ts

July 21, 2023

[46]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from statsmodels.tsa.arima_model import ARMA
from statsmodels.tsa.ar_model import AR
```

[2]:
```
# Loading The Dataset (reading the dataset using read_csv)
df = pd.read_csv("stock_data.csv",
parse_dates=True,
index_col="Date")

# displaying the first five rows of dataset
df.head()
```

[2]:
```
            Unnamed: 0   Open   High    Low  Close    Volume  Name
Date
2006-01-03         NaN  39.69  41.22  38.79  40.91  24232729  AABA
2006-01-04         NaN  41.22  41.90  40.77  40.97  20553479  AABA
2006-01-05         NaN  40.93  41.73  40.85  41.53  12829610  AABA
2006-01-06         NaN  42.88  43.57  42.80  43.21  29422828  AABA
2006-01-09         NaN  43.10  43.66  42.82  43.42  16268338  AABA
```

[3]:
```
#Dropping Unwanted Columns
```

[4]:
```
# deleting column
df.drop(columns='Unnamed: 0')
```

[4]:
```
             Open   High    Low  Close    Volume  Name
Date
2006-01-03  39.69  41.22  38.79  40.91  24232729  AABA
2006-01-04  41.22  41.90  40.77  40.97  20553479  AABA
2006-01-05  40.93  41.73  40.85  41.53  12829610  AABA
2006-01-06  42.88  43.57  42.80  43.21  29422828  AABA
2006-01-09  43.10  43.66  42.82  43.42  16268338  AABA
…             …     …      …      …       …    …
2017-12-22  71.42  71.87  71.22  71.58  10979165  AABA
2017-12-26  70.94  71.39  69.63  69.86   8542802  AABA
```

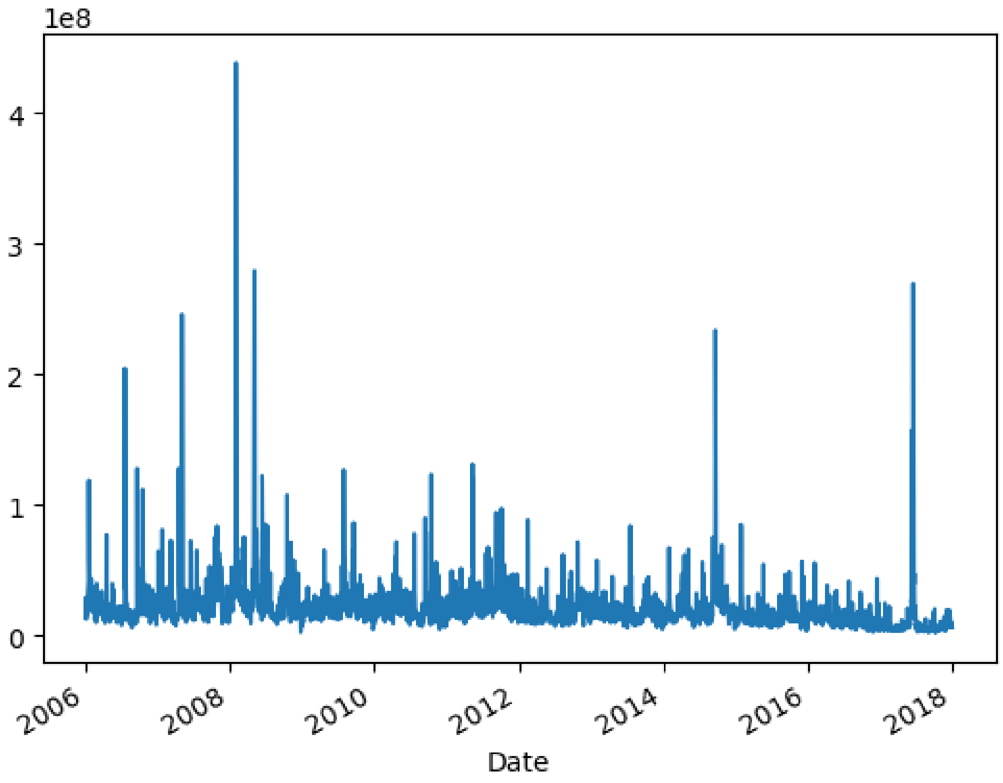
```
2017-12-27  69.77  70.49  69.69  70.06   6345124  AABA
2017-12-28  70.12  70.32  69.51  69.82   7556877  AABA
2017-12-29  69.79  70.13  69.43  69.85   6613070  AABA

