize the stock market trends. We provide two types of charts for this purpose:

   a. Candlestick Chart: This chart displays the open, close, high, and low prices for a given time period, providing a comprehensive view of price fluctuations.



Understanding candle stick chart:

Green candlestick: A green candlestick is typically used to represent a bullish price movement, indicating that the closing price of the stock is higher than the opening price. The body of the candlestick is filled or colored green. The top of the body represents the closing price, and the bottom represents the opening price. The thin lines extending above and below the body are called "wicks" or "shadows" and represent the high and low prices reached during the time period.

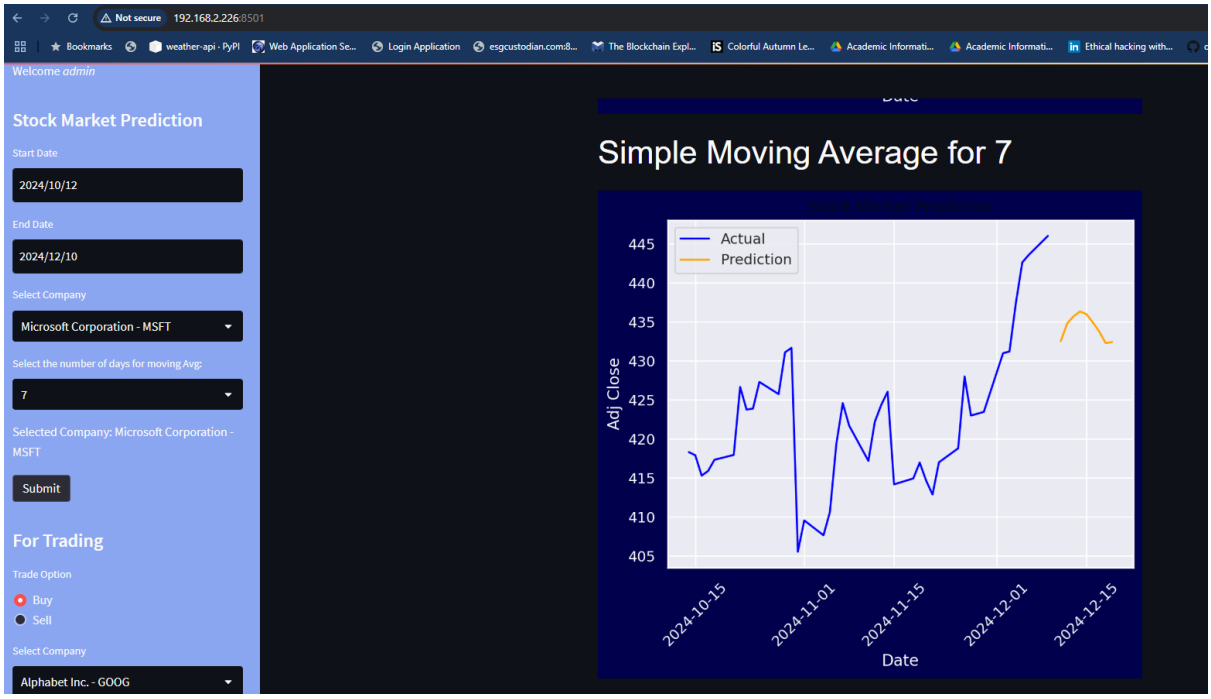
Red candlestick: A red candlestick, on the other hand, is used to represent a bearish price movement, indicating that the closing price is lower than the opening price. The body of the candlestick is filled or colored red. Similar to the green candlestick, the top of the body represents the opening price, and the bottom represents the closing price. The wicks or shadows represent the high and low prices reached during the time period.

It's important to note that the length of the candlestick's body and the position of the wicks provide additional information about the price action and market sentiment. For example, a long green candlestick with small or no wicks indicates strong buying pressure and a significant upward movement in the stock price. Conversely, a long red candlestick with small or no wicks suggests strong selling pressure and a significant downward movement in the stock price.

