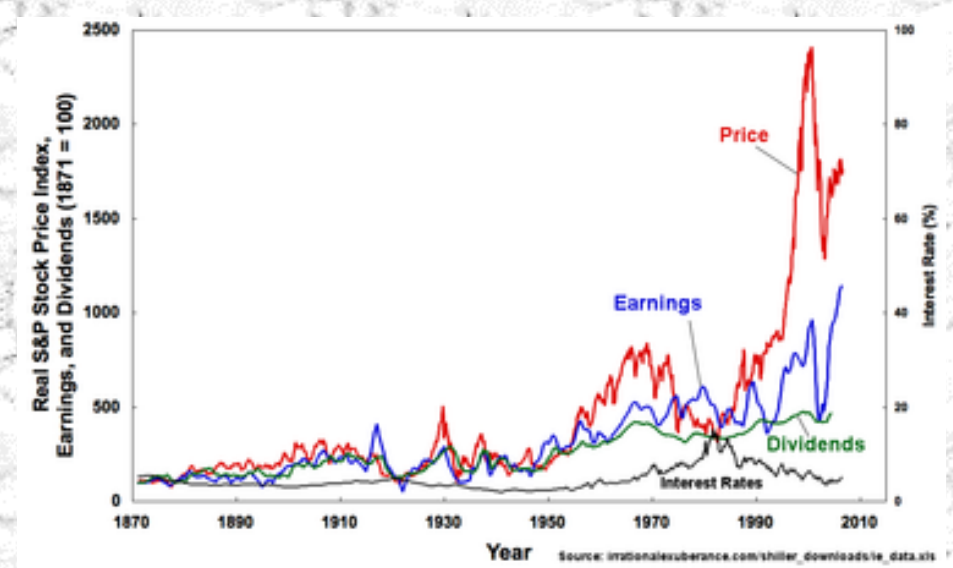
Department of Information Science & Engineering

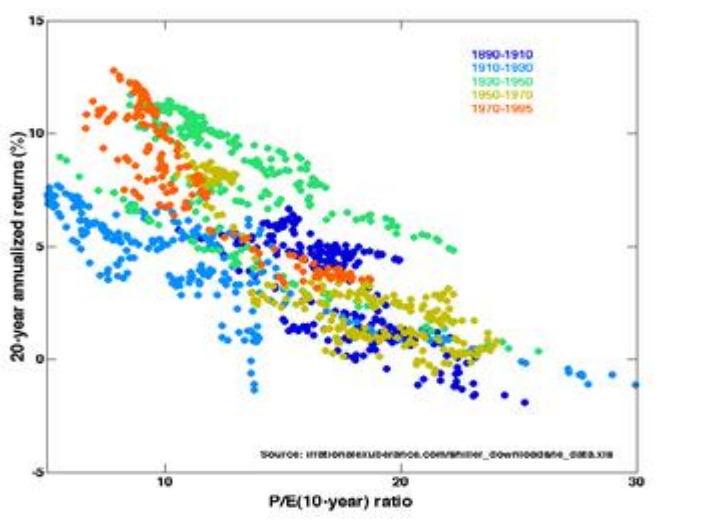
Contents

INTRODUCTION

A **stock market**, **equity market**, or **share market** is the aggregation of buyers and sellers of stocks (also called shares), which represent ownership claims on businesses; these may include *securities* listed on a public stock exchange, as well as stock that is only traded privately, such as shares of private companies which are sold to investors through equity crowdfunding platforms. Investment is usually made with an investment strategy in mind.The strategy and the tools that we use to predict the price movement of Assets here, will be 5 day moving average.



Robert Shiller's plot of the S&P Composite Real Price Index, Earnings, Dividends, and Interest Rate



Price-Earnings ratios as a predictor of twenty-year returns based upon the plot by Robert Shiller

5 Day Exponential Moving Average

What Is an Exponential Moving Average (EMA)?
An exponential moving average (EMA) is a type of moving average (MA) that places a greater weight and significance on the most recent data points. The exponential moving average is also referred to as the exponentially weighted moving average. An exponentially weighted moving average reacts more significantly to recent price changes than a simple moving average simple moving average (SMA), which applies an equal weight to all observations in the period.