[3019 rows x 6 columns]
```

[5]:
```
#Plotting a simple line plot for time series data.
```

[6]:
```
df['Volume'].plot()
```

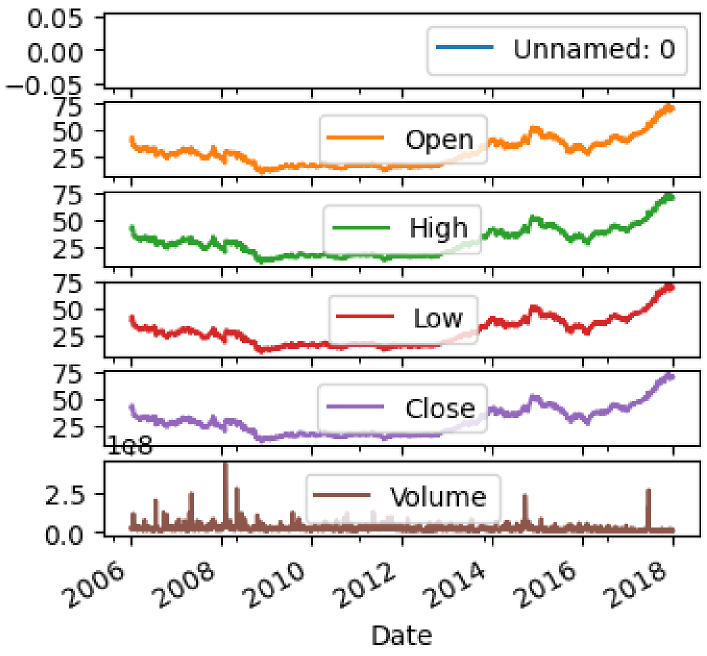
[6]:
```
<AxesSubplot:xlabel='Date'>
```



[7]:
```
#Plot other columns
```

[8]:
```
df.plot(subplots=True, figsize=(4, 4))
```

[8]:
```
array([<AxesSubplot:xlabel='Date'>, <AxesSubplot:xlabel='Date'>,
       <AxesSubplot:xlabel='Date'>, <AxesSubplot:xlabel='Date'>,
       <AxesSubplot:xlabel='Date'>, <AxesSubplot:xlabel='Date'>],
      dtype=object)
```



[11]:
```
# Resampling: Resampling is a methodology of economically using a data sample␣
 ↪to improve the accuracy and
#quantify the uncertainty of a population parameter.
#Resampling for months or weeks and making bar plots is another very simple and␣
 ↪widely used method of finding seasonality.
#Here we are going to make a bar plot of month data for 2016 and 2017.
```

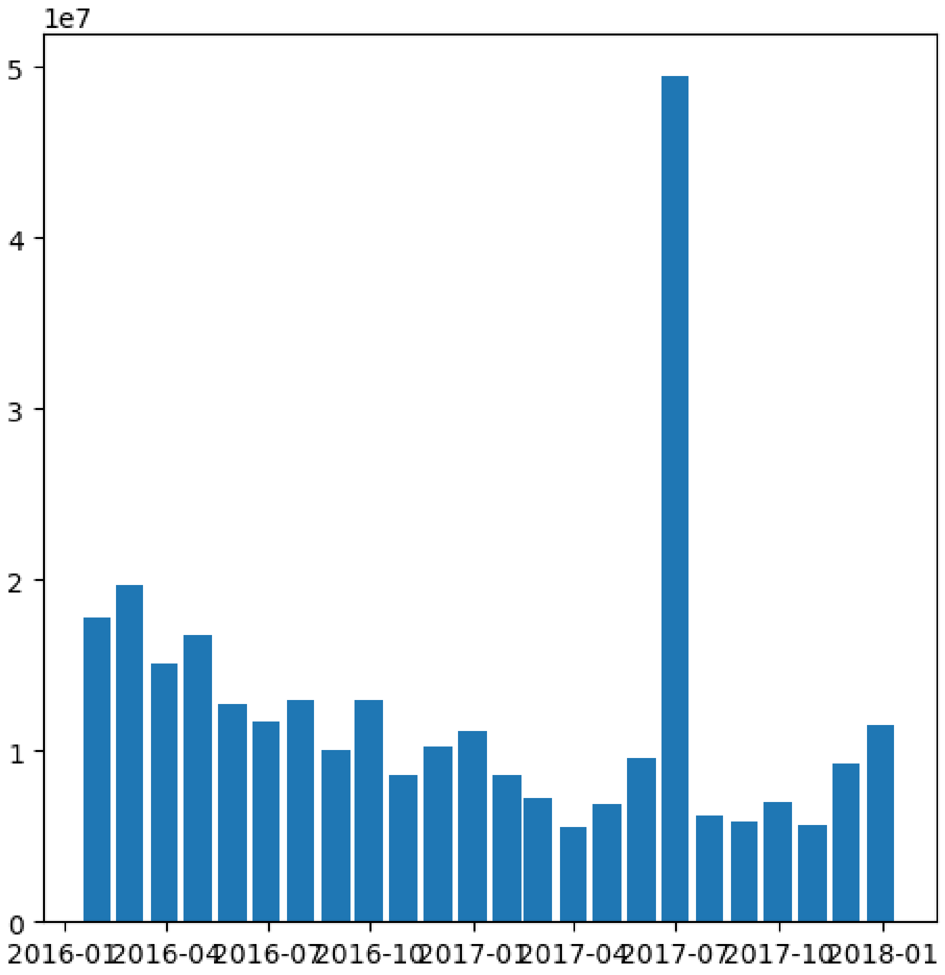
[12]:
```
# Resampling the time series data based on monthly 'M' frequency
df_month = df.resample("M").mean()

