What, when, & all about IGL.NS stocks ?

Situation: The investment firm desire to excel among competitors by acquiring new clients.

Task: Work as a Financial Analyst and prepare a conclusive report on IGL.NS, showing the best use of data analytics in high-return decision-making.

Available Data: Used Yahoo Finance API to collect IGL.NS stock data.

Stock listed on NSE India.

Motivation:

The motivation behind the project was to perform a real-world analysis of the stock market, focusing on IGL.NS. Through time series analysis, I aimed to understand the historical trends and patterns of the stock's performance. This project is based on real-world data and provided an opportunity to develop a predictive machine learning model to forecast future stock prices. During the process, I gained valuable insights into the dynamics of the stock market, such as the influence of economic factors, market sentiment, and technical indicators. Overall, this project enhanced my understanding of stock markets and sharpened my data analysis and predictive modeling skills.

What does the data look like?

```
Data columns (total 7 columns):
 #   Column        Non-Null Count   Dtype
---  ------        --------------   -----
 0   Open          4790 non-null    float64
 1   High          4790 non-null    float64
 2   Low           4790 non-null    float64
 3   Close         4790 non-null    float64
 4   Volume        4790 non-null    int64
 5   Dividends     4790 non-null    float64
 6   Stock Splits  4790 non-null    float64
```

|	Open	High	Low	Close	Volume
count	4790.000000	4790.000000	4790.000000	4790.000000	4.790000e+03
mean	145.381782	147.553985	143.042496	145.139095	2.644245e+06
std	158.052253	160.200565	155.568904	157.717374	5.782734e+06
min	8.183029	8.240455	7.989222	8.096893	0.000000e+00
25%	20.736934	21.154136	20.292982	20.693667	8.716778e+05
50%	59.113422	60.436933	57.926111	59.130798	1.637080e+06
75%	268.862200	272.847864	264.276305	268.941429	2.831603e+06
max	571.154494	573.105927	557.304009	563.015564	2.358938e+08

Report:

The Data was cleaned in order to eradicate errors that could hinder Technical Analysis and results of the Predictive ML Model.
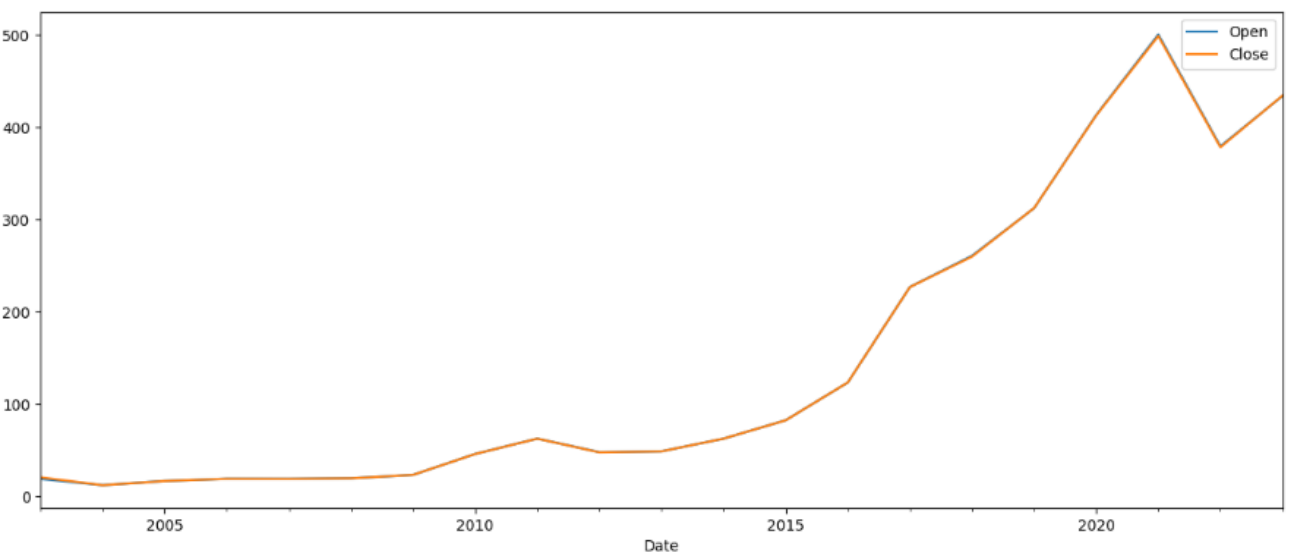
Traits of cleaned data:

1- No null values

2- Date - Time index

3- Data starting from stock launch.

4- Columns with their ideal datatypes.