Formula for Exponential Moving Average (EMA)

$$EMA_{\text{Today}} = \left(\text{Value}_{\text{Today}} * \left(\frac{\text{Smoothing}}{1+\text{Days}}\right)\right) + EMA_{\text{Yesterday}} * \left(1 - \left(\frac{\text{Smoothing}}{1+\text{Days}}\right)\right)$$

where:

EMA = Exponential moving average

OBJECTIVES

I. To predict the price movement of financial Instruments using 5 Day EMA.
II. To predict the price movement of stocks and commodities using past history and data.
III. *For better risk management*: To decrease the risk and maximise the profit margin of trades.
IV. *Liquidity Planning*: Companies around the world take on a lot of debt. This is done to enable them to expand faster. However, with higher debt, the risk of default is also increased. If a company fails to manage its cash-flow appropriately, it stands the risk of going insolvent.
V. *Minimization of human emotions:* The most significant pro of algorithmic trading is the minimization of human emotions. The strategies are pre-formulated and there is no room for the traders to get affected by their emotions.
VI. *Ability to Backtest:* The new algorithms created are first backtested using historical data. This helps to test whether the strategy will work or not.
VII. *Improved Order Entry Speed:* Algo trading processes the trades automatically. As soon as the trade criteria are met, the algorithm responds to the market change and generates orders.

Literature Survey

https://www.geeksforgeeks.org/stock-price-prediction-using-machine-learning-in-python/

https://www.simplilearn.com/tutorials/machine-learning-tutorial/stock-price-prediction-using-machine-learning

https://github.com/matplotlib/mplfinance/blob/master/examples/addplot.ipynb

https://stackoverflow.com/questions/63967999/mplfinance-moving-average-of-specific-column

https://www.youtube.com/watch?v=rO_cqa4x60o

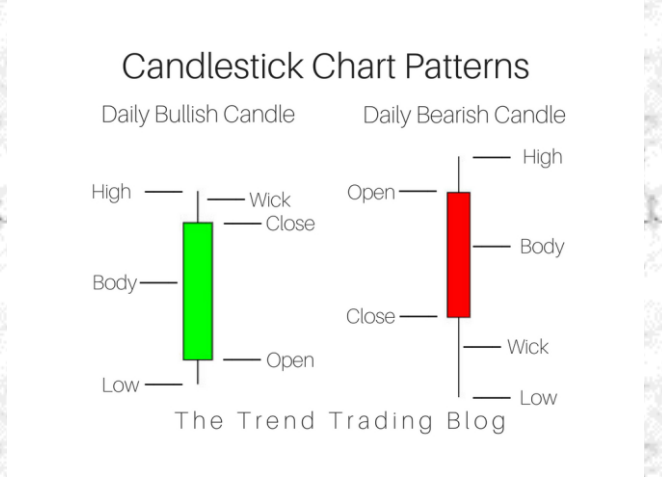
Proposed Methodology

The Strategy

The 5 Day EMA is plotted against the price movement of a particular stock. The main psychology behind the strategy is that the market overvalues the bad and undervalues the good, like Superman and Clark Kent.

The price tends to usually reverse and average out over a 5 day period a short or a sell signal will be generated when the price of a certain stock is above the 5 Day EMA. The algorithm automatically identifies such trades and executes them at market price.

The timeframe which will be used here will be 5m candles.



The strategy worked beautifully on Adani total gas on 7th Dec, 8:37 am The trade gave a 1:2.5 RR Ratio. We stand to make about 5000rs on a Capital of 1,00,000 in a matter of 90 minutes

