Capstone Project: Analysis of Stock price and forecasting using LSTM

Rezoan Ahmed Shuvro

Objective

- To perform exploratory data analysis to observe various stock price trend and analyze the stock price behavior of different stocks.

- To develop a simple LSTM based model for predicting the upward/downward trend for a stock using historical stock price data and predict future stock price.

Energy transfer stock prediction (source: CNN)

Data collection

- Used pandas datareader API to scrap stock prices data from 'yahoo'
- Data was then manipulated to create the following DataFrame where:
    - rows represents time series of date
    - Columns represent a hierarchical table of stock tickers and prices info

ticker	ET						FANG				...
info	High	Low	Open	Close	Volume	Adj Close	High	Low	Open	Close	...
Date											
2020-04-20	6.45	5.71	5.80	6.08	40978800.0	6.08	32.480000	28.549999	29.000000	30.860001	...
2020-04-21	6.19	5.82	5.92	6.14	29398100.0	6.14	31.540001	29.150000	29.469999	31.400000	...
2020-04-22	6.57	6.12	6.30	6.48	27209800.0	6.48	34.650002	32.980000	33.200001	34.240002	...
2020-04-23	7.10	6.63	6.75	7.05	36418800.0	7.05	37.830002	34.849998	35.450001	37.099998	...
2020-04-24	7.49	7.02	7.28	7.19	42761400.0	7.19	39.490002	35.160000	37.880001	35.779999	...

Data analysis

ticker

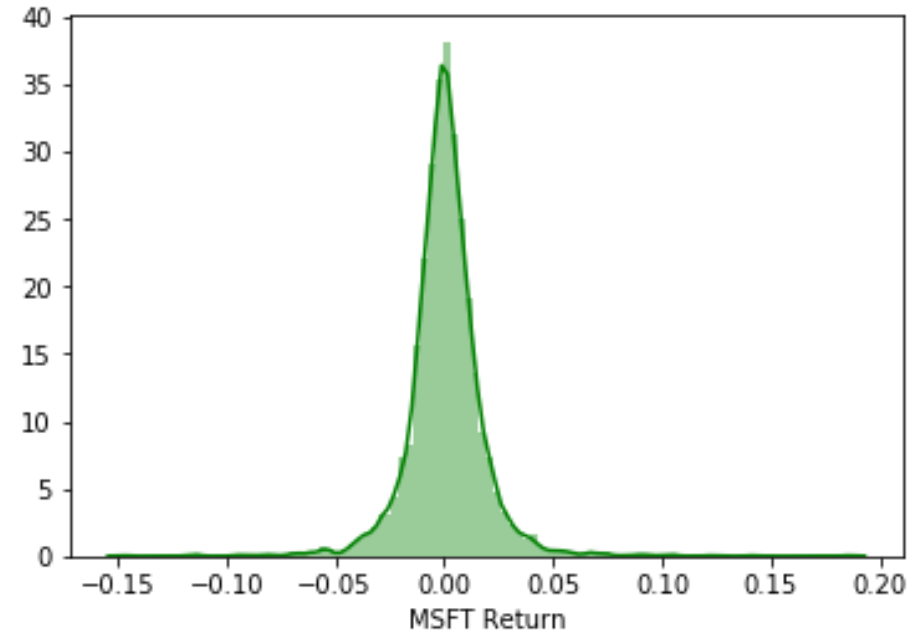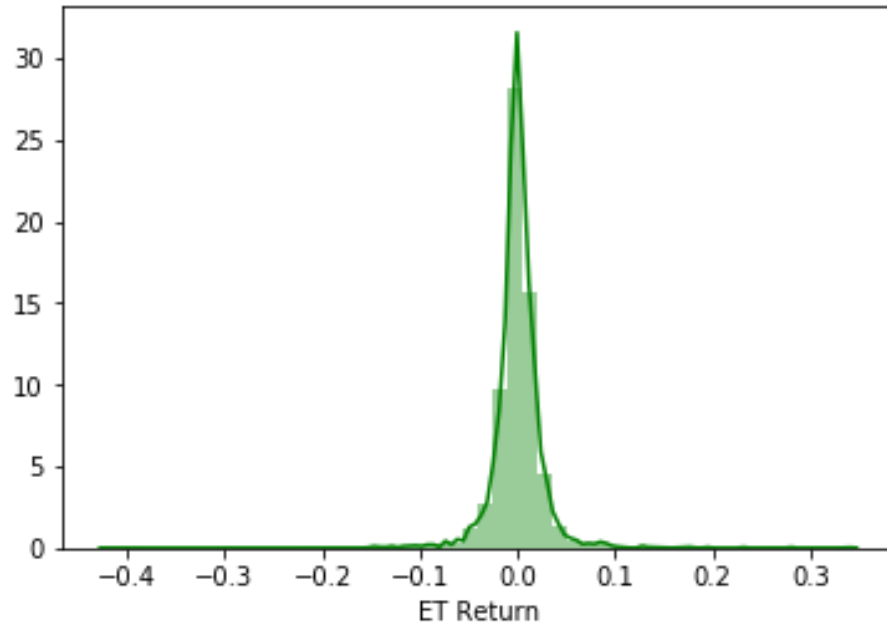|	
ET	7.19
FANG	35.78
MSFT	174.55
SPG	51.49
VGT	233.89
VOO	260.14