Open, High, and Low produces the following graph when plotted.
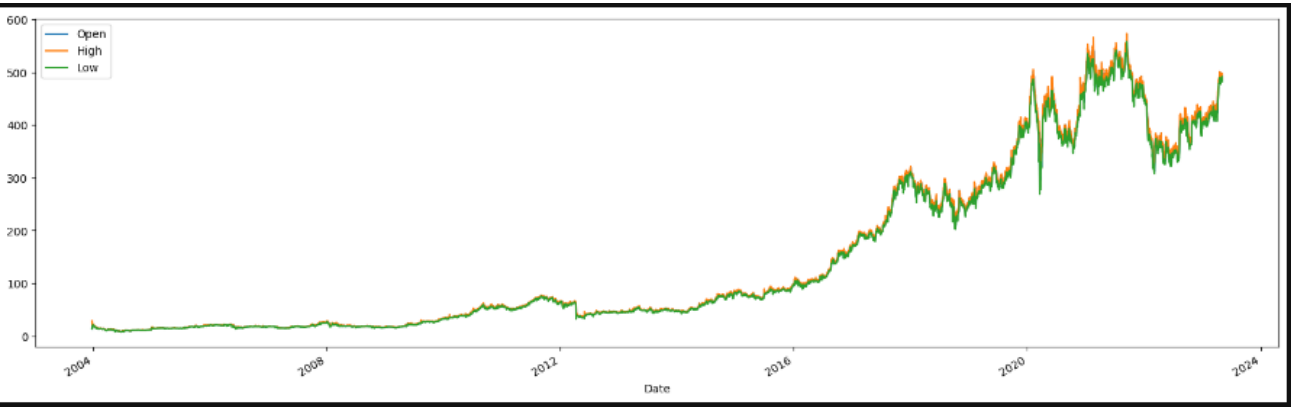
For better understanding, resampling the data:

Note: The Stock Price does not seem to have any major fluctuation prior to 2015, however, After 2015, the stock has shown tremendous growth over the years.

Important: Stock Close value is chosen for Technical Analysis

Reason: the most stable value is the close value, open, high, and low fluctuate with time, however, the close value is fixed once the market is closed, thus it is the most stable value to analyze price change over time.

Technical Analysis:-

Plotting Close Value :
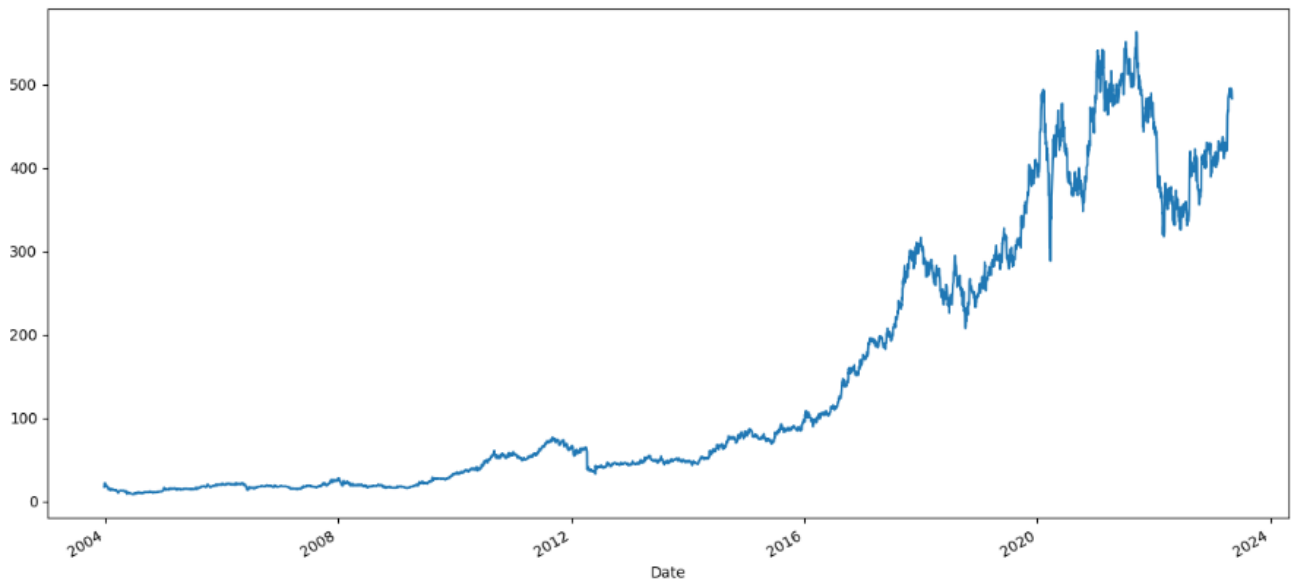
As the stock seems to be less active prior to the Year 2018, I decided to analyze data since January 2016, the reason being after 2018 the stock shows a volatile tendency.
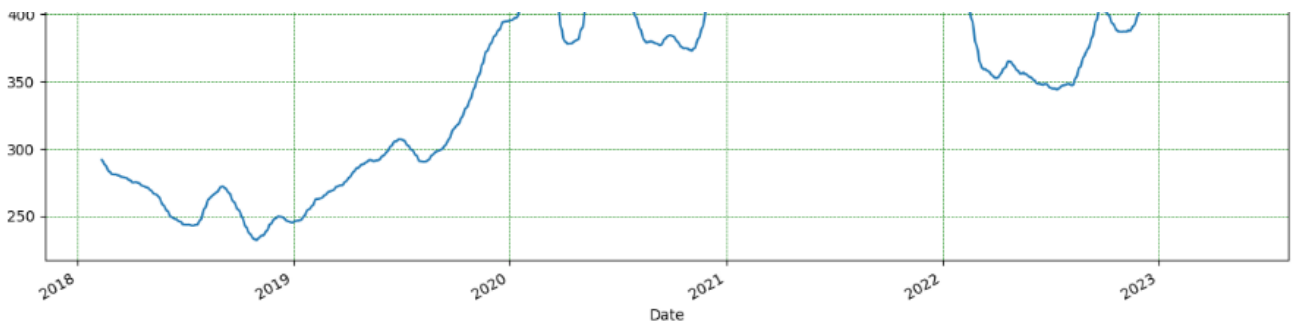
Graph for Close values from 2018 to the current period:

