STOCK PRICE ANALYTICS & PREDICTION USING ML

ABSTRACT

The stock market is one of the most dynamic and complex fields of finance, where the stock prices of companies continuously fluctuate.

This project aimed to build a stock price analytics and prediction app using Streamlit, a user-friendly web application framework for Python.

The app is aim’s to simplify the complex world of stock market analytics, making it more accessible to a wider audience.

INTRODUCTION

This mini-project introduces a stock price analytics and prediction app built using streamlit,
a user-friendly web application framework for Python.

The app enables users to select a company and view its historical stock price data, along with visualizations of technical indicators using the TA library.

Additionally, the app uses a linear regression algorithm to provide users with predictions for selected days, helping them to make informed investment decisions.

KEY FEATURES

- **Historical Data** : The app provides users with historical stock price data for the selected company.
- **Technical Indicators** : The app allows users to visualize technical indicators such as Moving Averages, Relative Strength Index (RSI), and Bollinger Bands using the TA library.
- **Interactive Charts** : The app provides interactive charts that allow users to zoom in and out, making it easier to analyze data.
- **Customization**: Users can customize the app by selecting the time period for which they want to view data and choosing the technical indicators they want to visualize.
- **Prediction**: The app provides users with predictions for the selected days using a linear regression algorithm, helping them to make informed investment decisions.

TOOLS/LIBRARIES USED

Programming Language : Python

Tool/Platform : Visual Studio Code

Operating System : Windows 10 Pro

Libraries Used : Sklearn, Streamlit, Pandas, & TA

DATA SOURCE :

- Historical and Live Data of stocks are gathered using yfinance api of Yahoo Finance

```
yf.download("META")
```

```
[**********100%**********]  1 of 1 completed
```

Date	Open	High	Low	Close	Adj Close	Volume
2012-05-18	42.049999	45.000000	38.000000	38.230000	38.230000	573576400
2012-05-21	36.529999	36.660000	33.000000	34.029999	34.029999	168192700
2012-05-22	32.610001	33.590000	30.940001	31.000000	31.000000	101786600
2012-05-23	31.370001	32.500000	31.360001	32.000000	32.000000	73600000
2012-05-24	32.950001	33.209999	31.770000	33.029999	33.029999	50237200
...	...	...	...	...	...	...
2023-05-03	239.470001	241.750000	232.750000	237.029999	237.029999	34463900
2023-05-04	236.059998	238.199997	232.929993	233.520004	233.520004	17889400
2023-05-05	232.240005	234.679993	229.850006	232.779999	232.779999	26978900
2023-05-08	231.419998	235.619995	230.270004	233.270004	233.270004	16400500

METHODOLOGY

We have used the following methodology to develop the stock price prediction app :

- Data Collection: We have collected the historical stock price data of the given company from Yahoo Finance using the yfinance Python library.

- Data Preprocessing: We have preprocessed the historical stock price data to make it suitable for the Scikit-learn library. The preprocessing includes removing missing values, resampling the data to a daily frequency, and renaming the columns.

- Feature Engineering: We have created additional features such as moving averages, exponential moving averages, and technical indicators such as the Relative Strength Index (RSI) and the Moving Average Convergence Divergence (MACD) to improve the accuracy of the stock price prediction.

- Model Training: We have used the Scikit-learn library to train the stock price prediction model. We have used linear regression to model the relationship between the historical stock price and the additional features created in step 3.

