Cricket Time Series

May 9, 2021

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
```

[2]:
```
data = pd.read_csv("TimeSeriesData.csv")
data.head()
```

[2]:

	Date	Type	Pos	Neg	Neu
0	01-Mar-21	Politics	314	311	375
1	01-Mar-21	Entertainment	693	64	243
2	01-Mar-21	Social	670	30	300
3	01-Mar-21	Song	106	82	812
4	01-Mar-21	Entertainment	420	76	504

[3]:
```
data = data[data.Type=="Cricket"]
data.head()
```

[3]:

	Date	Type	Pos	Neg	Neu
43	09-Mar-21	Cricket	726	6	268
44	09-Mar-21	Cricket	738	34	228
55	17-Mar-21	Cricket	68	24	908
58	17-Mar-21	Cricket	538	232	230
59	17-Mar-21	Cricket	327	41	632

[4]:
```
data["Date"] = pd.to_datetime(data["Date"])
```

[5]:
```
data = data[data.Date>"17-Mar-21"]
data.head()
```

[5]:

	Date	Type	Pos	Neg	Neu
64	2021-03-18	Cricket	506	88	406
74	2021-03-20	Cricket	392	88	520
79	2021-03-21	Cricket	754	10	236
85	2021-03-23	Cricket	500	50	450
100	2021-03-26	Cricket	452	127	421

[6]:
```
data.reset_index(inplace=True)
```

[7]:
```
data.head()
```

[7]:

	index	Date	Type	Pos	Neg	Neu
0	64	2021-03-18	Cricket	506	88	406
1	74	2021-03-20	Cricket	392	88	520
2	79	2021-03-21	Cricket	754	10	236
3	85	2021-03-23	Cricket	500	50	450
4	100	2021-03-26	Cricket	452	127	421

[8]:
```
del data["index"]
```

[9]:
```
data.head()
```

[9]:

	Date	Type	Pos	Neg	Neu
0	2021-03-18	Cricket	506	88	406
1	2021-03-20	Cricket	392	88	520
2	2021-03-21	Cricket	754	10	236
3	2021-03-23	Cricket	500	50	450
4	2021-03-26	Cricket	452	127	421

[10]:
```
data.to_csv(r'C:\Users\asus\Desktop\Hashtag WD\CricketData.csv',index=False)
```

[2]:
```
data = pd.read_csv("CricketData.csv")
data.head()
```

[2]:

	Date	Type	Pos	Neg	Neu
0	18-03-2021	Cricket	506	88	406
1	19-03-2021	Cricket	449	88	463
2	20-03-2021	Cricket	392	88	520
3	21-03-2021	Cricket	754	10	236
4	22-03-2021	Cricket	627	30	343

1 Pos Time Series

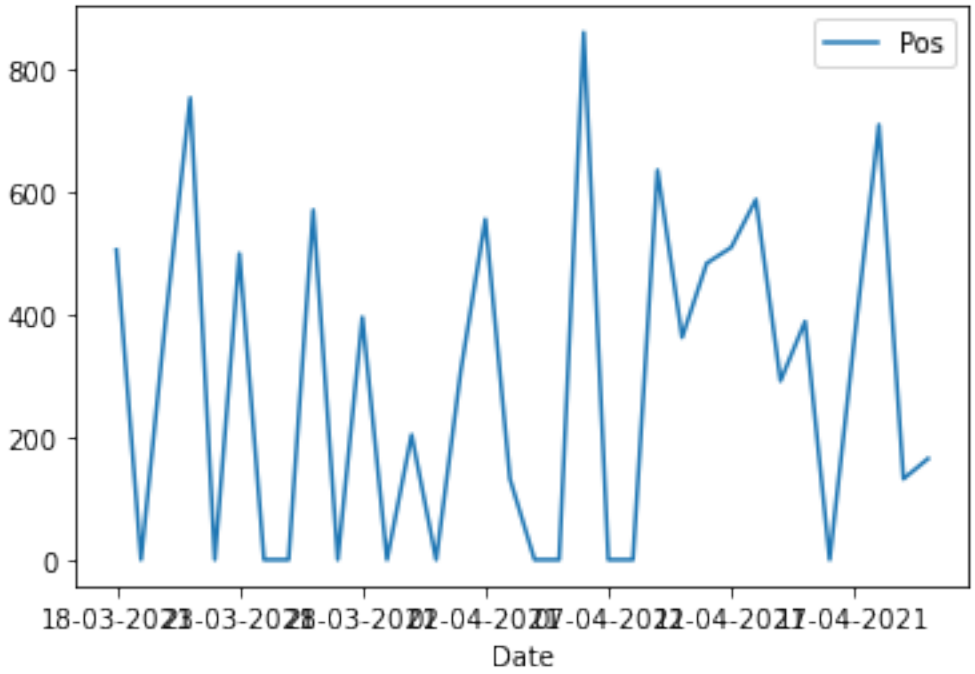
[4]:
```
data1 = data.iloc[:,[0,2]]
```

[5]:
```
data1.set_index('Date',inplace=True)
data1.head()
```

[5]:

Date	Pos
18-03-2021	506
19-03-2021	0
20-03-2021	392
21-03-2021	754
22-03-2021	0

[6]:
```
data1.plot();
```



[7]:
```
from statsmodels.tsa.stattools import adfuller
```

[8]:
```
# H0: It is non stationary
# H1: It is stationary
def adfuller_test(Pos):
    result = adfuller(Pos)
    labels = ["ADF Test statistics","P-value","#Lags Used","Number of␣
 ↪Observation Used"]
    for value,labels in zip(result,labels):
        print(labels+' : '+str(value) )
    if result[1] <= 0.05:
        print("Strong evidence against null hypothesis")
    else:
        print("weak evidence against null hypothesis")
```

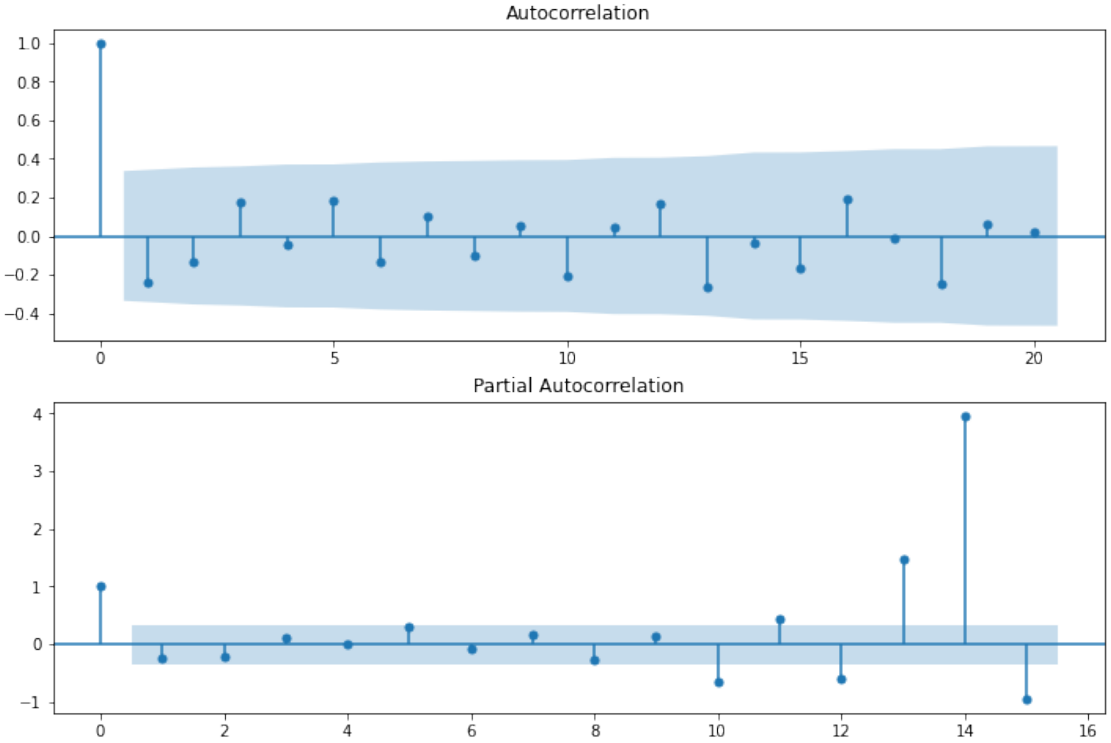
[9]:
```
adfuller_test(data1["Pos"])
```