Trend of Close Value for last 5 years

Using statistical methods to smoothen the graph and increase readability.

Moving Average of 30 days


30 Day moving average line
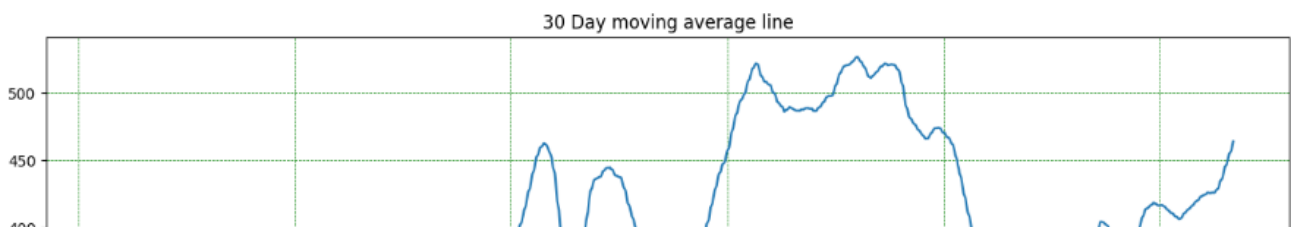
Findings from the above graph

- It can be seen that stock value tends to take a dip in the 3rd quarter of every year.
- The duration between the transition from the 2nd Quarter to the 3rd is most favorable to get into the stock.
- It can be noticed that investments made in Q4 can show high returns in next year's Q1.

Plotting Close and Open values together with moving averages to compare.
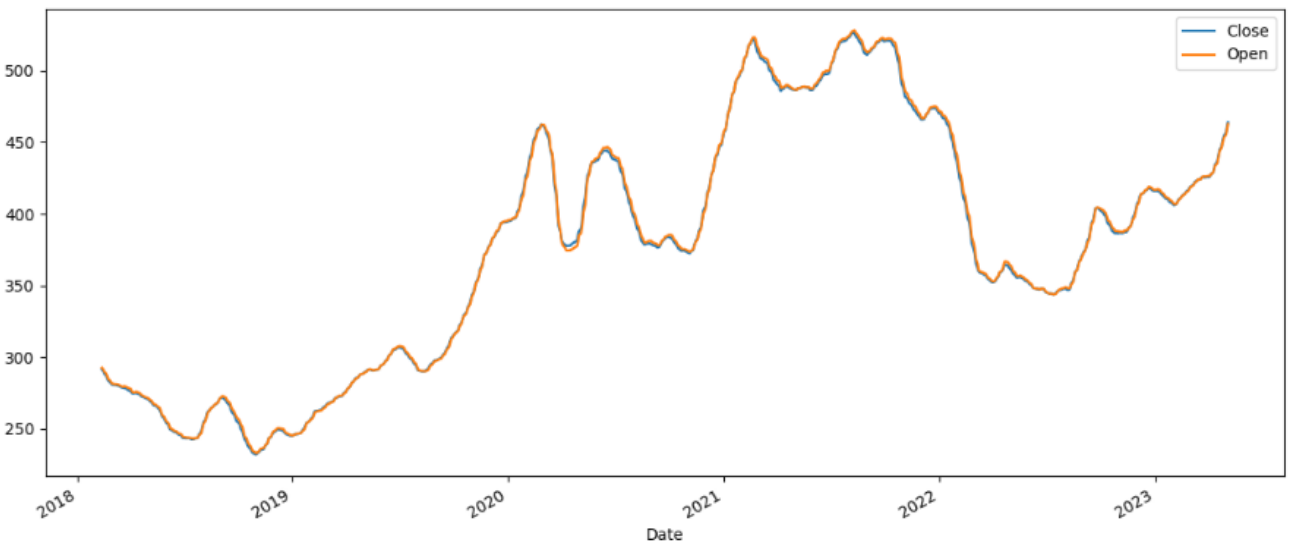
Findings from the above graph

- From 2018 to the 3rd quarter of 2019 stock prices closed above open prices.
- In 2021, the mean closed price was trending lower than the mean open price.
- The effect of Covid-19 can be seen, the prices started falling down from the 1st quarter of 2020 and the downfall happened again in 2021.
- The recovery of stock started with the relaxations in Covid protocols after 3rd quarter of 2021.
- Prices tumbled drastically from FI 2021-22 Q2, stocks closed less than open prices and managed to show recovery in 2022 Q1.