Last day's price

pd.merge(pd.DataFrame(my_stocks.xs(key='Close',axis=1 ,level='info').idxmax()),
pd.DataFrame(my_stocks.xs(key='Close',axis=1,level='info ').max()),on='ticker')

ticker

ET	2015-06-15	35.240002
FANG	2018-10-03	139.919998
MSFT	2020-02-10	188.699997
SPG	2016-08-01	227.600006
VGT	2020-02-19	273.209991
VOO	2020-02-19	310.920013

All time high

pd.merge(pd.DataFrame(my_stocks.xs(key='Close',axis=1,level='info'). idxmin()),
pd.DataFrame(my_stocks.xs(key='Close',axis=1,level='info').min()),on= 'ticker')

ticker

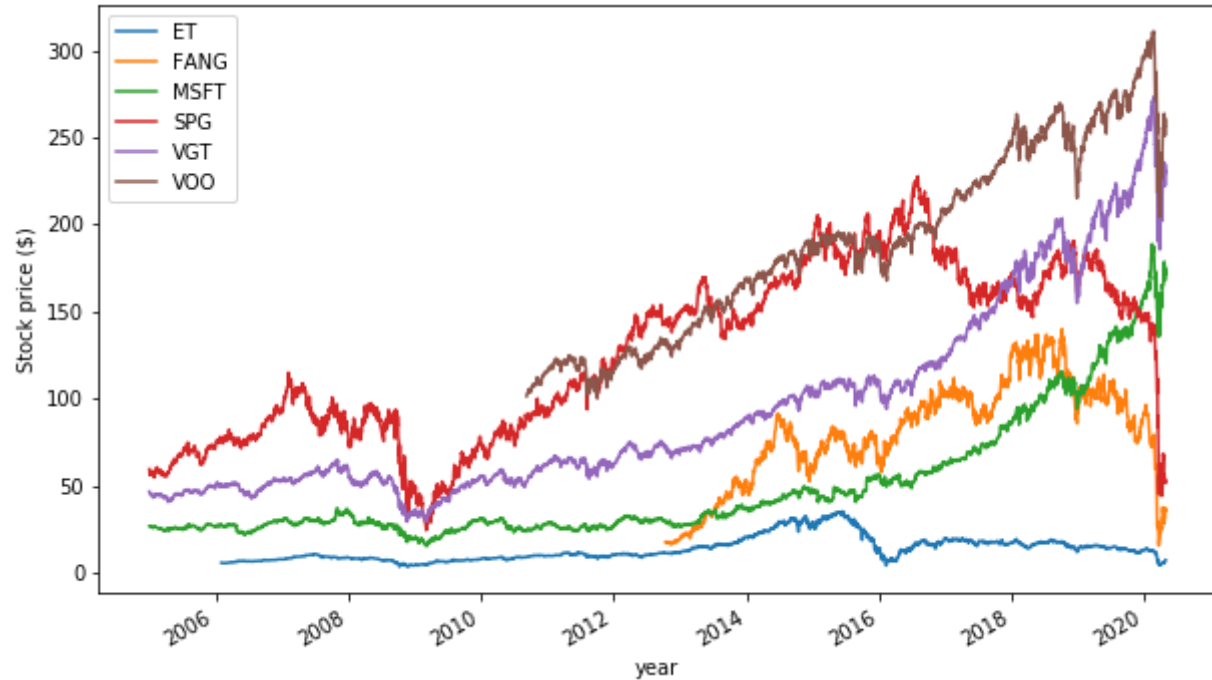|		
ET	2008-11-21	3.322500
FANG	2020-03-18	15.560000
MSFT	2009-03-09	15.150000
SPG	2009-03-06	24.308067
VGT	2008-11-20	29.270000
VOO	2011-10-03	100.339996

