Financial Analysis

USER MANUAL

May 25, 2021

Rev	Description	Date	Prep	Chk'd	Apprv'd
01	New Document				

REVISION HISTORY

Rev	Description	Section	Pages
01	New document	-	-
		-	

CONTENTS

1 INTRODUCTION

TBA

2 SUMMARY

2.1 Improvements

2.1.1 General Programming Improvements

/Convert Daily data, insider_info to insider json. Do this in next revision? Should this be code in python?

/ Hostorical analysis.
Give a time cut-off like 2 days ago (or similar)?
Run only tickers not available in DB?

/DB imrovements. Convert to JSON column all others.

For long-term:
/ Repeat for 13F or 13D (identify numeral) institutional data

/ Make data quality to be sets of Description, Value format; Easy for troubleshooting
/ Save required data from runs for future use
/ Remove the "submit" for the block and just move on to select the text?
/ Autosearch should only show to 25 choices (or) only after people enter min of 2 letter

2.1.2 Basic Information

Change Yfinance data (DONE)

Get all tickers and create a JSON file to show what is supported by app?
Get SYmbols supported by Tiingo:
`pandas_datareader.tiingo.get_tiingo_symbols()`
Get Symbols supported by Yahoo:
??

Add current stock price for display
Add Market Cap

2.1.3 Technical Indicators

Add volatility
Add Momentum (Strength)

Outstanding shares vs. Trading volume? Build on the history?

2.1.4 Insider Investors

Instituational Investors bought when?
https://www.sec.gov/developer

For SEC information

nonDerivativeTable is incorporated (DONE)
derivativeTable is to be incorporated (?)

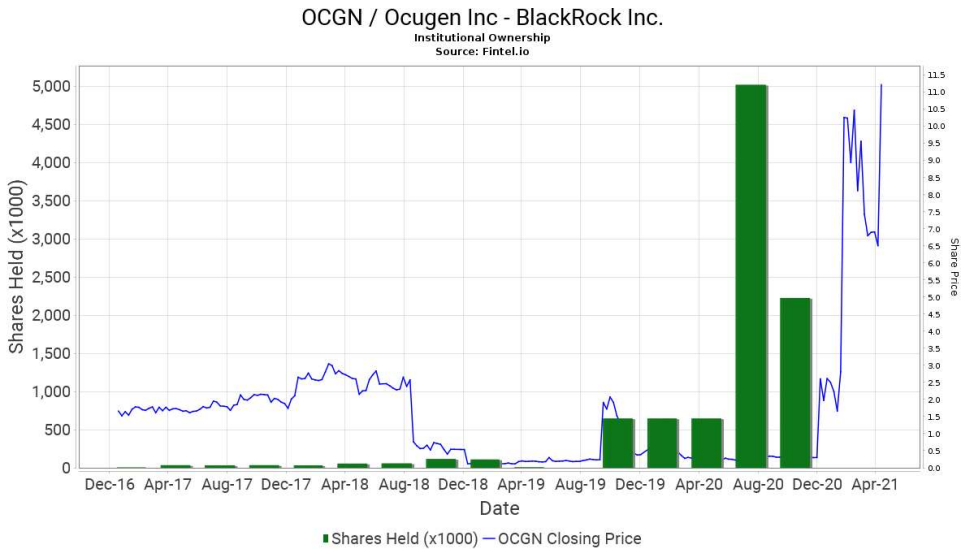
Convert Date to datetime for easy formatting of X-axis monthly plot.

2.1.5 Institutional Investors

Instituational Investors bought when?
https://www.sec.gov/developer

https://www.sec.gov/files/data/broker-dealers/company-information-about-active-broker-dealers/bd010421.txt

Think Sabio
Can we get anything from Think Sabio (or) Something similar?



