Stock Market Prediction Using Numerical & Textual Analysis

Importing Libraries

In [2]:
```
import os
import warnings
warnings.filterwarnings('ignore')
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import itertools
from statsmodels.tsa.stattools import adfuller, acf, pacf
from statsmodels.tsa.arima_model import ARIMA
import nltk
import re
from nltk.corpus import stopwords
nltk.download('stopwords')
nltk.download('vader_lexicon')
from textblob import TextBlob
from nltk.sentiment.vader import SentimentIntensityAnalyzer
from nltk.stem.porter import PorterStemmer
from sklearn.metrics import mean_squared_error
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
import xgboost
import lightgbm
```

```
[nltk_data] Downloading package stopwords to /usr/share/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
[nltk_data] Downloading package vader_lexicon to
[nltk_data]     /usr/share/nltk_data...
[nltk_data]   Package vader_lexicon is already up-to-date!
```

Load the Textual Data

In [3]:
```
df_text = pd.read_csv("../input/india-headlines-news-dataset/india-news-headlines.csv")
df_text.head()
```

Out[3]:

	publish_date	headline_category	headline_text
0	20010102	unknown	Status quo will not be disturbed at Ayodhya; s...
1	20010102	unknown	Fissures in Hurriyat over Pak visit
2	20010102	unknown	America's unwanted heading for India?
3	20010102	unknown	For bigwigs; it is destination Goa
4	20010102	unknown	Extra buses to clear tourist traffic

Handling with Textual Data:

In [4]:
```
df_text.drop(0, inplace=True)
df_text.drop('headline_category', axis = 1, inplace=True)
df_text.head()
```

Out[4]:

	publish_date	headline_text
1	20010102	Fissures in Hurriyat over Pak visit
2	20010102	America's unwanted heading for India?
3	20010102	For bigwigs; it is destination Goa
4	20010102	Extra buses to clear tourist traffic
5	20010102	Dilute the power of transfers; says Riberio

In [5]:
```
df_text["publish_date"] = pd.to_datetime(df_text["publish_date"],format='%Y%m%d')
df_text.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 3424066 entries, 1 to 3424066
Data columns (total 2 columns):
 #   Column         Dtype         
---  ------         -----         
 0   publish_date   datetime64[ns]
 1   headline_text  object        
dtypes: datetime64[ns](1), object(1)
memory usage: 78.4+ MB
```

In [6]:
```
df_text.shape
```

Out[6]:
```
(3424066, 2)
```

In [7]:
```
df_text.isnull().sum()
```

Out[7]:
```
publish_date     0
headline_text    0
dtype: int64
```

In [8]:
```
df_text['headline_text'] = df_text.groupby(['publish_date']).transform(lambda x : ' '.jo
df_text = df_text.drop_duplicates()
len(df_text)
```

Out[8]:
```
7262
```

In [9]:
```
df_text
```

Out[9]:

	publish_date	headline_text
1	2001-01-02	Fissures in Hurriyat over Pak visit America's ...
86	2001-01-03	Powerless north India gropes in the dark Think...
127	2001-01-04	The string that pulled Stephen Hawking to Indi...
280	2001-01-05	Light combat craft takes India into club class...
406	2001-01-06	Light combat craft takes India into club class...
...	...	...
3421573	2020-12-27	#BigInterview! Dhritiman Chatterjee: Nobody da...
3422072	2020-12-28	Horoscope Today; 28 December 2020: Check astro...
3422570	2020-12-29	Man recovers charred remains of 'thief' from h...
3423069	2020-12-30	Numerology Readings 30 December 2020: Predicti...
3423569	2020-12-31	Horoscope Today; 31 December 2020: Check astro...

7262 rows × 2 columns

In [10]:
```
df_text.reset_index(inplace=True,drop=True)
```

Remove Unwanted Characters from the head_line text

In [11]:
```
df_text.replace("[^a-zA-Z']"," ",regex=True,inplace=True)
df_text["headline_text"].head(5)
```

Out[11]:
```
0    Fissures in Hurriyat over Pak visit America's ...
1    Powerless north India gropes in the dark Think...
2    The string that pulled Stephen Hawking to Indi...
3    Light combat craft takes India into club class...
4    Light combat craft takes India into club class...
Name: headline_text, dtype: object
```

In [12]:
```
def Subjectivity(text):
  return TextBlob(text).sentiment.subjectivity

def Polarity(text):
  return  TextBlob(text).sentiment.polarity

df_text['Subjectivity'] = df_text['headline_text'].apply(Subjectivity)
df_text['Polarity'] = df_text['headline_text'].apply(Polarity)
df_text
```

Out[12]:

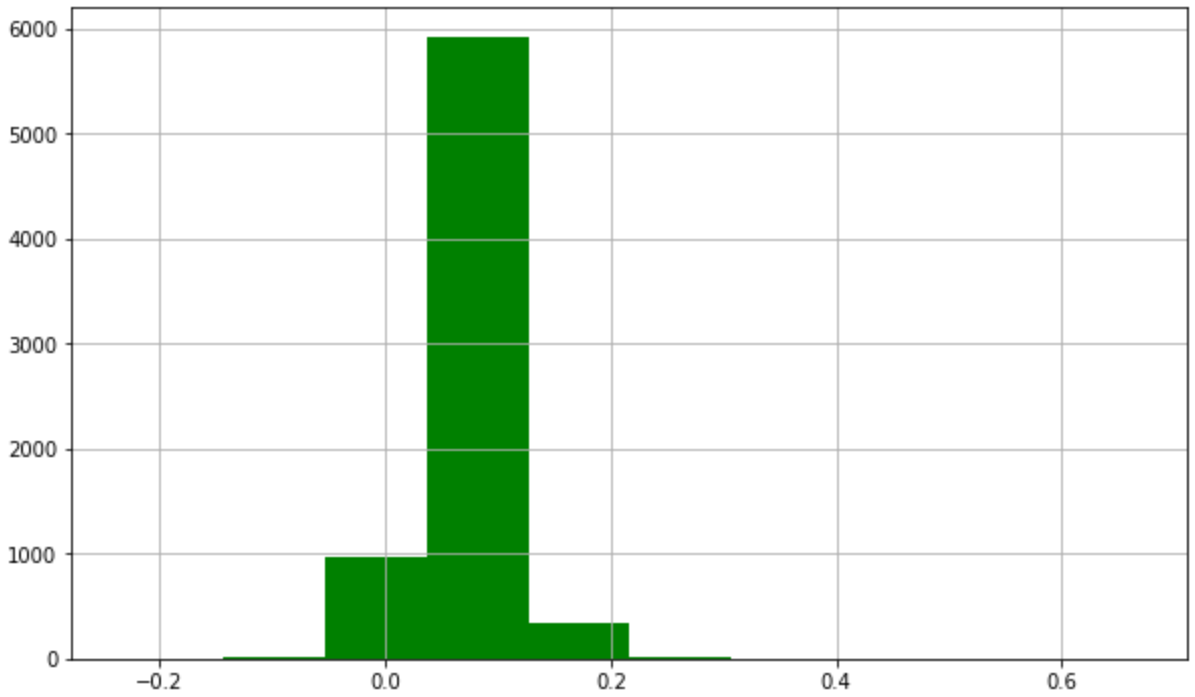
	publish_date	headline_text	Subjectivity	Polarity
0	2001-01-02	Fissures in Hurriyat over Pak visit America's ...	0.286859	0.143590
1	2001-01-03	Powerless north India gropes in the dark Think...	0.392857	0.089286
2	2001-01-04	The string that pulled Stephen Hawking to Indi...	0.445360	0.093039
3	2001-01-05	Light combat craft takes India into club class...	0.480553	0.264024
4	2001-01-06	Light combat craft takes India into club class...	0.439394	0.248485
...	...	...	...	...
7257	2020-12-27	BigInterview Dhritiman Chatterjee Nobody da...	0.392082	0.042978
7258	2020-12-28	Horoscope Today December Check astro...	0.409973	0.071405
7259	2020-12-29	Man recovers charred remains of 'thief' from h...	0.415684	0.060775
7260	2020-12-30	Numerology Readings December Predicti...	0.436863	0.046930
7261	2020-12-31	Horoscope Today December Check astro...	0.408454	0.091829

7262 rows × 4 columns

Visualize a Polarity and Subjectivity

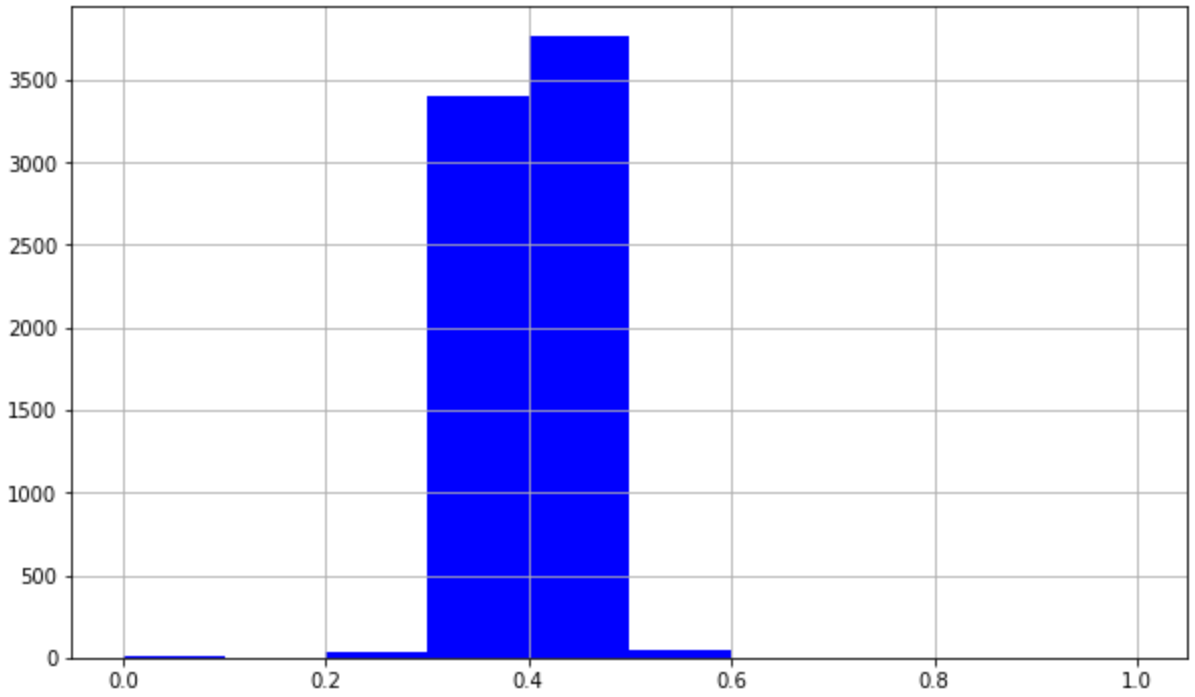
In [13]:
```
plt.figure(figsize = (10,6))
df_text['Polarity'].hist(color = 'green')
```