```
ADF Test statistics : -7.172924548393732
P-value : 2.774310473655622e-10
#Lags Used : 0
Number of Observation Used : 33
Strong evidence against null hypothesis
```

[10]:
```
from statsmodels.graphics.tsaplots import plot_acf,plot_pacf
import statsmodels.api as sm
```

[11]:
```
fig = plt.figure(figsize=(12,8))
ax1 = fig.add_subplot(211)
fig = sm.graphics.tsa.plot_acf(data1['Pos'].iloc[0:],lags=20,ax=ax1)
ax2 = fig.add_subplot(212)
fig = sm.graphics.tsa.plot_pacf(data1['Pos'].iloc[0:],lags=15,ax=ax2)
```

```
C:\Users\asus\anaconda3\lib\site-
packages\statsmodels\regression\linear_model.py:1434: RuntimeWarning: invalid
value encountered in sqrt
  return rho, np.sqrt(sigmasq)
```



[12]:
```
import pmdarima as pm
```

[13]:
```
def arimamodel(df):
    automodel=pm.
 ↪auto_arima(df,start_p=0,start_q=0,max_p=4,max_q=4,test="adf",seasonal=False,trace=True)
    return automodel
```

[14]:
```
arimamodel(data1["Pos"])
```

```
Performing stepwise search to minimize aic
 ARIMA(0,1,0)(0,0,0)[0] intercept   : AIC=496.339, Time=0.01 sec
 ARIMA(1,1,0)(0,0,0)[0] intercept   : AIC=486.987, Time=0.08 sec
 ARIMA(0,1,1)(0,0,0)[0] intercept   : AIC=inf, Time=0.06 sec
 ARIMA(0,1,0)(0,0,0)[0]             : AIC=494.359, Time=0.02 sec
 ARIMA(2,1,0)(0,0,0)[0] intercept   : AIC=478.090, Time=0.06 sec
 ARIMA(3,1,0)(0,0,0)[0] intercept   : AIC=477.342, Time=0.21 sec
 ARIMA(4,1,0)(0,0,0)[0] intercept   : AIC=473.971, Time=0.04 sec
 ARIMA(4,1,1)(0,0,0)[0] intercept   : AIC=475.693, Time=0.15 sec
 ARIMA(3,1,1)(0,0,0)[0] intercept   : AIC=inf, Time=0.37 sec
 ARIMA(4,1,0)(0,0,0)[0]             : AIC=471.977, Time=0.06 sec
 ARIMA(3,1,0)(0,0,0)[0]             : AIC=475.349, Time=0.04 sec
 ARIMA(4,1,1)(0,0,0)[0]             : AIC=473.699, Time=0.12 sec
 ARIMA(3,1,1)(0,0,0)[0]             : AIC=472.587, Time=0.30 sec

Best model:  ARIMA(4,1,0)(0,0,0)[0]
Total fit time: 1.530 seconds
```

[14]:
```
ARIMA(order=(4, 1, 0), scoring_args={}, suppress_warnings=True,
      with_intercept=False)
```

[15]:
```
from statsmodels.tsa.arima_model import ARIMA
```

[16]:
```
model = ARIMA(data1['Pos'],order=(4,1,0))
model_fit1=model.fit()
```

```
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py:472:
FutureWarning:
statsmodels.tsa.arima_model.ARMA and statsmodels.tsa.arima_model.ARIMA have
been deprecated in favor of statsmodels.tsa.arima.model.ARIMA (note the .
between arima and model) and
statsmodels.tsa.SARIMAX. These will be removed after the 0.12 release.

statsmodels.tsa.arima.model.ARIMA makes use of the statespace framework and
is both well tested and maintained.

