



ASSIGNMENT 09

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CLASS:TY-AI&DS

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```
In [51]: import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import LogisticRegression
from sklearn.svm import LinearSVC
from sklearn.metrics import classification_report, accuracy_score, confusion_m
```

```
In [38]: df = pd.read_csv("train_data.csv")
```

```
[39]: df
```

Out[39]:

sentence sentiment		
0	awww that s a bummer you shoulda got david car...	0
1	is upset that he can t update his facebook by ...	0
2	i dived many times for the ball managed to sav...	0
3	my whole body feels itchy and like its on fire	0
4	no it s not behaving at all i m mad why am i h...	0
...
1523970	just woke up having no school is the best feel...	1
1523971	thewdb com very cool to hear old walt interviews	1
1523972	are you ready for your mojo makeover ask me fo...	1
1523973	happy th birthday to my boo of alll time tupac...	1
1523974	happy charitytuesday	1

1523975 rows × 2 columns

```
In [40]: df.shape
```

Out[40]: (1523975, 2)

```
In [41]: df.isnull().sum()
```

```
Out[41]: sentence    0
sentiment          0
dtype: int64
```

```
In [42]: df1 = df.rename(columns={"sentence": "text", "sentiment": "label"})
print(df1.head())
```

	text	label
0	awww that s a bummer you shoulda got david car...	0
1	is upset that he can t update his facebook by ...	0
2	i dived many times for the ball managed to sav...	0
3	my whole body feels itchy and like its on fire	0
4	no it s not behaving at all i m mad why am i h...	0

```
In [43]: def clean_text(text):
text = str(text).lower()
text = re.sub(r"http\S+", "", text)
text = re.sub(r"@w+", "", text)
text = re.sub(r"[^a-z\s]", "", text)
return text
df1["text"] = df1["text"].apply(clean_text)
```

TRAIN TEST SPLIT

```
In [44]: X_train, X_test, y_train, y_test = train_test_split(df1["text"], df1["label"], t
```

TF-IDF vectorization

```
In [45]: vectorizer = TfidfVectorizer(max_features=30000, ngram_range=(1,2))
```

```
In [46]: X_train_vec = vectorizer.fit_transform(X_train)
X_test_vec = vectorizer.transform(X_test)
```

Logistic Regression

```
In [47]: lr_model = LogisticRegression(max_iter=1000)
```

```
In [48]: lr_model.fit(X_train_vec, y_train)
lr_preds = lr_model.predict(X_test_vec)
```

```
In [49]: def evaluate_model(y_true, y_pred, model_name):
print(f"==== {model_name} =====")
print("Accuracy:", accuracy_score(y_true, y_pred))
print("Classification Report:\n", classification_report(y_true, y_pred))
print("Confusion Matrix:\n", confusion_matrix(y_true, y_pred))
print("\n")
```

```
In [50]: lr_acc = accuracy_score(y_test, lr_preds)
print("Accuracy", lr_acc)
lr_cr = classification_report(y_test, lr_preds)
print("Classification Report:\n", lr_cr)
lr_cm = confusion_matrix(y_test, lr_preds)
print("Confusion Matrix:\n", lr_cm)
```

Accuracy 0.8114831280040683

Classification Report:

	precision	recall	f1-score	support
0	0.82	0.80	0.81	153092
1	0.80	0.82	0.81	151703
			0.81	304795
accuracy			0.81	304795
macro avg	0.81	0.81	0.81	
weighted avg	0.81	0.81		

Confusion Matrix:

```
[[122841  30251]
 [ 27208 124495]]
```

GradientBoosting model

```
In [16]: svm = LinearSVC()
```

```
In [54]: svm.fit(X_train_vec, y_train)
svm_preds = svm.predict(X_test_vec)
```

```
In [55]: svm_acc = accuracy_score(y_test, svm_preds)
print("Accuracy",gb_acc)
svm_cr = classification_report(y_test, svm_preds)
print("Classification Report:\n",svm_cr)
svm_cm = confusion_matrix(y_test, svm_preds)
print("Confusion Matrix:\n",svm_cm)
```

Accuracy 0.7023606030282649

Classification Report:

	precision	recall	f1-score	support
0	0.82	0.80	0.81	153092
1	0.80	0.82	0.81	151703
			0.81	304795
accuracy			0.81	304795
macro avg			0.81	304795
weighted avg	0.81	0.81	0.81	304795
	0.81	0.81		

Confusion Matrix:

```
[[122841  30251]
 [ 27208 124495]]
```

COMPARISON

```
In [56]: if lr_acc > svm_acc:
          print("Logistic Regression performs better")
        elif gb_acc > lr_acc:
          print("Gradient Boosting performs better")
        else:
          print("Both models perform equally")
```

Logistic Regression performs better

