Titan Stock predictions using regression

In [1]:
```
#Importing necessary library
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import KFold
from sklearn.model_selection import train_test_split
from sklearn.model_selection import GridSearchCV
from sklearn.ensemble import GradientBoostingRegressor
from sklearn.linear_model import LinearRegression
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import StratifiedKFold
from sklearn.metrics import mean_squared_error
from sklearn.metrics import mean_absolute_error
from sklearn.metrics import r2_score
```

importing datasets - collected titan data for 5 years from feb 2018-feb 2023

In [2]:
```
db1=pd.read_csv(r"C:\Users\vasan\Downloads\Quote-Equity-TITAN-EQ-04-02-2021-to-04-02-2023.csv",parse_dates=['Date '],index_col=['
db1.head()
```

Out[2]:

Date	series	OPEN	HIGH	LOW	PREV. CLOSE	ltp	close	vwap	52W H	52W L	VOLUME	VALUE	No of trades
2023-02-03	EQ	2,320.10	2,470.00	2,320.10	2,308.10	2,458.30	2,463.10	2,425.35	2,791.00	1,825.05	3693638	8,958,363,285.70	205942
2023-02-02	EQ	2,341.05	2,385.00	2,269.60	2,345.90	2,325.00	2,308.10	2,336.44	2,791.00	1,825.05	1788381	4,178,441,160.95	114317
2023-02-01	EQ	2,408.55	2,409.80	2,300.05	2,377.15	2,345.00	2,345.90	2,363.36	2,791.00	1,825.05	1521514	3,595,890,169.10	103902
2023-01-31	EQ	2,347.00	2,386.45	2,335.65	2,335.55	2,383.00	2,377.15	2,367.90	2,791.00	1,825.05	1252600	2,966,030,261.25	90793
2023-01-30	EQ	2,332.00	2,342.85	2,287.05	2,331.25	2,340.00	2,335.55	2,315.79	2,791.00	1,825.05	1401847	3,246,381,011.10	120736

In [53]:
```
db2=pd.read_csv(r"C:\Users\vasan\Downloads\Quote-Equity-TITAN-EQ-04-02-2019-to-04-02-2021.csv",parse_dates=['Date '],index_col=['
db2.head()
```

Out[53]:

Date	series	OPEN	HIGH	LOW	PREV. CLOSE	ltp	close	vwap	52W H	52W L	VOLUME	VALUE	No of trades
2021-02-04	EQ	1,530.00	1,540.00	1,488.10	1,525.15	1,511.95	1,513.60	1,507.87	1,621.35	720.9	2728965	4,114,924,472.35	79930
2021-02-03	EQ	1,492.00	1,529.00	1,492.00	1,485.45	1,520.10	1,525.15	1,518.24	1,621.35	720.9	1853072	2,813,415,047.10	66399
2021-02-02	EQ	1,515.00	1,536.00	1,482.00	1,501.55	1,488.00	1,485.45	1,504.37	1,621.35	720.9	1974202	2,969,930,201.00	65640
2021-02-01	EQ	1,437.80	1,508.55	1,423.65	1,420.30	1,505.75	1,501.55	1,469.39	1,621.35	720.9	2215933	3,256,060,141.60	74312
2021-01-29	EQ	1,456.00	1,469.25	1,415.25	1,450.10	1,422.00	1,420.30	1,439.44	1,621.35	720.9	2435997	3,506,475,243.70	62294

In [52]:
```
db2.columns
```

Out[52]:
```
Index(['series ', 'OPEN ', 'HIGH ', 'LOW ', 'PREV. CLOSE ', 'ltp ', 'close ',
       'vwap ', '52W H ', '52W L ', 'VOLUME ', 'VALUE ', 'No of trades '],
      dtype='object')
```

In [4]:
```
db3=pd.read_csv(r"C:\Users\vasan\Downloads\Quote-Equity-TITAN-EQ-04-02-2018-to-04-02-2019.csv",parse_dates=['Date '],index_col=['
db3.head()
```

