```
!wget http://prdownloads.sourceforge.net/ta-lib/ta-lib-0.4.0-src.tar.gz
!ls
!tar xvzf ta-lib-0.4.0-src.tar.gz
import os
os.chdir('ta-lib')
!./configure --prefix=/usr
!make
!make install
os.chdir('../')
!pip install TA-Lib
```

STOCK TREND PREDICTION DMW Mini Project-LP-1

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```
DATASET DETAILS
```

Dataset- KOTAKBANK.csv from NIFTY-50 dataset on Kaggle There are 4863 entries from 2000 to 2020 There are total 14 cloumns We have tried to build a model which can predict the uptrend i.e. 1 or downTrend i.e. 0.

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
df=pd.read_csv("/content/KOTAKBANK.csv",index_col=[0])
df.index=pd.to_datetime(df.index)
df.head()
```

Date	Symbol	Series	Prev Close	Open	High	Low	Last	Close	VWAP	Volume	Turr
2000-01-03	KOTAKMAH	EQ	212.35	220.0	229.35	220.00	229.35	229.35	229.13	7086	1.62364(
2000-01-04	KOTAKMAH	EQ	229.35	247.7	247.70	225.25	247.70	246.95	244.12	73681	1.79872(
2000-01-05	KOTAKMAH	EQ	246.95	229.0	240.00	227.20	228.00	228.40	233.75	105799	2.473093

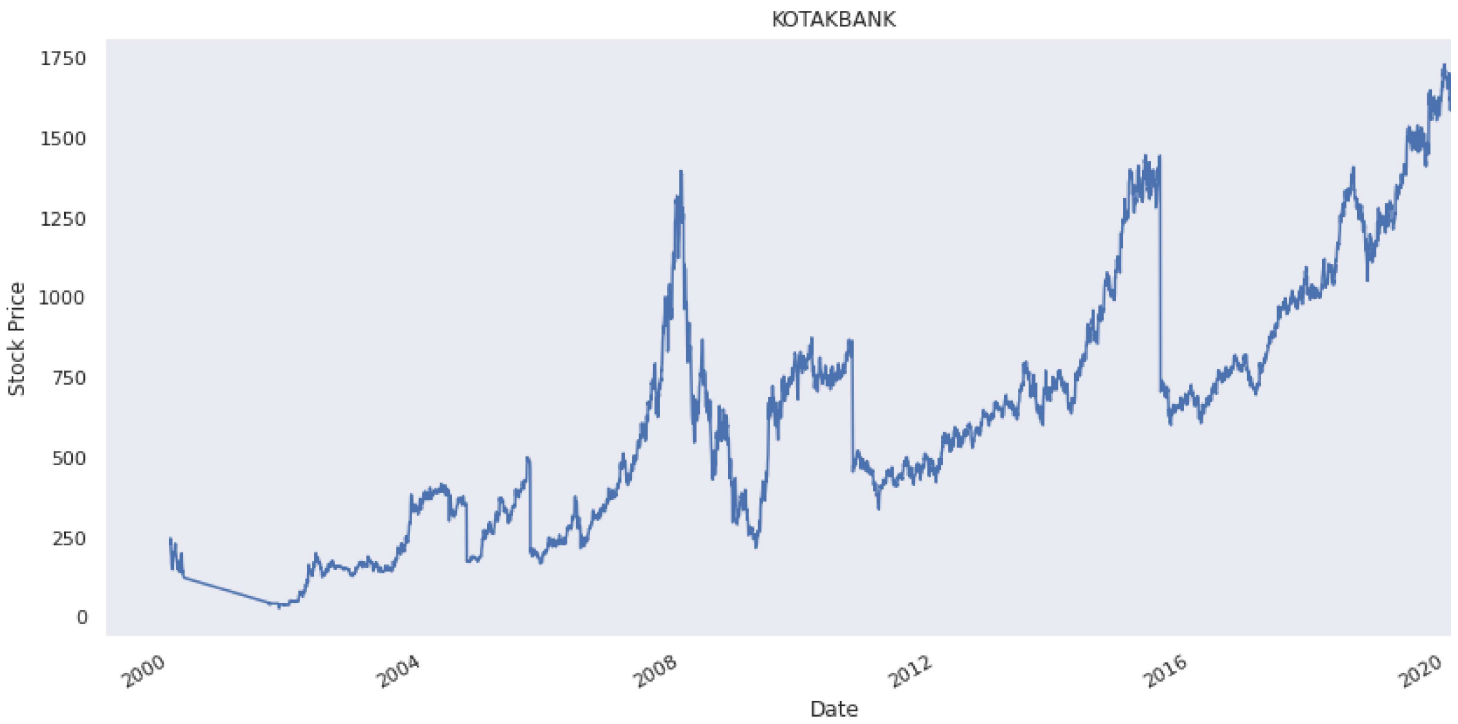
```
df=df.drop(['Symbol','Series','Prev Close','VWAP','Turnover','Trades','Deliverable Volume','%Del
df.head()
```

