Model Development Phase Template

Date	14th July 2024
Team ID	739782
Project Title	SENTIMENTAL ANALYSIS OF COMMODITY NEWS (GOLD)
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be show cased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

In [14]:
```
#Applying the text cleaning
import re
import string

#This function converts to lower-case, removes square bracket, removes numbers and punctuation
def text_clean_1(text):
    text = text.lower()      #converts to lower-case or upper case
    text = re.sub('\[.*?\]', '', text)  #it will remove .,?,"", []
    text = re.sub('[%s]' % re.escape(string.punctuation), '', text)     # #it will remove "",.
    text = re.sub('\w*\d\w*', '', text)
    text = re.sub('[‘’“”…]', '', text)  #it will remove ‘‘, ’’, ‘“’, ’”’, and ‘…’.
    text = re.sub('\n', '', text)
    return text

Cleaned_News = lambda x: text_clean_1(x)
```

In [15]:
```
#the updated text here
df['Cleaned_News'] = pd.DataFrame(df.News.apply(Cleaned_News))
df.head(10)
```

Out[15]:

	News	Price Sentiment	Cleaned_News
0	april gold down 20 cents to settle at $1,116.1...	negative	april gold down cents to settle at
1	gold suffers third straight daily decline	negative	gold suffers third straight daily decline
2	Gold futures edge up after two-session decline	positive	gold futures edge up after twosession decline
3	dent research : is gold's day in the sun comin...	none	dent research is golds day in the sun coming ...
4	Gold snaps three-day rally as Trump, lawmakers...	negative	gold snaps threeday rally as trump lawmakers r...
5	Dec. gold climbs $9.40, or 0.7%, to settle at ...	positive	dec gold climbs or to settle at
6	gold falls by rs 25 on sluggish demand, global...	negative	gold falls by rs on sluggish demand global cues
7	Gold futures fall for the session, but gain fo...	positive	gold futures fall for the session but gain for...
8	Gold struggles; silver slides, base metals falter	neutral	gold struggles silver slides base metals falter
9	april gold holds slight gain, up $2.50, or 0.2...	positive	april gold holds slight gain up or at

In [18]:
```
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=0)

print("x_train:",len(x_train))
print("x_test:",len(x_test))
print("y_train:",len(y_train))
print("y_test:",len(y_test))
```

```
x_train: 8456
x_test: 2114
y_train: 8456
y_test: 2114
```

Model building with Logistic Regression

In [20]:
```
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import LogisticRegression
tvec = TfidfVectorizer()
clf2 = LogisticRegression()
```

In [21]:
```
from sklearn.pipeline import Pipeline
model = Pipeline([('vectorizer',tvec),('classifier',clf2)])
model.fit(x_train,y_train)
from sklearn.metrics import confusion_matrix
predictions = model.predict(x_test)
pred_train=model.predict(x_train)
confusion_matrix(predictions, y_test)
```

Out[21]:
```
array([[701,  15,  26,  29],
       [  1,  50,   1,   2],
       [ 31,   9, 330,  48],
       [ 36,  15,  34, 786]], dtype=int64)
```

Model building with SVM ¶

In [22]:
```
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.svm import SVC
svm=SVC(kernel='linear')
tvec = TfidfVectorizer()
```

In [23]:
```
# from sklearn.pipeline import Pipeline
model2 = Pipeline([('vectorizer',tvec),('classifier',svm)])
model2.fit(x_train,y_train)
from sklearn.metrics import confusion_matrix
predictions2 = model.predict(x_test)
pred2_train=model.predict(x_train)
confusion_matrix(predictions2, y_test)
```

Out[23]:
```
array([[701,  15,  26,  29],
       [  1,  50,   1,   2],
       [ 31,   9, 330,  48],
       [ 36,  15,  34, 786]], dtype=int64)
```

In [24]:
```
#Logistic Regression
from sklearn.metrics import accuracy_score
print("Accuracy_test : ", accuracy_score(predictions, y_test))
print("Accuracy_train : ", accuracy_score(pred_train, y_train))
```

```
Accuracy_test :  0.8831598864711447
Accuracy_train :  0.9331835383159887
```

In [25]:
```
#SVM
#from sklearn.metrics import accuracy_score
print("Accuracy_test: ", accuracy_score(predictions2, y_test))
print("Accuracy_train : ", accuracy_score(pred2_train, y_train))
```

```
Accuracy_test:  0.8831598864711447
Accuracy_train :  0.9331835383159887
```

In [26]:
```
example = ["gold to trade in 28670-29160 range: achiievers equities"]
result = model.predict(example)
print(result)
```

```
['neutral']
```

In [27]:
```
example = ["gold to trade in 28670-29160 range: achiievers equities"]
result = model2.predict(example)
print(result)
```

```
['neutral']
```

In [28]:
```
example = ["can investment in gold, sensex & ppfs give the same returns?"]
result = model.predict(example)
print(result)
```

```
['none']
```

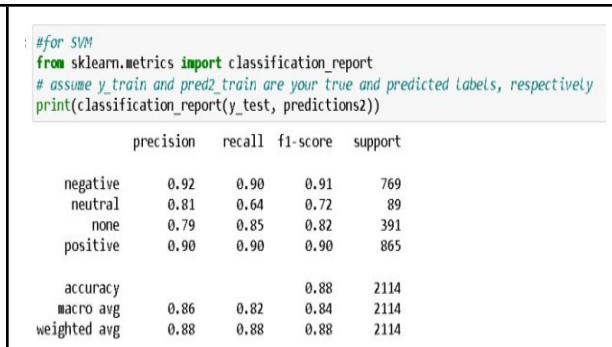
In [29]:
```
example = ["can investment in gold, sensex & ppfs give the same returns?"]
result = model2.predict(example)
print(result)
```

```
['none']
```

Model Validation and Evaluation Report:

Model	Classification Report	F1 Score	Confusion Matrix

LOGISTIC REGRESSION	`#for Logistic Regression`
	`from sklearn.metrics import classification_report`
	`# assume y_train and pred_train are your true and predicted labels, respectively`
	`print(classification_report(y_test, predictions))`
	
	precision recall f1-score support
	
	negative 0.91 0.91 0.91 769
	neutral 0.93 0.56 0.70 89
	none 0.79 0.84 0.82 391
	positive 0.90 0.91 0.91 865
	
	accuracy 0.88 2114
	macro avg 0.88 0.81 0.83 2114
	weighted avg 0.88 0.88 0.88 2114
		88%	`confusion_matrix(predictions, y_test)`
			
			array([[701, 15, 26, 29],
			[1, 50, 1, 2],
			[31, 9, 330, 48],
			[36, 15, 34, 786]], dtype=int64)

SUPPORT VECTOR MACHINE		88%