Important: It is noted that the simple moving average (SMA) method always highlights delay w.r.t sudden changes to market conditions. This can be well understood by the following graph.

Stock Close Value Vs Close 50 days rolling Average value
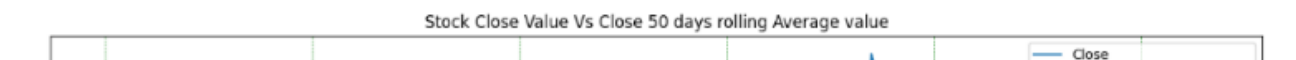
The yellow highlighted region depicts the delay Simple Moving Average follows. The original Values trend is upwards, however, the SMA line goes follows the opposite trend for some time period.

The Lag Simple Moving Average induces can be removed to a considerable extent by using Exponential Weighted Moving Average, Nearest observation is given the highest weightage to predict new value.

Creating EWMA with 50-day span similar to SMA

```python
igl_5_years['EMA_50_day_span']=igl_5_years['Close'].ewm(span=50, adjust=False).mean()
```

Comparing SMA, EWMA Values together along with Close Value:
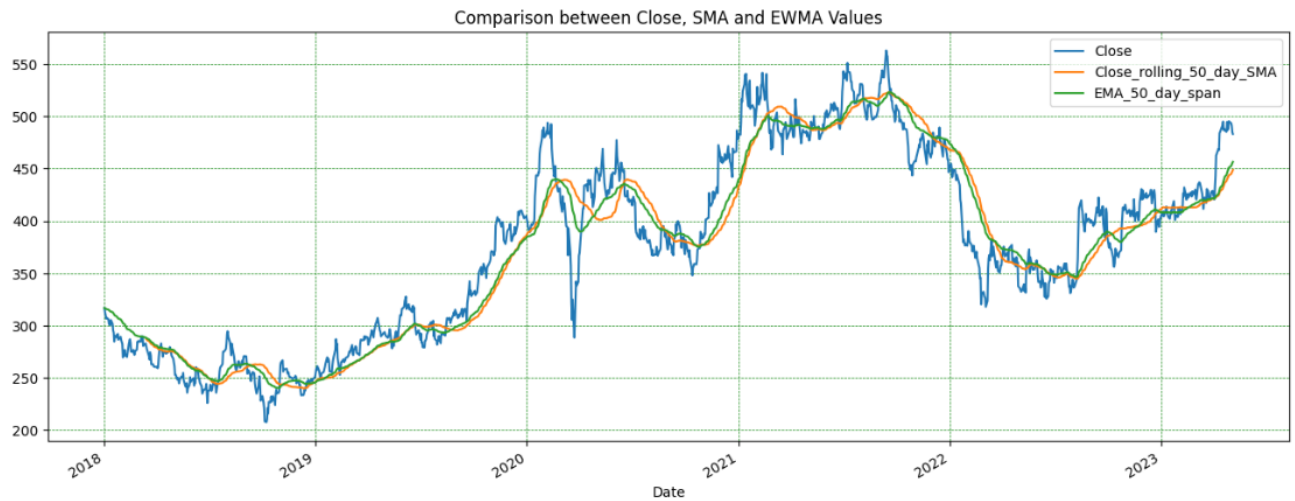
Findings from the above graph

PROS

- EMA line is much smoother than the Original Close values
- It resembles values much closer to the Original Close values, this can be estimated by the gap between EMA and Close Price line.
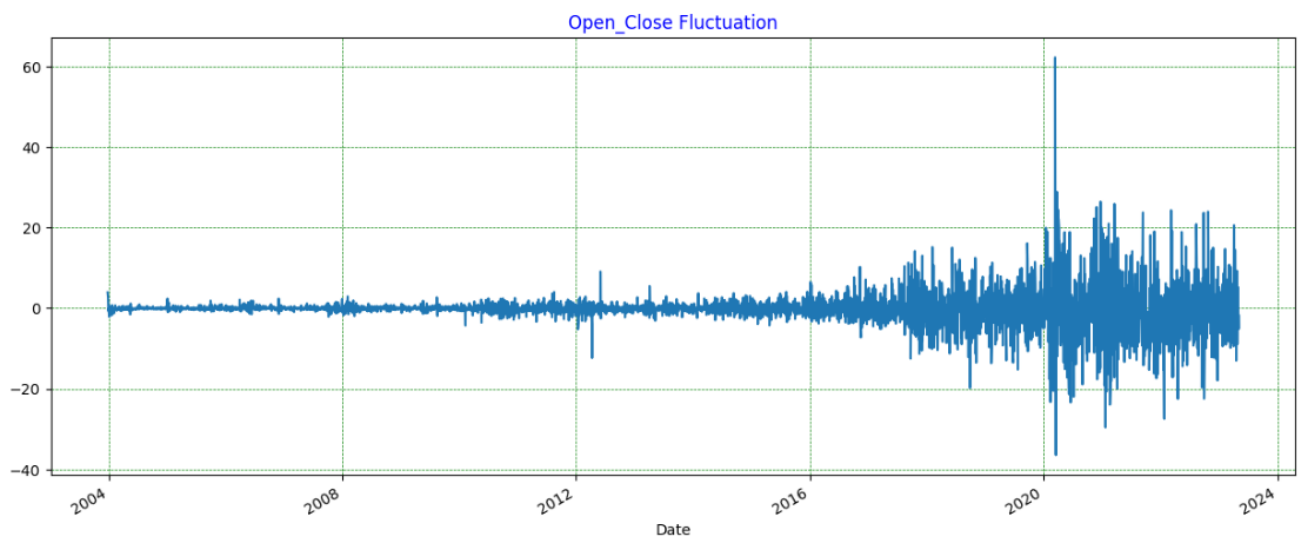- EMA is highly responsive to sudden changes.