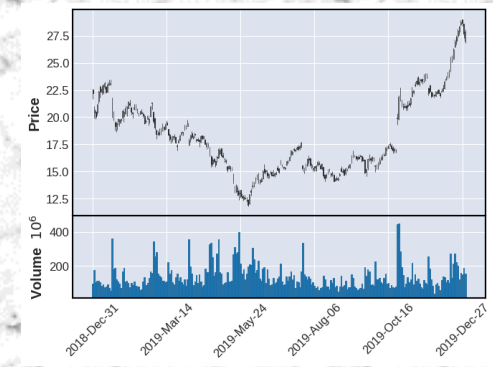
System Architecture and Design

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import pandas_datareader as data
import datetime as dt
```

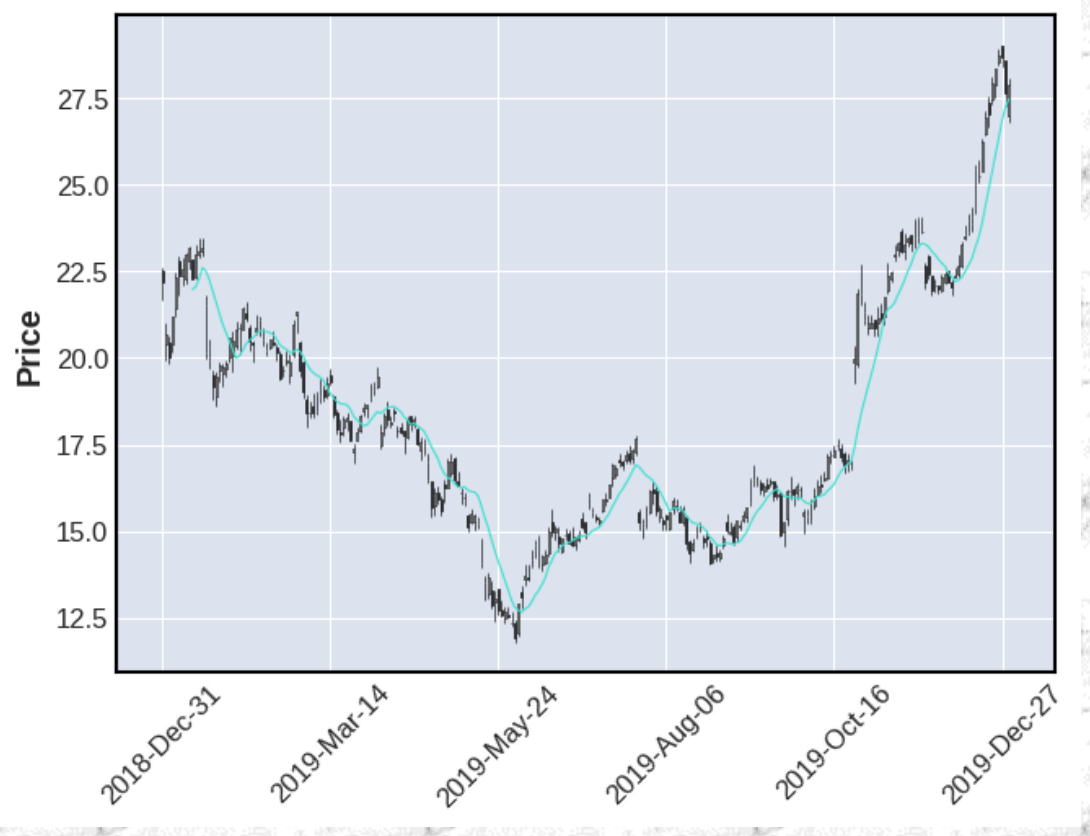
```
start = '2018-12-31'
end='2019-12-31'


df=data.DataReader('TSLA','yahoo',start,end)
df.head()
```

Date	High	Low	Open	Close	Volume	Adj Close
2018-12-31	22.614000	21.684000	22.519333	22.186666	94534500	22.186666
2019-01-02	21.008667	19.920000	20.406668	20.674667	174879000	20.674667
2019-01-03	20.626667	19.825333	20.466667	20.024000	104478000	20.024000
2019-01-04	21.200001	20.181999	20.400000	21.179333	110911500	21.179333
2019-01-07	22.449333	21.183332	21.448000	22.330667	113268000	22.330667

