```
from google.colab import files

# This will prompt you to upload a file
uploaded = files.upload()
```

```
Choose Files 3 files
```

- description.txt(text/plain) - 366 bytes, last modified: 6/18/2021 - 100% done
- test_data.txt(text/plain) - 34780789 bytes, last modified: 6/18/2021 - 100% done
- train_data.txt(text/plain) - 35435236 bytes, last modified: 6/18/2021 - 100% done

```
Saving description.txt to description.txt
Saving test_data.txt to test_data.txt
Saving train_data.txt to train_data.txt
```

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, classification_report
import re
```

```
# Load the training data
train_df = pd.read_csv('train_data.txt', delimiter=':::', engine='python', names=['ID', 'Title', 'Genre', 'Description'])

# Load the test data
test_df = pd.read_csv('test_data.txt', delimiter=':::', engine='python', names=['ID', 'Title', 'Description'])

# Check the first few rows of the data
print(train_df.head())
print(test_df.head())
```

```
   ID                               Title       Genre  \
0   1       Oscar et la dame rose (2009)       drama
1   2                    Cupid (1997)    thriller
2   3   Young, Wild and Wonderful (1980)       adult
3   4              The Secret Sin (1915)       drama
4   5             The Unrecovered (2007)       drama

                                         Description
0   Listening in to a conversation between his do...
1   A brother and sister with a past incestuous r...
2   As the bus empties the students for their fie...
3   To help their unemployed father make ends mee...
4   The film's title refers not only to the un-re...
   ID                          Title  \
0   1          Edgar's Lunch (1998)
1   2      La guerra de papá (1977)
2   3   Off the Beaten Track (2010)
3   4        Meu Amigo Hindu (2015)
4   5             Er nu zhai (1955)

                                         Description
0   L.R. Brane loves his life - his car, his apar...
1   Spain, March 1964: Quico is a very naughty ch...
2   One year in the life of Albin and his family ...
3   His father has died, he hasn't spoken with hi...
4   Before he was known internationally as a mart...
```

```
# Feature Extraction using TF-IDF
tfidf = TfidfVectorizer(stop_words='english', max_features=5000)

# Fit and transform the training data descriptions, and transform the test data descriptions
X_train = tfidf.fit_transform(train_df['Description'])
X_test = tfidf.transform(test_df['Description'])

# Labels (Genres)
y_train = train_df['Genre']
```

```
# Initialize the classifier
model = LogisticRegression(max_iter=1000)

# Train the model
model.fit(X_train, y_train)
```

```
LogisticRegression(max_iter=1000)
```

```
# Predict the genres for the test data
y_pred = model.predict(X_test)

# Add predictions to the test DataFrame
test_df['Predicted_Genre'] = y_pred

# Display the first few rows of the predictions
print(test_df.head())
```

```
   ID                          Title  \
0   1          Edgar's Lunch (1998)
1   2      La guerra de papá (1977)
2   3   Off the Beaten Track (2010)
3   4        Meu Amigo Hindu (2015)
4   5             Er nu zhai (1955)

                                         Description Predicted_Genre
0   L.R. Brane loves his life - his car, his apar...          short
1   Spain, March 1964: Quico is a very naughty ch...          drama
2   One year in the life of Albin and his family ...    documentary
3   His father has died, he hasn't spoken with hi...          drama
4   Before he was known internationally as a mart...          drama
```

```
import pickle

# Save the model
with open('genre_prediction_model.pkl', 'wb') as model_file:
    pickle.dump(model, model_file)

# Save the TF-IDF vectorizer
with open('tfidf_vectorizer.pkl', 'wb') as vec_file:
    pickle.dump(tfidf, vec_file)
```

```
uploaded = files.upload()
```

```
Choose Files  test_data_solution.txt
• test_data_solution.txt(text/plain) - 35436708 bytes, last modified: 6/18/2021 - 100% done
Saving test_data_solution.txt to test_data_solution.txt
```

```
# Load the test data solution
test_solution_df = pd.read_csv('test_data_solution.txt', delimiter=':::', engine='python', names=['ID', 'Title', 'Genre', 'Desc
# Display the first few rows to ensure it's loaded correctly
print(test_solution_df.head())
```