Out[13]:
```
<AxesSubplot:>
```



In [14]:
```
plt.figure(figsize = (10,6))
df_text['Subjectivity'].hist(color = 'blue')
```

Out[14]:
```
<AxesSubplot:>
```



Sentiment Analysis using News Headlines

In [15]:
```
snt = SentimentIntensityAnalyzer()
```

In [16]:
```
df_text['Compound'] = [snt.polarity_scores(v)['compound'] for v in df_text['headline_tex
df_text['Negative'] = [snt.polarity_scores(v)['neg'] for v in df_text['headline_text']]
df_text['Neutral'] = [snt.polarity_scores(v)['neu'] for v in df_text['headline_text']]
df_text['Positive'] = [snt.polarity_scores(v)['pos'] for v in df_text['headline_text']]
df_text
```

Out[16]:

	publish_date	headline_text	Subjectivity	Polarity	Compound	Negative	Neutral	Positive
0	2001-01-02	Fissures in Hurriyat over Pak visit America's ...	0.286859	0.143590	-0.9804	0.123	0.808	0.069
1	2001-01-03	Powerless north India gropes in the dark Think...	0.392857	0.089286	-0.8910	0.156	0.735	0.109
2	2001-01-04	The string that pulled Stephen Hawking to Indi...	0.445360	0.093039	0.7543	0.104	0.792	0.104
3	2001-01-05	Light combat craft takes India into club class...	0.480553	0.264024	0.9365	0.142	0.696	0.161
4	2001-01-06	Light combat craft takes India into club class...	0.439394	0.248485	-0.8316	0.214	0.655	0.131
...	...	...	...	...	...	...	...	...
7257	2020-12-27	BigInterview Dhritiman Chatterjee Nobody da...	0.392082	0.042978	-0.9997	0.129	0.793	0.079
7258	2020-12-28	Horoscope Today December Check astro...	0.409973	0.071405	-0.9998	0.142	0.761	0.097
7259	2020-12-29	Man recovers charred remains of 'thief' from h...	0.415684	0.060775	-0.9999	0.151	0.753	0.096
7260	2020-12-30	Numerology Readings December Predicti...	0.436863	0.046930	-0.9999	0.146	0.770	0.084
7261	2020-12-31	Horoscope Today December Check astro...	0.408454	0.091829	-0.9998	0.141	0.759	0.100

7262 rows × 8 columns

Load the Numerical Data

In [17]:
```
df_num = pd.read_csv("../input/numerical-stock-prices/QMCI.csv")
df_num.head()
```

Out[17]:

	Date	Open	High	Low	Close	Adj Close	Volume
0	2021-02-08	0.20	0.22	0.19	0.19	0.19	70200
1	2021-02-09	0.19	0.21	0.19	0.19	0.19	51600
2	2021-02-10	0.39	0.40	0.24	0.27	0.27	4710100
3	2021-02-11	0.28	0.32	0.27	0.28	0.28	795700
4	2021-02-12	0.27	0.28	0.21	0.22	0.22	595600

Handling with Numerical Data

All the things that are going to happen in this data must be related to time to this index.

In [18]:
```
df_num["Date"] = pd.to_datetime(df_num["Date"],format='%Y-%m-%d')
df_num.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 252 entries, 0 to 251
Data columns (total 7 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   Date       252 non-null    datetime64[ns]
 1   Open       252 non-null    float64
 2   High       252 non-null    float64
 3   Low        252 non-null    float64
 4   Close      252 non-null    float64
 5   Adj Close  252 non-null    float64
 6   Volume     252 non-null    int64
dtypes: datetime64[ns](1), float64(5), int64(1)
memory usage: 13.9 KB
```

Let's see how the data will be like:

In [19]:
```
df_num
```

Out[19]:

	Date	Open	High	Low	Close	Adj Close	Volume
0	2021-02-08	0.20	0.22	0.19	0.19	0.19	70200
1	2021-02-09	0.19	0.21	0.19	0.19	0.19	51600
2	2021-02-10	0.39	0.40	0.24	0.27	0.27	4710100
3	2021-02-11	0.28	0.32	0.27	0.28	0.28	795700
4	2021-02-12	0.27	0.28	0.21	0.22	0.22	595600
...	...	...	...	...	...	...	...
247	2022-01-31	0.16	0.16	0.16	0.16	0.16	0
248	2022-02-01	0.16	0.16	0.16	0.16	0.16	600
249	2022-02-02	0.17	0.17	0.17	0.17	0.17	1000
250	2022-02-03	0.16	0.16	0.16	0.16	0.16	100
251	2022-02-04	0.16	0.16	0.15	0.15	0.15	9000

252 rows × 7 columns

In [20]:
```
df_num.describe()
```

Out[20]:

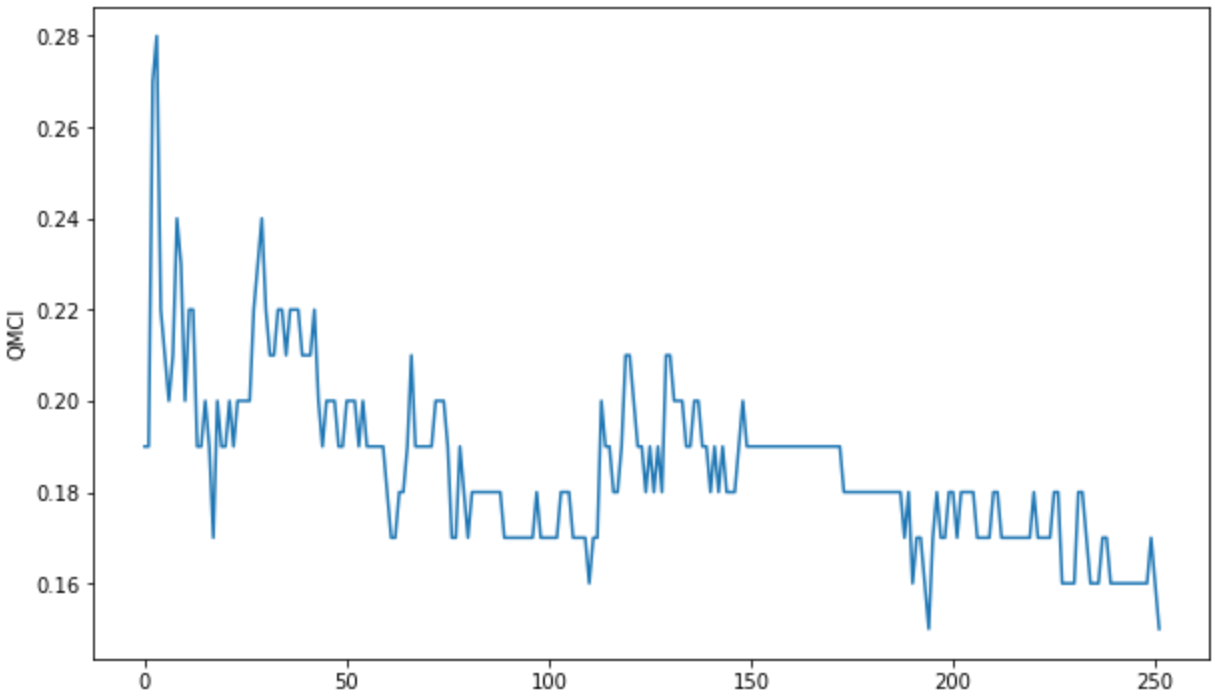
	Open	High	Low	Close	Adj Close	Volume
count	252.000000	252.000000	252.000000	252.000000	252.000000	2.520000e+02
mean	0.186706	0.192540	0.181111	0.185675	0.185675	7.413571e+04
std	0.022277	0.025419	0.015369	0.018336	0.018336	3.063803e+05
min	0.160000	0.160000	0.150000	0.150000	0.150000	0.000000e+00
25%	0.170000	0.180000	0.170000	0.170000	0.170000	7.775000e+03
50%	0.180000	0.190000	0.180000	0.180000	0.180000	2.820000e+04
75%	0.190000	0.200000	0.190000	0.190000	0.190000	6.582500e+04
max	0.390000	0.400000	0.270000	0.280000	0.280000	4.710100e+06

In [21]:
```
#check for null values
df_num.isnull().sum()
```

Out[21]:
```
Date         0
Open         0
High         0
Low          0
Close        0
Adj Close    0
Volume       0
dtype: int64
```

In [22]:
```
plt.figure(figsize=(10,6))
df_num['Close'].plot()
plt.ylabel('QMCI')
```

Out[22]:
```
Text(0, 0.5, 'QMCI')
```



Plotting Moving Average

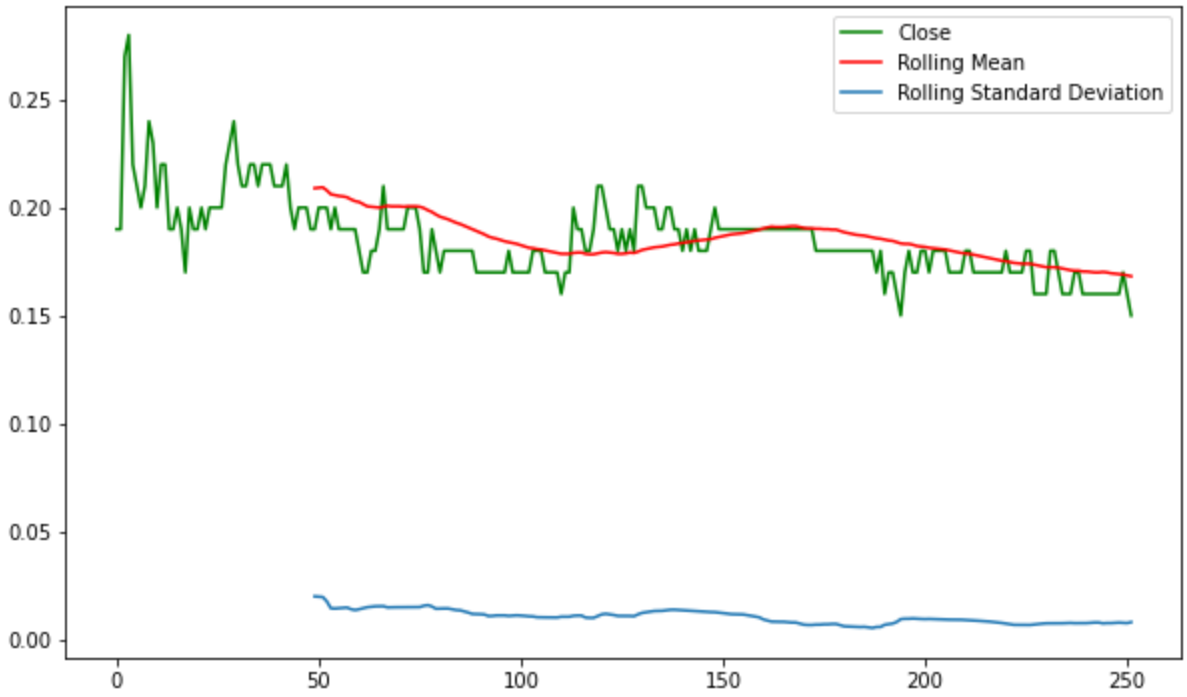
In [23]:
```
close = df_num['Close']

ma = close.rolling(window = 50).mean()
std = close.rolling(window = 50).std()

plt.figure(figsize=(10,6))
df_num['Close'].plot(color='g',label='Close')
ma.plot(color = 'r',label='Rolling Mean')
std.plot(label = 'Rolling Standard Deviation')

plt.legend()
```