Date	Open	High	Low	Last	Close	Volume
2000-01-03	220.0	229.35	220.00	229.35	229.35	7086
2000-01-04	247.7	247.70	225.25	247.70	246.95	73681

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 4863 entries, 2000-01-03 to 2020-10-30
Data columns (total 6 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   Open    4863 non-null   float64
 1   High    4863 non-null   float64
 2   Low     4863 non-null   float64
 3   Last    4863 non-null   float64
 4   Close   4863 non-null   float64
 5   Volume  4863 non-null   int64  
dtypes: float64(5), int64(1)
memory usage: 265.9 KB
```

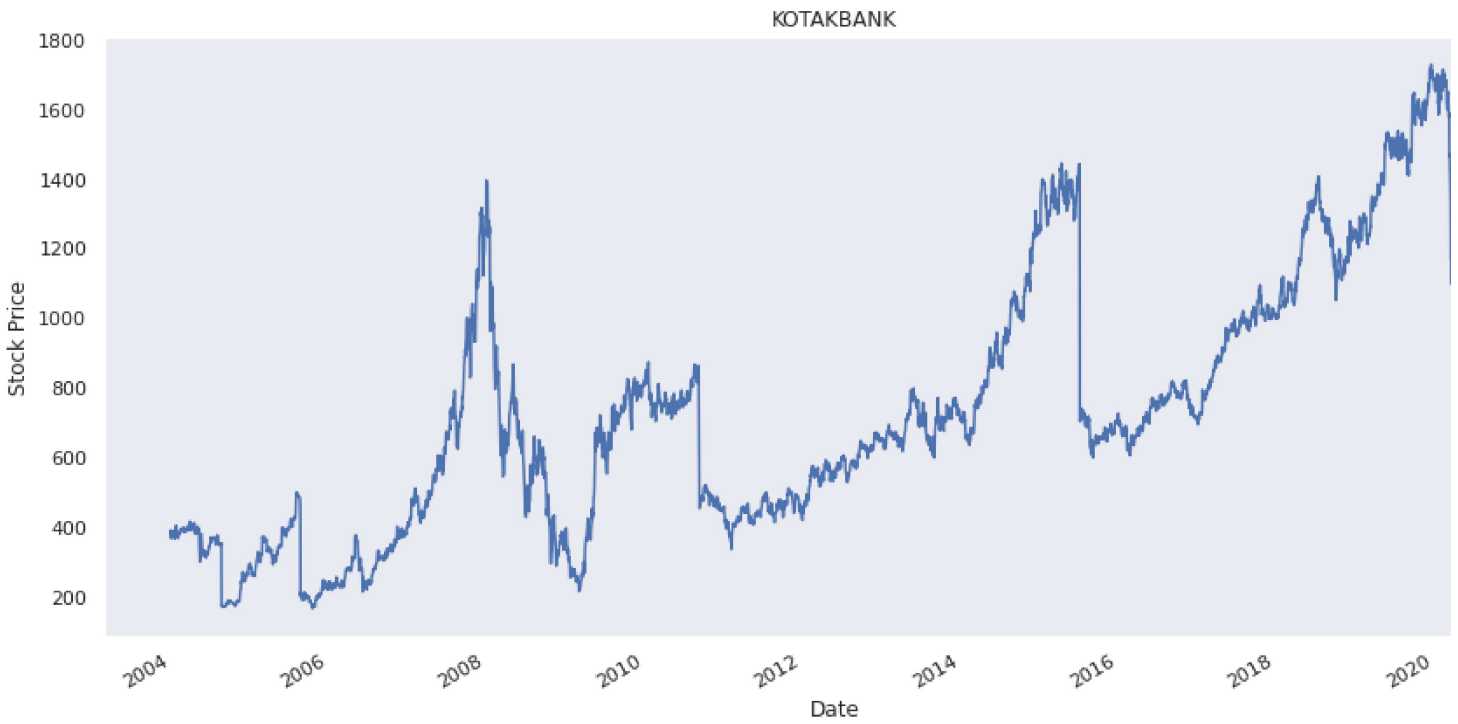
```
df.Close.plot(figsize=(15,7))
plt.xlabel('Date')
plt.ylabel('Stock Price')
plt.title('KOTAKBANK')
plt.grid()
plt.show()
```




```
df=df['2004-01-01':'2020-10-30']
```

```
df.Close.plot(figsize=(15,7))
plt.xlabel('Date')
```

```
plt.xlabel('Date')
plt.ylabel('Stock Price')
plt.title('KOTAKBANK')
plt.grid()
plt.show()
```




```
import talib as ta
df['RSI']=ta.RSI(df['Close'].values,timeperiod=14)
df['DIFF1']=df['Close'].diff().values
df['DIFF2']=df['Close'].diff(2).values
df['DIFF3']=df['Close'].diff(3).values
df['DIFF4']=df['Close'].diff(4).values
print(df.head())
df.tail()
```

```
                Open    High    Low   Last  ...  DIFF1  DIFF2  DIFF3  DIFF4
```

```
df['Trends']=np.where(df.Close.shift(-1)>df.Close,1,0)
print(df.head(15))
df.tail(15)
```

```
                Open    High     Low   Last  ...  DIFF2  DIFF3  DIFF4  Trends
Date                                         ...
2004-01-01  399.0  399.00  383.00  391.9  ...    NaN    NaN    NaN       0
2004-01-02  397.5  397.50  379.00  383.0  ...    NaN    NaN    NaN       0
2004-01-05  388.0  390.90  370.00  373.0  ... -19.15    NaN    NaN       0
2004-01-06  375.8  375.80  363.00  363.0  ... -16.45 -23.25    NaN       1
2004-01-07  350.0  376.95  350.00  370.1  ...  -1.45 -13.80 -20.60       1
2004-01-08  377.9  388.00  374.00  388.0  ...  15.90  11.80  -0.55       1
2004-01-09  386.0  402.00  386.00  393.5  ...  20.75  23.40  19.30       0
2004-01-12  388.3  389.00  378.00  382.5  ...  -1.65  11.60  14.25       1
2004-01-13  390.0  390.00  379.80  385.0  ...  -6.20   1.30  14.55       0
2004-01-14  384.5  389.95  384.50  386.0  ...   2.60  -6.55   0.95       1
2004-01-15  395.0  397.50  385.00  391.5  ...   4.95   7.90  -1.25       0
2004-01-16  390.0  395.00  375.05  382.0  ...  -3.20  -3.55  -0.60       0
2004-01-19  378.0  384.80  375.10  378.0  ... -12.85  -7.55  -7.90       1
2004-01-20  385.0  392.00  383.50  391.0  ...   8.25  -0.25   5.05       0
2004-01-21  383.2  390.00  370.00  380.5  ...  -0.80  -5.15 -13.65       0

[15 rows x 12 columns]
```

Date	Open	High	Low	Last	Close	Volume	RSI	DIFF1	DIFF2	DIFF3
2020-10-12	1328.00	1358.20	1307.50	1312.85	1312.90	5175329	49.522672	-6.95	-7.20	-11.80
2020-10-13	1319.65	1349.70	1307.20	1341.10	1344.95	4872154	56.427840	32.05	25.10	24.85
2020-10-14	1335.25	1358.00	1324.15	1355.00	1353.35	3358472	58.047671	8.40	40.45	33.50
2020-10-15	1353.35	1365.95	1301.25	1307.00	1309.55	3496590	48.022629	-43.80	-35.40	-3.35
2020-10-16	1308.50	1343.30	1308.50	1336.45	1336.55	2358054	53.368905	27.00	-16.80	-8.40
2020-10-19	1350.00	1380.00	1333.50	1374.90	1376.70	3971028	59.963650	40.15	67.15	23.35
2020-10-20	1371.70	1386.00	1355.50	1369.10	1368.80	3228111	58.218980	-7.90	32.25	59.25
2020-10-21	1375.00	1400.00	1358.65	1392.25	1393.30	4280457	61.919412	24.50	16.60	56.75
2020-10-22	1388.00	1405.00	1377.55	1391.50	1393.05	3610102	61.859207	-0.25	24.25	16.35
2020-	1400.00	1407.70	1378.25	1385.65	1383.05	2385861	59.372418	-10.00	-10.25	14.25

```
print(df['Trends'].count())
print(df['Trends'].sum())
```

```
4181
2174
```

```
df.dropna(inplace=True)
predictor_list=['RSI','DIFF1','DIFF2','DIFF3','DIFF4']
X=df[predictor_list]
y=df['Trends']
y.tail()
```

```
Date
2020-10-26    1
2020-10-27    0
2020-10-28    1
2020-10-29    0
2020-10-30    0
Name: Trends, dtype: int64
```

```
print(df['Trends'].count())
df['Trends'].sum()
```

```
4167
2168
```

```
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=42,stratify=y)
print(X_train.shape,X_test.shape)
print(y_train.shape,y_test.shape)
```

```
(3333, 5) (834, 5)
(3333,) (834,)
```

```
print(X_train,X_test)
print(y_train,y_test)
```

```
                  RSI  DIFF1  DIFF2  DIFF3  DIFF4
Date
2020-01-02  49.741388  -2.50 -12.80 -18.85 -14.05
2019-05-06  68.063975  -7.40   4.05  23.85  31.15
2016-12-06  36.486365   4.20  10.45 -10.95 -21.45
2019-03-11  49.242285  10.65  12.35   8.25   9.10
2019-04-16  70.476185  12.55  42.95  43.20  36.50
...               ...    ...    ...    ...    ...
2009-11-11  60.631459  22.45   9.80  49.95  95.15
2015-12-24  59.550285  -1.20   3.15  -4.55  -1.10
2009-06-09  64.768922  37.85   5.45   0.90  16.95
2014-06-18  71.649055  23.00  29.80  43.30  26.55
2007-02-06  76.065300   2.50  20.50  44.55  41.70

[3333 rows x 5 columns]                   RSI  DIFF1  DIFF2  DIFF3  DIFF4
Date
2005-10-03  28.639965   0.70  -3.65  -3.20   0.65
2004-03-30  47.487975  -3.40  -8.45  -4.80  -9.25
2008-01-08  58.099341 -59.25 -50.35 -19.10 -68.60
2014-08-05  56.059885   0.20  12.65 -15.75 -36.30
2010-12-06  47.405880  -5.65  -8.35   0.05   3.50
...               ...    ...    ...    ...    ...
2018-12-24  54.907086  11.30   2.20  12.85   1.40
2004-04-07  48.584772  -5.35  -9.30  -9.40 -21.90
2011-01-07  36.673685  -9.90 -13.70 -25.30 -21.90
```

```
2009-08-27  54.184438 -12.60  -6.60 -17.65  -5.15
2010-04-08  60.069829  -1.55   4.15  19.75  39.25

[834 rows x 5 columns]
Date
2020-01-02    0
2019-05-06    0
2016-12-06    1
2019-03-11    1
2019-04-16    0
              ..
2009-11-11    0
2015-12-24    1
2009-06-09    1
2014-06-18    0
2007-02-06    1
Name: Trends, Length: 3333, dtype: int64 Date
2005-10-03    0
2004-03-30    1
2008-01-08    0
2014-08-05    0
2010-12-06    0
              ..
2018-12-24    1
2004-04-07    1
2011-01-07    0
2009-08-27    1
2010-04-08    0
Name: Trends, Length: 834, dtype: int64
```

```
from sklearn.tree import DecisionTreeClassifier
clf=DecisionTreeClassifier(criterion='gini',max_depth=3,random_state=20,min_samples_leaf=5)
model=clf.fit(X_train,y_train)
```

```
print(accuracy_score(y_test,model.predict(X_test),normalize=True)*100)
```

```
52.038369304556355
```

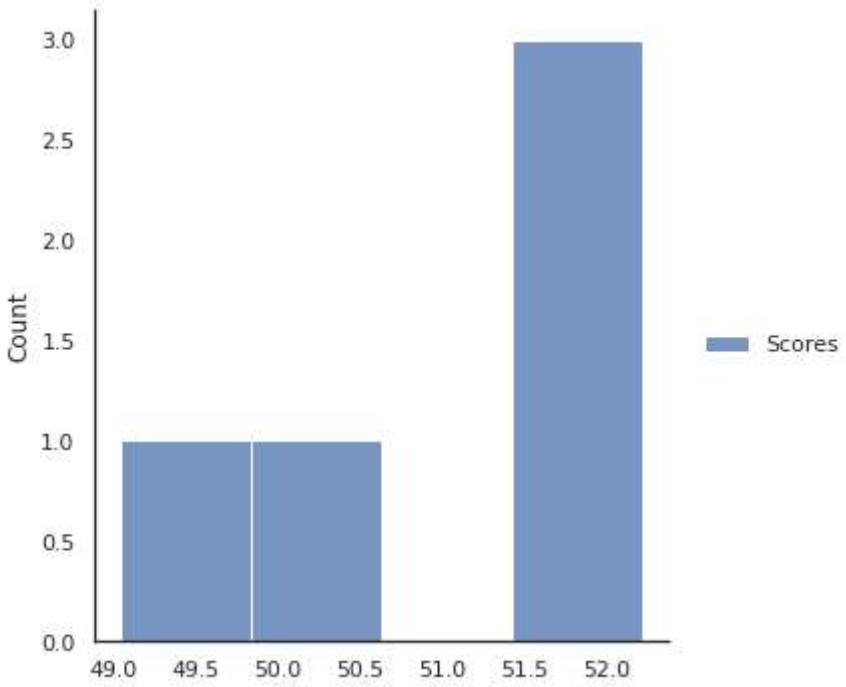
```
from sklearn.model_selection import KFold
kf=KFold(n_splits=5,shuffle=False)
kf.split(X)
```

```
<generator object _BaseKFold.split at 0x7f2b7d3ec4c0>
```

```
from sklearn.metrics import accuracy_score
accuracy_model=[]
for train_index,test_index in kf.split(X):
  X_train,X_test=X.iloc[train_index],X.iloc[test_index]
  y_train,y_test=y[train_index],y[test_index]
  model=clf.fit(X_train,y_train)
  accuracy_model.append(accuracy_score(y_test,model.predict(X_test),normalize=True)*100)
print(accuracy_model)
```

```
[51.91846522781775, 49.040767386091126, 51.50060024009604, 52.22088835534213, 50.5402160864
```

```
scores = pd.DataFrame(accuracy_model,columns=['Scores'])
sns.set(style="white", rc={"lines.linewidth": 3})
sns.displot(scores)
plt.show()
sns.set()
```




```
from sklearn.metrics import confusion_matrix
from sklearn.metrics import accuracy_score
cm = confusion_matrix(y_test, y_pred)
print("CONFUSION MATRIX \n",cm)
```

```
CONFUSION MATRIX
 [[155 245]
 [167 266]]
```

```
from sklearn.metrics import classification_report
y_pred=model.predict(X_test)
report=classification_report(y_test,y_pred)
print(report)
```

```
                precision    recall  f1-score   support

             0       0.48      0.39      0.43       400
             1       0.52      0.61      0.56       433

      accuracy                           0.51       833
     macro avg       0.50      0.50      0.50       833
  weighted avg       0.50      0.51      0.50       833
```

```
from scipy.stats import sem
from numpy import mean
from numpy import std
from sklearn.datasets import make_classification
from sklearn.model_selection import RepeatedKFold
from sklearn.model_selection import cross_val_score
from sklearn.naive_bayes import GaussianNB
```

```
from matplotlib import pyplot
model_NB = GaussianNB()
model_NB.fit(X_train, y_train)
```

```
GaussianNB(priors=None, var_smoothing=1e-09)
```

```
# evaluate a model with a given number of repeats
def evaluate_model(X, y, repeats):
  cv = RepeatedKFold(n_splits=10, n_repeats=repeats, random_state=1)
  scores_NB = cross_val_score(model_NB, X, y, scoring='accuracy', cv=cv, n_jobs=-1)
  return scores_NB

# create dataset
```

```
repeats = range(1,16)
results = list()
for r in repeats:
  scores_NB = evaluate_model(X, y, r)
  results.append(scores_NB)
sns.displot(scores_NB)
```

```
>1 mean=0.4968 se=0.005
>2 mean=0.4968 se=0.005
```

```
y_pred_NB = model_NB.predict(X_test)
cm = confusion_matrix(y_test, y_pred_NB)
print(cm)
report=classification_report(y_test,y_pred_NB)
print(report)
```

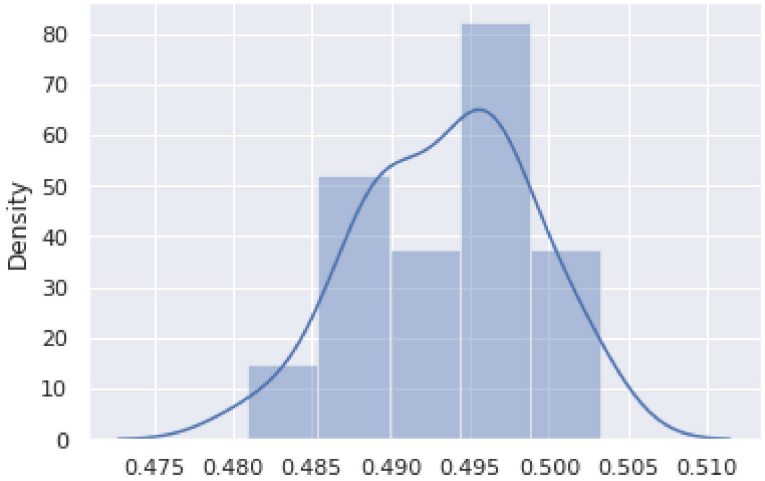
```
[[ 76 324]
 [ 86 347]]
              precision    recall  f1-score   support

           0       0.47      0.19      0.27       400
           1       0.52      0.80      0.63       433

    accuracy                           0.51       833
   macro avg       0.49      0.50      0.45       833
weighted avg       0.49      0.51      0.46       833
```

```
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import classification_report
from sklearn.metrics import confusion_matrix
import matplotlib.pyplot as plt
%matplotlib inline
k_range = range(1, 31)
k_scores = []
for k in k_range:
    knn = KNeighborsClassifier(n_neighbors=k)
    scores = cross_val_score(knn, X, y, cv=10, scoring='accuracy')
    k_scores.append(scores.mean())
sns.distplot(k_scores)
```

```
/usr/local/lib/python3.6/dist-packages/seaborn/distributions.py:2551: FutureWarning: `distp
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f2b81d447b8>
```




```
y_pred_knn= classifier_knearest.predict(X_test)
cm = confusion_matrix(y_test, y_pred_knn)
print(cm)
report=classification_report(y_test,y_pred_knn)
print(report)
```

```
[[206 194]
 [217 216]]
              precision    recall  f1-score   support

           0       0.49      0.52      0.50       400
           1       0.53      0.50      0.51       433

    accuracy                           0.51       833
   macro avg       0.51      0.51      0.51       833
weighted avg       0.51      0.51      0.51       833
```

/