```python
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

df=pd.read_csv('Social_Network_Ads.csv')

df
```

```
      User ID  Gender  Age  EstimatedSalary  Purchased
0    15624510    Male   19            19000          0
1    15810944    Male   35            20000          0
2    15668575  Female   26            43000          0
3    15603246  Female   27            57000          0
4    15804002    Male   19            76000          0
..        ...     ...  ...              ...        ...
395  15691863  Female   46            41000          1
396  15706071    Male   51            23000          1
397  15654296  Female   50            20000          1
398  15755018    Male   36            33000          0
399  15594041  Female   49            36000          1

[400 rows x 5 columns]
```

```python
df=df.drop(columns=["User ID"])

df
```

```
     Gender  Age  EstimatedSalary  Purchased
0      Male   19            19000          0
1      Male   35            20000          0
2    Female   26            43000          0
3    Female   27            57000          0
4      Male   19            76000          0
..      ...  ...              ...        ...
395  Female   46            41000          1
396    Male   51            23000          1
397  Female   50            20000          1
398    Male   36            33000          0
399  Female   49            36000          1

[400 rows x 4 columns]
```

```python
df=pd.get_dummies(df,drop_first=True)

df
```

```
     Age  EstimatedSalary  Purchased  Gender_Male
0     19            19000          0            1
1     35            20000          0            1
2     26            43000          0            0
3     27            57000          0            0
```

```
4     19            76000          0            1
..   ...              ...        ...          ...
395   46            41000          1            0
396   51            23000          1            1
397   50            20000          1            0
398   36            33000          0            1
399   49            36000          1            0

[400 rows x 4 columns]
```

```
independent=df[["Age","EstimatedSalary","Gender_Male"]]
dependent=df[["Purchased"]]
```

```
from sklearn.model_selection import train_test_split
X_train,X_test,Y_train,Y_test=train_test_split(independent,dependent,test_size=1/3,random_state=0)
```

```
from sklearn.ensemble import RandomForestClassifier
classifier=RandomForestClassifier(n_estimators=10,criterion='entropy',
random_state=0)
classifier.fit(X_train,Y_train)
```

```
C:\Users\CSELAB\AppData\Local\Temp\ipykernel_6708\1498940516.py:3:
DataConversionWarning: A column-vector y was passed when a 1d array
was expected. Please change the shape of y to (n_samples,), for
example using ravel().
  classifier.fit(X_train,Y_train)

RandomForestClassifier(criterion='entropy', n_estimators=10,
random_state=0)
```

```
Y_pred=classifier.predict(X_test)
```

```
from sklearn.metrics import confusion_matrix,classification_report
cm=confusion_matrix(Y_test,Y_pred)
print("confusion matrix:\n",cm)
```

```
confusion matrix:
 [[78  7]
 [ 6 43]]
```

```
clf_report=classification_report(Y_test,Y_pred)
print("Classification Report:\n",clf_report)
```

```
Classification Report:
               precision    recall  f1-score   support

           0       0.93      0.92      0.92        85
           1       0.86      0.88      0.87        49

    accuracy                           0.90       134
   macro avg       0.89      0.90      0.90       134
```

```
weighted avg       0.90      0.90      0.90       134
```

```
import joblib
joblib.dump(classifier,'random_forest_model.pkl')
print("Model saved as random_forest_model.pkl")
```

```
Model saved as random_forest_model.pkl
```

```
loaded_model=joblib.load('random_forest_model.pkl')
print("Model loaded successfully.")
```

```
Model loaded successfully.
```

```
Y_pred_loaded=loaded_model.predict(X_test)
print("predictions from loaded model:\n",Y_pred_loaded)
```

```
predictions from loaded model:
 [0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 1 0 0 1 0 0 1 0 1 0 1 0 0 0 0 0 0 1 0
0 0 0
 0 0 1 0 0 0 0 1 0 0 1 0 1 1 0 0 1 1 1 0 0 1 0 0 1 0 1 0 1 0 0 0 0 1 0
0 1
 0 0 0 0 1 1 1 1 0 0 1 0 1 1 0 0 0 1 0 0 0 0 0 1 1 1 1 1 0 1 1 1 0 0 0
0 0
 0 0 1 1 0 0 0 0 1 0 1 1 1 0 0 1 1 1 1 0 1 0 1]
```