Final Project Report SI 206

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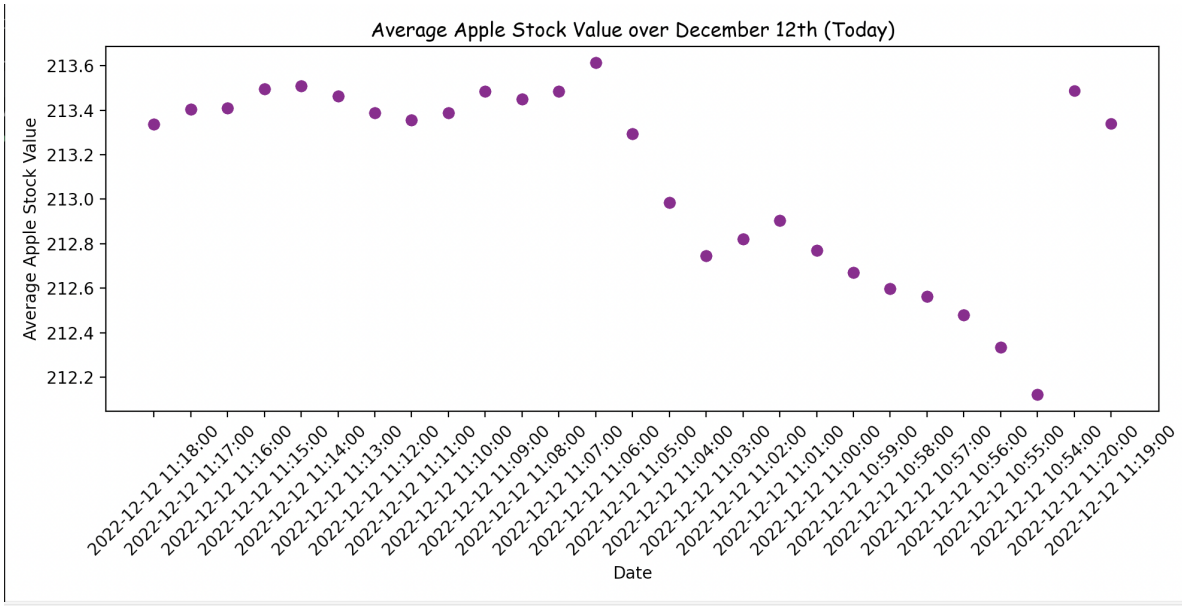
GITHUB LINK: https://github.com/sscully2324/FinalProject.git

1. **Original goals for project:**
   Our group wanted to test historical and current stock market trends for the Apple ticker. We compared these trends to the sentiment scores of Apple market news articles published within the last month. We wanted to look at whether the news headlines were positive or negative, and see if that correlated at all to how the stock market was trending the past month.
2. **Goals that were achieved:**
   Our group successfully located 3 APIs that gave us the 3 different types of data needed to compare current Apple stock value to last month's Apple stock value, and also observed the sentiment score trends in market news for the past month. By looking at our visuals we can conclude that the daily trend for Apple stock value today is steadily declining, while over the past month it seems to stay pretty constant. This is interesting because the sentiment report shows that there were articles each day of the past month with very high sentiment (positive), and some with very low (negative) sentiment.
3. **Problems faced:**
   While we get more in depth to our problems on question 8, we had some general issues that we had to face and overcome during this project. Some of our biggest problems include struggling to find an API that gave us the sentiment score on the news headlines and having issues with git commands, such as git push and git pull. Also, we had a hard time finding out what to normalize with our data, and we actually failed to figure that out, as most of our data was quantitative. To make up for normalizing parts of the data, we decided to create an additional visualization to make up the points.
4. **'calculations.csv'** contains all of our calculations
5. **4 Visualizations and explain what the calculation is**
   a. Calculation for 1st Visual: average of highest and lowest Apple stock price over every minute for 25 minutes
   b. Calculation for 2nd Visual: average of highest and lowest Apple stock price per day over the past month
   c. Calculation for 3rd Visual: sentiment score of Apple stock price per day over the past month
   d. Calculation for 4th (extra credit visual): sentiment classification count for past month
   e. VISUALS BELOW