All time low

- SPG, FANG, ET are close to their all time low
- MSFT, VOO, VGT are very close to their all time high
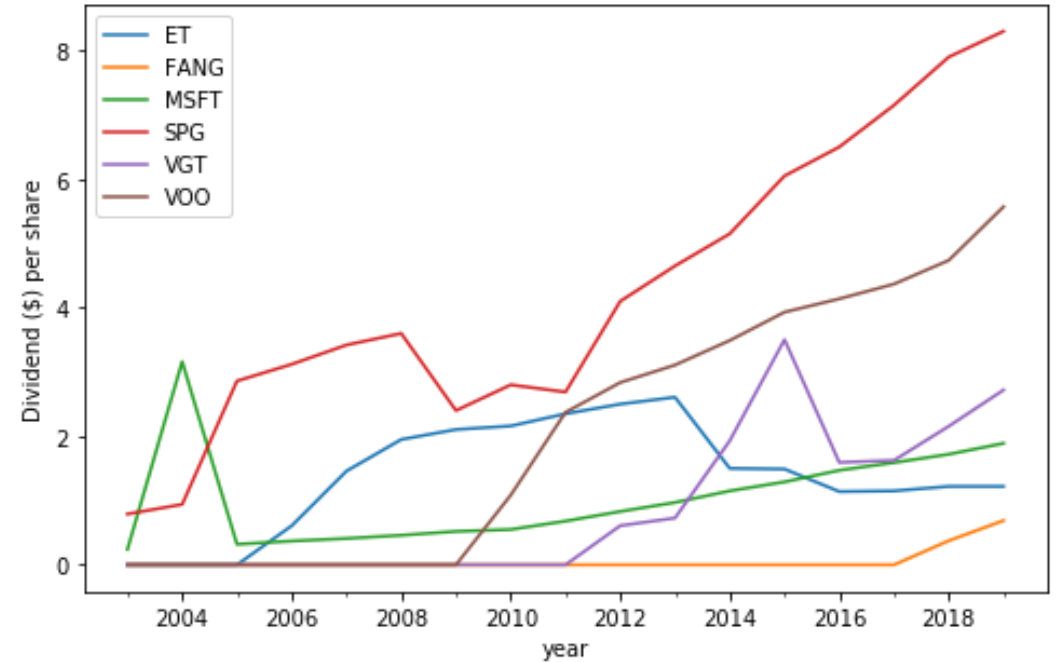
Data analysis