File Date	Effective Date	Form	Security	Class	ID	Avg Share Price	Shares	Shares Changed (%)	Value (x1000)	Value Changed (%)	Allocation (%)	Cost Basis (x1000)	Profit (x1000)	Return (%)
2021-05-07	2021-03-31	13F	OCUGEN	COM	67577C105		3,422,471	53.77	23,238	470.54	0.00			
2021-02-05	2020-12-31	13F	OCUGEN	COM	67577C105									
2020-11-06	2020-09-30	13F	OCUGEN	COM	67577C105									
2020-08-14	2020-06-30	13F	OCUGEN	COM	67577C105									
2020-05-01	2020-03-31	13F	OCUGEN	COM	67577C105									
2020-02-13	2019-12-31	13F	OCUGEN	COM	67577C105									
2019-11-08	2019-09-30	13F	OCUGEN	COM	67577C105									
2019-08-22	2019-06-30	13F/A-1	HISTOGENICS	COM	43358V109									
~~2019-08-13~~	~~2019-06-30~~	~~13F~~	~~HISTOGENICS~~	~~COM~~	~~43358V109~~									
2019-05-09	2019-03-31	13F	HISTOGENICS	COM	43358V109									
2019-02-08	2018-12-31	13F	HISTOGENICS	COM	43358V109									
2018-11-09	2018-09-30	13F	HISTOGENICS	COM	43358V109									
2018-08-09	2018-06-30	13F	HISTOGENICS	COM	43358V109									
2018-05-09	2018-03-31	13F	HISTOGENICS	COM	43358V109									
2018-02-09	2017-12-31	13F	HISTOGENICS	COM	43358V109									
2017-11-14	2017-09-30	13F	HISTOGENICS	COM	43358V109									
2017-08-10	2017-06-30	13F	HISTOGENICS	COM	43358V109									
2017-05-12	2017-03-31	13F	HISTOGENICS	COM	43358V109									

2.1.6 Refactoring

Price Y-axis on log scale for price?

Refactor get_data methods into another file (Done)
Refactor financial-analysis methods into another file (Done)

2.2 Security (Not Required)

No API keys are currently being used.

If API keys are used by an application, they should be robustly secured prior to going into pay for data. Send the keys as secrets from DevOps pipelines as environment variable in the end system?

2.3 Mutual Funds

https://www.sec.gov/edgar/searchedgar/mutualsearch.html

2.4 URL Architecture

S.No	URL	GET	POST	Status
1	StockAnalysis	Display to Select Ticker	a/ Empty ticker. Design stays on samepage b/ if ticker entered: *Redirect to ticker summary MenuId*	
2	StockAnalysis/<ticker>	Redirect to ticker summary MenuId	None	Completed
3	StockAnalysis/<ticker>/<MenuId>	To ticker and MenuID	Redirect to (new) Ticker and selectedMenuId?	Completed

3 DATA SOURCES

3.1 Tiingo

3.2 Iex

3.3 Yahoo Finance

https://pypi.org/project/yfinance/
https://algotrading101.com/learn/yfinance-guide/

http://theautomatic.net/yahoo_fin-documentation/

3.4 SEC Data

SEC data is free to use but comes with lot of call restrictions. Unbridled usage without monitoring can cause to blocked access etc. Programming should be carefully and prudently done.

See Appendix G for further guidelines as things are learnt.

https://www.sec.gov/oiea/Article/edgarguide.html

https://www.sec.gov/os/webmaster-faq

https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins-69

nsider Trade Data for all publicly traded U.S. companies
Institutional Ownership Data, pulled from 13(F) filings

Direct SourceL
https://www.sec.gov/edgar/searchedgar/accessing-edgar-data.htm

Example SEC data for NIO:
https://www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0001736541&type=&dateb=&owner=exclude&count=100
https://www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0001736541&type=def+14a&dateb=&owner=exclude&count=100

Oher Paid Services or APIs
https://developer.edgar-online.com/home (got to pay annual fee after 2 weeks of use
https://mboum.com/api/welcome (Basic : 500# requests, Investor and Business Memberships)
https://finnhub.io/docs/api#filings (Finnhub: SEC Filings 1994-2020; updated 7 months ago)

https://whalewisdom.com/stock/nio-2 (Last quarter free. Rest are paid.)

3.4.1 Summary

Filiing Type	Description	Included?
3	Initial statement of beneficial ownership	
4	Statement of changes in beneficial ownership – typically within two business days of the transaction.	
5	Annual statement of beneficial ownership	
SC 13D	beneficial ownership report –Filed when a party acquires more than five percent of a class of a company's registered voting securities; also used to disclose any subsequent changes to their holdings.	

