Title: Stock Market Predictor - A Streamlit App for Stock Analysis

Introduction:

The Stock Market Predictor is an interactive online application created with the help of Streamlit, a Python package. The app's main objectives are to examine historical stock data, anticipate future stock values using the Prophet forecasting model, and do sentiment analysis on news stories pertaining to the chosen firm. In-depth examination of the app's features, coding, and potential areas for development will be provided in this report.

Functionalities:

The program allows users to enter the ticker symbol for a particular company's stock, such as AAPL for Apple Inc. The program utilizes the Yfinance library to retrieve historical stock data from Yahoo Finance once the user enters the stock ticker. The information is then cleaned up and kept for further examination.

Date Range Selection: Users may select the start year and number of years they want to project out using sliders. The specified date range is crucial for the forecasting model to be trained and for precise forecasts to be made.

Exponential Smoothing: To produce a smoothed line for the closing stock prices, the program uses exponential smoothing. The user may customize the smoothness of the trend line by adjusting the amount of smoothing using a slider.

Stock History Visualization: Plotly is used to display the historical opening and closing stock prices as well as an exponentially smoothed line that represents the closing stock prices. This gives readers a thorough understanding of the stock's historical price movements.

News Data Retrieval: Using the News API, the app retrieves news stories about the chosen organization. To guarantee that the retrieved articles are pertinent to the selected firm, the search query contains both the stock ticker and the company name.

Sentiment Analysis: Using the TextBlob library, the program analyzes sentiment after obtaining the news articles. Each article receives a sentiment score based on word lists that are specifically created for positive and negative sentiment. The overall sentiment toward the firm is then calculated by averaging the sentiment scores.

Forecasting and visualization: The software makes stock price predictions based on historical data using the Prophet forecasting model. The projected stock prices and their related confidence intervals are plotted alongside the forecasted data. Users may now see probable pricing patterns in the future thanks to this.

Code Organization: The "Stock Market Predictor" app's code is divided into a number of functions, each of which is in charge of carrying out a certain duty:

Data Loading and Caching: To load historical stock data and obtain news items, respectively, two functions, load\_data() and get\_news(), are defined. Both methods use the @st.cache\_data decorator, which enables caching to enhance app performance by reducing the number of API requests required when users return to the same stock.

The plot\_raw\_data() function is in charge of graphically representing historical stock data, including the opening and closing prices as well as the smoothed line. An interactive graphic that enables viewers to zoom in and out for in-depth study is made using Plotly.

Prophet Forecasting Model: The Prophet library's Prophet forecasting model is used to anticipate future stock values. The smoothed closing stock prices are used to build the df\_train DataFrame, and the model is trained using the provided changepoint prior scale.

Conclusion:

Streamlit's Stock Market Predictor software offers an interactive and user-friendly tool for examining historical stock data, forecasting stock values, and doing sentiment analysis on pertinent news stories. The software is a useful instructional tool for comprehending sentiment research and stock market predictions because of its features, implementation, and visualization capabilities.

Potential Improvements:

While the Stock Market Predictor app is functional and informative, there are several potential areas for improvement:

Additional Features: To enhance user experience, additional features could be added, such as the ability to explore technical indicators, or analyze other financial data.

Error Handling: The app could benefit from improved error handling to provide users with informative messages when invalid inputs or errors occur during data retrieval or processing.

Model Tuning: Fine-tuning the Prophet model's hyperparameters could lead to more accurate predictions, improving the app's forecasting capabilities.

User Authentication: Implementing user authentication could allow users to save and access their stock analysis preferences and predictions securely.

Real-time Data: Incorporating real-time data updates would enable users to analyze the most recent stock data and make informed decisions accordingly.

UI Enhancements: Improving the app's user interface design and adding interactive elements could further enhance the overall user experience.

In conclusion, the Stock Market Predictor Streamlit app is a valuable tool for stock analysis and forecasting, offering users insights into historical stock trends, future price predictions, and overall sentiment surrounding a company. By addressing potential improvements, the app could become even more powerful and user-friendly, providing valuable insights to users interested in the stock market.