Average Apple Stock Value over December 12th (Today)
Average Apple Stock Value
213.6
213.4
213.2
213.0
212.8
212.6
212.4
212.2
2022-12-12 11:18:00
2022-12-12 11:17:00
2022-12-12 11:16:00
2022-12-12 11:15:00
2022-12-12 11:14:00
2022-12-12 11:13:00
2022-12-12 11:12:00
2022-12-12 11:11:00
2022-12-12 11:10:00
2022-12-12 11:09:00
2022-12-12 11:08:00
2022-12-12 11:07:00
2022-12-12 11:06:00
2022-12-12 11:05:00
2022-12-12 11:04:00
2022-12-12 11:03:00
2022-12-12 11:02:00
2022-12-12 11:01:00
2022-12-12 11:00:00
2022-12-12 10:59:00
2022-12-12 10:58:00
2022-12-12 10:57:00
2022-12-12 10:56:00
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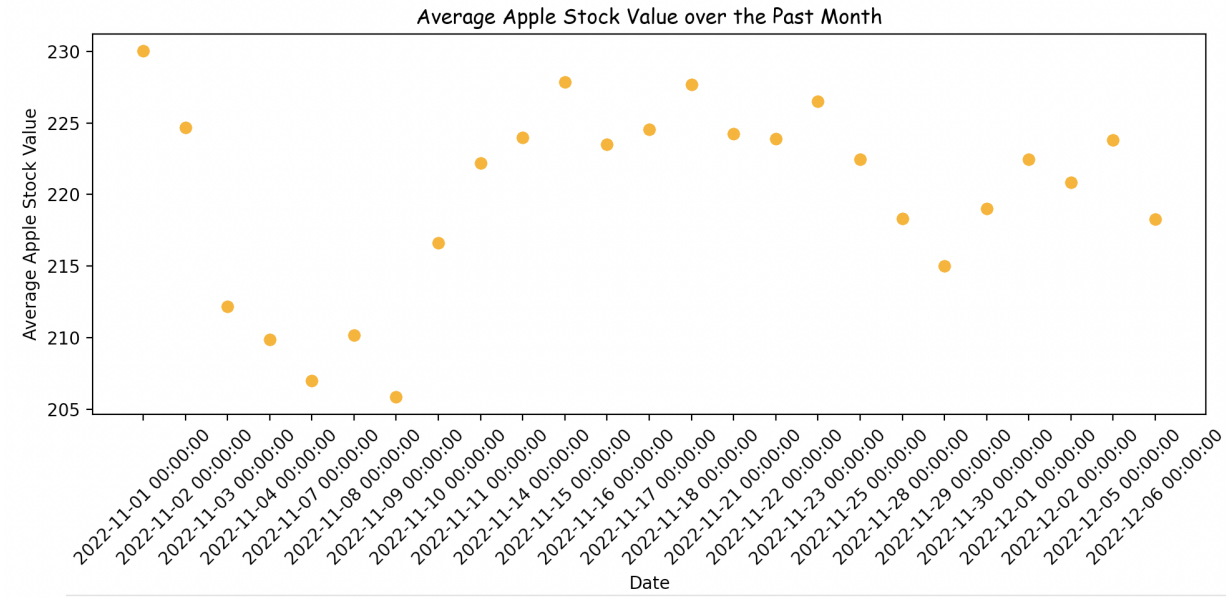
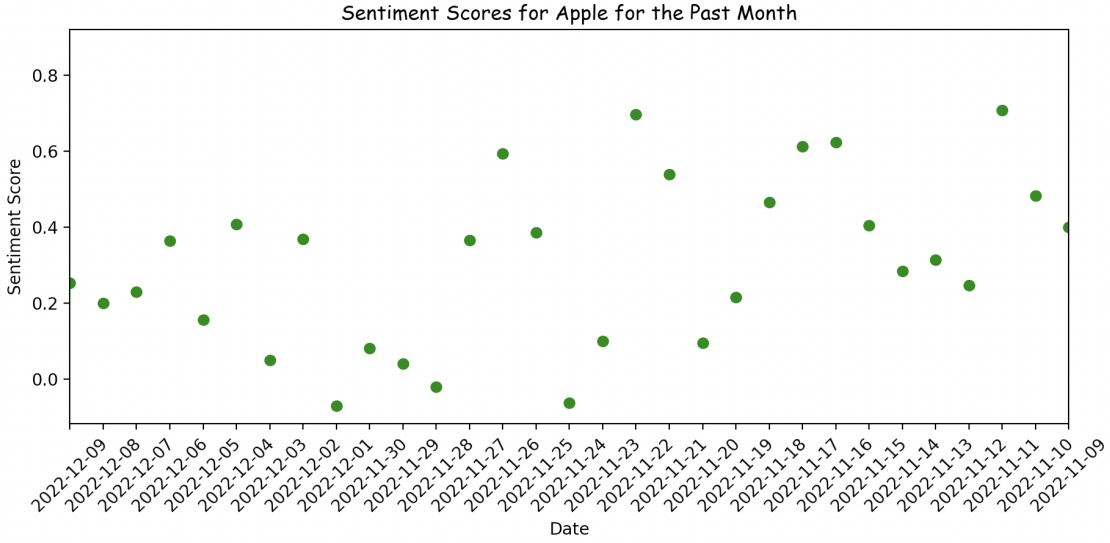
2022-12-12 10:54:00
2022-12-12 11:20:00
2022-12-12 11:19:00
Date