To silence this warning and continue using ARMA and ARIMA until they are
removed, use:

import warnings
warnings.filterwarnings('ignore', 'statsmodels.tsa.arima_model.ARMA',
                        FutureWarning)
warnings.filterwarnings('ignore', 'statsmodels.tsa.arima_model.ARIMA',
                        FutureWarning)

  warnings.warn(ARIMA_DEPRECATION_WARN, FutureWarning)
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:581:
ValueWarning: A date index has been provided, but it has no associated frequency
```

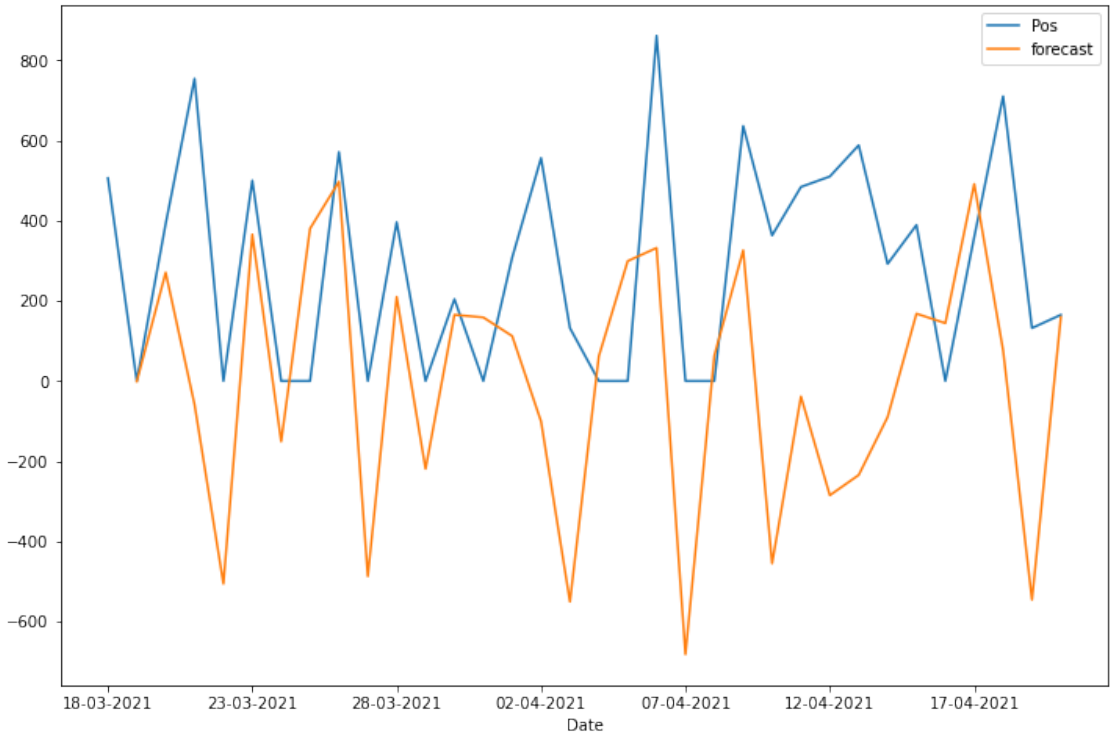
```
information and so will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it has no'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:585:
ValueWarning: A date index has been provided, but it is not monotonic and so
will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it is not'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:581:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it has no'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:585:
ValueWarning: A date index has been provided, but it is not monotonic and so
will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it is not'
```

[17]:
```
model_fit1.summary()
```

[17]:
```
<class 'statsmodels.iolib.summary.Summary'>
"""
                             ARIMA Model Results
==============================================================================
Dep. Variable:                 D.Pos   No. Observations:                   33
Model:                 ARIMA(4, 1, 0)   Log Likelihood                -231.090
Method:                       css-mle   S.D. of innovations            258.156
Date:                Sat, 01 May 2021   AIC                            474.180
Time:                        10:07:56   BIC                            483.160
Sample:                             1   HQIC                           477.202

==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
const          -1.0050     11.062     -0.091      0.928     -22.686      20.676
ar.L1.D.Pos    -1.0957      0.159     -6.899      0.000      -1.407      -0.784
ar.L2.D.Pos    -1.0803      0.219     -4.934      0.000      -1.510      -0.651
ar.L3.D.Pos    -0.6967      0.224     -3.107      0.002      -1.136      -0.257
ar.L4.D.Pos    -0.4107      0.167     -2.463      0.014      -0.738      -0.084
                                    Roots
=============================================================================
                  Real          Imaginary           Modulus         Frequency
-----------------------------------------------------------------------------
AR.1            0.1259           -1.2466j            1.2530           -0.2340
AR.2            0.1259           +1.2466j            1.2530            0.2340
AR.3           -0.9741           -0.7760j            1.2454           -0.3929
AR.4           -0.9741           +0.7760j            1.2454            0.3929
-----------------------------------------------------------------------------
"""
```

[18]:
```
data1['forecast']=model_fit1.predict(start=1,end=33, dynamic=False)
#pd.Series(model_fit1.fittedvalues,copy=True)
data1[['Pos','forecast']].plot(figsize=(12,8));
```

```
<ipython-input-18-775a41f2f878>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  data1['forecast']=model_fit1.predict(start=1,end=33, dynamic=False)
```



[19]:
```
Positive = model_fit1.forecast(steps=10)[0]
```

[20]:
```
Positive
```

[20]:
```
array([356.97828313, 365.2086339 , 358.87925946, 205.31137367,
       291.53411825, 359.68517523, 297.14781657, 290.73969215,
       278.12379846, 310.14620252])
```

2 Neg Time Series

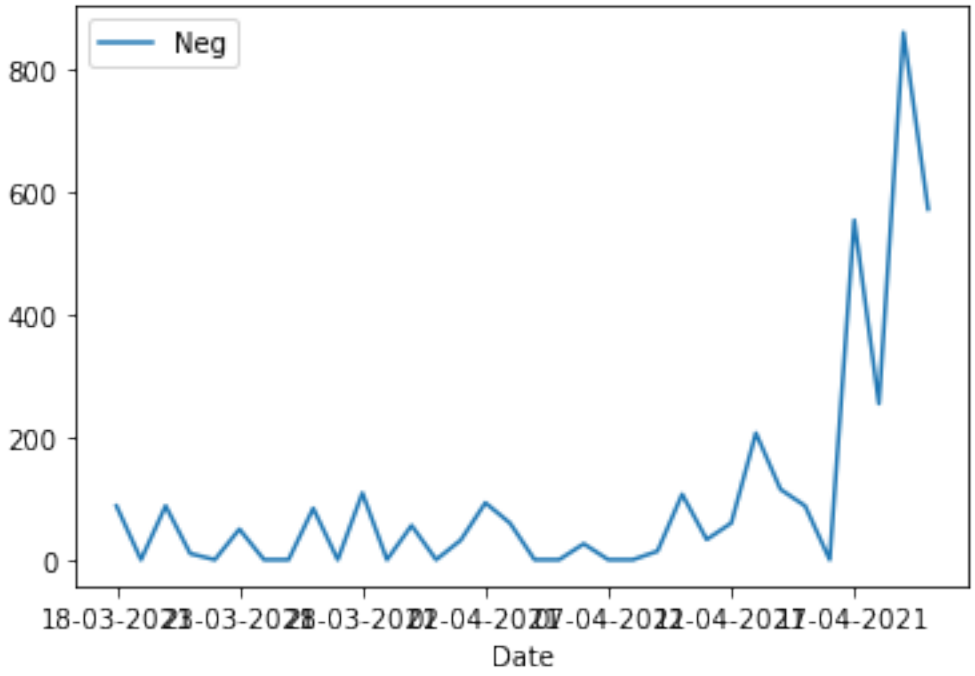
[21]:
```
data2 = data.iloc[:,[0,3]]
```

[22]:
```
data2.set_index('Date',inplace=True)
data2.head()
```

[22]:

Date	Neg
18-03-2021	88
19-03-2021	0
20-03-2021	88
21-03-2021	10
22-03-2021	0

[23]:
```
data2.plot();
```



[24]:
```
from statsmodels.tsa.stattools import adfuller
```

[25]:
```
# H0: It is non stationary
# H1: It is stationary
def adfuller_test(Neg):
    result = adfuller(Neg)
```