- Distribution plot of the standard deviation of the return (calculated using the percentage change) indicates that ET stock is more fluctuations in prices compared to MSFT
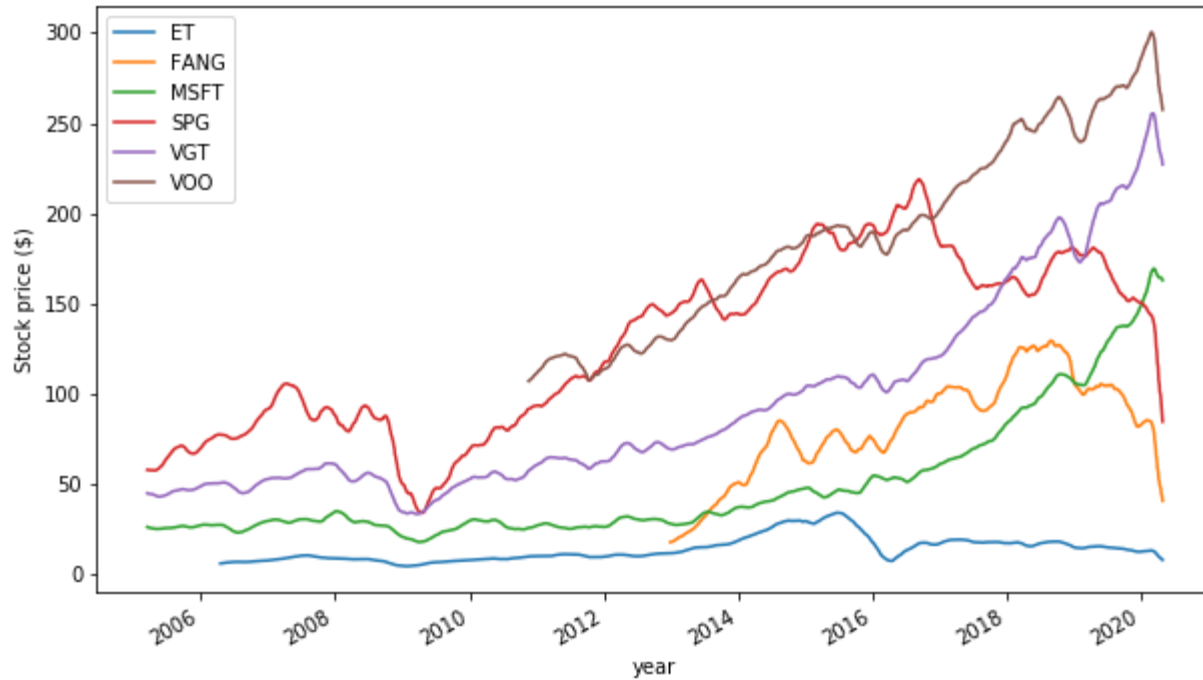
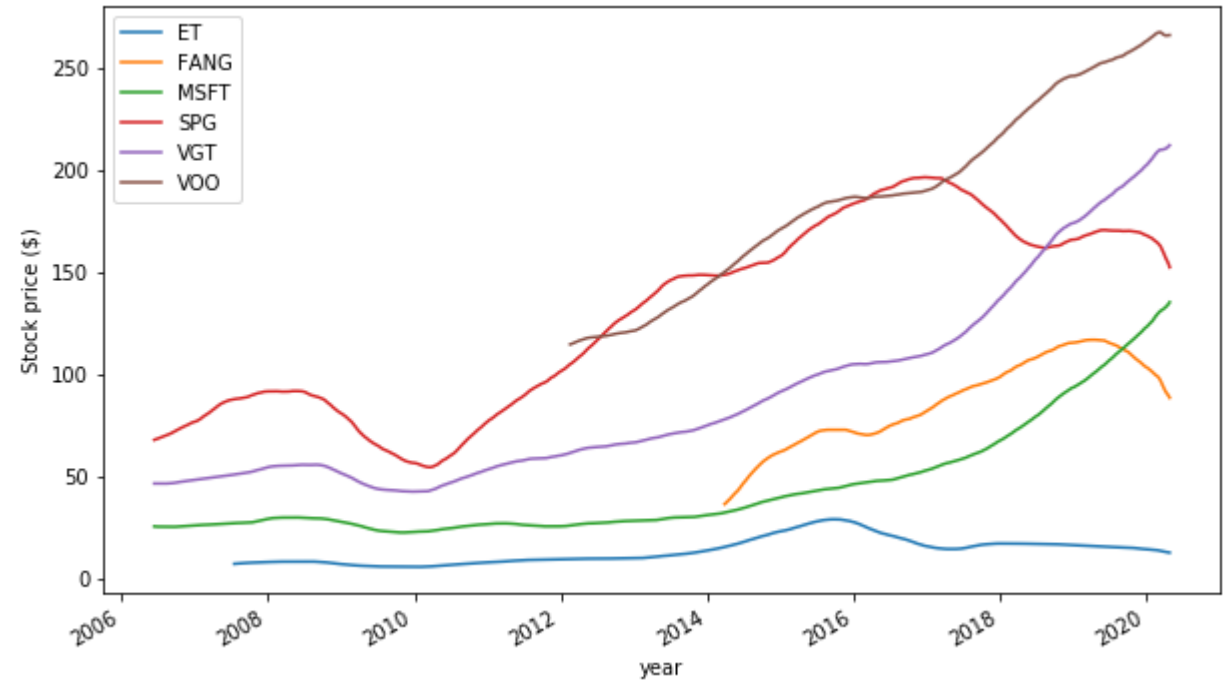# Stock price and dividend over time

Stock price

Dividend

- SPG, MSFT, VOO are very stable dividend payers. While ET pays dividend at a decent ratio, but the dividend is not growing