Out[23]:
```
<matplotlib.legend.Legend at 0x7f4d2b50c290>
```



In [24]:
```
#split the data to train and test
train = df_num[:200]
test = df_num[200:]
```

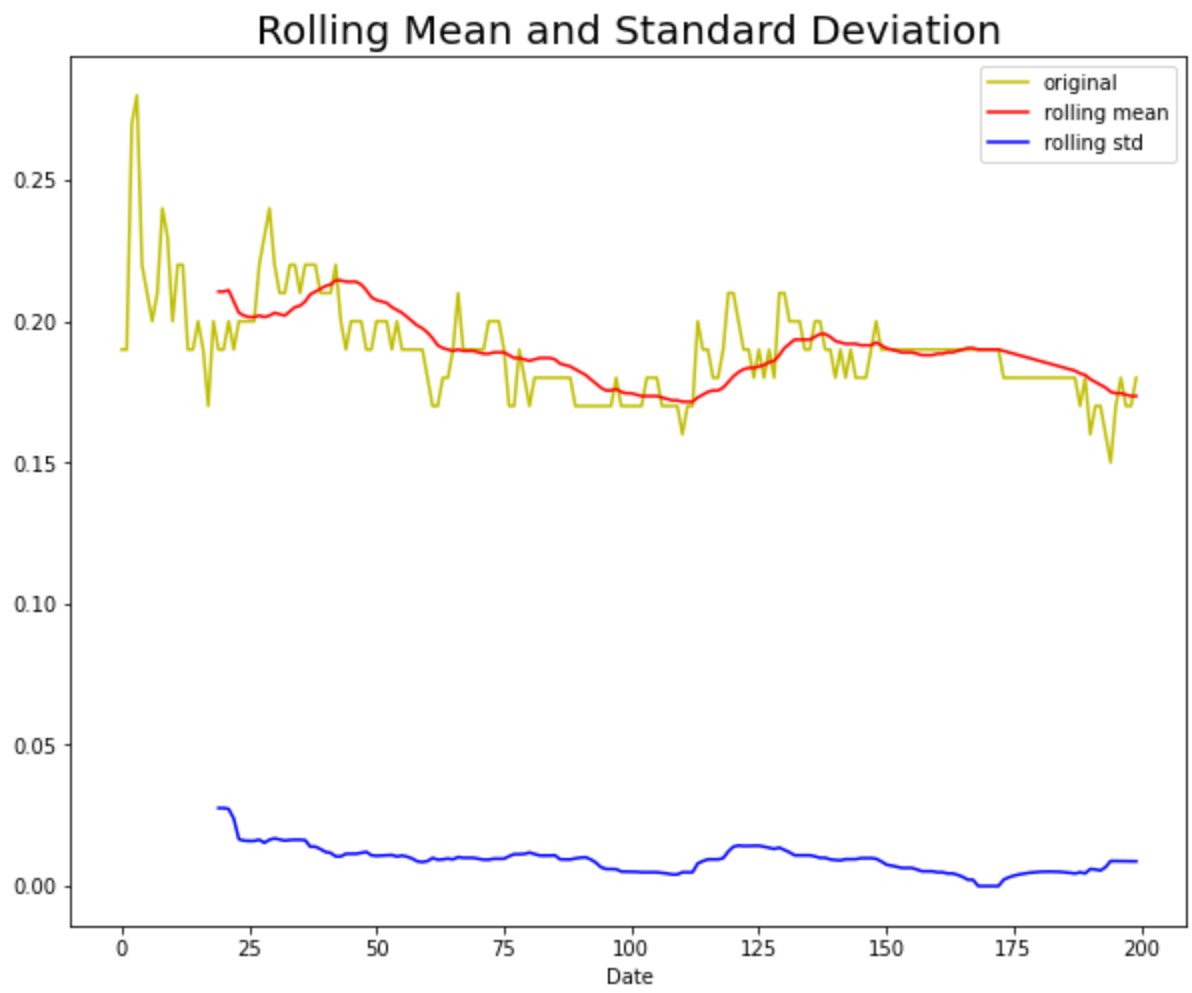
Rolling mean and Standard Deviation

In [25]:
```
def test_stationarity(timeseries):

 #Determing rolling statistics
 rolmean = timeseries.rolling(20).mean()
 rolstd = timeseries.rolling(20).std()

 #Plot rolling statistics:
 plt.figure(figsize = (10,8))
 plt.plot(timeseries, color = 'y', label = 'original')
 plt.plot(rolmean, color = 'r', label = 'rolling mean')
 plt.plot(rolstd, color = 'b', label = 'rolling std')
 plt.xlabel('Date')
 plt.legend()
 plt.title('Rolling Mean and Standard Deviation',  fontsize = 20)
 plt.show(block = False)

 print('Results of dickey fuller test')
 result = adfuller(timeseries, autolag = 'AIC')
 labels = ['ADF Test Statistic','p-value','#Lags Used','Number of Observations Used']
 for value,label in zip(result, labels):
   print(label+' : '+str(value) )
 if result[1] <= 0.05:
   print("Strong evidence against the null hypothesis(Ho), reject the null hypothesis. D
 else:
   print("Weak evidence against null hypothesis, time series is non-stationary ")
test_stationarity(train['Close'])
```