Cons

- It is less stationary than SMA, which makes it difficult to create a predictive ML model.

Volatility Check:

- **Close - Open Volatility**
- **High- Low Volatility**

Close - Open Volatility

```python
igl['Close_Open_Difference'] = igl['Close'] - igl['Open']
```


Open_Close Fluctuation

- **The stock seems to have stable fluctuations in Close-Open price difference prior to 2016**
- **Since 2016 stock gained momentum and the Close-Open difference gap increased.**

Two sudden changes were found in the analysis, This analysis focuses on volatility in two parts on the basis of the time period.

1- Time period from 2016 to March 2020

Weekly Variation of Close - Open Difference between January 2016 and March 2020
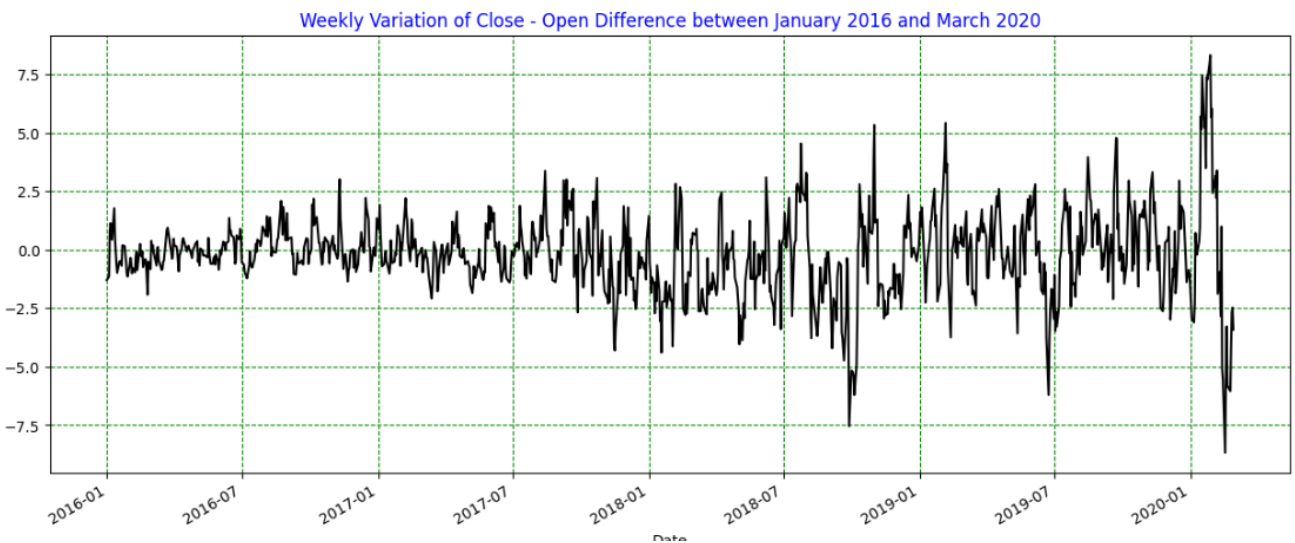
- January, July, and August show a high positive difference between Close-Open prices
- Max Range: -19 to +23
- Mean : 3
- Average Fluctuation: -5 to +5

