

Crude Oil Price Forecast

Project Flow

1. Problem Statement

Nowadays, the increased oil prices worldwide are having a great impact on all economic activities. Over the years there has been a fluctuation in petroleum prices, and a close consideration of the demand and supply side effects that sparked these price changes shows there is high probability that these changes will continue in the outlook period and beyond. West African Monetary Agency (2008) concluded that increase in world oil prices have been shown to worsen fiscal deficit positions of oil importing countries like Ghana. For this reason, we believe that if the government can see ahead of monthly petroleum prices, our deficit would not be worsened.

2. EDA

i) Basic information about data - EDA

#Basic information

#Describe the data

ii) Know the datatypes

#Datatypes

iii) Find the Null values

#Find null values

iv) Duplicate values

#Find the duplicates

v) ffill & bfill for missing Dates values

vi) A quick box plot(Outlier Detection)

First grouping data by yearwise using Grouper function

#Boxplot

3) Visualization

i) Line plots:

ii) Histogram plots:

iii) Density plots:

iv) Lag plots:

v) Moving Average

```
df.COprice.plot()

for i in range(2,24,6):
    df["COprice"].rolling(i).mean().plot(label=str(i))

plt.legend(loc='best')
```

#To see plot separatly

```
plt.figure(figsize=(24,7))

df.COprice.plot(label="org")

for i in range(2,24):

    plt.figure(figsize=(24,7))

    df["COprice"].rolling(i).mean().plot(label=str(i))

    plt.title("MA"+str(i))

    plt.legend(loc='best')

    plt.show()
```

vi) Time series decomposition plot

vii) Autocorrelation plots(Acf) And PACF plot:

4) Converting NS into Stationary

we can make a non-stationary dataset to stationary by :

(i) taking its difference, where from each value in the time series data we subtract the previous value.

In python we can do this by using `df.diff()` method.

5) Model building

A) Model Based Methods

- i) Linear Model
- ii) Exponential
- iii) Quadratic
- iv) Additive seasonality
- v) Additive Seasonality Quadratic
- vi) Multiplicative Seasonality
- vii) Multiplicative Additive Seasonality

B) Data Driven Models

- i) Simple Exponential Method
- ii) Holt Method
- iii) Holts winter exponential smoothing with additive seasonality and additive trend
- iv) Holts winter exponential smoothing with multiplicative seasonality and additive trend
- v) ARIMA
- vi) LSTM
- vii) RNN

6) Deployment with Streamlit