```
   ID                          Title          Genre  \
0   1          Edgar's Lunch (1998)       thriller
1   2      La guerra de papá (1977)         comedy
2   3   Off the Beaten Track (2010)    documentary
3   4        Meu Amigo Hindu (2015)          drama
4   5             Er nu zhai (1955)          drama

                                         Description
0   L.R. Brane loves his life - his car, his apar...
1   Spain, March 1964: Quico is a very naughty ch...
2   One year in the life of Albin and his family ...
3   His father has died, he hasn't spoken with hi...
4   Before he was known internationally as a mart...
```

```
# True genres from the test solution
y_true = test_solution_df['Genre']

# Descriptions for prediction (these should match the descriptions in the test set)
X_test_solution = tfidf.transform(test_solution_df['Description'])
```

```
# Predict the genres for the test data
y_pred = model.predict(X_test_solution)

# Evaluate the model's accuracy
accuracy = accuracy_score(y_true, y_pred)
print(f'Accuracy: {accuracy * 100:.2f}%')

# Detailed classification report
print(classification_report(y_true, y_pred))
```

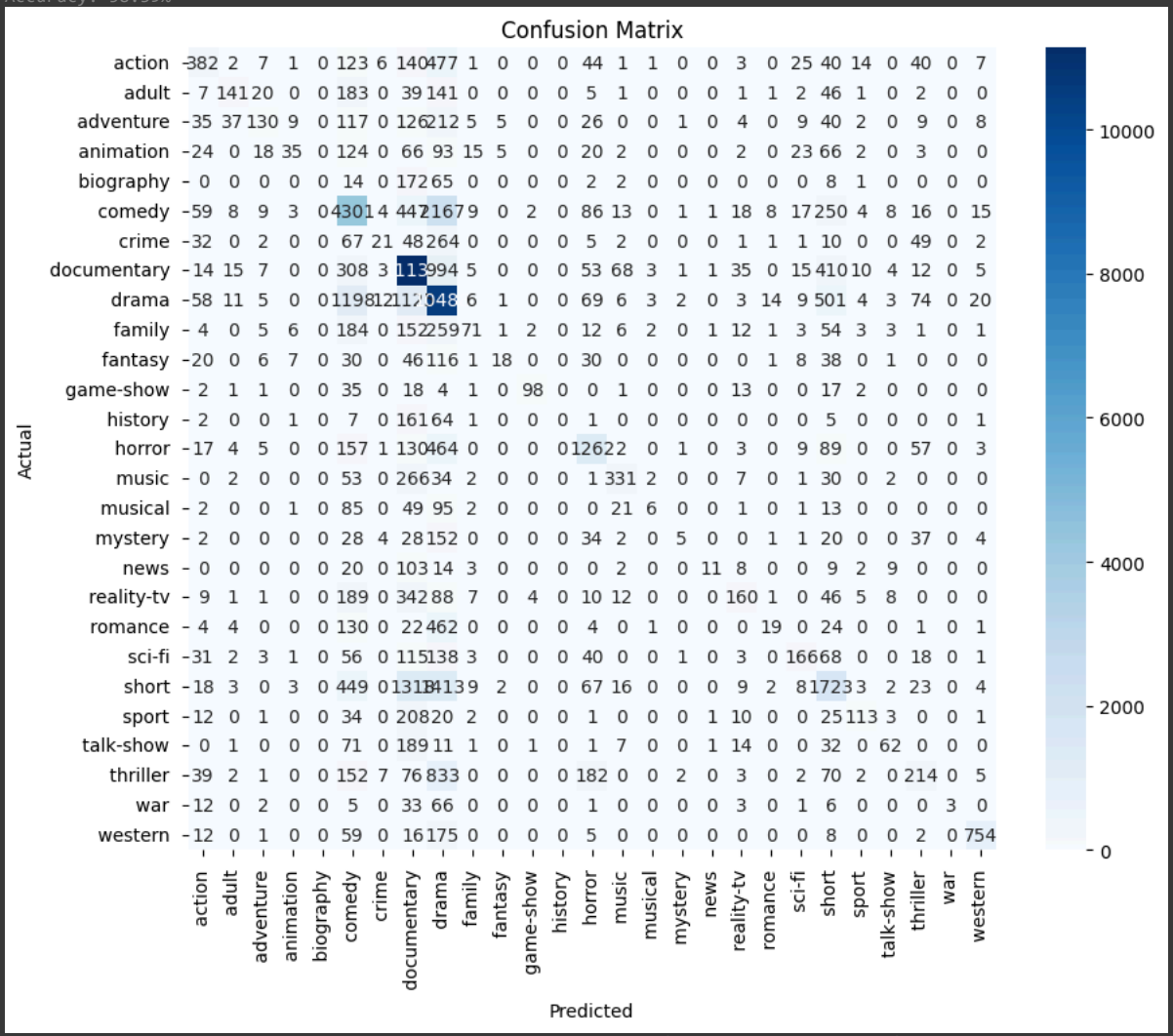
```
Accuracy: 58.39%
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1471: UndefinedMetricWarning: Precision and F-score
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1471: UndefinedMetricWarning: Precision and F-score
  _warn_prf(average, modifier, msg_start, len(result))
              precision    recall  f1-score   support
```