Average Apple Stock Value over the Past Month
Average Apple Stock Value
230
225
220
215
210
205
2022-11-01 00:00:00
2022-11-02 00:00:00
2022-11-03 00:00:00
2022-11-04 00:00:00
2022-11-07 00:00:00
2022-11-08 00:00:00
2022-11-09 00:00:00
2022-11-10 00:00:00
2022-11-11 00:00:00
2022-11-14 00:00:00
2022-11-15 00:00:00
2022-11-16 00:00:00
2022-11-17 00:00:00
2022-11-18 00:00:00
2022-11-21 00:00:00
2022-11-22 00:00:00
2022-11-23 00:00:00
2022-11-25 00:00:00
2022-11-28 00:00:00
2022-11-29 00:00:00
2022-11-30 00:00:00
2022-12-01 00:00:00
2022-12-02 00:00:00
2022-12-05 00:00:00
2022-12-06 00:00:00
Date


Sentiment Scores for Apple for the Past Month
Sentiment Score
0.8
0.6
0.4
0.2
0.0
2022-12-09
2022-12-08
2022-12-07
2022-12-06
2022-12-05
2022-12-04
2022-12-03
2022-12-02
2022-12-01
2022-11-30
2022-11-29
2022-11-28
2022-11-27
2022-11-26
2022-11-25
2022-11-24
2022-11-23
2022-11-22
2022-11-21
2022-11-20
2022-11-19
2022-11-18
2022-11-17
2022-11-16
2022-11-15
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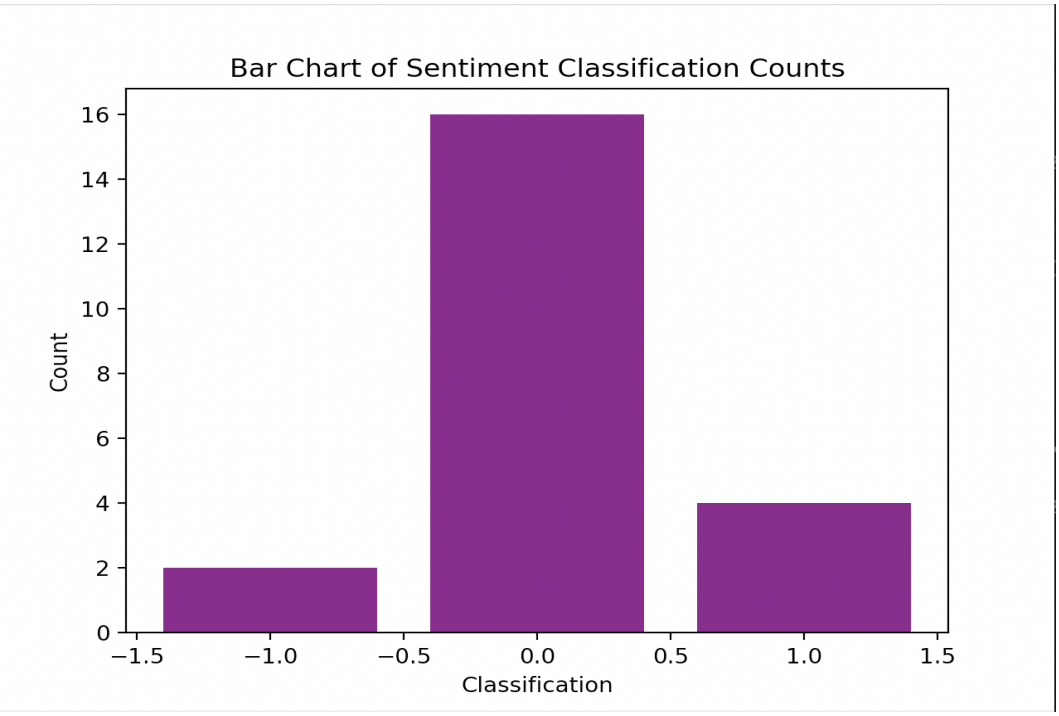
2022-11-13
2022-11-12
2022-11-11
2022-11-10
2022-11-09
Date