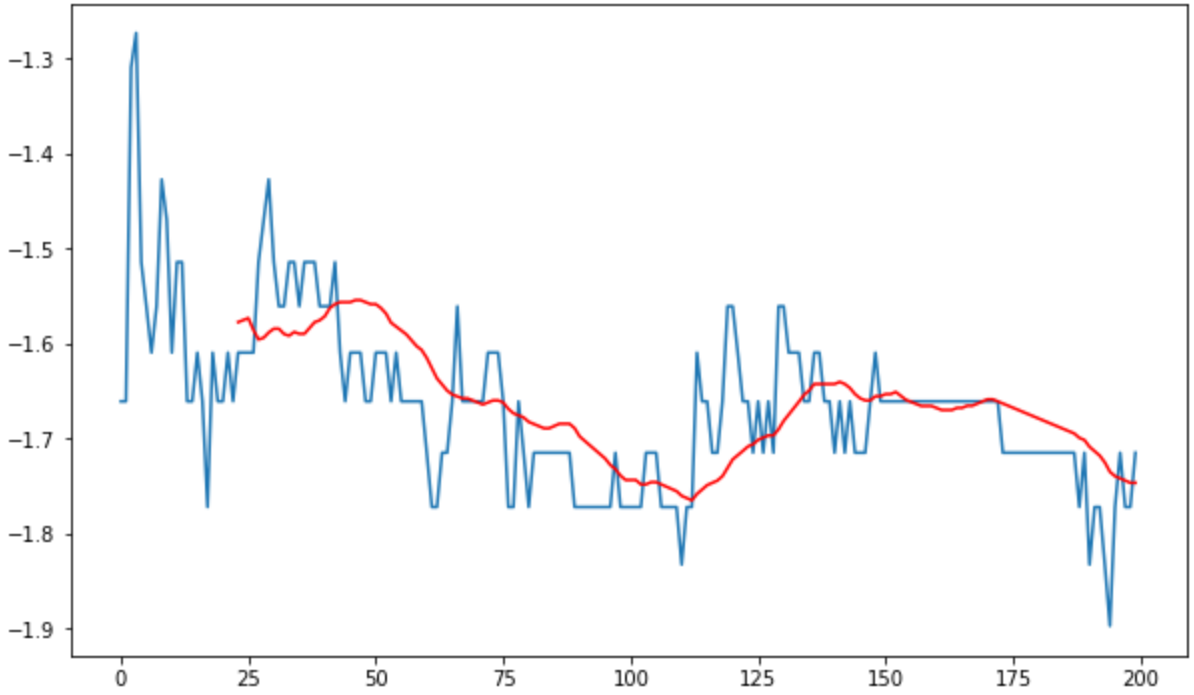



```
Results of dickey fuller test
ADF Test Statistic : -2.6310567849620403
p-value : 0.08674682352531471
#Lags Used : 5
Number of Observations Used : 194
Weak evidence against null hypothesis, time series is non-stationary
```

In [26]:
```
train_log = np.log(train['Close'])
test_log = np.log(test['Close'])

mav = train_log.rolling(24).mean()
plt.figure(figsize = (10,6))
plt.plot(train_log)
plt.plot(mav, color = 'red')
```

Out[26]:
```
[<matplotlib.lines.Line2D at 0x7f4d2b320c90>]
```



Auto arima to make predictions using log data

In [27]:
```
!pip install pmdarima
```

```
Collecting pmdarima
  Downloading pmdarima-1.8.4-cp37-cp37m-manylinux_2_17_x86_64.manylinux2014_x86_64.manyl
inux_2_24_x86_64.whl (1.4 MB)
     |████████████████████████████████| 1.4 MB 516 kB/s
Requirement already satisfied: statsmodels!=0.12.0,>=0.11 in /opt/conda/lib/python3.7/si
te-packages (from pmdarima) (0.13.1)
Requirement already satisfied: urllib3 in /opt/conda/lib/python3.7/site-packages (from p
mdarima) (1.26.7)
Requirement already satisfied: scipy>=1.3.2 in /opt/conda/lib/python3.7/site-packages (f
rom pmdarima) (1.7.3)
Requirement already satisfied: joblib>=0.11 in /opt/conda/lib/python3.7/site-packages (f
rom pmdarima) (1.1.0)
Requirement already satisfied: pandas>=0.19 in /opt/conda/lib/python3.7/site-packages (f
rom pmdarima) (1.3.5)
Requirement already satisfied: scikit-learn>=0.22 in /opt/conda/lib/python3.7/site-packa
ges (from pmdarima) (0.23.2)
Requirement already satisfied: numpy>=1.19.3 in /opt/conda/lib/python3.7/site-packages
(from pmdarima) (1.20.3)
Requirement already satisfied: setuptools!=50.0.0,>=38.6.0 in /opt/conda/lib/python3.7/s
ite-packages (from pmdarima) (59.5.0)
Requirement already satisfied: Cython!=0.29.18,>=0.29 in /opt/conda/lib/python3.7/site-p
ackages (from pmdarima) (0.29.26)
Requirement already satisfied: python-dateutil>=2.7.3 in /opt/conda/lib/python3.7/site-p
ackages (from pandas>=0.19->pmdarima) (2.8.0)
Requirement already satisfied: pytz>=2017.3 in /opt/conda/lib/python3.7/site-packages (f
rom pandas>=0.19->pmdarima) (2021.3)
Requirement already satisfied: threadpoolctl>=2.0.0 in /opt/conda/lib/python3.7/site-pac
kages (from scikit-learn>=0.22->pmdarima) (3.0.0)
Requirement already satisfied: patsy>=0.5.2 in /opt/conda/lib/python3.7/site-packages (f
rom statsmodels!=0.12.0,>=0.11->pmdarima) (0.5.2)
Requirement already satisfied: six in /opt/conda/lib/python3.7/site-packages (from patsy
>=0.5.2->statsmodels!=0.12.0,>=0.11->pmdarima) (1.16.0)
Installing collected packages: pmdarima
Successfully installed pmdarima-1.8.4
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting
behaviour with the system package manager. It is recommended to use a virtual environmen
t instead: https://pip.pypa.io/warnings/venv
```