2- Time period from March 2020 to the Current date

Weekly Variation of Close - Open Difference after March 2020
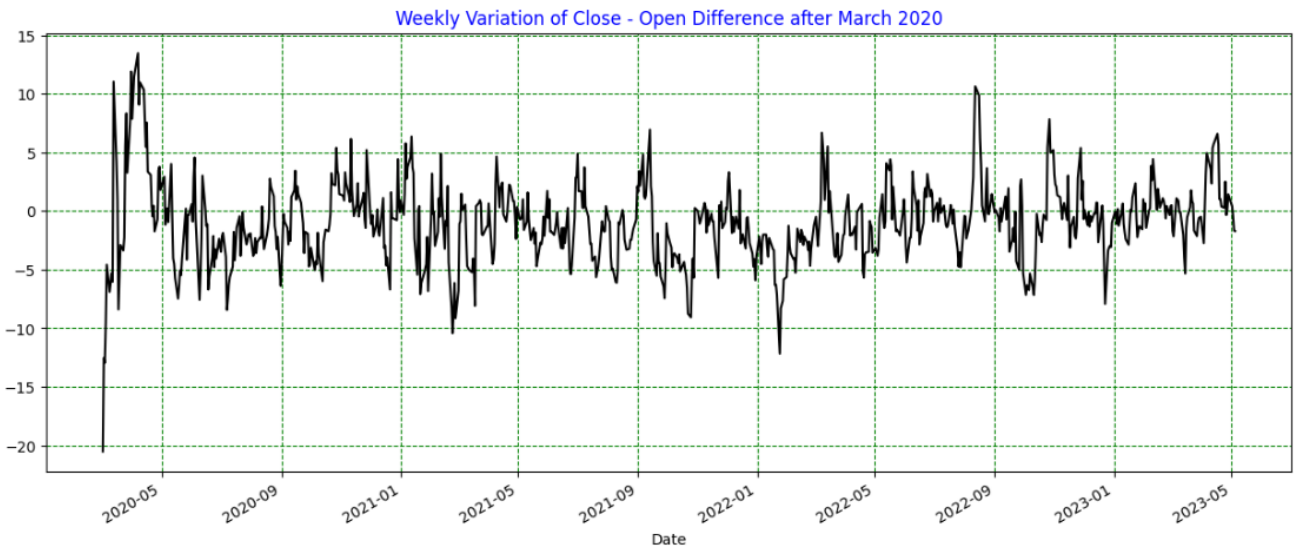
- April shows a high positive difference between Close-Open prices
- Max Range: -36 to +62
- Mean: 6
- Average Fluctuation: -6 to +7

INFLUENCE OF WORLD EVENTS :

- **March 2020 shows tremendous change, highly influenced by Covid-19 sentiments**
- **Another change noticed in 2022, influenced by the Russia-Ukraine war**

High - Low Volatility

```
igl['High_low_diff'] = igl['High'] - igl['Low']
igl.head()
```

Date	Open	High	Low	Close	Volume	Close_Open_Difference	High_low_diff
2003-12-26 00:00:00+05:30	13.207699	28.669321	13.207699	17.141296	99224725	3.933597	15.461621
2003-12-29 00:00:00+05:30	17.851921	20.572418	17.241783	20.529350	76012820	2.677429	3.330635
2003-12-30 00:00:00+05:30	20.852370	23.687719	20.852370	21.663496	101253950	0.811126	2.835349
2003-12-31 00:00:00+05:30	21.921904	22.869413	20.830833	21.254341	65094260	-0.667563	2.038579
2004-01-01 00:00:00+05:30	21.821407	22.094175	21.132310	21.627598	37308910	-0.193809	0.961865

High Low Difference Variation with Time
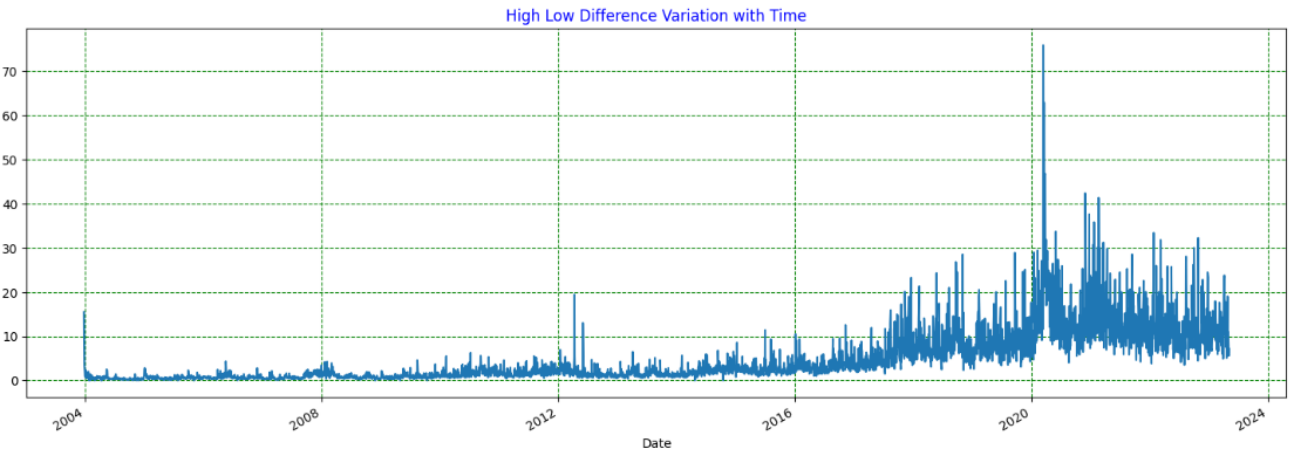
Findings from the above graph

- **The variation is almost similar and seems constant before 2016 with not much difference, however after 2016 there is a tremendous change**
- **Again in March 2020, there is a sharp upturn, and the trend of the series changed.**

