# Final project: STOCK PREDICTION APP

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## Goal

The goal of this project is to create an application that allows the user to check sentiment for the top 20 S&P500 stocks for the past week and check the estimated closing price of the selected stock for the next business day. This app primarily targeted for short-term traders for whom such information as estimated next day closing price of the stock and recent sentiment can be useful information to make buy/sell decision.

## App

We are excited to present you our [Stock Prediction App](https://share.streamlit.io/rnhondova/fintech540-final-project/main/stock_prediction_app.py)!

Here we will walk you through how to use an app, using an example for Apple.

**About the App Section:** First, the user can familiarize herself with the purpose of this app and what data and methods were used for the analysis.

Graphical user interface, text, application, email

Description automatically generated

**Wordcloud:** The user can then pick one of the 20 stocks of S&P500 by Market Cap and check it’s wordcloud based on the tweets data (for the past week) relating to the selected stock. Size of a word in wordcloud indicates its frequency and importance.

Text

Description automatically generated

## **Sentiment Analysis:** Next, the user can check what are the current positive and negative sentiment scores based on Twitter data (last 7 days). Also, we provide subjectivity score, which indicates expressions of opinions, feelings, and evaluations. This essentially is capturing if the tweets collected, were either mostly subjective (closer to zero) or objective (closer to 1).

## Graphical user interface, text, application, email Description automatically generated

## **Prediction of Next Closing Price of a Stock:** For the selected stock, the user can check the graph to see the performance of the model for the last 150 days by comparing actual and predicted prices of the stock. The graph also includes the predicted next closing price. In addition, the user can check for the estimated increase/decrease of stock price calculated as difference of the last closing price and the predicted closing price for the next business day. If the model estimates a monetary increase, the number will be shown in green and in red otherwise.

Chart

Description automatically generated

## DATA

We used the data from APIs yahoo-financials & alpha\_vantage in Python. From yahoo-financials, the app collects daily stock closing prices and volume traded. Alpha\_vantage is used for technical signals RSI, MACD and SMA.

## Methods

**Sentiment analysis:**

Sentiment analysis was conducted on Twitter Data for the past week. Tweets including the stock symbol with ‘$’ appended (e.g. $AAPL for Apple) are collected and cleaned. The cleaning is to remove emojis, stop words, punctuation etc. The packages Vader and Textblob are then used to calculate the sentiment and subjectivity.

**Stock Prediction:**

Long short-term memory (LSTM) was used to predict closing price of the stock. Models with different features and lags were considered. The final model for forecasting one day stock price includes a 7-day lag, volume traded in those days and RSI.

## CODE

For details on the models and the app, please refer to our [git repository](https://github.com/Rnhondova/Fintech540-Final-Project).