	Activist Investor 13D Filings	
SC 13G	beneficial ownership report – Filed when a party acquires more than five percent of a class of a company's registered voting securities as a passive investment. Beneficial Ownership 13G Filings	
SC 13F	Institutional Ownership 13F Filings	
DEF 14A	Definitive proxy statement – Here, companies are required to disclose the amount of equity securities beneficially owned by their directors and officers, and any person or group that beneficially owns more than five percent of any class of the company's voting securities.	
13F-HR	Institutional investment manager report – Institutional investment managers disclose their holdings and any changes to them on a quarterly basis.	
?	Mutual Fund & ETF Ownership Filings UK Ownership Filings	How to get this data?

3.4.2 Institutional Investors

Monthly Trends (if possible)

- Add monthly trends of all investors
- Add monthly trends for the top 5 (?) institutional investors
- TBA?

3.4.3 Features

a/ To distinguish between 2 or 3 persons with same title, Appended person's initials at the end of company relationship/title
b/ Use default Y Scale from 0 to 2.

Prepare following plot on a monthly basis:

- Add Buys
- effective Sales from options excercised i.e. Differential;
- Effective Buys

https://pypi.org/project/python-edgar/
https://py-sec-edgar.readthedocs.io/en/latest/readme.html
https://pypi.org/project/sec-edgar-downloader/
https://www.investopedia.com/articles/fundamental-analysis/08/sec-forms.asp

Example of SEC Form4 data:

https://www.sec.gov/Archives/edgar/data/797468/000156761920016373/doc1.xml
https://www.sec.gov/Archives/edgar/data/797468/000156761920016040/doc1.xml
https://www.sec.gov/Archives/edgar/data/797468/000156761920011932/doc1.xml

Use XML to JSON converter.
Get required data from Form4.

4 TECHNICAL

4.1 Timeline Analysis

4.1.1 Dividend Reinvestment

The key assumptions
Dividend reinvestment is an investment tool that comes at no fees to reinvest dividend.
Most companies allow this with no fees and the brokers pass through the no fees to the users as well.

4.1.2 Dividend Cashout

Dividend reinvestment is an investment tool that comes at no fees to reinvest dividend.
Most companies allow this with no fees and the brokers pass through the no fees to the users as well.

4.2 Portfolio Balancing Analysis

5 INDIVIDUAL STOCK ANALYSIS

5.1 Break-out Stocks

Add the following:

- RSI (Strength index)
- MFI (Money flow index)
- Common Shares outstanding
- CAN SLIM
    - **C**urrent Quarterly earnings. The higher, the better
    - **A**nnual Earnings Increases: Look for significant growth
    - **N**ew Products, New Management, New Highs: Buying at the right time
    - **S**upply and Demand: Shares outstanding plus big volume demand
    - **L**eader or Laggard: Which is your stock?
    - **I**nstitutional Sponsorship: Follow the Leaders
    - **M**arket Direction: How to determine it?

5.2 Technical Indicators

Python technical indicators (TA) are 83 in total number and comprise the following:

- Volume : 15
- Volatility : 21
- Trend : 34
- Momentum: 15

'volume_adi', 'volume_obv', 'volume_cmf', 'volume_fi', 'volume_mfi', 'volume_em', 'volume_sma_em', 'volume_vpt', 'volume_nvi', 'volume_vwap',

'volatility_atr', 'volatility_bbm', 'volatility_bbh', 'volatility_bbl', 'volatility_bbw', 'volatility_bbp', 'volatility_bbhi', 'volatility_bbli', 'volatility_kcc', 'volatility_kch', 'volatility_kcl', 'volatility_kcw', 'volatility_kcp', 'volatility_kchi', 'volatility_kcli', 'volatility_dcl', 'volatility_dch', 'volatility_dcm', 'volatility_dcw', 'volatility_dcp', 'volatility_ui',

'trend_macd', 'trend_macd_signal', 'trend_macd_diff', 'trend_sma_fast', 'trend_sma_slow', 'trend_ema_fast', 'trend_ema_slow', 'trend_adx', 'trend_adx_pos', 'trend_adx_neg', 'trend_vortex_ind_pos', 'trend_vortex_ind_neg', 'trend_vortex_ind_diff', 'trend_trix', 'trend_mass_index', 'trend_cci', 'trend_dpo', 'trend_kst', 'trend_kst_sig', 'trend_kst_diff', 'trend_ichimoku_conv', 'trend_ichimoku_base', 'trend_ichimoku_a', 'trend_ichimoku_b', 'trend_visual_ichimoku_a', 'trend_visual_ichimoku_b', 'trend_aroon_up', 'trend_aroon_down', 'trend_aroon_ind', 'trend_psar_up', 'trend_psar_down', 'trend_psar_up_indicator', 'trend_psar_down_indicator', 'trend_stc',