```
           action       0.48      0.29      0.36      1314
            adult       0.60      0.24      0.34       590
        adventure       0.58      0.17      0.26       775
        animation       0.52      0.07      0.12       498
        biography       0.00      0.00      0.00       264
           comedy       0.53      0.58      0.55      7446
            crime       0.36      0.04      0.07       505
      documentary       0.67      0.85      0.75     13096
            drama       0.54      0.77      0.64     13612
           family       0.49      0.09      0.15       783
          fantasy       0.56      0.06      0.10       322
        game-show       0.92      0.51      0.65       193
          history       0.00      0.00      0.00       243
           horror       0.64      0.57      0.61      2204
            music       0.67      0.45      0.54       731
          musical       0.33      0.02      0.04       276
          mystery       0.36      0.02      0.03       318
             news       0.69      0.06      0.11       181
       reality-tv       0.51      0.18      0.27       883
          romance       0.39      0.03      0.05       672
           sci-fi       0.55      0.26      0.35       646
            short       0.47      0.34      0.40      5072
            sport       0.67      0.26      0.38       431
        talk-show       0.59      0.16      0.25       391
         thriller       0.38      0.13      0.20      1590
              war       1.00      0.02      0.04       132
          western       0.91      0.73      0.81      1032

         accuracy                           0.58     54200
        macro avg       0.53      0.26      0.30     54200
     weighted avg       0.57      0.58      0.55     54200

/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1471: UndefinedMetricWarning: Precision and F-score
  _warn_prf(average, modifier, msg_start, len(result))
```

```
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.metrics import confusion_matrix
import numpy as np
```

```
# Predict the genres for the test data
y_pred = model.predict(X_test_solution)

# Compute accuracy
accuracy = accuracy_score(y_true, y_pred)
print(f'Accuracy: {accuracy * 100:.2f}%')

# Generate a confusion matrix
conf_matrix = confusion_matrix(y_true, y_pred, labels=np.unique(y_true))

# Plot the confusion matrix
plt.figure(figsize=(10, 8))
sns.heatmap(conf_matrix, annot=True, fmt='d', cmap='Blues', xticklabels=np.unique(y_true), yticklabels=np.unique(y_true))
plt.title('Confusion Matrix')
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.show()

# Detailed classification report
report = classification_report(y_true, y_pred, output_dict=True)
report_df = pd.DataFrame(report).transpose()

# Plot accuracy for each genre
plt.figure(figsize=(12, 6))
sns.barplot(x=report_df.index[:-3], y=report_df['precision'][:-3], palette='viridis')
plt.title('Precision for Each Genre')
plt.xlabel('Genre')
plt.ylabel('Precision')
plt.xticks(rotation=45)
plt.show()
```

```
Accuracy: 58.39%
```




```
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1471: UndefinedMetricWarning: Precision and F-sco
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1471: UndefinedMetricWarning: Precision and F-sco
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1471: UndefinedMetricWarning: Precision and F-sco
  _warn_prf(average, modifier, msg_start, len(result))
<ipython-input-19-88cb2754012e>:25: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and

  sns.barplot(x=report_df.index[:-3], y=report_df['precision'][:-3], palette='viridis')
```