```
    labels = ["ADF Test statistics","P-value","#Lags Used","Number of␣
↪Observation Used"]
    for value,labels in zip(result,labels):
        print(labels+' : '+str(value) )
    if result[1] <= 0.05:
        print("Strong evidence against null hypothesis")
    else:
        print("weak evidence against null hypothesis")
```

[26]:
```
adfuller_test(data2["Neg"])
```

```
ADF Test statistics : 2.8362612369974447
P-value : 1.0
#Lags Used : 10
Number of Observation Used : 23
weak evidence against null hypothesis
```

[27]:
```
data2['Neg_First_Difference'] = data2['Neg']-data2['Neg'].shift(1)
#data2['Neg'].shift(1)
```

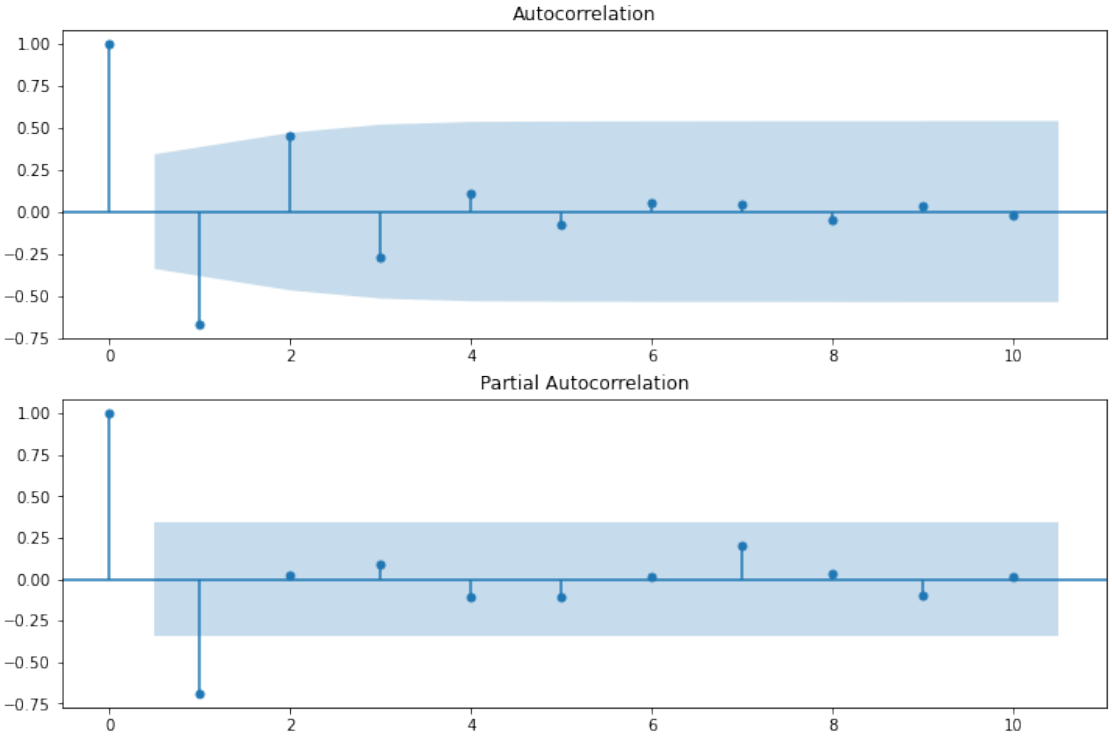
```
<ipython-input-27-0fa6d72db0bc>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  data2['Neg_First_Difference'] = data2['Neg']-data2['Neg'].shift(1)
```

[28]:
```
# Again test dickey fuller test
adfuller_test(data2['Neg_First_Difference'].dropna())
```

```
ADF Test statistics : 2.5857254811611696
P-value : 0.9990723782047033
#Lags Used : 10
Number of Observation Used : 22
weak evidence against null hypothesis
```

[29]:
```
from statsmodels.graphics.tsaplots import plot_acf,plot_pacf
import statsmodels.api as sm
```

[30]:
```
fig = plt.figure(figsize=(12,8))
ax1 = fig.add_subplot(211)
fig = sm.graphics.tsa.plot_acf(data2['Neg_First_Difference'].dropna().iloc[0:
↪],lags=10,ax=ax1)
ax2 = fig.add_subplot(212)
fig = sm.graphics.tsa.plot_pacf(data2['Neg_First_Difference'].dropna().iloc[0:
↪],lags=10,ax=ax2)
```



[31]:
```
def arimamodel(df):
    automodel=pm.
 ↪auto_arima(df,start_p=0,start_q=0,max_p=4,max_q=4,test="adf",seasonal=False,trace=True)
    return automodel
```

[32]:
```
arimamodel(data2["Neg"])
```