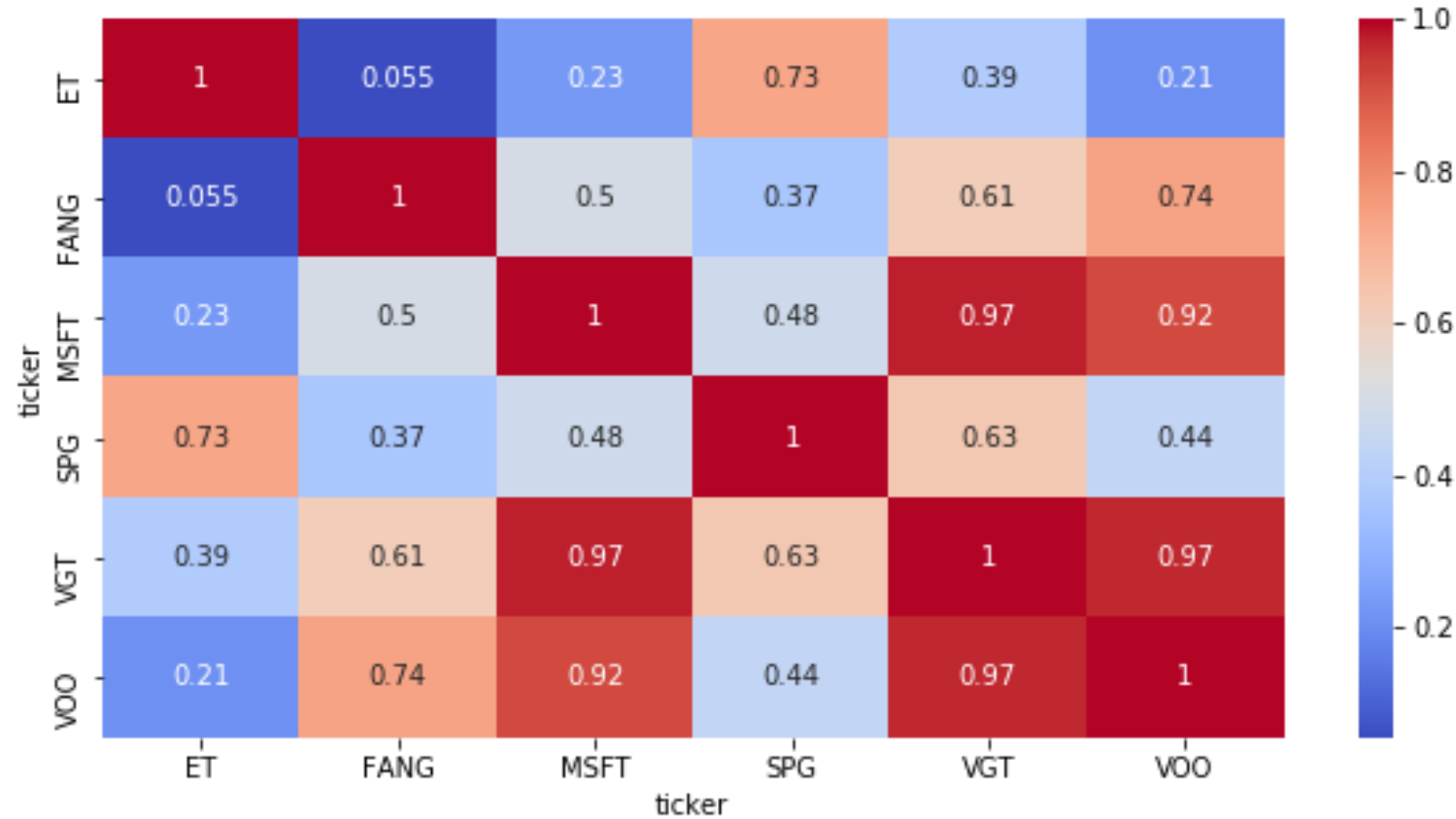# Smoothing the variance of the stock prices