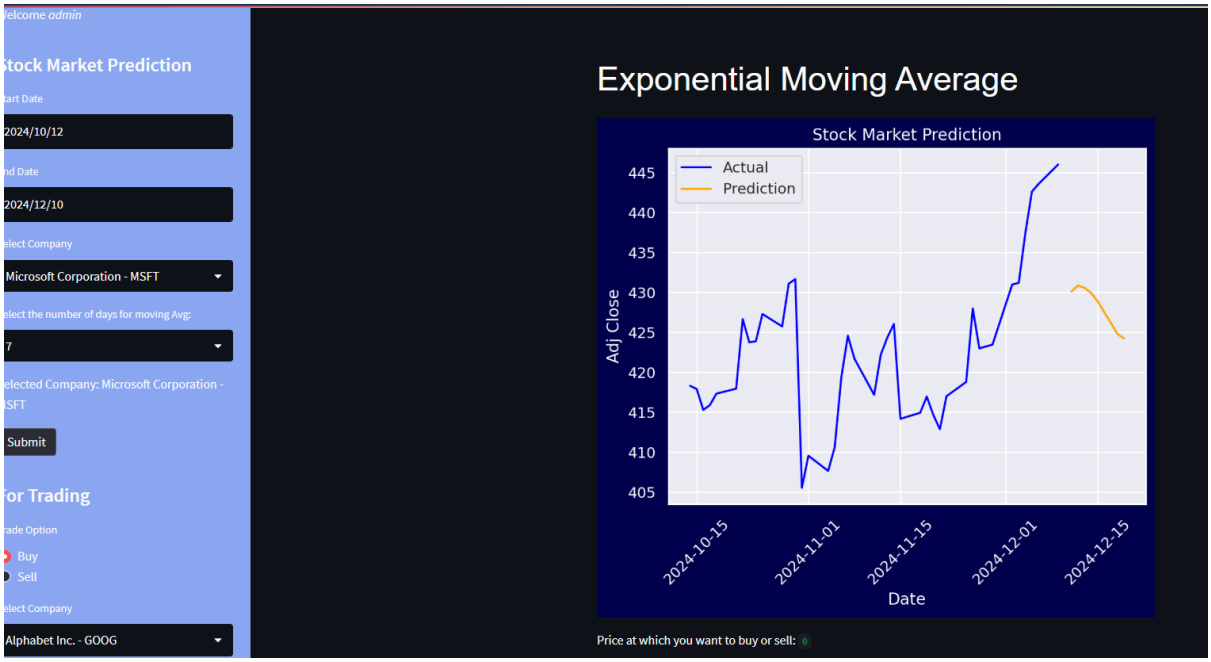
b. Line Chart: This chart specifically focuses on the open and close prices, enabling users to track the overall trend of a stock over time.

4) Prediction: To assist users in making future projections, we have integrated an LSTM (Long Short-Term Memory) AI model. This model utilizes historical data to forecast potential stock market outcomes. Additionally, we offer three types of Moving Averages, namely:

a. Simple Moving Average (SMA)



b. Exponential Moving Average (EMA)



c. Next as day as moving Average

These moving average techniques provide users with different ways to analyze and interpret stock market trends and potential future movements.

By combining the historical data visualization capabilities with the predictive power of our LSTM AI model and various moving average options, our platform equips users with valuable tools to make informed investment decisions and gain insights into market behavior.

Stock sentiment analysis Tool

Objective:

The project aims to build a web-based application that aggregates and visualizes market data from multiple sources. It will combine sentiment data from Twitter and Reddit with real-time stock prices from Yahoo Finance and market sentiment indicators. The platform will use NLP to analyze social media sentiment, identifying trends and public opinion on stocks and markets. Real-time data and insights will be displayed through interactive, user-friendly visualizations. This application will help traders make informed decisions by providing a clear and actionable view of market trends and dynamics.

Business Needs:

1. Provide traders with actionable insights by combining data from multiple sources.
2. Help traders evaluate the sentiment surrounding stocks based on social media discussions and market trends.
3. Deliver this data in an accessible, user-friendly format.