6. **Instructions for running the code**
    a. We have 1 main file titled ‘all.py’
        i. This file should be run 4 times to create the full database. On the 4th run, the last 3 functions in main() should be uncommented to create the 3 visualizations that are made from the tables in the database.
7. **Documentation for each function (input/output)**
    a. get_stock_data_polygon
        i. API request for Polygon API. Input is the parameters (stocksTicker, multiplier, timespan, from_date, to_date, sort, limit, apikey). Output is a json dictionary.
    b. get_current_stock_data
        i. API request for TwelveData API. Input is the parameters (symbol,interval, outputsize, apikey). Output is a json dictionary.
    c. setUp_news
        i. API request for EOD API. Input is the parameters (stocks, froms, to). Output is a json dictionary.
    d. analyze_sentiment
        i. The analyze_sentiment function takes a list of sentiment scores and an end date as input. The function returns a tuple containing the dictionary of daily average sentiment scores and the end date. The dictionary keys are dates and the values are the average sentiment scores for that day. The end

date is either the date of the last processed sentiment score, None, or the input end date, depending on the conditions mentioned above.

e. classify_score
    i. Takes in a sentiment score as parameter and returns if it is of Positive (1), Negative(-1) or Neutral Value(0).
f. setUpDatabase
    i. Setting up the database. Input is the name of the database, and output a cursor and connector.
g. create_stock_table
    i. Output creates table ‘stock’ from Polygon API with stock data from past month: day, open value, close value, lowest value, highest value, volume. Takes in a cursor, connector, and json dictionary that is produced from an API request function
h. create_current_stock_table
    i. Output creates table ‘current_stock’ from TwelveData API with current stock data: datetime, open value, close value, lowest value, highest value, volume. Input is a cursor, connector, and json dictionary that is produced from an API request function.
i. insertData_news
    i. Output creates table ‘news_stock’ from EOD API with news sentiment data from the past month: count_id, date, sentiment score, classification. Input is a cursor, connector, and json dictionary that is produced from an API request function.
j. avg_current_stock
    i. Input is a cursor and connector. Outputs a list of the average stock value over each minute for the past 25 minute span.
k. avg_historical_stock
    i. Input is a cursor and connector. Output is a list of the average stock values over each day in the last month.
l. eod_calculation
    i. Input us a cursor and connector. Output is an ordered dictionary with the sentiment classification as keys and values as the amount of times each classification exists for the Apple articles in the past month.
m. twelvedata_viz
    i. Input is a cursor and connector. Output is a scatterplot of the Average Apple Stock Value over December 9th (current time).
n. polygon_viz
    i. Input is a cursor and connector. Output is a scatterplot of the Average Apple Stock Value over the month of November 2022.

o. eod_viz
    i. Input is a cursor and connector. Output is a scatterplot of the sentiment scores for Apple over the month of November 2022. (Shares date data with polygon in a join table)
p. main()
    i. Our main function has no input and does not return anything. This function is manipulated to call the functions that create the 3 visualizations and the single database.

8. **Resources used:**

Date	**Issue Description**	**Resources Used**	**Was the Problem Solved?**
12/4	Finding a news API that gave us sentiment report (our previous one did not give us the data we thought it did)	Google, and the free API list github repo https://github.com/public-apis/public-apis	Yes, we successfully found the EOD API which provided us with a sentiment report of Apple News articles over the correct timespan
12/5	Adding titles to the visuals	https://matplotlib.org/stable/tutorials/introductory/quick_start.html	Yes
12/6	Changing color of points in scatter plot visuals	https://matplotlib.org/stable/tutorials/introductory/quick_start.html	Yes
12/4	Git push/ git pull issues and getting errors any time I would try to do a git command in my terminal	Office hours/ IAs	Yes
12/11	Removing duplicate string data from the tables	(how to make a primary key) https://www.w3schoo	Yes

		ls.com/sql/sql_primarykey.ASP	
12/6	Iterating through TwelveData/Polygon/EOD json dictionaries	Json editor https://jsoneditoronline.org/#left=local.cuqewi&right=local.dimuqo	Yes