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Batch: TE Comps-B Batch B

Experiment No. 7

```
import pandas as pd
import numpy as np

from matplotlib import pyplot as plt

import seaborn as sns # read csv

file

df=pd.read_csv('/content/Employee.csv')
```

```
df.head()
```

	Education	JoiningYear	City	PaymentTier	Age	Gender	EverBenched	ExperienceInCurrentDomain	LeaveOrNot
0	Bachelors	2017	Bangalore	3	34	Male	No	0	0
1	Bachelors	2013	Pune	1	28	Female	No	3	1
2	Bachelors	2014	New Delhi	3	38	Female	No	2	0
3	Masters	2016	Bangalore	3	27	Male	No	5	1
4	Masters	2017	Pune	3	24	Male	Yes	2	1

	Education	JoiningYear	City	PaymentTier	Age	Gender	EverBenched	ExperienceInCurrentDomain	LeaveOrNot
4648	Bachelors	2013	Bangalore	3	26	Female	No	4	0
4649	Masters	2013	Pune	2	37	Male	No	2	1
4650	Masters	2018	New Delhi	3	27	Male	No	5	1
4651	Bachelors	2012	Bangalore	3	30	Male	Yes	2	0
4652	Bachelors	2015	Bangalore	3	33	Male	Yes	4	0

```
df.tail()
```

```
df.shape
```

```
(4653, 9)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
  RangeIndex: 4653 entries, 0 to 4652
  Data columns (total 9 columns):
   #   Column                     Non-Null Count  Dtype
  ---  ------                     --------------  -----
  0   Education                  4653 non-null   object
  1   JoiningYear                4653 non-null   int64
  2   City                       4653 non-null   object
  3   PaymentTier                4653 non-null   int64
  4   Age                        4653 non-null   int64
  5   Gender                     4653 non-null   object
  6   EverBenched                4653 non-null   object
  7   ExperienceInCurrentDomain  4653 non-null   int64  8   LeaveOrNot
      4653 non-null   int64 dtypes: int64(5), object(4) memory usage: 327.3+ KB
```

```
df.describe()
```

```
       JoiningYear  PaymentTier          Age  ExperienceInCurrentDomain   LeaveOrNot
count  4653.000000  4653.000000  4653.000000                4653.000000  4653.000000
mean   2015.062970     2.698259    29.393295                   2.905652     0.343864
std       1.863377     0.561435     4.826087                   1.558240     0.475047
min    2012.000000     1.000000    22.000000                   0.000000     0.000000
25%    2013.000000     3.000000    26.000000                   2.000000     0.000000
50%    2015.000000     3.000000    28.000000                   3.000000     0.000000
75%    2017.000000     3.000000    32.000000                   4.000000     1.000000
max    2018.000000     3.000000    41.000000                   7.000000     1.000000
```

```
df.isnull().sum()
```

```
                           0
Education                  0
JoiningYear                0
City                       0
PaymentTier                0
Age                        0
Gender                     0
EverBenched                0
ExperienceInCurrentDomain  0
LeaveOrNot                 0
```

[redacted]

dtype: int64

```
from sklearn.preprocessing import LabelEncoder

label_encoder = LabelEncoder() categorical_columns = ['Gender',
'EverBenched', 'Education', 'City']

#Apply label encoding to each categorial column for
column in categorial_columns:     df[column] =
label_encoder.fit_transform(df[column])

x = df.drop('LeaveOrNot', axis=1) y = df['LeaveOrNot'] 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)
```

```
from sklearn.ensemble import RandomForestClassifier model =

RandomForestClassifier(n_estimators=100,random_state=42)

model.fit(x_train, y_train)
```

```
▾    RandomForestClassifier    ⓘ ?
RandomForestClassifier(random_state=42)
```

```
#Make predictions on the test set
y_pred = model.predict(x_test)
```

```
from sklearn.metrics import accuracy_score

accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy * 100:.2f}%")
```

```
Accuracy: 84.96%
```

```
from sklearn.metrics import classification_report

print(classification_report(y_test, y_pred))
```

```
precision    recall  f1-score   support

                0       0.86      0.92      0.89       610
        1       0.82      0.72      0.77       321

           accuracy                           0.85       931
        macro avg       0.84      0.82      0.83       931
        weighted avg       0.85      0.85      0.85       931
```