# using subplot
fig, ax = plt.subplots(figsize=(6, 6))

# plotting bar graph
ax.bar(df_month['2016':].index,
df_month.loc['2016':, "Volume"],
width=25, align='center')
```

```
<ipython-input-12-b7d07158cb28>:2: FutureWarning: The default value of
numeric_only in DataFrameGroupBy.mean is deprecated. In a future version,
numeric_only will default to False. Either specify numeric_only or select only
columns which should be valid for the function.
  df_month = df.resample("M").mean()
```

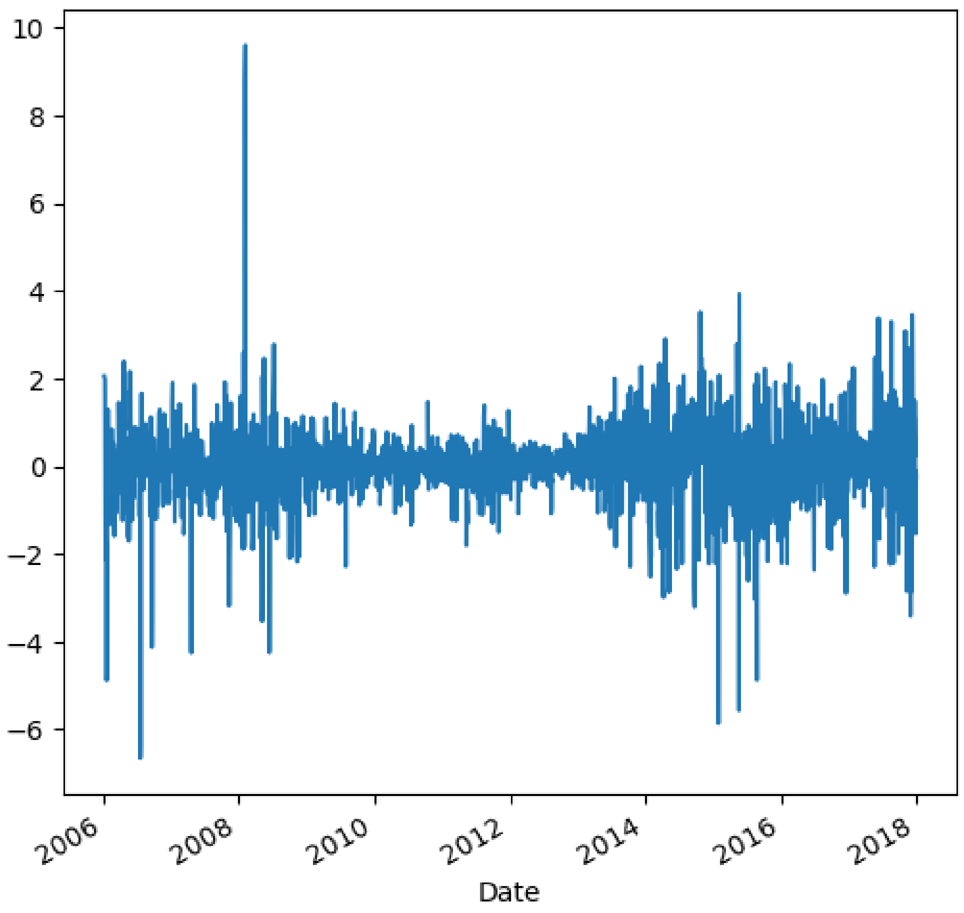
[12]:
```
<BarContainer object of 24 artists>
```



```
[13]: #Differencing: Differencing is used to make the difference in values of a␣
        ↪specified interval.
      #By default, it's one, we can specify different values for plots. It is the␣
        ↪most popular method to remove
      #trends in the data
```

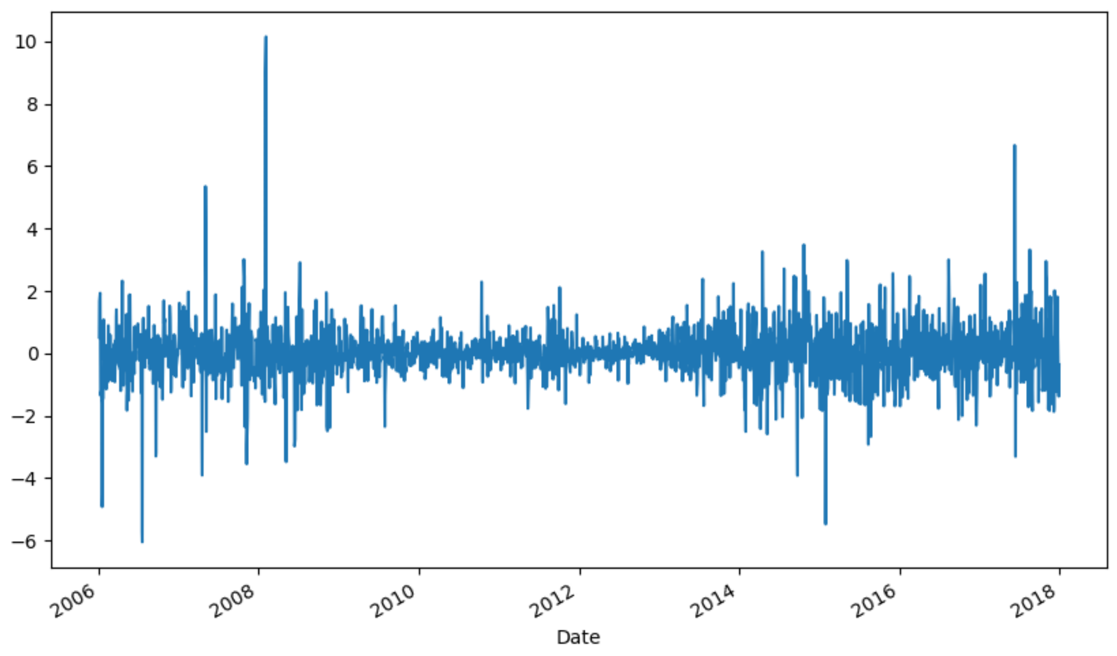
```
[14]: df.Low.diff(2).plot(figsize=(6, 6))
```