```
mpl.plot(df,type='candle',volume=True)
plt.plot(df.Close)
```



```
ema = df.Close.ewm(com=2).mean()
ema
```



The working project:
[pbltest2.ipynb - Colaboratory (google.com)]

Subject Mapping

Engineering Mathematics - III (21MTB31)

The Exponential Moving averages is a part of our syllabus in module 1 of time series forecasting. We were taught how to calculate the moving averages over different time period and how this particular concept is useful in our daily life and economics

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where:

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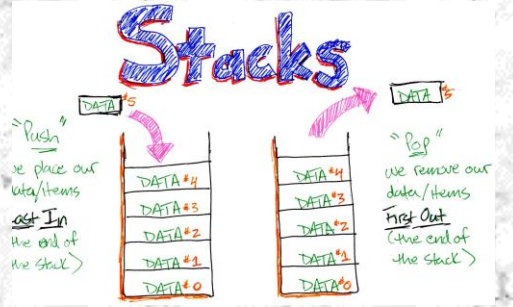
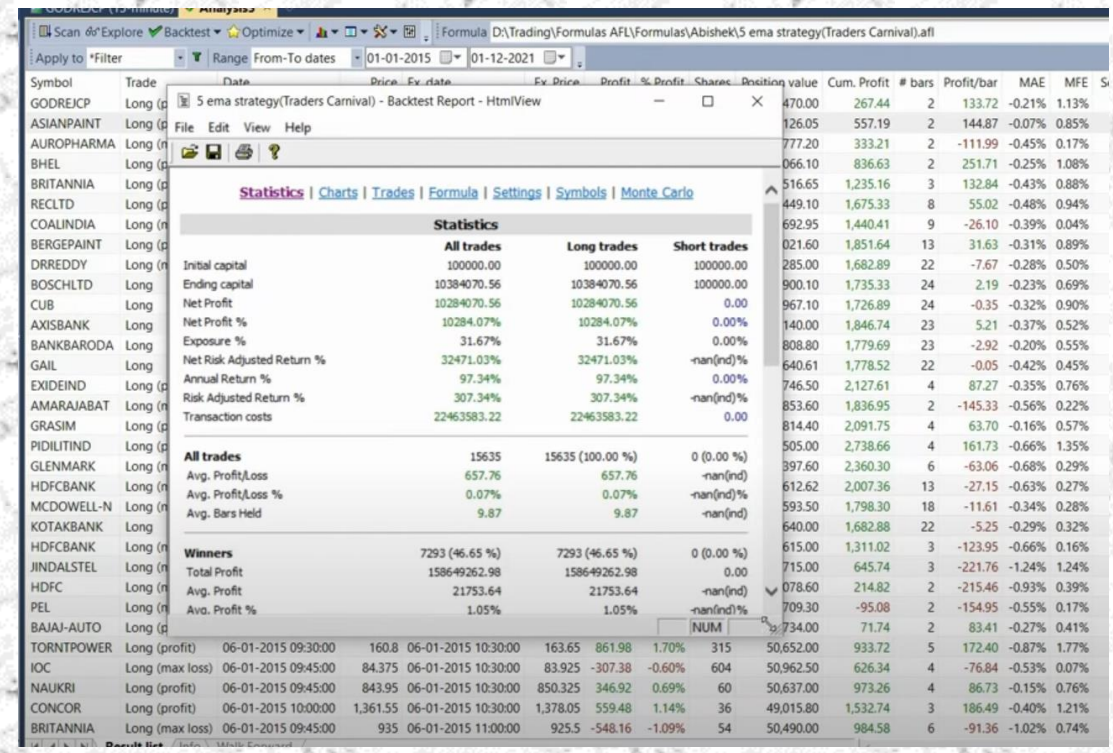
Data Structure and Applications (21CS35)

We are taught how to utilize the least possible space and how to make the algorithms more efficient



Validation



When back tested the strategy made over 300% a year beating the average annual return of the nifty 50 index which returns about 12%pa.

The back test was on over 27,000 stocks over a 5 year period

Future Scope and Enhancement

Machine Learning and Data Science will play a huge role in the financial industry int the upcoming years. Automated bots and tools which use Machine Learning will definitely improve our lives for better or worse. Our existing algorithm is one such example of what machine learning is truly capable of. The Algorithm can be further Enhanced by use of multiple chart and candlestick patterns which occur in the higher and lower chart timeframe, by using such tools and methods the probability and possibility of finding high conviction trades which have a high risk : reward ratio increases we can also position size better and give the best possible return on the users capital. The algorithm has huge upside potential as we continue to feed multiple data points and charts for the enhancement of the algorithm