Strategy:

1. **API Integration:**
    - Integrated Yahoo Finance for real-time stock data.
    - Integrated Twitter and Reddit APIs to gather user sentiment data.
2. **Sentiment Analysis:**
    - Use GPT-powered sentiment analysis to classify **social media sentiment**.
3. **Market Sentiment Indicators:**
    - Scrape CNN data to display Fear & Greed indicators.
4. **Data Visualization:**
    - Create an intuitive interface with interactive charts (using Chart.js) to display trends and sentiment scores.
5. **Subscription Model:**
    - Implement a payment gateway using Stripe for monetization.

Business Benefits:

1. Helps traders make more informed decisions using real-time sentiment and price data.
2. Enhances user engagement with intuitive visualizations.
3. Monetization via subscription models provides a recurring revenue stream.

Difficulty Before Requirement:

1. Limited tools were available to combine stock price data and social media sentiment on a unified platform.
2. Traders had to rely on multiple sources, making data aggregation and analysis time-consuming.

3. The absence of real-time insights hindered the ability to respond quickly to market changes.
4. Fragmented data led to less accurate decision-making, increasing the risk of missed opportunities.

Tools & Technology:

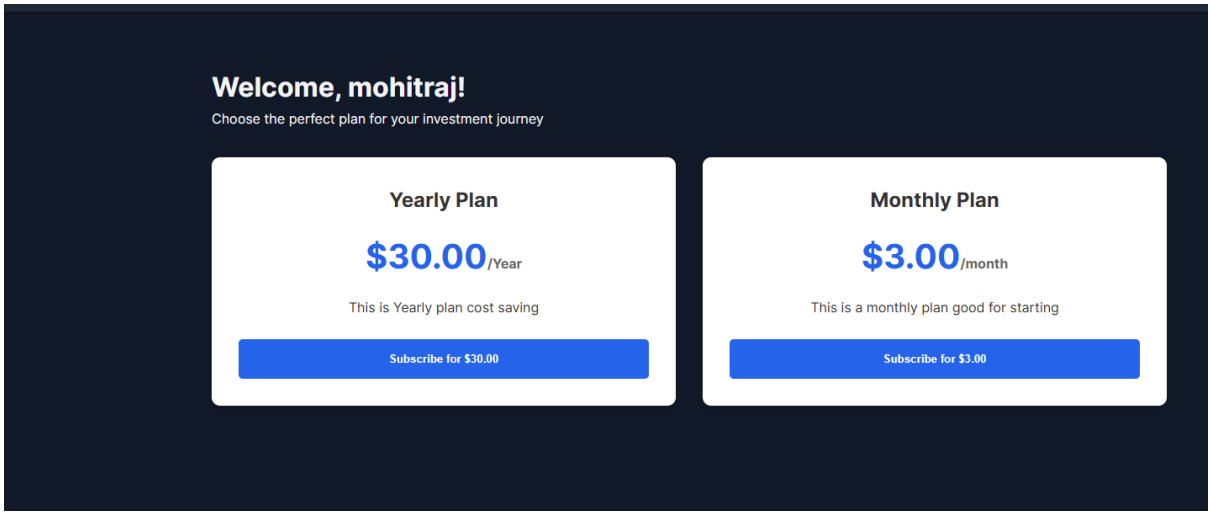
1. **Backend:** Django for API calls, data processing, and sentiment analysis.
2. **Frontend:** Libraries like Chart.js for interactive visualizations.
3. **APIs:**
    - Yahoo Finance
    - Twitter
    - Reddit
4. **Sentiment Analysis:** GPT for processing social media data.
5. **Web Scraping:** Extracted CNN data for Fear & Greed indicators.
6. **Payment Integration:** Stripe for subscription handling.