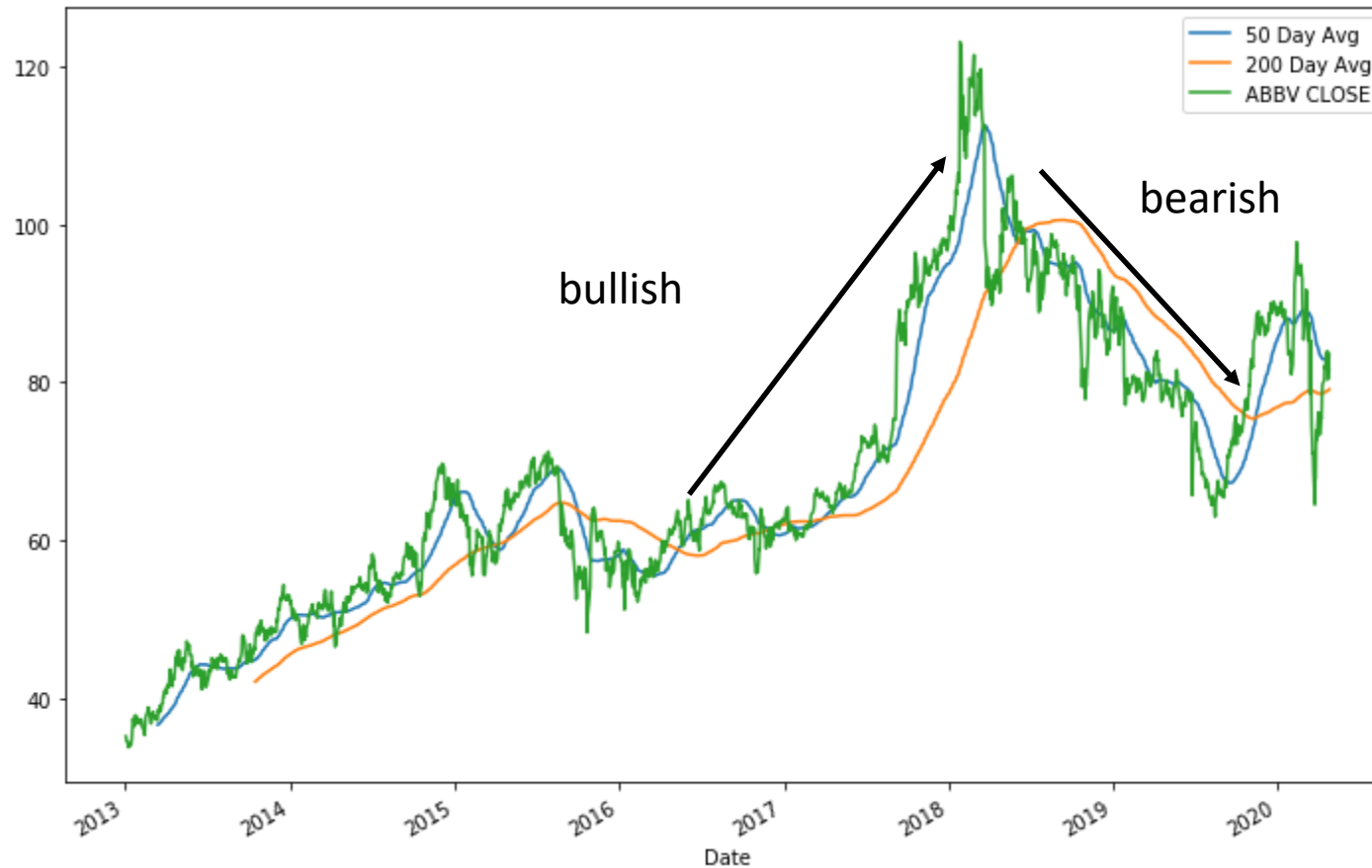50 day rolling average

365 day rolling average

- Time series of the 50 day and 365 day rolling average gives a high-level idea about the stock type.
- For example, MSFT is a still growing (growth stock)
- Energy transfer pays dividends to the share holders. It's a dividend stock

Correlation between stock price

- Correlation between stocks can be used to identify similar stocks. For example VGT (technology index and VOO (S&P 500 index are heavily correlated))
- To enhance diversity of the portfolio, avoid investing all of your investments in the same bucket

50 Day moving avg vs 200 day moving Avg.

- When 50day moving average cuts the 200day moving average, it is called the golden cross
- 50day moving average cuts the 200day moving average and the slop is positive, it's a bullish signal (buy)
- 50day moving average cuts the 200day moving average and the slop is positive, it's a bearish signal (sell)

The figure above for the ticker 'ABBV' (a pharmaceutical stock) validates the above-mentioned fact