EXPERINMENT-29

29.Question: Evaluation Metrics for Model Performance
You have trained a machine learning model on a dataset, and now you want to evaluate its performance using various metrics.
Write a Python program that loads a dataset and trained model from scikit-learn. The program should ask the user to input the names of the features and the target variable they want to use for evaluation. The program should then calculate and display common evaluation metrics such as accuracy, precision, recall, and F1-score for the model's predictions on the test data.

Code:

```
iimport pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score, precision_score, recall_score, f1_score
from sklearn.ensemble import RandomForestClassifier
file = input("Enter CSV file name (e.g., customers.csv): ")
data = pd.read_csv(file)
print("\nAvailable Columns:", list(data.columns))
feature_input = input("\nEnter feature column names (comma separated): ")
features = [col.strip() for col in feature_input.split(",")]
target = input("Enter target column name: ").strip()
X = data[features]
y = data[target]
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.3, random_state=0
)
model = RandomForestClassifier(n_estimators=100, random_state=0)
model.fit(X_train, y_train)
y_pred = model.predict(X_test)
print("\nModel Evaluation Metrics:")
print("Accuracy:", round(accuracy_score(y_test, y_pred), 4))
print("Precision:", round(precision_score(y_test, y_pred, zero_division=0), 4))
print("Recall:", round(recall_score(y_test, y_pred, zero_division=0), 4))
print("F1-Score:", round(f1_score(y_test, y_pred, zero_division=0), 4))
```

Output:

```
Available columns: ['usage_minutes', 'contract_months', 'support_calls', 'churn']
Enter feature columns (comma separated): usage_minutes, contract_months, support_calls
Enter target column name: churn

Model Evaluation Metrics:
Accuracy: 0.9444
Precision: 0.9375
Recall: 0.9836
F1-Score: 0.96
```