```
Performing stepwise search to minimize aic
 ARIMA(0,2,0)(0,0,0)[0] intercept   : AIC=462.798, Time=0.01 sec
 ARIMA(1,2,0)(0,0,0)[0] intercept   : AIC=414.872, Time=0.04 sec
 ARIMA(0,2,1)(0,0,0)[0] intercept   : AIC=inf, Time=0.10 sec
 ARIMA(0,2,0)(0,0,0)[0]             : AIC=460.811, Time=0.02 sec
 ARIMA(2,2,0)(0,0,0)[0] intercept   : AIC=411.789, Time=0.10 sec
 ARIMA(3,2,0)(0,0,0)[0] intercept   : AIC=409.442, Time=0.28 sec
 ARIMA(4,2,0)(0,0,0)[0] intercept   : AIC=408.354, Time=0.25 sec
 ARIMA(4,2,1)(0,0,0)[0] intercept   : AIC=409.877, Time=0.42 sec
 ARIMA(3,2,1)(0,0,0)[0] intercept   : AIC=408.882, Time=0.34 sec
 ARIMA(4,2,0)(0,0,0)[0]             : AIC=407.898, Time=0.17 sec
 ARIMA(3,2,0)(0,0,0)[0]             : AIC=408.209, Time=0.10 sec
 ARIMA(4,2,1)(0,0,0)[0]             : AIC=409.339, Time=0.29 sec
 ARIMA(3,2,1)(0,0,0)[0]             : AIC=408.539, Time=0.17 sec

Best model:  ARIMA(4,2,0)(0,0,0)[0]
```

```
Total fit time: 2.330 seconds
```

[32]:
```
ARIMA(order=(4, 2, 0), scoring_args={}, suppress_warnings=True,
      with_intercept=False)
```

[33]:
```
from statsmodels.tsa.arima_model import ARIMA
```

[34]:
```
model = ARIMA(data2['Neg'],order=(4,2,0))
model_fit2=model.fit()
```

```
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py:472:
FutureWarning:
statsmodels.tsa.arima_model.ARMA and statsmodels.tsa.arima_model.ARIMA have
been deprecated in favor of statsmodels.tsa.arima.model.ARIMA (note the .
between arima and model) and
statsmodels.tsa.SARIMAX. These will be removed after the 0.12 release.

statsmodels.tsa.arima.model.ARIMA makes use of the statespace framework and
is both well tested and maintained.

To silence this warning and continue using ARMA and ARIMA until they are
removed, use:

import warnings
warnings.filterwarnings('ignore', 'statsmodels.tsa.arima_model.ARMA',
                        FutureWarning)
warnings.filterwarnings('ignore', 'statsmodels.tsa.arima_model.ARIMA',
                        FutureWarning)

  warnings.warn(ARIMA_DEPRECATION_WARN, FutureWarning)
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:581:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it has no'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:585:
ValueWarning: A date index has been provided, but it is not monotonic and so
will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it is not'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:581:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it has no'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:585:
ValueWarning: A date index has been provided, but it is not monotonic and so
will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it is not'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\base\model.py:547:
HessianInversionWarning: Inverting hessian failed, no bse or cov_params
```

```
available
  warnings.warn('Inverting hessian failed, no bse or cov_params '
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\base\model.py:566:
ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check
mle_retvals
  warnings.warn("Maximum Likelihood optimization failed to "
```

[35]:
```
model_fit2.summary()
```

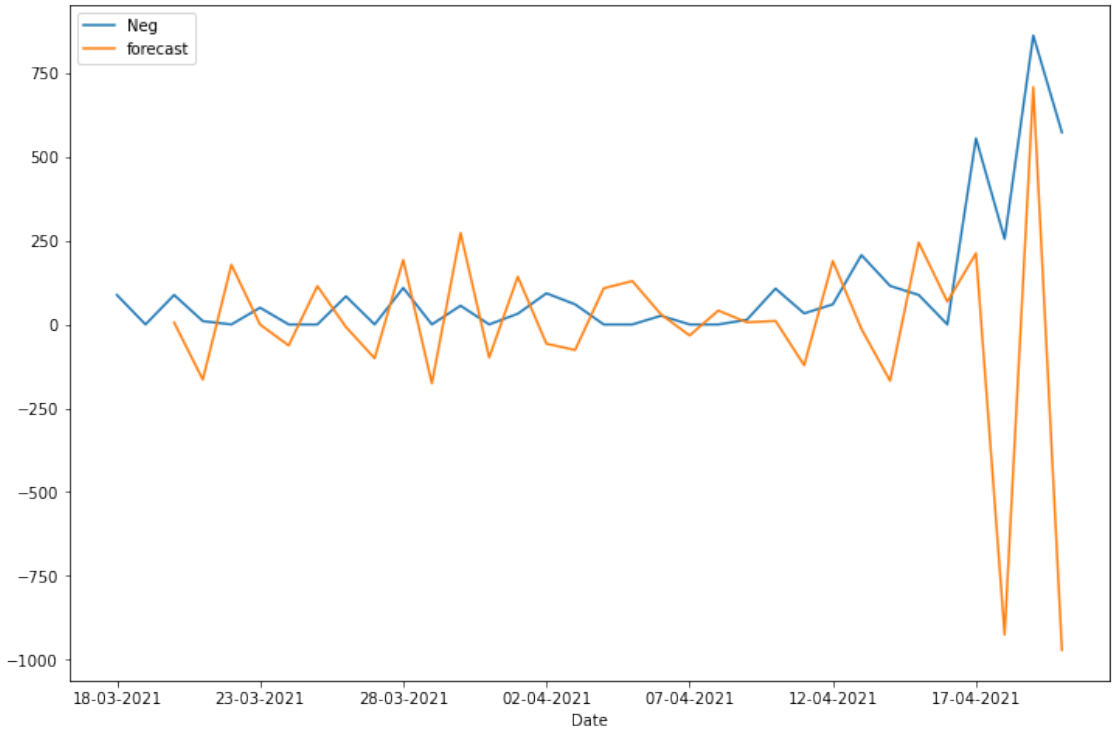
```
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py:1521:
RuntimeWarning: invalid value encountered in sqrt
  return np.sqrt(np.diag(-inv(hess)))
```

[35]:
```
<class 'statsmodels.iolib.summary.Summary'>
"""
                             ARIMA Model Results
==============================================================================
Dep. Variable:                 D2.Neg   No. Observations:                   32
Model:                 ARIMA(4, 2, 0)   Log Likelihood                -205.143
Method:                       css-mle   S.D. of innovations            111.922
Date:                Sat, 01 May 2021   AIC                            422.286
Time:                        10:08:53   BIC                            431.080
Sample:                             2   HQIC                           425.201