Out[4]:

Date	series	OPEN	HIGH	LOW	PREV. CLOSE	ltp	close	vwap	52W H	52W L	VOLUME	VALUE	No of trades
2019-02-04	EQ	1,025.00	1,050.00	1,009.05	991.55	1,024.50	1,025.75	1,032.34	1,050.00	732.3	9556052	9,865,132,637.60	230113
2019-02-01	EQ	1,003.00	1,005.00	985.10	995.80	991.80	991.55	991.67	1,005.00	732.3	3424938	3,396,415,408.95	88182
2019-01-31	EQ	968.20	1,000.00	966.50	968.90	1,000.00	995.80	986.14	1,000.00	732.3	2306391	2,274,435,354.85	69982
2019-01-30	EQ	966.10	974.95	960.05	966.10	964.55	968.90	967.76	999.70	732.3	1468812	1,421,453,859.20	50380
2019-01-29	EQ	955.20	970.00	945.00	958.65	966.30	966.10	962.53	999.70	732.3	1411027	1,358,155,357.10	53060

In [5]:
```
db1.shape,db2.shape,db3.shape #checking the shape of the dataset
```

Out[5]:
```
((497, 13), (471, 13), (247, 13))
```

In [6]:
```
db1.isnull().sum(),db2.isnull().sum(),db3.isnull().sum() #checking for null values in dataset
```

Out[6]:
```
(series          0
 OPEN            0
 HIGH            0
 LOW             0
 PREV. CLOSE     0
 ltp             0
 close           0
 vwap            0
 52W H           0
 52W L           0
 VOLUME          0
 VALUE           0
 No of trades    0
 dtype: int64,
 series          0
 OPEN            0
 HIGH            0
 LOW             0
 PREV. CLOSE     0
 ltp             0
 close           0
 vwap            0
 52W H           0
 52W L           0
 VOLUME          0
 VALUE           0
 No of trades    0
 dtype: int64,
 series          0
 OPEN            0
 HIGH            0
 LOW             0
 PREV. CLOSE     0
 ltp             0
 close           0
 vwap            0
 52W H           0
 52W L           0
 VOLUME          0
 VALUE           0
 No of trades    0
 dtype: int64)
```

In [7]:
```
db=pd.concat([db1,db2,db3]) #joning three tables
db
```

Out[7]:

Date	series	OPEN	HIGH	LOW	PREV. CLOSE	ltp	close	vwap	52W H	52W L	VOLUME	VALUE	No of trades
2023-02-03	EQ	2,320.10	2,470.00	2,320.10	2,308.10	2,458.30	2,463.10	2,425.35	2,791.00	1,825.05	3693638	8,958,363,285.70	205942
2023-02-02	EQ	2,341.05	2,385.00	2,269.60	2,345.90	2,325.00	2,308.10	2,336.44	2,791.00	1,825.05	1788381	4,178,441,160.95	114317
2023-02-01	EQ	2,408.55	2,409.80	2,300.05	2,377.15	2,345.00	2,345.90	2,363.36	2,791.00	1,825.05	1521514	3,595,890,169.10	103902
2023-01-31	EQ	2,347.00	2,386.45	2,335.65	2,335.55	2,383.00	2,377.15	2,367.90	2,791.00	1,825.05	1252600	2,966,030,261.25	90793
2023-01-30	EQ	2,332.00	2,342.85	2,287.05	2,331.25	2,340.00	2,335.55	2,315.79	2,791.00	1,825.05	1401847	3,246,381,011.10	120736
...	...	...	...	...	...	...	...	...	...	...	...	...	...
2018-02-09	EQ	790.10	804.00	783.05	800.75	796.05	796.80	796.06	938.50	383.15	1564899	1,245,747,232.90	43947
2018-02-08	EQ	785.10	808.90	780.80	783.65	800.80	800.75	795.94	938.50	383.15	2219546	1,766,626,655.70	70462
2018-02-07	EQ	785.00	801.00	780.00	782.65	784.00	783.65	791.39	938.50	383.15	2686877	2,126,363,479.40	79600
2018-02-06	EQ	765.00	788.40	752.70	802.3	781.45	782.65	770.10	938.50	383.15	3188895	2,455,754,204.95	106398
2018-02-05	EQ	810.00	816.75	795.20	822.2	806.00	802.30	806.28	938.50	383.15	3079541	2,482,986,278.95	70102