Feature List:

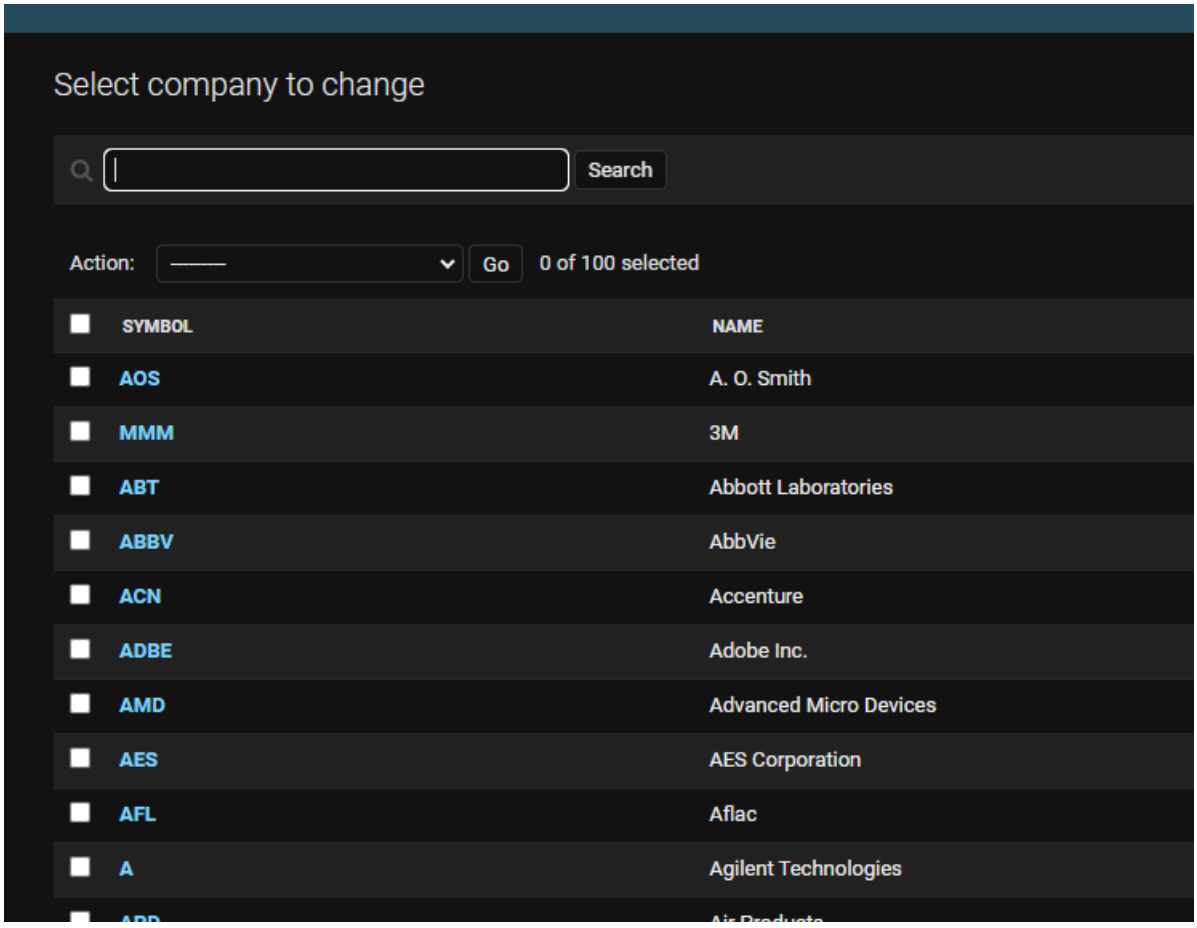
1. **Real-Time Stock Price Tracking:**
   Seamless integration with Yahoo Finance to display up-to-date stock prices, ensuring traders have the latest market data.
2. **Social Media Sentiment Analysis:**
   Advanced NLP-powered analysis of Twitter and Reddit data to uncover public sentiment trends and highlight key discussions around stocks and markets.
3. **Market Sentiment Visualization:**
   Interactive Fear & Greed index visualization to provide users with a clear overview of market psychology.
4. **Subscription-Based User Access:**
   Tiered subscription plans offering tailored access to premium features, ensuring scalability and flexibility for diverse user needs.
5. **Comprehensive Admin Dashboard:**
   A powerful admin panel for managing users, monitoring platform performance, and importing or updating company data efficiently.
6. **Interactive Trend Charts:**
   Dynamic charts displaying real-time stock price movements and sentiment trends, enhancing data interpretation and decision-making.
7. **Automated Data Pipeline:**
   Backend automation for fetching, processing, and storing sentiment and market data, ensuring reliability and reducing manual effort.