'momentum_rsi', 'momentum_stoch_rsi', 'momentum_stoch_rsi_k', 'momentum_stoch_rsi_d', 'momentum_tsi', 'momentum_uo', 'momentum_stoch', 'momentum_stoch_signal', 'momentum_wr', 'momentum_ao', 'momentum_kama', 'momentum_roc', 'momentum_ppo', 'momentum_ppo_signal', 'momentum_ppo_hist',

'others_dr', 'others_dlr', 'others_cr'

5.2.1 Volume Indicators

	Description	Meaning	TA Column	DTF UI Display?
1	On Balance Volume (OBV); OnBalanceVolumeIndicator	Running avg of volume	volume_obv	Y
2	Chaikin Money Flow; ChaikinMoneyFlowIndicator	Money flow; short-term indicator	volume_cmf	Y
3	Klinger Oscillator	Money flow; long-term indicator	Not available	N
4	Ease of Movement	Price increase divided by volume	volume_em	Y
5	14 day SMA Ease of Movement		volume_sma_em	Y
	AccDistIndexIndicator		volume_adi	
	ForceIndexIndicator		volume_fi	
	MFIIndicator		volume_mfi	
	VolumePriceTrendIndicator		volume_vpt	
	NegativeVolumeIndexIndicator		volume_nvi	
	VolumeWeightedAveragePrice		volume_vwap	Y

https://www.investopedia.com/articles/technical/02/010702.asp
https://www.investopedia.com/terms/k/klingeroscillator.asp

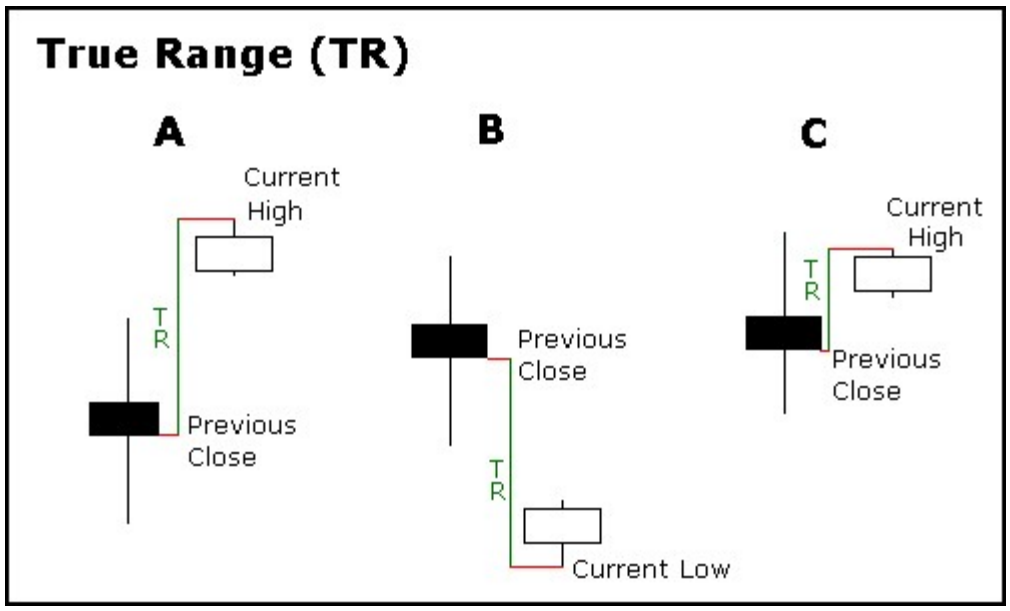
5.2.2 Volatility

	Description	Meaning	TA Column	DTF UI Display?
1			volatility_atr	
2	Bollinger Bands	20 day Moving Average	volatility_bbm	
3	Bollinger Bands	+2 std High	volatility_bbh	
4	Bollinger Bands	-2 std Low	volatility_bbl	