I will divide my analysis into two parts:-
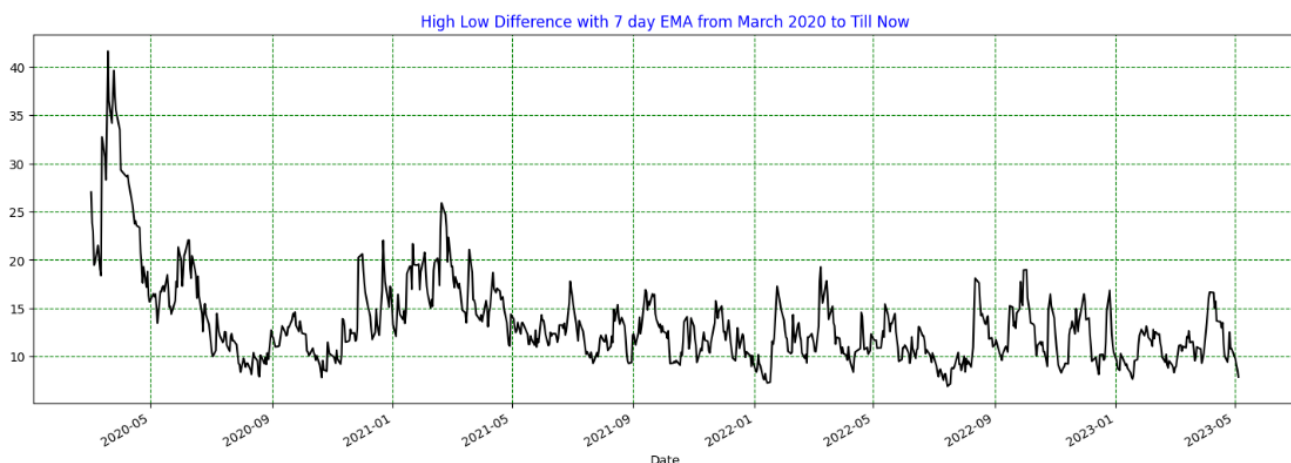
1- January 2016 to March 2020

High Low Difference from 2016 to March 2020
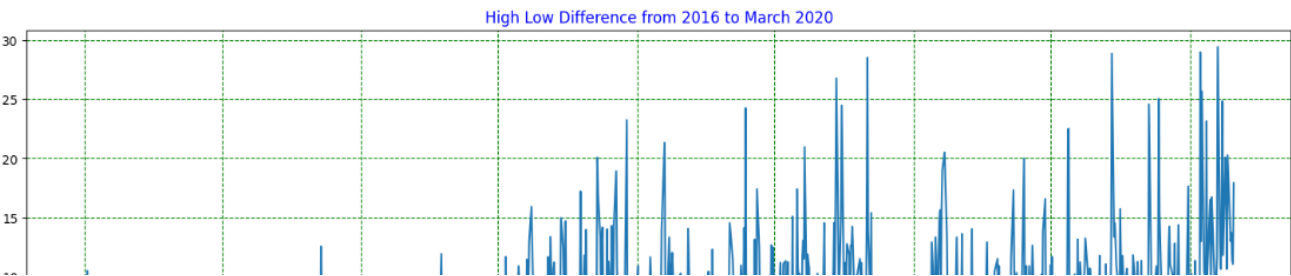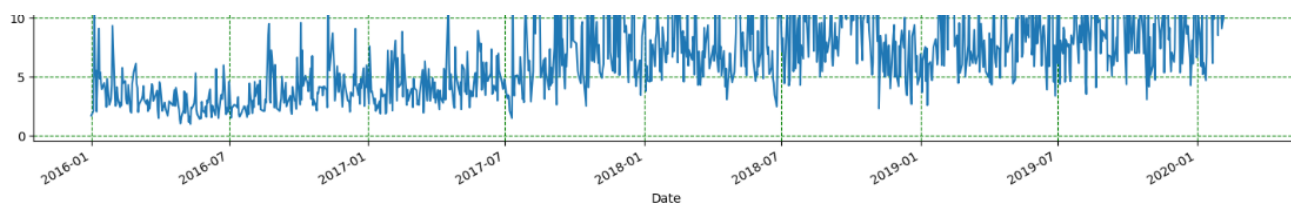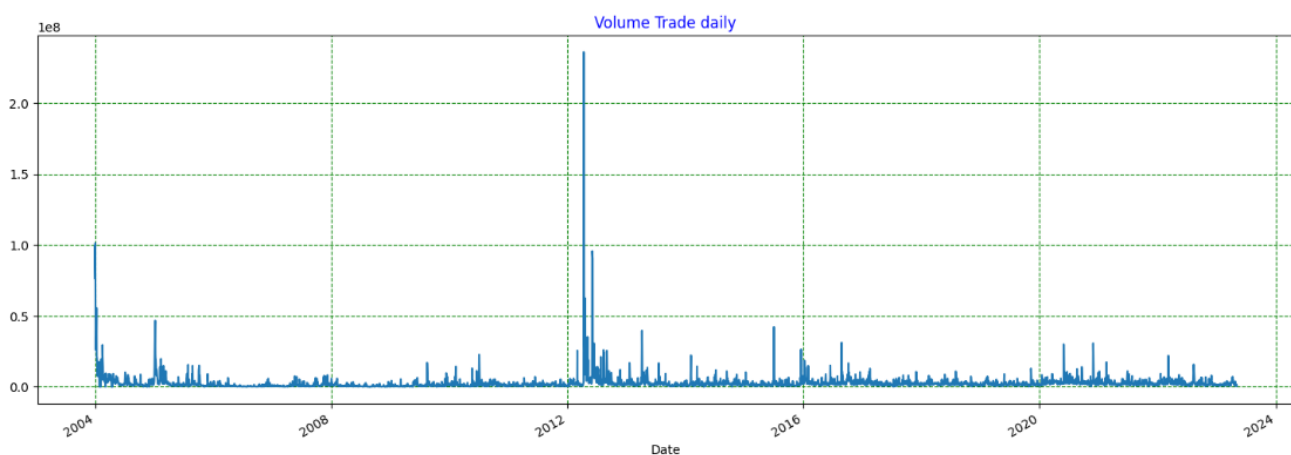
- **February has the maximum number of high (High-Low) gaps.**
- **The range of gap is between 5 to 14 on average, Which moved up from 3 to 6 in 2017**