1215 rows × 13 columns

In [8]:
```
db.shape #checking shape after joining
```

Out[8]:
```
(1215, 13)
```

In [9]:
```
db.isnull().sum() ##checking for null values  after joining
```

Out[9]:
```
series           0
OPEN             0
HIGH             0
LOW              0
PREV. CLOSE      0
ltp              0
close            0
vwap             0
52W H            0
52W L            0
VOLUME           0
VALUE            0
No of trades     0
dtype: int64
```

In [10]:
```
db.describe() #understanding dataset using descibre()
```

Out[10]:

	VOLUME	No of trades
count	1.215000e+03	1215.000000
mean	2.318868e+06	82822.887243
std	1.794731e+06	46078.996177
min	1.815060e+05	10139.000000
25%	1.227330e+06	54639.500000
50%	1.859258e+06	71139.000000
75%	2.829072e+06	96742.000000
max	2.214359e+07	536406.000000

In [11]:
```
db.dtypes # checking datatypes of dataset
```

Out[11]:
```
series           object
OPEN             object
HIGH             object
LOW              object
PREV. CLOSE      object
ltp              object
close            object
vwap             object
52W H            object
52W L            object
VOLUME            int64
VALUE            object
No of trades      int64
dtype: object
```

In [12]:
```
db.info() #observing the information of dataset
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 1215 entries, 2023-02-03 to 2018-02-05
Data columns (total 13 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   series         1215 non-null   object
 1   OPEN           1215 non-null   object
 2   HIGH           1215 non-null   object
 3   LOW            1215 non-null   object
 4   PREV. CLOSE    1215 non-null   object
 5   ltp            1215 non-null   object
 6   close          1215 non-null   object
 7   vwap           1215 non-null   object
 8   52W H          1215 non-null   object
 9   52W L          1215 non-null   object
 10  VOLUME         1215 non-null   int64
 11  VALUE          1215 non-null   object
 12  No of trades   1215 non-null   int64
dtypes: int64(2), object(11)
memory usage: 132.9+ KB
```

In [13]:
```
# renaming columns
cols=['Series','Open','High','Low','Previous_close','last_traded_price','Close','Vwap','52wh','52wl','Volume','Value','Nooftrader
```

In [14]:
```
db.columns=cols
```

In [15]:
```
#dropping columns from the dataset
db.drop(['Series','Nooftraders','52wh','52wl','Previous_close'],axis=1,inplace=True)
```

In [16]:
```
#checking for any null values
db.isnull().sum()
```

Out[16]:
```
Open                0
High                0
Low                 0
last_traded_price   0
Close               0
Vwap                0
Volume              0
Value               0
dtype: int64
```