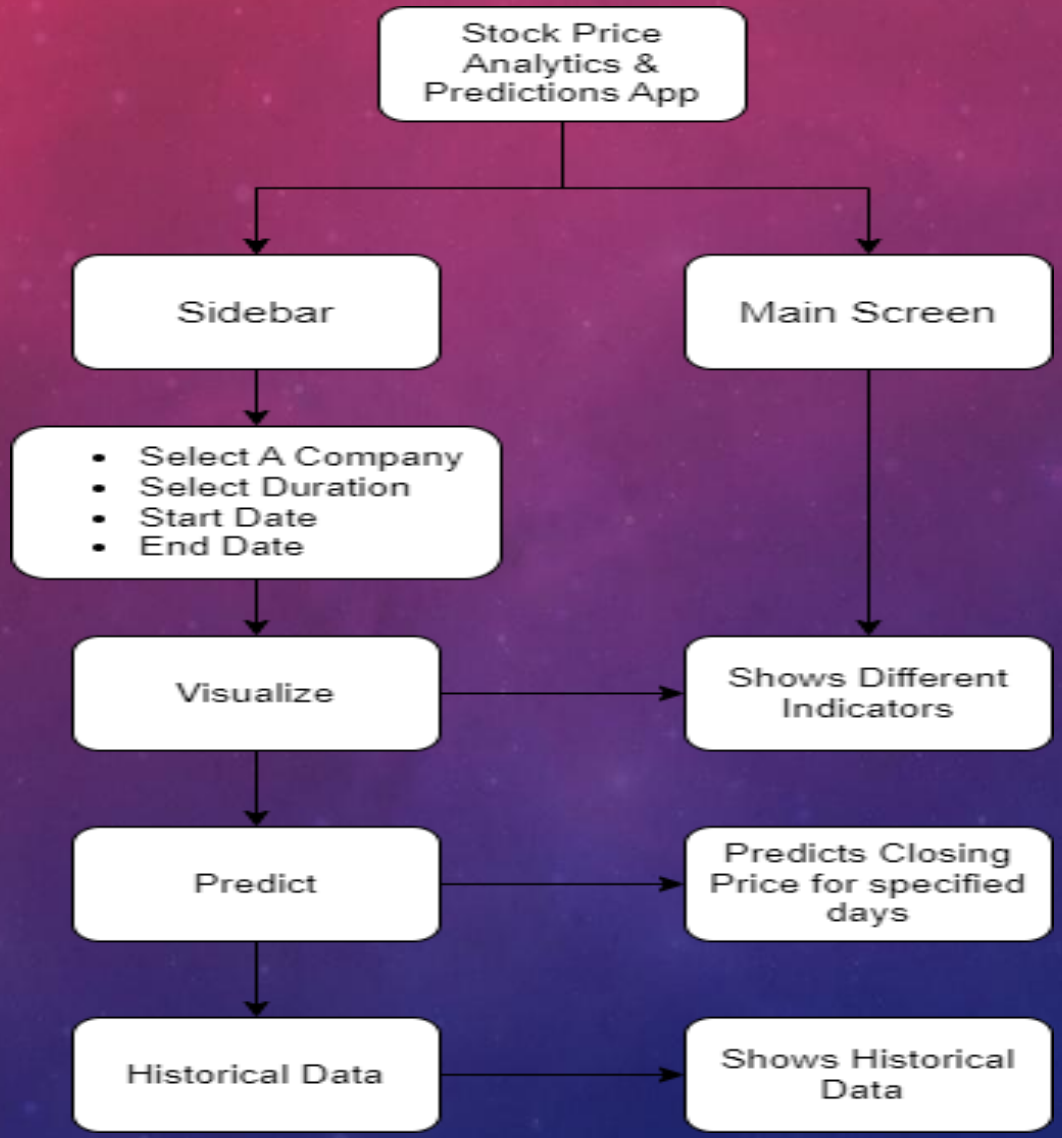
- Model Evaluation: We have evaluated the performance of the stock price prediction model using the mean absolute error (MAE) and mean squared error (MSE) metrics.

- Web Application Development: We have developed the web application using Streamlit. The web application has a simple user interface that allows the user to input the name of the company, the start date, and the end date for the stock price prediction.