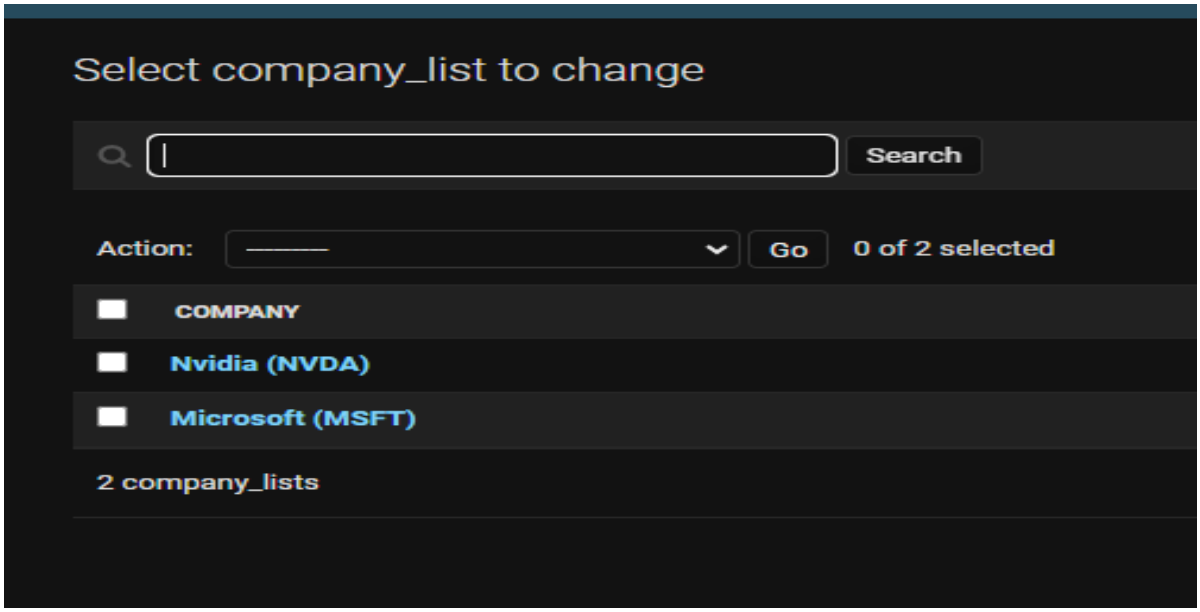
Details Feature list

1. Subscription-based user access model.



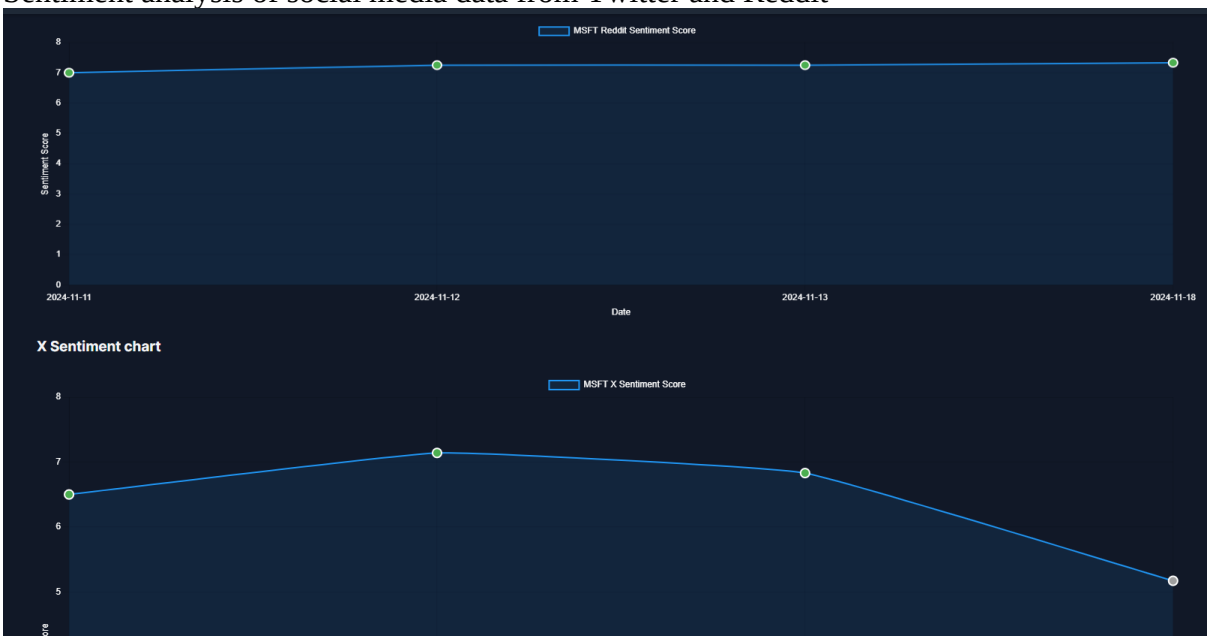
2. Admin panel with company management and data import functionalities.