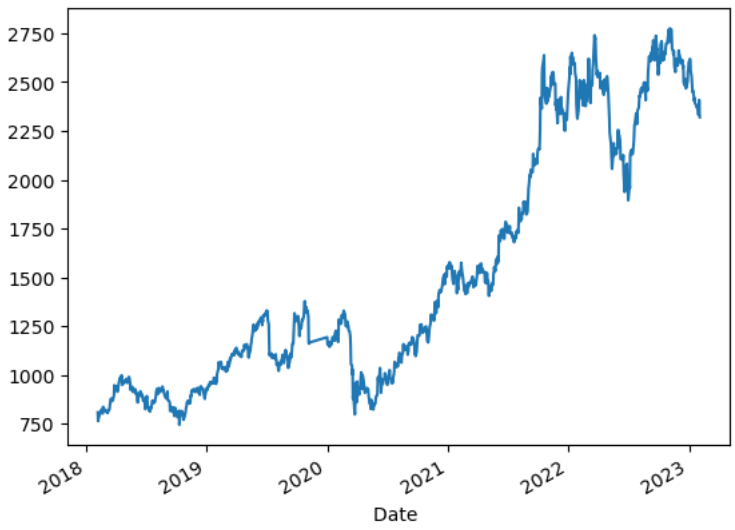
In [17]:
```
# replacing object datatypes as float
db['Open']=db['Open'].str.replace(',','').astype(float)
db['High']=db['High'].str.replace(',','').astype(float)
db['Low']=db['Low'].str.replace(',','').astype(float)
db['last_traded_price']=db['last_traded_price'].str.replace(',','').astype(float)
db['Close']=db['Close'].str.replace(',','').astype(float)
db['Vwap']=db['Vwap'].str.replace(',','').astype(float)
db['Value']=db['Value'].str.replace(',','').astype(float)
```

In [18]:
```
db.info()
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 1215 entries, 2023-02-03 to 2018-02-05
Data columns (total 8 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   Open              1215 non-null   float64
 1   High              1215 non-null   float64
 2   Low               1215 non-null   float64
 3   last_traded_price  1215 non-null   float64
 4   Close             1215 non-null   float64
 5   Vwap              1215 non-null   float64
 6   Volume            1215 non-null   int64  
 7   Value             1215 non-null   float64
dtypes: float64(7), int64(1)
memory usage: 85.4 KB
```

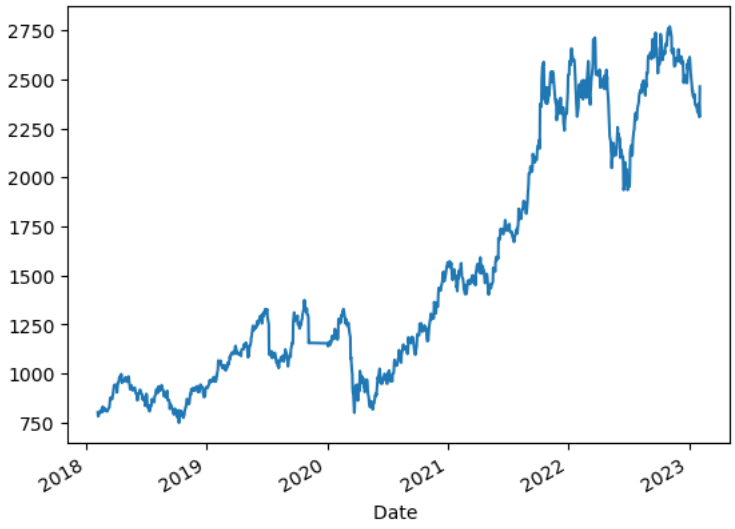
In [19]:
```
#visualize for understanding the dataset
db.Open.plot()
```

Out[19]:
```
<AxesSubplot:xlabel='Date '>
```



In [20]:
```
db.Close.plot()
```

Out[20]: <AxesSubplot:xlabel='Date '>



In [21]:
```
db.describe()
```

Out[21]:

	Open	High	Low	last_traded_price	Close	Vwap	Volume	Value
count	1215.000000	1215.000000	1215.000000	1215.000000	1215.000000	1215.000000	1.215000e+03	1.215000e+03
mean	1528.664033	1547.417695	1507.101193	1527.635267	1527.273745	1527.252181	2.318868e+06	3.092927e+09
std	627.645533	633.137310	620.276337	626.320457	626.142945	626.386902	1.794731e+06	2.090076e+09
min	746.000000	787.000000	720.900000	749.000000	749.500000	770.100000	1.815060e+05	2.817199e+08
25%	985.000000	994.875000	966.025000	980.500000	979.725000	979.790000	1.227330e+06	1.912385e+09
50%	1275.200000	1292.550000	1257.650000	1275.000000	1275.000000	1272.700000	1.859258e+06	2.590376e+09
75%	2137.450000	2165.500000	2110.750000	2141.350000	2139.975000	2136.545000	2.829072e+06	3.577893e+09
max	2774.900000	2791.000000	2746.600000	2770.000000	2769.700000	2761.110000	2.214359e+07	2.451345e+10