2- March 2020 to present

High Low Difference with 7 day EMA from March 2020 to Till Now

- **After March 2020, March has the maximum number of high (High-Low) gaps.**
- **The range of gap is between 10 to 16 on average.**

Volume Trade Analysis:

Volume Trade daily

- **January holds less Volume traded.**
- **February has the highest volume of traded**

Trend of Stock Volume

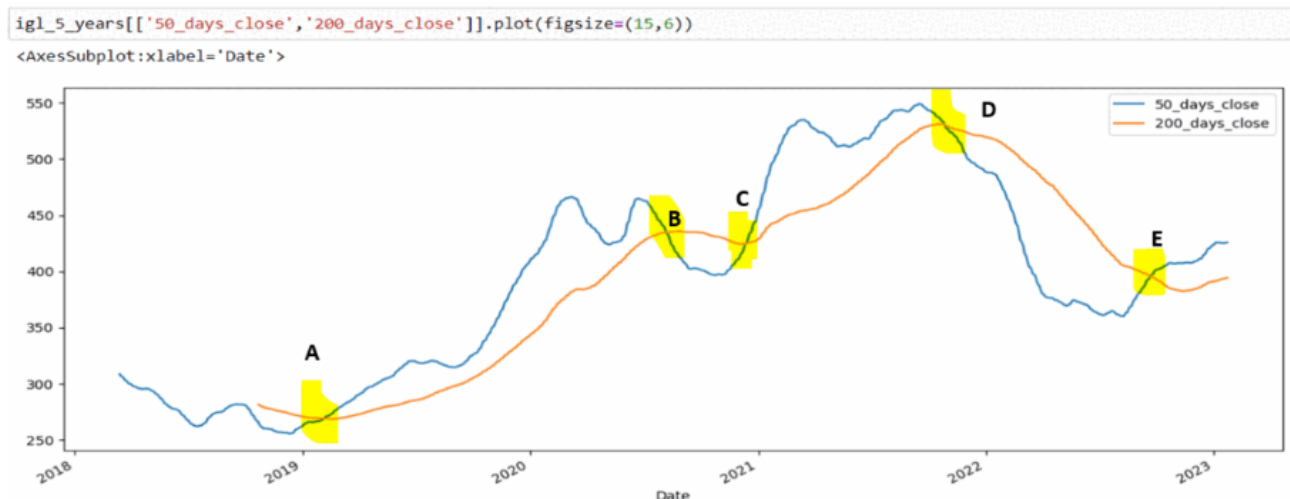**Min** :- May, July, December

Falls In :- Feb

Start Rising In :- May, July

Max :- March

Golden Cross & Death Cross

Within the last 5 Year period, I observed 3 Golden Cross and 2 Death Cross and every one made a high difference in the stock value followed later

```
igl_5_years[['50_days_close','200_days_close']].plot(figsize=(15,6))
<AxesSubplot:xlabel='Date'>
```


During my analysis I majorly focussed on the last 5 year time period, There are two reasons:

- A tremendous change was observed in the behavior of stock nearly 5 years ago.
- Stocks are highly volatile in nature and change their state every second, it is good to observe new trends currently reflected from stocks.
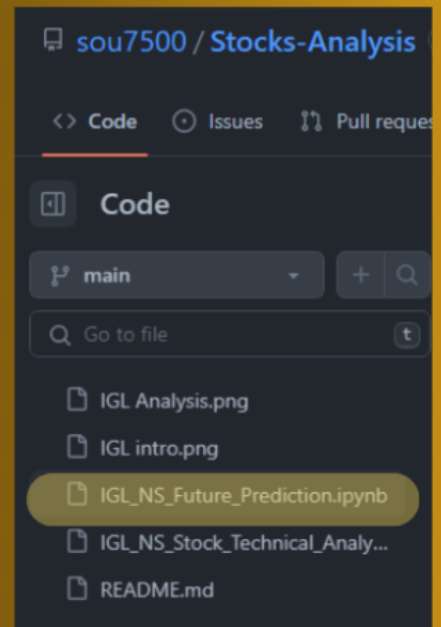
I conclude that IGL being under the umbrella of energy stock is highly unpredictable but can offer high returns if carefully managed

March-August is my favorite month to call buy action on "IGL.NS"