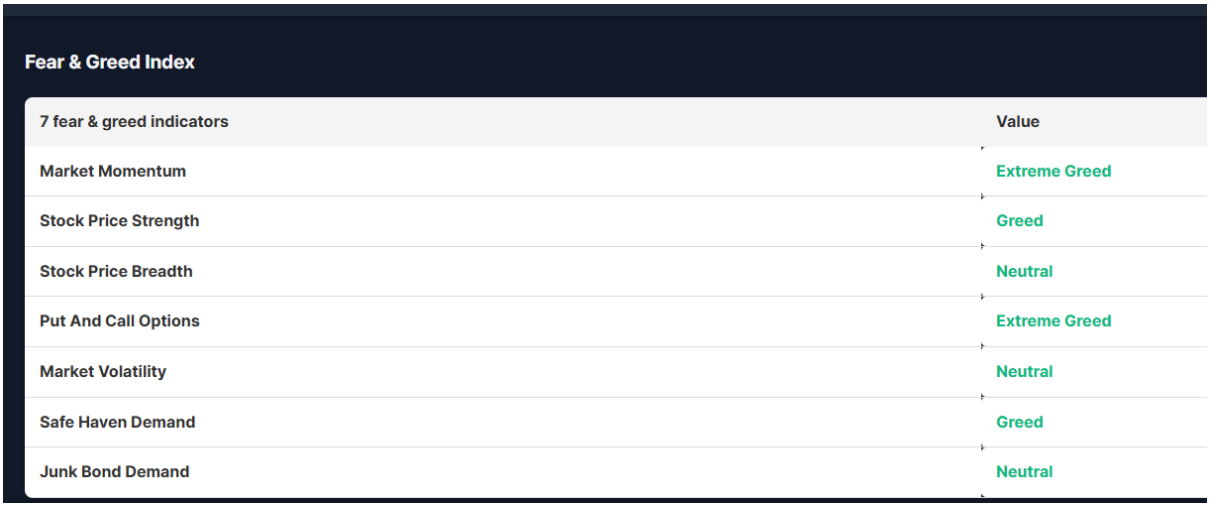


3. Real-time stock price display from Yahoo Finance.

4. Sentiment analysis of social media data from Twitter and Reddit



5. Fear & Greed indicator visualization.



Fear & Greed Index

7 fear & greed indicators	Value
Market Momentum	Extreme Greed
Stock Price Strength	Greed
Stock Price Breadth	Neutral
Put And Call Options	Extreme Greed
Market Volatility	Neutral
Safe Haven Demand	Greed
Junk Bond Demand	Neutral

6. Backend automation for fetching and storing sentiment data.

Note: Instead of Yahoo Finance, we can integrate any other stock market data, addition to twitter and Reddit, we can integrate any other social media API or any other channel API to get people sentiment information.