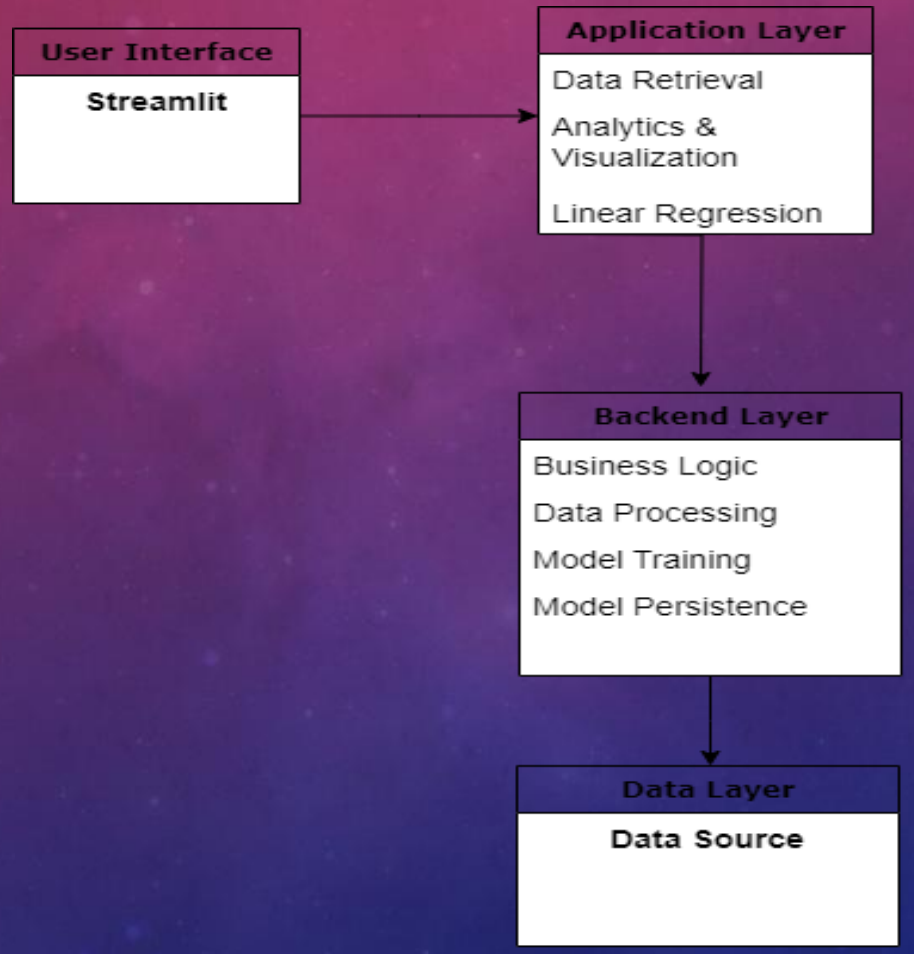
UI/UX

- Web Application is created using Streamlit library in Python.
- The app allows the user to select a company from a list, choose a date range, and view recent stock price data. The user can also view different technical indicators such as Bollinger Bands, MACD, RSI, SMA, and EMA.
- The app also provides a prediction feature where the user can input the number of days they want to predict the stock price for and the model uses Linear Regression for prediction.
- The app uses the yfinance library to download stock price data, and the ta (technical analysis) library to calculate the technical indicators. The app also uses scikit-learn for data preprocessing, training the models, and evaluating their performance.

USER CASE DIAGRAM



ARCHITECTURE DIAGRAM



Select Company

Google Inc.

Enter the duration

3000 − +

Start Date

2015/02/21

End date

2023/05/10

Start date: 2015-02-21

End date: 2023-05-10

Make a choice

Predict

Stock Price Analytics & Predictions

How many days of forecast?

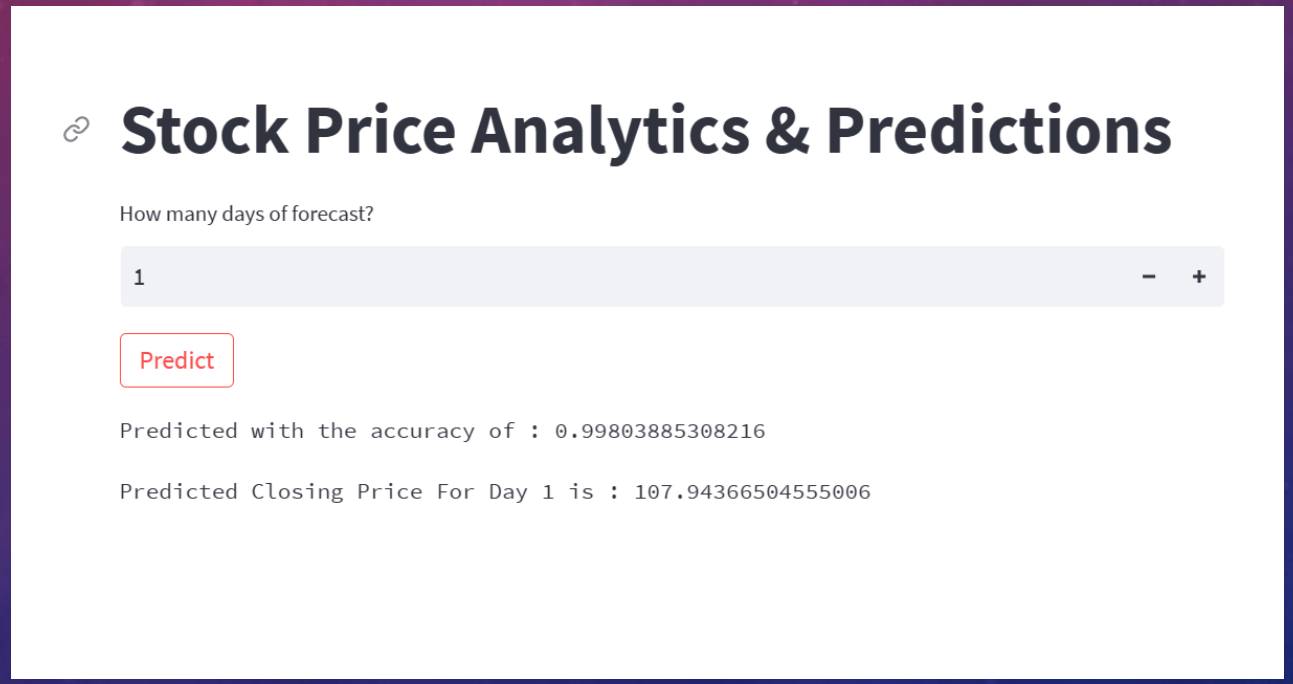
1 − +

Predict

Made with Streamlit

ACCURACY

- To check the accuracy of model, R Squared Score Metrics are used
- Model has performed well with the accuracy 99%



RESULTS

The developed web application provides accurate stock price predictions for a given company.

The user can select the company from the list of top companies, the start date, and the end date for the stock price prediction.

The user can also see technical indicators, which helps user understand about stocks.

Linear Regression algorithm produced 99% Accuracy

CONCLUSIONS

In conclusion, we have developed a web application that predicts the stock price of a given company using linear regression by the Scikit-learn library. The web application is built using Streamlit, which is an open-source app framework for data science teams.

The web application provides accurate stock price predictions for a given company, and it is user-friendly, responsive, and easy to use.

The developed web application can be used by investors, traders, and financial analysts to make informed decisions.

THANK YOU!