==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
const          5.7534        nan        nan        nan         nan         nan
ar.L1.D2.Neg  -1.6175    2.4e-05  -6.74e+04      0.000      -1.618      -1.617
ar.L2.D2.Neg  -1.1409   2.33e-05   -4.9e+04      0.000      -1.141      -1.141
ar.L3.D2.Neg  -0.8166   1.36e-05  -6.03e+04      0.000      -0.817      -0.817
ar.L4.D2.Neg  -0.2932   2.73e-06  -1.07e+05      0.000      -0.293      -0.293
                                    Roots
=============================================================================
                  Real          Imaginary           Modulus         Frequency
-----------------------------------------------------------------------------
AR.1           -0.0346           -1.4094j            1.4098           -0.2539
AR.2           -0.0346           +1.4094j            1.4098            0.2539
AR.3           -1.0000           -0.0000j            1.0000           -0.5000
AR.4           -1.7161           -0.0000j            1.7161           -0.5000
-----------------------------------------------------------------------------
"""
```

[36]:
```
data2['forecast']=model_fit2.predict(start=2,end=33, dynamic=False)
#pd.Series(model_fit3.fittedvalues,copy=True)
data2[['Neg','forecast']].plot(figsize=(12,8));
```

```
<ipython-input-36-de8c313b82e8>:1: SettingWithCopyWarning:
```

```
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  data2['forecast']=model_fit2.predict(start=2,end=33, dynamic=False)
```



[37]:
```
Negative = model_fit2.forecast(steps=10)[0]
```

[38]:
```
Negative
```

[38]:
```
array([1236.15452354,  919.48350922, 1595.11836034, 1296.7685297 ,
       1990.67890472, 1695.80404657, 2400.64050468, 2119.85047861,
       2837.26048786, 2566.13952526])
```

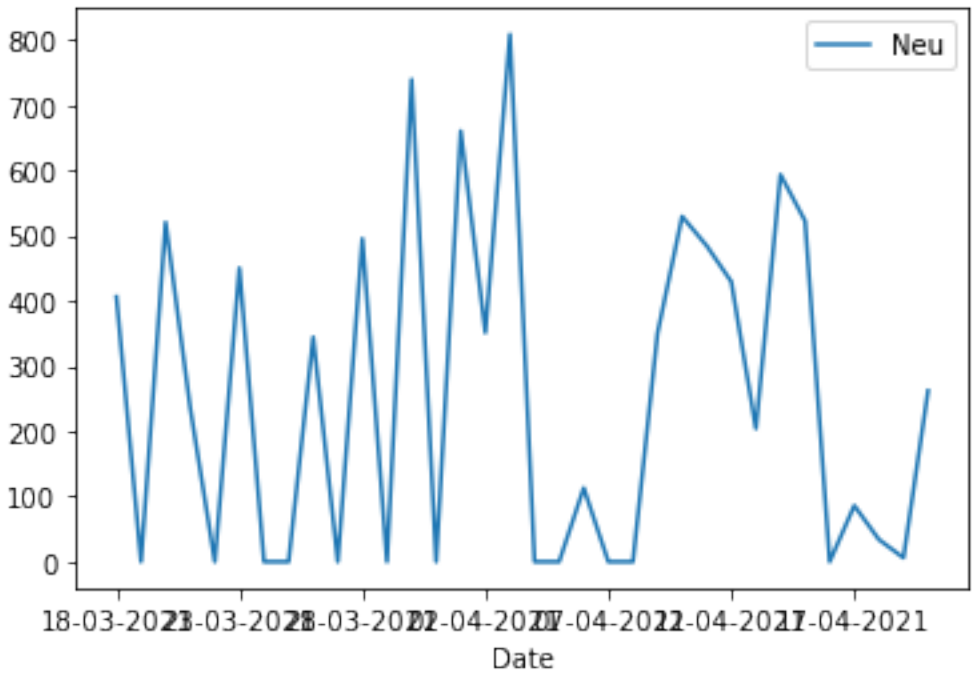
3 Neu Time Series

[39]:
```
data3 = data.iloc[:,[0,4]]
```

[40]:
```
data3.set_index('Date',inplace=True)
data3.head()
```

[40]:
```
             Neu
Date
18-03-2021   406
19-03-2021     0
20-03-2021   520
21-03-2021   236
22-03-2021     0
```

[41]:
```
data3.plot();
```



[42]:
```
from statsmodels.tsa.stattools import adfuller
```

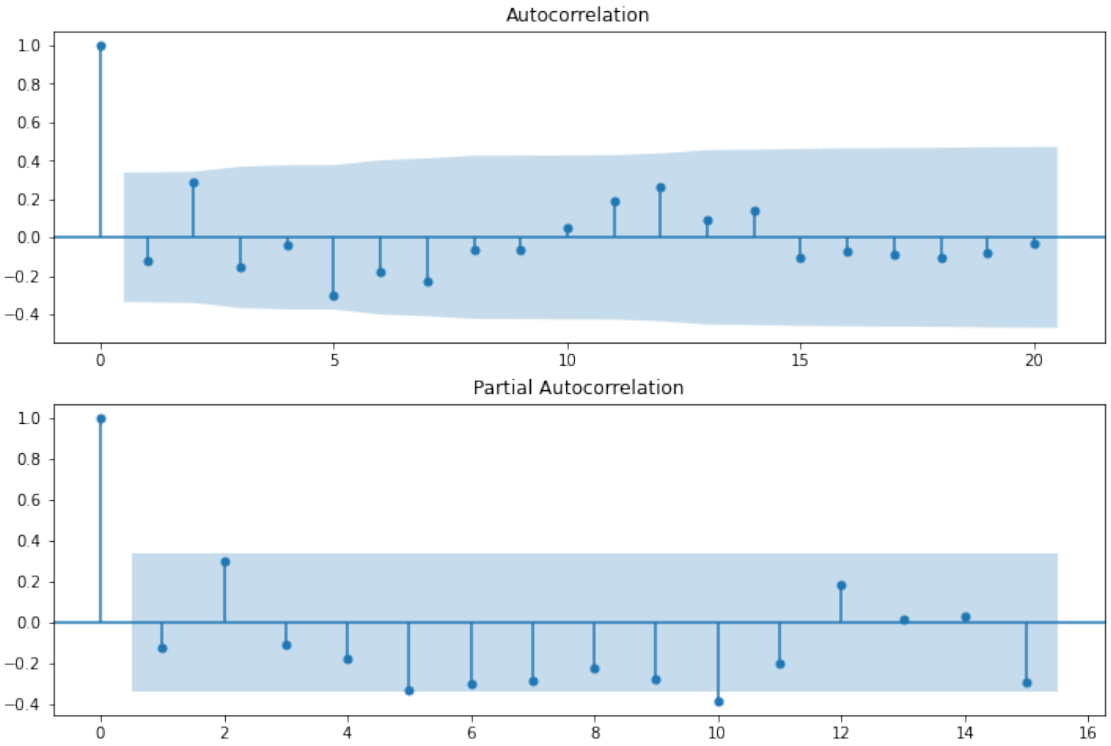
[43]:
```
# H0: It is non stationary
# H1: It is stationary
def adfuller_test(Neg):
    result = adfuller(Neg)
    labels = ["ADF Test statistics","P-value","#Lags Used","Number of␣
 ↪Observation Used"]
    for value,labels in zip(result,labels):
        print(labels+' : '+str(value) )
    if result[1] <= 0.05:
        print("Strong evidence against null hypothesis")
    else:
        print("weak evidence against null hypothesis")
```

[44]:
```
adfuller_test(data3["Neu"])
```