5	Bollinger Bands	Total Band Width	volatility_bbw	
	Bollinger Bands	Total Percent Band Width	volatility_bbp	y
	Bollinger Bands	HighBand indicator	volatility_bbhi	y
	Bollinger Bands	LowBand indicator	volatility_bbli	y
	keltner_channel; Uses ATR (20 day Average True Range for price) vs. Direct Standard dev (for Bollinger Bands) ; Better than Bollinger Bands	Moving average Hight Low Width Percent High indicator Low indicator	volatility_kcc volatility_kch volatility_kcl volatility_kcw volatility_kcp volatility_kchi volatility_kcli	 Y Y Y
	Doncian Channels (high and low prices) 20 days	Low High Mid Width band percent band	volatility_dcl volatility_dch volatility_dcm volatility_dcw volatility_dcp	 Y
	Ulcer Index	14 day range; Based on price depreciation from its high; close to zero, better	volatility_ui	Y

https://school.stockcharts.com/doku.php?id=technical_indicators:keltner_channels
https://school.stockcharts.com/doku.php?id=technical_indicators:average_true_range_atr

True Range is greatest of the following:



5.2.3 Trends

	Description	Meaning	TA Column	DTF UI Display?
1			trend_macd trend_macd_signal trend_macd_diff	
2	SMAIndicator	12 day 26 day	trend_sma_fast trend_sma_slow	
3	EMAIndicator	12 day 26 day	trend_ema_fast trend_ema_slow	
4	ADXIndicator		trend_adx trend_adx_pos trend_adx_neg	
5	VortexIndicator		trend_vortex_ind_pos trend_vortex_ind_neg trend_vortex_ind_diff	
	TRIXIndicator		trend_trix	
	MassIndex		trend_mass_index	
	CCIIndicator		trend_cci	
	DPOIndicator		trend_dpo	
	KSTIndicator		trend_kst trend_kst_sig trend_kst_diff	
	IchimokuIndicator	Conversion Base	trend_ichimoku_conv trend_ichimoku_base	

		A B	trend_ichimoku_a trend_ichimoku_b trend_visual_ichimoku_a trend_visual_ichimoku_b	
	AroonIndicator		trend_aroon_up trend_aroon_down trend_aroon_ind	
	PSARIndicator		trend_psar_up trend_psar_down trend_psar_up_indicator trend_psar_down_indicator	
	STCIndicator (Scaff Trend Cycle)		trend_stc	

5.2.4 Momentum

	Description	**Meaning**	**TA Column**	**DTF UI Display?**
1	RSIIndicator	14 day	momentum_rsi	y
2	StochRSIIndicator		momentum_stoch_rsi momentum_stoch_rsi_k momentum_stoch_rsi_d	Y
3	TSIIndicator		momentum_tsi	y
4	UltimateOscillator		momentum_uo	y
5	StochasticOscillator		momentum_stoch momentum_stoch_signal	
	WilliamsRIndicator	(o – overbought) and -100 oversold)	momentum_wr	y
	AwesomeOscillatorIndicator	difference of a 34 Period and 5 Period Simple Moving Averages	momentum_ao	y
	KAMAIndicator	(10 day) Identifies pivot points	momentum_kama	
	ROCIndicator	Rate of Change (12 day)	momentum_roc	y

	PercentagePriceOscillator		momentum_ppo momentum_ppo_signal momentum_ppo_hist	
	PercentageVolumeOscillator		momentum_ppo momentum_ppo_signal momentum_ppo_hist	

https://school.stockcharts.com/doku.php?id=technical_indicators:ultimate_oscillator

5.2.5 Others

	Description	Meaning	TA Column	DTF UI Display?
1	DailyReturnIndicator		others_dr	
2	DailyLogReturnIndicator		others_dlr	
3	CumulativeReturnIndicator		others_cr	

https://handsoffinvesting.com/calculate-and-analyze-rsi-using-python/

https://tcoil.info/compute-rsi-for-stocks-with-python-relative-strength-index/
https://handsoffinvesting.com/get-40-technical-indicators-for-a-stock-using-python/

https://algotrading101.com/learn/yfinance-guide/

5.3 Perform Historical Analysis

How many months in that trend. When will this trend fail? Need timeline in half monthly intervals?

Model Back analysis

Stock	Date	Category	
TLRY	27 Nov 2020	Drugs	
NIO	06 Nov 2020		
PLUG	06 Nov 2020		
Jumia	06 Nov 2020		
BNTX		Health	

MRNA		Health	
XME			
SPY		S&P 500	

What indicators will help track and determine performance of a stock?