In [22]:
```
#creating a new columns for the target
db['Tomorrow']=db['Close'].shift(-1)
db=db.dropna()
```

In [23]:
```
#splitting the data
X=db.drop(['Tomorrow'],axis=1)
y=db['Tomorrow']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.20,shuffle=False)
```

In [24]:
```
X_train.shape
```

Out[24]: (971, 8)

In [25]:
```
X_train.head()
```

Out[25]:

Date	Open	High	Low	last_traded_price	Close	Vwap	Volume	Value
2023-02-03	2320.10	2470.00	2320.10	2458.3	2463.10	2425.35	3693638	8.958363e+09
2023-02-02	2341.05	2385.00	2269.60	2325.0	2308.10	2336.44	1788381	4.178441e+09
2023-02-01	2408.55	2409.80	2300.05	2345.0	2345.90	2363.36	1521514	3.595890e+09
2023-01-31	2347.00	2386.45	2335.65	2383.0	2377.15	2367.90	1252600	2.966030e+09
2023-01-30	2332.00	2342.85	2287.05	2340.0	2335.55	2315.79	1401847	3.246381e+09

In [27]:
```
#training a linear regression model()
reg=LinearRegression()
reg.fit(X_train,y_train)
```

Out[27]: LinearRegression()

In [28]:
```
# predict using the X_test data
y_pred=reg.predict(X_test)
```

In [29]:
```
# checking the score of model for test data
reg.score(X_test,y_test)
```

Out[29]: 0.9771973193697346

In [30]:
```
reg.score(X_train,y_train)
```

Out[30]: 0.9993457130611696

In [26]:
```
#creating folds for cross validation
folds=StratifiedKFold(n_splits=5)
```

In [31]:
```
model=cross_val_score(LinearRegression(),X_train,y_train,cv=5)
model.mean()
```

Out[31]: 0.9887826336716767

Evalution metrics

In [35]:
```
# we can clearly see the good fit of the model
R2=r2_score(y_pred,y_test)
R2
```

Out[35]: 0.9762170705889682

In [36]:
```
n=y_test.shape[0]
p=7
Adj_r2 = 1-(1-R2)*(n-1)/(n-p-1)
Adj_r2
```

Out[36]: 0.9755086429043843

In [32]:
```
# we can see the goodness of the model is clearly good
mse=mean_squared_error(y_pred,y_test)
mean_squared_error(y_pred,y_test)
```

Out[32]: 75.60556844067095

In [34]:
```
import math
rmse=math.sqrt(mse)
rmse
```

Out[34]: 8.6951462575779

In [33]:
```
#after large error penalization of the  model
mean_absolute_error(y_pred,y_test)
```

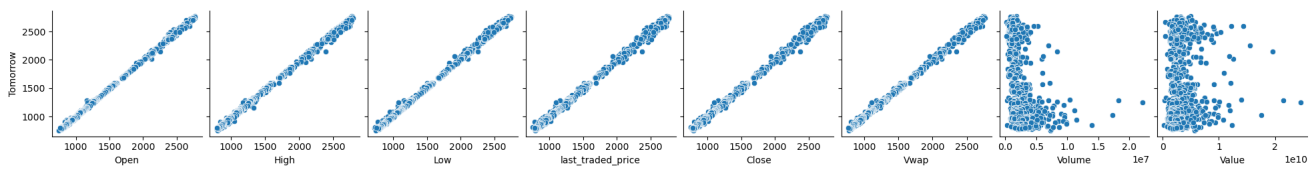
Out[33]: 5.835026231543772

Assumptions of linear regression

In [37]:
```
errors = y_test-y_pred
```

In [38]:
```
#after seeing the plots  we can understand the linearity of the dataset
sns.pairplot(db,x_vars=['Open','High','Low','last_traded_price','Close','Vwap','Volume','Value'],y_vars=['Tomorrow'])
```