```
[14]: <AxesSubplot:xlabel='Date'>
```



```
[15]: df.High.diff(2).plot(figsize=(10, 6))
```

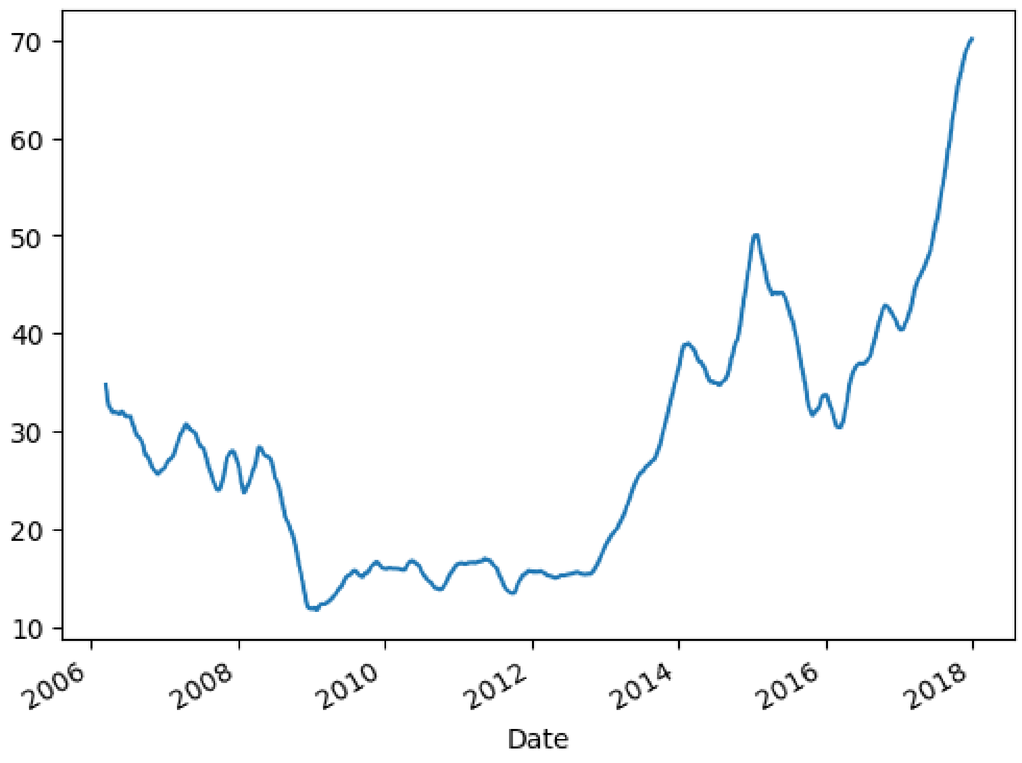
```
[15]: <AxesSubplot:xlabel='Date'>
```



```
[16]: #Trend In The Dataset
      #We can see the change in trend in our dataset, Trend helps us see where the␣
       ↪value of data that
      #we are considering is going upward or downward in the long run.
```

```
[17]: # Finding the trend in the "Open"
      # column using moving average method
      window_size = 50
      rolling_mean = df['Open'].rolling\
      (window_size).mean()
      rolling_mean.plot()
```

```
[17]: <AxesSubplot:xlabel='Date'>
```


70
60
50
40
30
20
10
2006
2008
2010
2012
2014
2016
2018
Date

```
[ ]:
```