```
ADF Test statistics : -3.4097141425017634
P-value : 0.010632141226616595
#Lags Used : 5
Number of Observation Used : 28
Strong evidence against null hypothesis
```

[45]:
```
from statsmodels.graphics.tsaplots import plot_acf,plot_pacf
import statsmodels.api as sm
```

[46]:
```
fig = plt.figure(figsize=(12,8))
ax1 = fig.add_subplot(211)
fig = sm.graphics.tsa.plot_acf(data3['Neu'].iloc[0:],lags=20,ax=ax1)
ax2 = fig.add_subplot(212)
fig = sm.graphics.tsa.plot_pacf(data3['Neu'].iloc[0:],lags=15,ax=ax2)
```



[47]:
```
def arimamodel(df):
    automodel=pm.
 ↪auto_arima(df,start_p=0,start_q=0,max_p=4,max_q=4,test="adf",seasonal=False,trace=True)
    return automodel
```

[48]:
```
arimamodel(data3["Neu"])
```

```
Performing stepwise search to minimize aic
 ARIMA(0,2,0)(0,0,0)[0] intercept   : AIC=515.251, Time=0.00 sec
 ARIMA(1,2,0)(0,0,0)[0] intercept   : AIC=482.189, Time=0.06 sec
 ARIMA(0,2,1)(0,0,0)[0] intercept   : AIC=inf, Time=0.09 sec
 ARIMA(0,2,0)(0,0,0)[0]             : AIC=513.279, Time=0.02 sec
 ARIMA(2,2,0)(0,0,0)[0] intercept   : AIC=476.078, Time=0.11 sec
 ARIMA(3,2,0)(0,0,0)[0] intercept   : AIC=473.767, Time=0.22 sec
 ARIMA(4,2,0)(0,0,0)[0] intercept   : AIC=474.062, Time=0.18 sec
 ARIMA(3,2,1)(0,0,0)[0] intercept   : AIC=inf, Time=0.37 sec
 ARIMA(2,2,1)(0,0,0)[0] intercept   : AIC=inf, Time=0.22 sec
 ARIMA(4,2,1)(0,0,0)[0] intercept   : AIC=inf, Time=0.42 sec
 ARIMA(3,2,0)(0,0,0)[0]             : AIC=471.793, Time=0.04 sec
 ARIMA(2,2,0)(0,0,0)[0]             : AIC=474.084, Time=0.03 sec
 ARIMA(4,2,0)(0,0,0)[0]             : AIC=472.065, Time=0.14 sec
 ARIMA(3,2,1)(0,0,0)[0]             : AIC=inf, Time=0.16 sec
 ARIMA(2,2,1)(0,0,0)[0]             : AIC=inf, Time=0.12 sec
 ARIMA(4,2,1)(0,0,0)[0]             : AIC=inf, Time=0.22 sec

Best model:  ARIMA(3,2,0)(0,0,0)[0]
Total fit time: 2.451 seconds
```

[48]:
```
ARIMA(order=(3, 2, 0), scoring_args={}, suppress_warnings=True,
      with_intercept=False)
```

[49]:
```
from statsmodels.tsa.arima_model import ARIMA
```

[50]:
```
model = ARIMA(data3['Neu'],order=(3,2,0))
model_fit3=model.fit()
```

```
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\arima_model.py:472:
FutureWarning:
statsmodels.tsa.arima_model.ARMA and statsmodels.tsa.arima_model.ARIMA have
been deprecated in favor of statsmodels.tsa.arima.model.ARIMA (note the .
between arima and model) and
statsmodels.tsa.SARIMAX. These will be removed after the 0.12 release.

statsmodels.tsa.arima.model.ARIMA makes use of the statespace framework and
is both well tested and maintained.

To silence this warning and continue using ARMA and ARIMA until they are
removed, use:

import warnings
warnings.filterwarnings('ignore', 'statsmodels.tsa.arima_model.ARMA',
                        FutureWarning)
warnings.filterwarnings('ignore', 'statsmodels.tsa.arima_model.ARIMA',
                        FutureWarning)
```

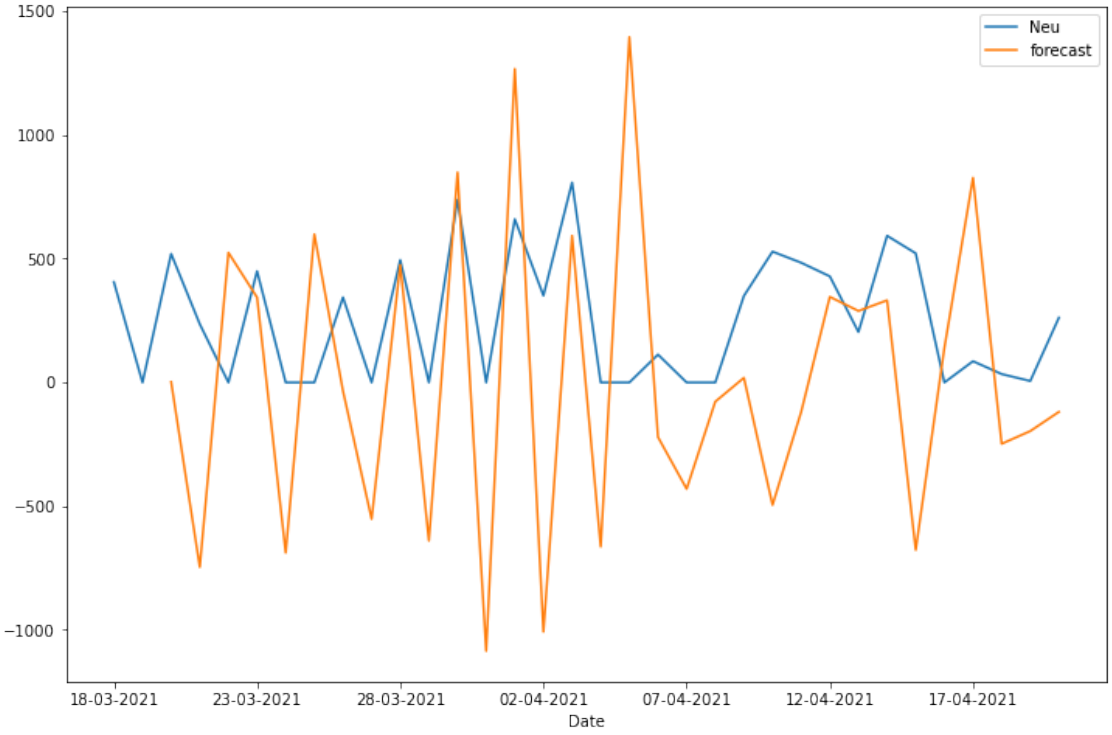
```
  warnings.warn(ARIMA_DEPRECATION_WARN, FutureWarning)
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:581:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it has no'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:585:
ValueWarning: A date index has been provided, but it is not monotonic and so
will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it is not'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:581:
ValueWarning: A date index has been provided, but it has no associated frequency
information and so will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it has no'
C:\Users\asus\anaconda3\lib\site-packages\statsmodels\tsa\base\tsa_model.py:585:
ValueWarning: A date index has been provided, but it is not monotonic and so
will be ignored when e.g. forecasting.
  warnings.warn('A date index has been provided, but it is not'
```

[51]:
```
model_fit3.summary()
```

[51]:
```
<class 'statsmodels.iolib.summary.Summary'>
"""
                             ARIMA Model Results
==============================================================================
Dep. Variable:                 D2.Neu   No. Observations:                   32
Model:                 ARIMA(3, 2, 0)   Log Likelihood                -232.296
Method:                       css-mle   S.D. of innovations            333.212
Date:                Sat, 01 May 2021   AIC                            474.593
Time:                        10:10:10   BIC                            481.921
Sample:                             2   HQIC                           477.022

==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
const          2.1946     16.760      0.131      0.896     -30.654      35.043
ar.L1.D2.Neu  -1.3752      0.162     -8.479      0.000      -1.693      -1.057
ar.L2.D2.Neu  -0.9170      0.248     -3.703      0.000      -1.402      -0.432
ar.L3.D2.Neu  -0.3623      0.165     -2.191      0.028      -0.686      -0.038
                                    Roots
=============================================================================
                  Real          Imaginary           Modulus         Frequency
-----------------------------------------------------------------------------
AR.1           -1.2580           -0.0000j            1.2580           -0.5000
AR.2           -0.6367           -1.3375j            1.4813           -0.3207
AR.3           -0.6367           +1.3375j            1.4813            0.3207
-----------------------------------------------------------------------------
"""
```

[52]:
```
data3['forecast']=model_fit3.predict(start=2,end=33, dynamic=False)
#pd.Series(model_fit3.fittedvalues,copy=True)
data3[['Neu','forecast']].plot(figsize=(12,8));
```

```
<ipython-input-52-b7e8b7c1c61c>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  data3['forecast']=model_fit3.predict(start=2,end=33, dynamic=False)
```



[53]:
```
Neutral = model_fit3.forecast(steps=10)[0]
```

[54]:
```
Neutral
```

[54]:
```
array([163.44410743, 291.36702935, 338.10722447, 425.26853858,
       457.26260792, 565.48641487, 612.84490712, 702.00686292,
       769.8998621 , 858.77710552])
```

[55]:
```
E = list(zip(Positive,Negative,Neutral))
```

[57]:
```
df = pd.DataFrame(E,columns=['Positive','Negative','Neutral'])
```

[58]:
```
df
```

[58]:

	Positive	Negative	Neutral
0	356.978283	1236.154524	163.444107
1	365.208634	919.483509	291.367029
2	358.879259	1595.118360	338.107224
3	205.311374	1296.768530	425.268539
4	291.534118	1990.678905	457.262608
5	359.685175	1695.804047	565.486415
6	297.147817	2400.640505	612.844907
7	290.739692	2119.850479	702.006863
8	278.123798	2837.260488	769.899862
9	310.146203	2566.139525	858.777106

[61]:
```
df.to_csv(r'C:\Users\asus\Desktop\Hashtag WD\Cricket\Cricket_Pred.
↪csv',index=False)
```

[3]:
```
Sentiment = pd.read_csv("Cricket_Pred.csv")
```

[4]:
```
Sentiment
```

[4]:

	Positive	Negative	Neutral	Sentiment
0	356.978283	1236.154524	163.444107	Negative
1	365.208634	919.483509	291.367029	Negative
2	358.879260	1595.118360	338.107225	Negative
3	205.311374	1296.768530	425.268539	Negative
4	291.534118	1990.678905	457.262608	Negative
5	359.685175	1695.804047	565.486415	Negative
6	297.147817	2400.640505	612.844907	Negative
7	290.739692	2119.850479	702.006863	Negative
8	278.123798	2837.260488	769.899862	Negative
9	310.146203	2566.139525	858.777105	Negative

[ ]:
```

```