Out[38]: <seaborn.axisgrid.PairGrid at 0x2489ad98cd0>



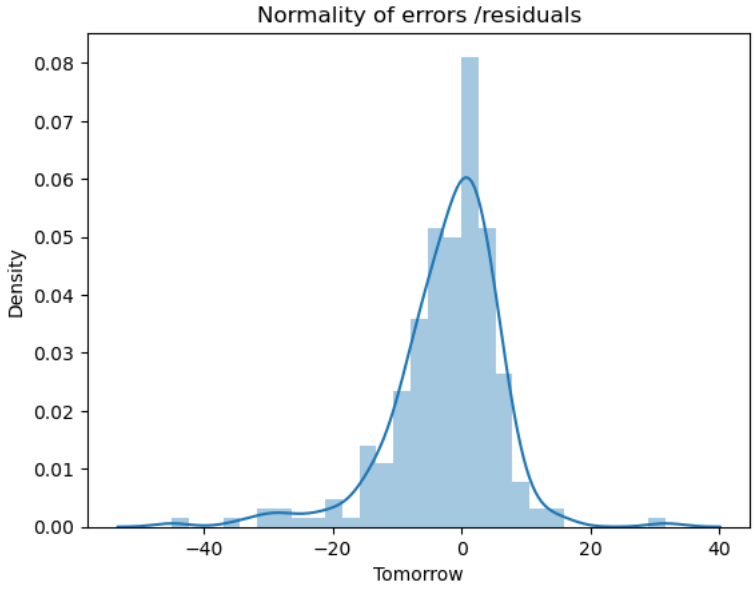
In [39]:
```
#the correlation is very high except volume and value
corr=db.corr()
corr.style.background_gradient(cmap='coolwarm')
```

Out[39]:

	Open	High	Low	last_traded_price	Close	Vwap	Volume	Value	Tomorrow
Open	1.000000	0.999516	0.999528	0.998998	0.999011	0.999447	-0.401387	0.064643	0.999723
High	0.999516	1.000000	0.999444	0.999624	0.999623	0.999819	-0.391827	0.077146	0.999304
Low	0.999528	0.999444	1.000000	0.999530	0.999568	0.999805	-0.407383	0.058027	0.999260
last_traded_price	0.998998	0.999624	0.999530	1.000000	0.999977	0.999819	-0.398811	0.068927	0.998793
Close	0.999011	0.999623	0.999568	0.999977	1.000000	0.999846	-0.399001	0.068357	0.998803
Vwap	0.999447	0.999819	0.999805	0.999819	0.999846	1.000000	-0.399188	0.068283	0.999210
Volume	-0.401387	-0.391827	-0.407383	-0.398811	-0.399001	-0.399188	1.000000	0.830701	-0.400160
Value	0.064643	0.077146	0.058027	0.068927	0.068357	0.068283	0.830701	1.000000	0.064070
Tomorrow	0.999723	0.999304	0.999260	0.998793	0.998803	0.999210	-0.400160	0.064070	1.000000

In [40]:
```
#the distibution of the data is normal distribution
p=sns.distplot(errors,kde=True)
p=plt.title('Normality of errors /residuals')
```

```
C:\Users\vasan\anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarning: `distplot` is a deprecated function an
d will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar fle
xibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```



moving average for titan

In [41]:
```
#creating moving in time frame of days 5,10,50,100
horizons=[5,10,50,100]
new_predictors=[]
for horizon in horizons :
    rolling_averages=db.rolling(horizon).mean()
    ratio_column=f"Close_ratio_{horizon}"
    db[ratio_column]=db['Close']/rolling_averages['Close']
    new_predictors +=[ratio_column]
```