5.4 Market Cap and other quantities:

Market Cap
Industry Relevant?

https://stackoverflow.com/questions/54815864/downloading-a-companies-market-cap-from-yahoo

https://stackabuse.com/how-to-send-emails-with-gmail-using-python/

https://stackoverflow.com/questions/5180382/convert-json-data-to-a-html-table
http://json2html.com/

Selecting

5.5 Trending Guidelines

Trend Template
1. The current stock price is above both the 150-day (30-week) and the 200-day (40-week) moving average price lines.
2. The 150-day moving average is above the 200-day moving average.
3. The 200-day moving average line is trending up for at least 1 month (preferably 4–5 months minimum in most cases).
4. The 50-day (10-week) moving average is above both the 150-day and 200-day moving averages.
5. The current stock price is trading above the 50-day moving average.
6. The current stock price is *at least* 30 percent above its 52-week low. (Many of the best selections will be 100 percent, 300 percent, or greater above their 52-week low *before* they emerge from a solid consolidation period and mount a large scale advance.)
7. The current stock price is within at least 25 percent of its 52-week high (the closer to a new high the better).
8. The relative strength ranking (as reported in *Investor's Business Daily*) is no less than 70, and preferably in the 80s or 90s, which will generally be the case with the better selections.

Plotting

https://community.plotly.com/t/how-to-plot-both-ohlc-and-volume/32761

5.6 Covered Call Strategies

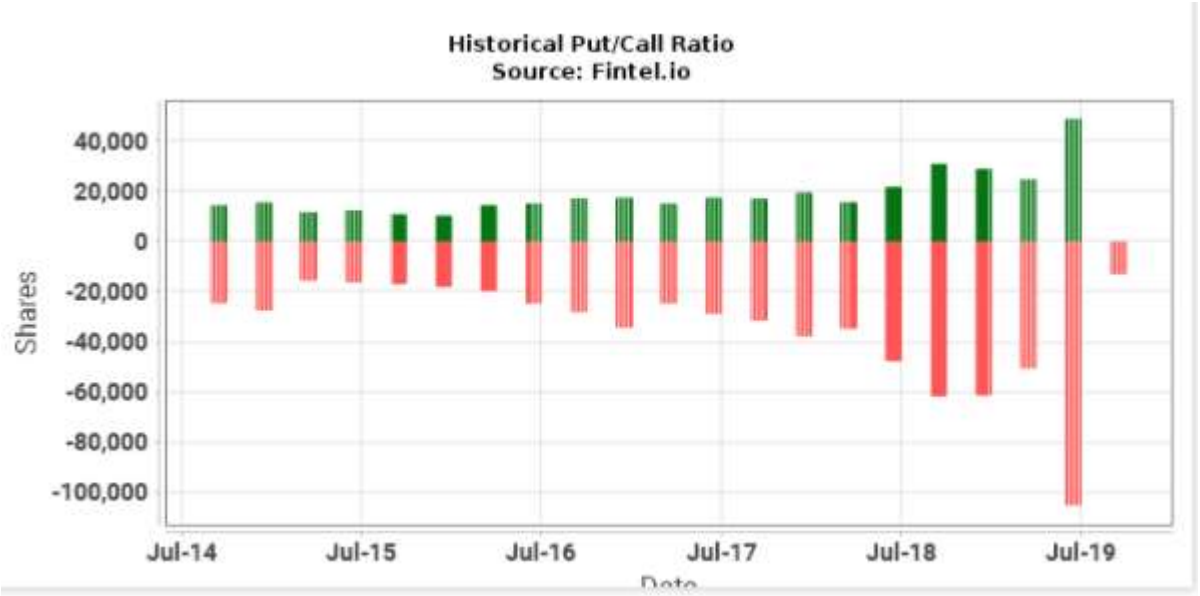
What type of stocks can we trade these?

Take call prices; Calculate the profit if stock continues to go up
Take latest close price

Prepare a chart with changing stock price & profit for various options; Max-Min? How to plot it?

https://www.schwab.com/resource-center/insights/content/options-strategies-covered-calls-covered-puts

5.7 Put-Call Ratio



6 REFERENCES

6.1 Books

6.2 Codes

6.3 Weblinks

https://pythonforfinance.net/
https://www.toptal.com/finance/financial-modeling/python-and-finance
https://learndatasci.com/tutorials/python-finance-part-yahoo-finance-api-pandas-matplotlib/

IEX
https://iexcloud.io/docs/api/#introduction API Help Documentation

6.4 Other Applications

http://www.blackarbs.com/notable-projects

APPENDIX A– PROGRAM HISTORY

6.5 Revision History

Revision Date	Features	

Figure 6-1.Program History

APPENDIX B - ERROR LOG

Figure 6-2.Error Log.

B.1 Calculation Errors

The typical errors encountered while running the calculation program are given in this section.

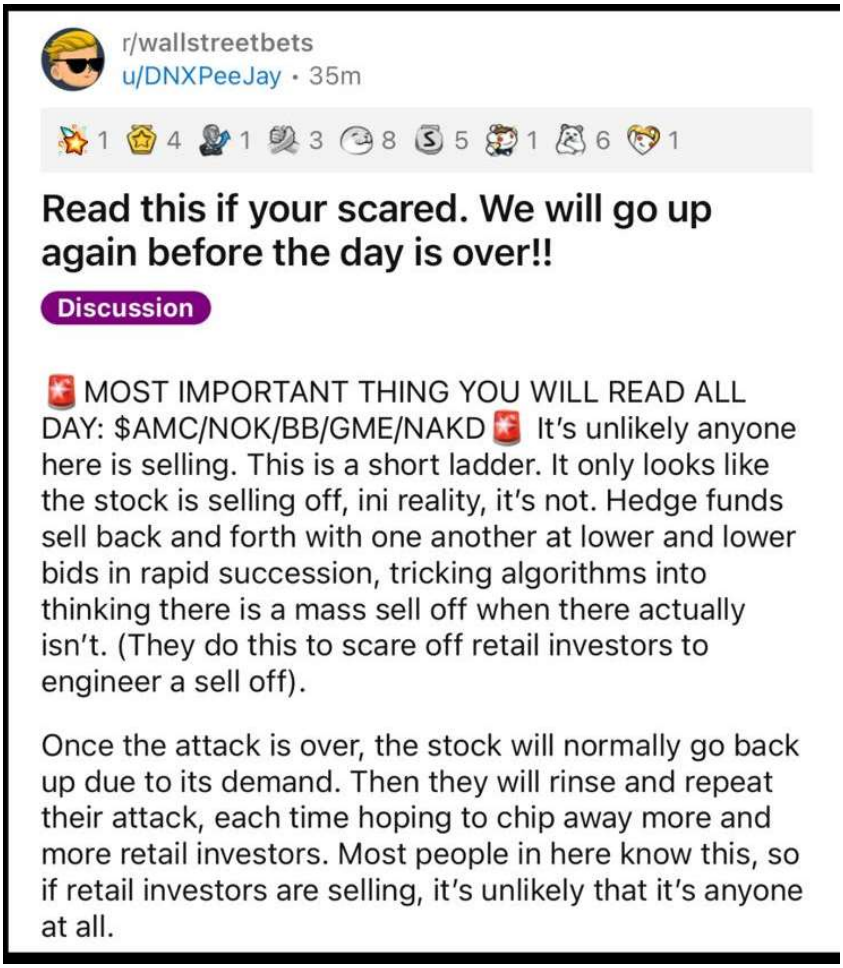
APPENDIX C-TEST CASES.

The program got to handle discontinuities as shown in figure below.

Figure 6-3.Test Cases.

APPENDIX D-SHENANIGANS

D.1 Short Squeeze (ie. Sell-offs)



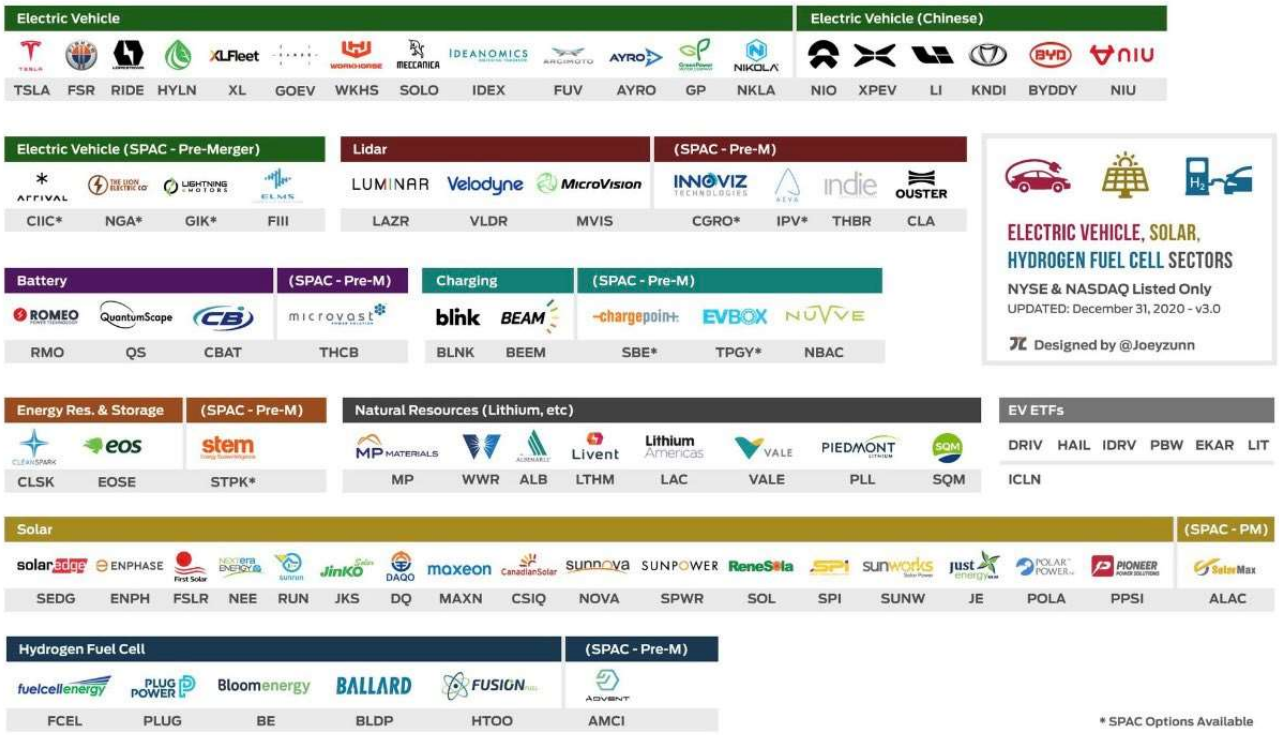
D.2 Sell Limit Filled by Institutional Investors on a downday

In a volatile or otherwise, keeping a sell limit is good to limit losses. But the market can be maniuputed to consume the outstanding sell orders and then move its way up.

People have experienced this phenomenon.

APPENDIX E - INDUSTRY CHARTS

E.1 Electric Vehicles



APPENDIX F - PYTHON PACKAGES

Get Insider Trades:
https://gist.github.com/janlukasschroeder/97c18450bdde0ccd7945d06dd5fa1844
https://sec-api.io/docs (Paid API - will not work?)
https://sec-api.io/register

APPENDIX G – SEC DATA GUIDELINES

G.1 Use agent information for http calls

https://stackoverflow.com/questions/27369998/urllib3-download-a-file-using-specified-user-agent Use agent information and verify the agent data is being used

Include the email address and company info in the user agent as follows:

Sample Declared Bot Request Headers:
User-Agent:
Sample Company Name AdminContact@<sample company domain>.com
Accept-Encoding:
gzip, deflate
Host:
www.sec.gov

https://www.sec.gov/os/webmaster-faq#access-denied
Add 0.4s sleep first in the SEC request code. Then add 0.3s from start to end.
SEC.gov (or) EDGAR Data.
A maximum requests per second of 10 is current limit.

APPENDIX H - POSTGRESQL USEFUL QUERIES

H.1 Table Alteration

Change column data type in existing table

```
alter table stocks.analysis alter column institution type JSON using institution::JSON;
```

Add a new column in existing Table

```
ALTER TABLE stocks.analysis ADD COLUMN insider json null;
```

Copy 1 column to another

```
UPDATE stocks.analysis SET insider = insider_info ;
```

Copy 1 column to another with transformation

```
UPDATE stocks.analysis SET insider = cast(insider_info AS json)  ;
```

H.2 Get/Check data

```
select count(*) from stocks.analysis;
```

```
select ticker, updated_time, insider_info from stocks.analysis a order by updated_time desc;
```