In [28]:

```
from pmdarima import auto_arima
model = auto_arima(train_log, trace = True, error_action = 'ignore', suppress_warnings =
model.fit(train_log)
predictions = model.predict(n_periods = len(test))
predictions = pd.DataFrame(predictions,index = test_log.index,columns=['Prediction'])
```

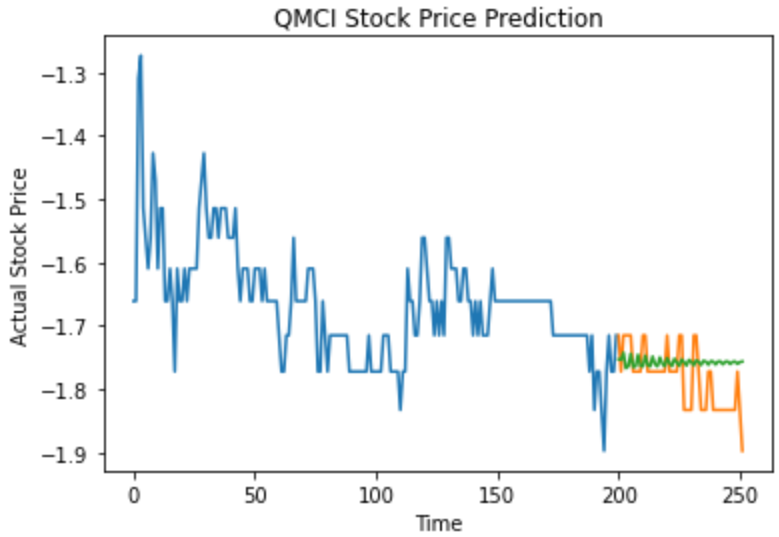
```
Performing stepwise search to minimize aic
 ARIMA(2,1,2)(0,0,0)[0] intercept   : AIC=-600.405, Time=0.42 sec
 ARIMA(0,1,0)(0,0,0)[0] intercept   : AIC=-569.632, Time=0.15 sec
 ARIMA(1,1,0)(0,0,0)[0] intercept   : AIC=-570.766, Time=0.07 sec
 ARIMA(0,1,1)(0,0,0)[0] intercept   : AIC=-576.677, Time=0.32 sec
 ARIMA(0,1,0)(0,0,0)[0]             : AIC=-571.627, Time=0.04 sec
 ARIMA(1,1,2)(0,0,0)[0] intercept   : AIC=-600.989, Time=0.56 sec
 ARIMA(0,1,2)(0,0,0)[0] intercept   : AIC=-602.012, Time=0.19 sec
 ARIMA(0,1,3)(0,0,0)[0] intercept   : AIC=-601.557, Time=0.65 sec
 ARIMA(1,1,1)(0,0,0)[0] intercept   : AIC=-595.176, Time=0.14 sec
 ARIMA(1,1,3)(0,0,0)[0] intercept   : AIC=-603.062, Time=0.51 sec
 ARIMA(2,1,3)(0,0,0)[0] intercept   : AIC=-608.680, Time=0.55 sec
 ARIMA(3,1,3)(0,0,0)[0] intercept   : AIC=-598.439, Time=0.59 sec
 ARIMA(2,1,4)(0,0,0)[0] intercept   : AIC=-610.889, Time=1.43 sec
 ARIMA(1,1,4)(0,0,0)[0] intercept   : AIC=-604.037, Time=1.02 sec
 ARIMA(3,1,4)(0,0,0)[0] intercept   : AIC=-601.670, Time=0.74 sec
 ARIMA(2,1,5)(0,0,0)[0] intercept   : AIC=-611.433, Time=0.83 sec
 ARIMA(1,1,5)(0,0,0)[0] intercept   : AIC=-602.766, Time=0.78 sec
 ARIMA(3,1,5)(0,0,0)[0] intercept   : AIC=-610.343, Time=0.86 sec
 ARIMA(2,1,5)(0,0,0)[0]             : AIC=-615.760, Time=0.71 sec
 ARIMA(1,1,5)(0,0,0)[0]             : AIC=-603.892, Time=0.53 sec
 ARIMA(2,1,4)(0,0,0)[0]             : AIC=-612.510, Time=0.99 sec
 ARIMA(3,1,5)(0,0,0)[0]             : AIC=inf, Time=1.03 sec
 ARIMA(1,1,4)(0,0,0)[0]             : AIC=-605.329, Time=0.41 sec
 ARIMA(3,1,4)(0,0,0)[0]             : AIC=-603.721, Time=0.62 sec

Best model:  ARIMA(2,1,5)(0,0,0)[0]
Total fit time: 14.194 seconds
```