```
C:\Users\vasan\AppData\Local\Temp\ipykernel_19500\530335140.py:6: 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-ve
rsus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  db[ratio_column]=db['Close']/rolling_averages['Close']
C:\Users\vasan\AppData\Local\Temp\ipykernel_19500\530335140.py:6: 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-ve
rsus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  db[ratio_column]=db['Close']/rolling_averages['Close']
C:\Users\vasan\AppData\Local\Temp\ipykernel_19500\530335140.py:6: 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-ve
rsus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  db[ratio_column]=db['Close']/rolling_averages['Close']
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rsus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  db[ratio_column]=db['Close']/rolling_averages['Close']
```

In [42]:
```
db
```

Out[42]:

e	Open	High	Low	last_traded_price	Close	Vwap	Volume	Value	Tomorrow	Close_ratio_5	Close_ratio_10	Close_ratio_50	Close_ratio_10
3-3	2320.10	2470.00	2320.10	2458.30	2463.10	2425.35	3693638	8.958363e+09	2308.10	NaN	NaN	NaN	Nal
3-2	2341.05	2385.00	2269.60	2325.00	2308.10	2336.44	1788381	4.178441e+09	2345.90	NaN	NaN	NaN	Nal
3-1	2408.55	2409.80	2300.05	2345.00	2345.90	2363.36	1521514	3.595890e+09	2377.15	NaN	NaN	NaN	Nal
3-1	2347.00	2386.45	2335.65	2383.00	2377.15	2367.90	1252600	2.966030e+09	2335.55	NaN	NaN	NaN	Nal
3-0	2332.00	2342.85	2287.05	2340.00	2335.55	2315.79	1401847	3.246381e+09	2331.25	0.987147	NaN	NaN	Nal
..	...	...	...	...	...	...	...	...	...	...	...	...	.
3-2	803.00	812.80	796.55	808.00	809.05	806.38	2067452	1.667157e+09	796.80	1.000124	0.992541	0.910843	0.89932
3-9	790.10	804.00	783.05	796.05	796.80	796.06	1564899	1.245747e+09	800.75	0.986725	0.980267	0.900554	0.88603
3-8	785.10	808.90	780.80	800.80	800.75	795.94	2219546	1.766627e+09	783.65	0.992218	0.986759	0.908305	0.89079
3-7	785.00	801.00	780.00	784.00	783.65	791.39	2686877	2.126363e+09	782.65	0.978596	0.969732	0.892519	0.87276
3-6	765.00	788.40	752.70	781.45	782.65	770.10	3188895	2.455754e+09	802.30	0.984986	0.973342	0.895056	0.87272