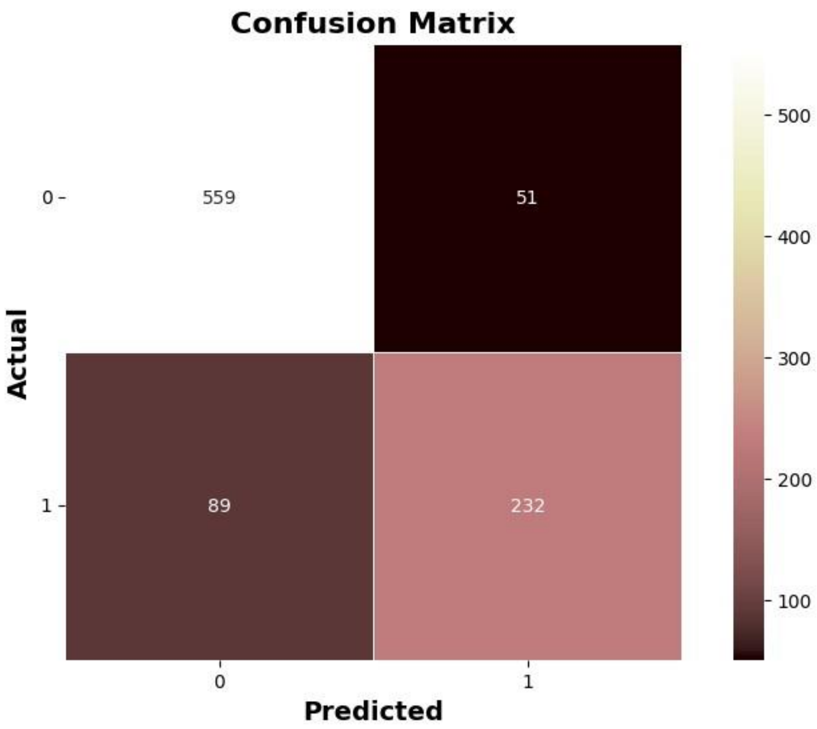
```
from sklearn.metrics import confusion_matrix

cm = confusion_matrix(y_test, y_pred)

plt.figure(figsize=(10, 6))

sns.heatmap(cm, annot=True, fmt='d', cmap='pink', linewidths=0.4, square=True, cbar=True,
xticklabels=["0", "1"],             yticklabels=["0", "1"]
            )
            )

plt.xlabel('Predicted', fontsize=14, fontweight='bold')
plt.ylabel('Actual', fontsize=14, fontweight='bold')
plt.title('Confusion Matrix', fontsize=16, fontweight='bold')
plt.yticks(rotation=360)
plt.show()
```



```
# Example of a model that may be underfitting
from sklearn.tree import DecisionTreeClassifier

#Assume X_train and y_train are your training features and labels
clf=DecisionTreeClassifier(max_depth=1)
clf.fit(x_train,y_train)
```

```
▾ DecisionTreeClassifier
DecisionTreeClassifier(max_depth=1)
```

```
y_predict=clf.predict(x_test)
```

```
accuracy = accuracy_score(y_test, y_predict)
print(f"Accuracy: {accuracy * 100:.2f}%")
```

```
Accuracy: 74.22%
```

```
print(classification_report(y_test, y_predict))
```

```
precision    recall  f1-score   support

                0       0.72      1.00      0.84       610
           1       1.00      0.25      0.40       321

        accuracy                           0.74       931
     macro avg       0.86      0.63      0.62       931
     weighted avg       0.81      0.74      0.69       931
```

```
from sklearn.naive_bayes import GaussianNB

# Build a Gaussian Classifier
model = GaussianNB()

# Train the classifier on the training data
model.fit(x_train, y_train)
```

```
▾ GaussianNB
GaussianNB()
```

```
y_pred1 = model.predict(x_test)

accuracy = accuracy_score(y_test, y_pred1)
print(f"Accuracy: {accuracy * 100:.2f}%")
```

```
Accuracy: 68.53%
```

```
#importing SVM

from sklearn.svm import SVC model_svm = SVC(kernel =
'linear', random_state = 0)
model_svm.fit(x_train, y_train)
```

```
▾ SVC
SVC(kernel='linear', random_state=0)
```

```
y_pred = model_svm.predict(x_test)

accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy * 100:.2f}%")
```

```
Accuracy: 68.42%
```