Visualize Prediction

In [29]:
```
plt.plot(train_log, label='Train')
plt.plot(test_log, label='Test')
plt.plot(predictions, label='Prediction')
plt.title('QMCI Stock Price Prediction')
plt.xlabel('Time')
plt.ylabel('Actual Stock Price')
```

Out[29]:
```
Text(0, 0.5, 'Actual Stock Price')
```



In [30]:
```
rms = np.sqrt(mean_squared_error(test_log,predictions))
print("RMSE : ", rms)
```

```
RMSE :  0.05305130554969066
```

Merging the Numerical and Textual Data

In [31]:
```
merge = df_text
merge
```

Out[31]:

	publish_date	headline_text	Subjectivity	Polarity	Compound	Negative	Neutral	Positive
0	2001-01-02	Fissures in Hurriyat over Pak visit America's ...	0.286859	0.143590	-0.9804	0.123	0.808	0.069
1	2001-01-03	Powerless north India gropes in the dark Think...	0.392857	0.089286	-0.8910	0.156	0.735	0.109
2	2001-01-04	The string that pulled Stephen Hawking to Indi...	0.445360	0.093039	0.7543	0.104	0.792	0.104
3	2001-01-05	Light combat craft takes India into club class...	0.480553	0.264024	0.9365	0.142	0.696	0.161
4	2001-01-06	Light combat craft takes India into club class...	0.439394	0.248485	-0.8316	0.214	0.655	0.131
...	...	...	...	...	...	...	...	...
7257	2020-12-27	BigInterview Dhritiman Chatterjee Nobody da...	0.392082	0.042978	-0.9997	0.129	0.793	0.079
7258	2020-12-28	Horoscope Today December Check astro...	0.409973	0.071405	-0.9998	0.142	0.761	0.097
7259	2020-12-29	Man recovers charred remains of 'thief' from h...	0.415684	0.060775	-0.9999	0.151	0.753	0.096
7260	2020-12-30	Numerology Readings December Predicti...	0.436863	0.046930	-0.9999	0.146	0.770	0.084
7261	2020-12-31	Horoscope Today December Check astro...	0.408454	0.091829	-0.9998	0.141	0.759	0.100

7262 rows × 8 columns

In [32]:
```
data = merge[['Subjectivity', 'Polarity', 'Compound', 'Negative', 'Neutral' ,'Positive']]
data
```

Out[32]:

	Subjectivity	Polarity	Compound	Negative	Neutral	Positive
0	0.286859	0.143590	-0.9804	0.123	0.808	0.069
1	0.392857	0.089286	-0.8910	0.156	0.735	0.109
2	0.445360	0.093039	0.7543	0.104	0.792	0.104
3	0.480553	0.264024	0.9365	0.142	0.696	0.161
4	0.439394	0.248485	-0.8316	0.214	0.655	0.131
...	...	...	...	...	...	...
7257	0.392082	0.042978	-0.9997	0.129	0.793	0.079
7258	0.409973	0.071405	-0.9998	0.142	0.761	0.097
7259	0.415684	0.060775	-0.9999	0.151	0.753	0.096
7260	0.436863	0.046930	-0.9999	0.146	0.770	0.084
7261	0.408454	0.091829	-0.9998	0.141	0.759	0.100

7262 rows × 6 columns

In [33]:
```
X = data[:252]
y = df_num['Close']
```

In [34]:
```
from sklearn.model_selection import train_test_split

x_train, x_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state =
x_train.shape
```

Out[34]:
```
(201, 6)
```

Apply Models

RandomForestRegressor Model

In [35]:
```
rf = RandomForestRegressor()
rf.fit(x_train, y_train)
prediction=rf.predict(x_test)
```

In [37]:
```
print(prediction[:10])
print(y_test[:10])
print('Mean Squared error: ',mean_squared_error(prediction,y_test))
```

```
[0.1808 0.2    0.1746 0.188  0.1747 0.1738 0.1846 0.1764 0.192  0.178 ]
158    0.19
83     0.18
170    0.19
101    0.17
150    0.19
199    0.18
118    0.19
227    0.16
63     0.18
135    0.19
Name: Close, dtype: float64
Mean Squared error:  0.00024587451153646784
```

DecisionTreeRegressor Model

In [38]:
```
from sklearn.tree import DecisionTreeRegressor
dec_tree = DecisionTreeRegressor()
dec_tree.fit(x_train, y_train)
predictions = dec_tree.predict(x_test)
print('Mean Squared error: ',mean_squared_error(predictions,y_test))
```

```
Mean Squared error:  0.0005138480392156864
```

XGBRegressor Model

In [39]:
```
xgb = xgboost.XGBRegressor()
xgb.fit(x_train, y_train)
predictions = xgb.predict(x_test)
print('Mean Squared error: ',mean_squared_error(predictions,y_test))
```

```
Mean Squared error:  0.0002865711676554356
```

Conclusion:

we can see that RandomForestRegressor shows a better performance than the others