rows × 13 columns

In [43]:
```
db.dropna() # dropping the nan values
```

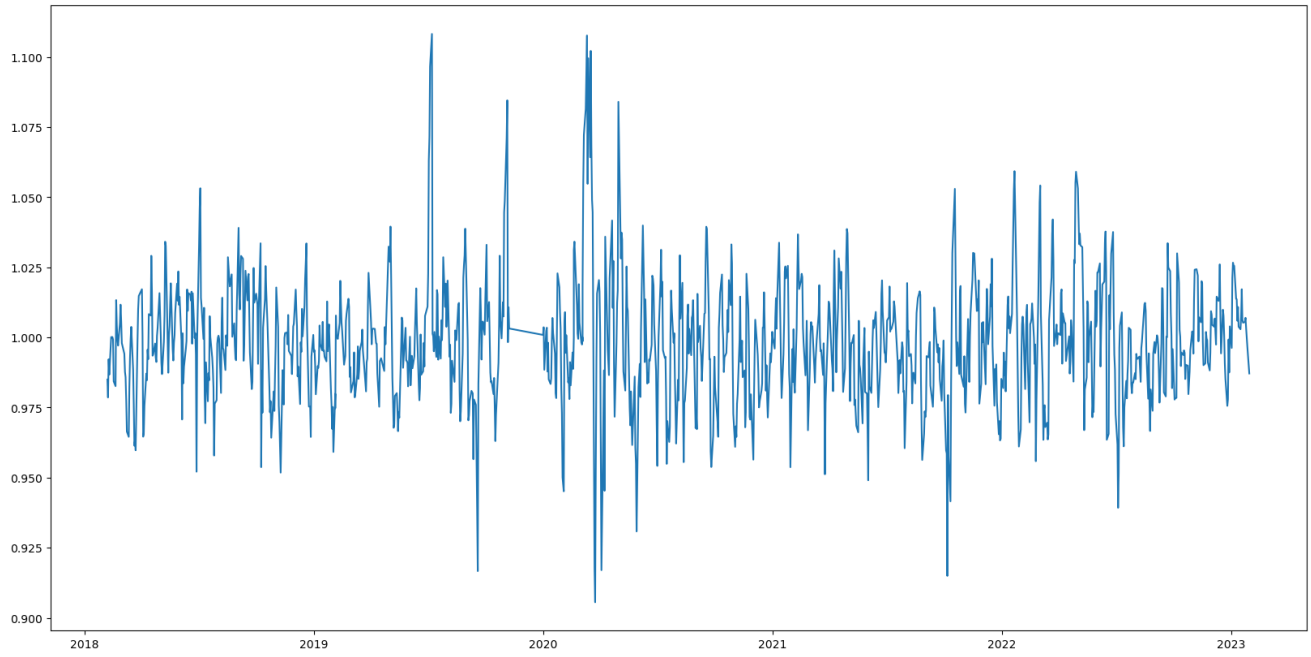
Out[43]:

ıte	Open	High	Low	last_traded_price	Close	Vwap	Volume	Value	Tomorrow	Close_ratio_5	Close_ratio_10	Close_ratio_50	Close_ratio_10
12-13	2680.0	2723.00	2672.00	2703.00	2705.55	2706.85	1536444	4.158926e+09	2661.15	1.017591	1.012931	1.019778	1.04976
12-12	2616.8	2669.70	2610.00	2668.00	2661.15	2645.70	808360	2.138676e+09	2603.45	0.997788	0.996098	1.002658	1.03174
12-09	2652.0	2652.15	2593.00	2600.80	2603.45	2613.56	777186	2.031221e+09	2626.70	0.976765	0.977023	0.980905	1.00821
12-08	2649.0	2659.90	2616.00	2629.00	2626.70	2635.36	754150	1.987456e+09	2637.75	0.987671	0.989868	0.989512	1.01611
12-07	2607.0	2641.40	2600.40	2639.50	2637.75	2628.47	438635	1.152937e+09	2631.65	0.996536	0.995116	0.993193	1.01936
...	...	...	...	...	...	...	...	...	...	...	...	...	.
18-12	803.0	812.80	796.55	808.00	809.05	806.38	2067452	1.667157e+09	796.80	1.000124	0.992541	0.910843	0.89932
18-09	790.1	804.00	783.05	796.05	796.80	796.06	1564899	1.245747e+09	800.75	0.986725	0.980267	0.900554	0.88603
18-08	785.1	808.90	780.80	800.80	800.75	795.94	2219546	1.766627e+09	783.65	0.992218	0.986759	0.908305	0.89079
18-07	785.0	801.00	780.00	784.00	783.65	791.39	2686877	2.126363e+09	782.65	0.978596	0.969732	0.892519	0.87276
18-06	765.0	788.40	752.70	781.45	782.65	770.10	3188895	2.455754e+09	802.30	0.984986	0.973342	0.895056	0.87272

5 rows × 13 columns

In [51]:
```
plt.figure(figsize=(20,10))
plt.plot(db.Close_ratio_5) # titan is clearly moving in the past 2 months
```

Out[51]: [<matplotlib.lines.Line2D at 0x248a0b19160>]



The model is balanced fit and its performs really good. we can improve the model adding more values to the dataset and handling it in a different way

we can develop the model to make buy and selling signal by improving the model by backtesting it .This is just a base model for the assignment purpose

Thanks rudo for the assignment I enjoyed working and learn a lot from it .hoping for the good response

In [ ]: