Import necessary libraries

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.preprocessing import LabelEncoder
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, classification_report,
confusion_matrix
```

Load the dataset

```
# Assuming the dataset is in a CSV file named 'Social_Network_Ads.csv'
df = pd.read_csv('Social_Network_Ads.csv')
```

Dataset Visualization

```
df.head()
```

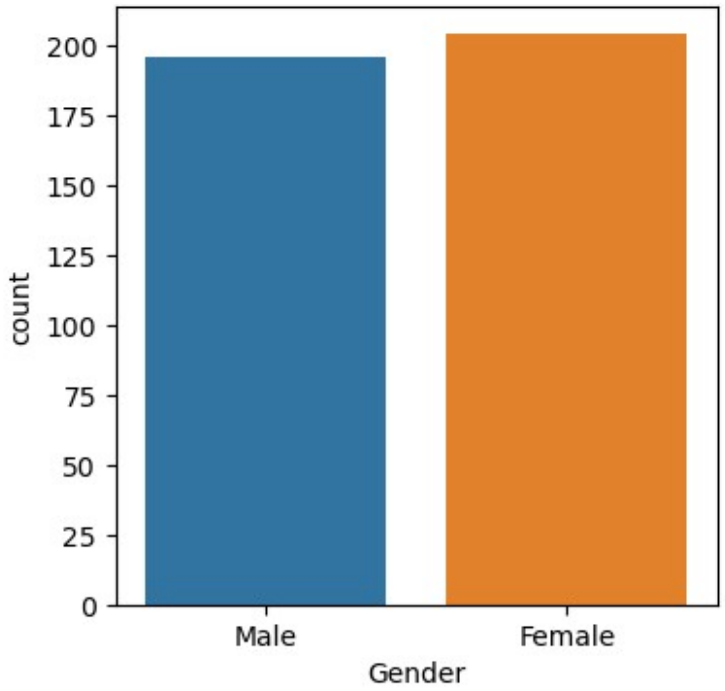
	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

```
df.shape
```

```
(400, 5)
```

EDA

```
ax = plt.subplots(figsize = (4,4))
ax = sns.countplot(x=df['Gender'])
plt.show()
```




```
ax = plt.subplots(figsize = (4,4))
ax = sns.countplot(x=df['Purchased'])
plt.show()
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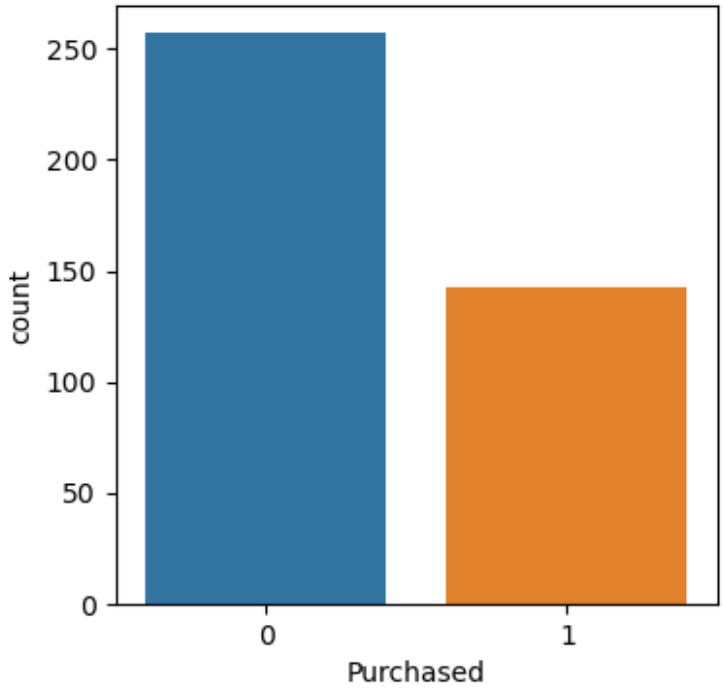


Feature Extraction

```
# Separate features (X) and target variable (y)
X = df.iloc[:, [1, 2, 3]].values  # Considering Gender, Age, and
Estimated Salary as features
y = df.iloc[:, 4].values  # Assuming 'Purchased' is the target
variable
```

Use LabelEncoder for 'Gender' as 'Gender' is non-numeric

```
label_encoder = LabelEncoder()
X[:, 0] = label_encoder.fit_transform(X[:, 0])
```

Split the dataset into training and testing sets

```
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)
```

Feature scaling

```
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)
```

Create a SVM classifier

```
svm_classifier = SVC(kernel='linear', probability=True,
random_state=0)
```

Fit the model to the training data

```
svm_classifier.fit(X_train, y_train)

SVC(kernel='linear', probability=True, random_state=0)
```

Make predictions on the test set

```
y_pred = svm_classifier.predict(X_test)
```

Evaluate the performance of the classifier

```
accuracy = accuracy_score(y_test, y_pred)
conf_matrix = confusion_matrix(y_test, y_pred)
classification_report_str = classification_report(y_test, y_pred)
```

Print the results

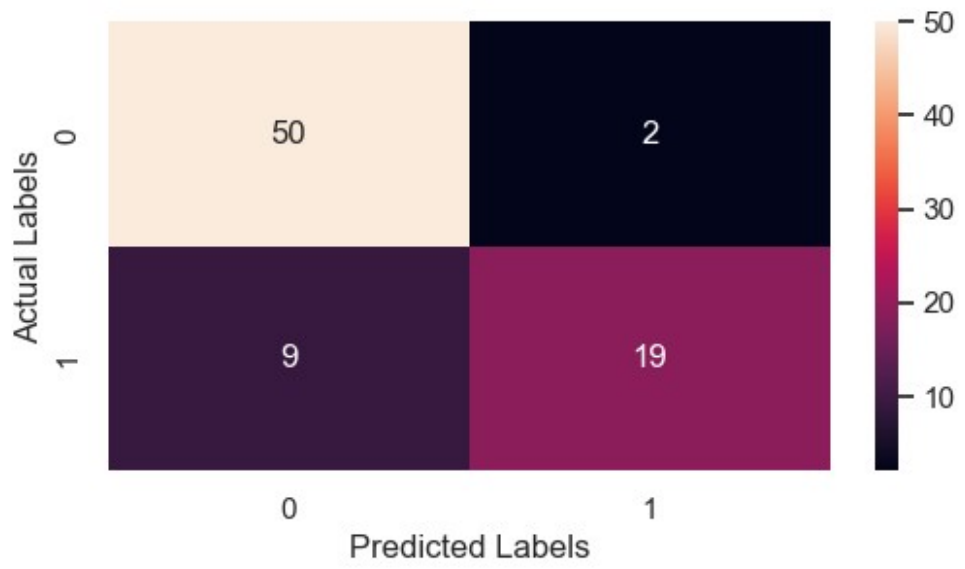
```
print(f'SVM Accuracy: {accuracy}')
print(f'SVM Confusion Matrix:\n{conf_matrix}')
```

```
sns.set(rc={'figure.figsize':(6,3)})
sns.heatmap(confusion_matrix(y_test,y_pred),annot = True,fmt = 'd')
plt.xlabel('Predicted Labels')
plt.ylabel('Actual Labels')
print(f'SVM Classification Report:\n{classification_report_str}')
```

```
SVM Accuracy: 0.8625
SVM Confusion Matrix:
[[50  2]
 [ 9 19]]
SVM Classification Report:
              precision    recall  f1-score   support

           0       0.85      0.96      0.90        52
           1       0.90      0.68      0.78        28

    accuracy                           0.86        80
   macro avg       0.88      0.82      0.84        80
weighted avg       0.87      0.86      0.86        80
```



Predict whether a targeted audience or person will purchase the product or not

```
# Assuming we have a new set of feature values for prediction
new_data = np.array([[0, 30, 50000]])  # Example: Gender (0 for
Female, 1 for Male), Age, Estimated Salary

# Use the trained SVM model to make predictions
predicted_purchase =
svm_classifier.predict(scaler.transform(new_data))

# Print the predicted outcome
```

```
if predicted_purchase[0] == 1:
    print("The targeted audience is predicted to purchase the
product.")
else:
    print("The targeted audience is predicted not to purchase the
product.")
```

```
The targeted audience is predicted not to purchase the product.
```

Output Visualization using Bar Plot

```
# Assuming we have already evaluated the model and obtained these
metrics, hence plotting the same in a bar plot
accuracy = 0.8625
precision = 0.87
recall = 0.86
f1_score = 0.86

# Plotting the bar plot
metrics_names = ['Accuracy', 'Precision', 'Recall', 'F1-Score']
metrics_values = [accuracy, precision, recall, f1_score]

plt.bar(metrics_names, metrics_values, color=['blue', 'green',
'orange', 'red'])
plt.ylim([0, 1])  # Set the y-axis limit between 0 and 1
plt.title('Model Evaluation Plot')
plt.xlabel('Evaluation Metrics')
plt.ylabel('Score')
plt.show()
```