In [3]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.preprocessing import LabelEncoder
from sklearn.svm import LinearSVC
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score, classification_report
```

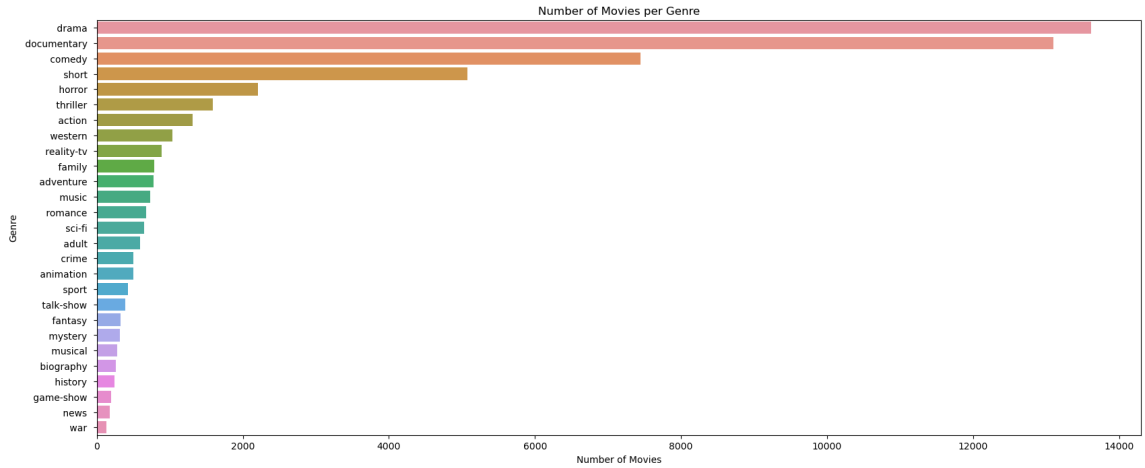
In [4]:
```
train_data = pd.read_csv('C:\\Users\\vaibhav vishal\\OneDrive\\Documents\\t
test_data = pd.read_csv('C:\\Users\\vaibhav vishal\\OneDrive\\Documents\\te
test_solution_data = pd.read_csv('C:\\Users\\vaibhav vishal\\OneDrive\\Docu
```

```
C:\Users\vaibhav vishal\AppData\Local\Temp\ipykernel_9732\2465242234.py:1:
ParserWarning: Falling back to the 'python' engine because the 'c' engine
does not support regex separators (separators > 1 char and different from
'\s+' are interpreted as regex); you can avoid this warning by specifying
engine='python'.
  train_data = pd.read_csv('C:\\Users\\vaibhav vishal\\OneDrive\\Documents
\\train_data.txt',sep=':::', names=['ID', 'TITLE', 'GENRE', 'DESCRIPTIO
N'])
C:\Users\vaibhav vishal\AppData\Local\Temp\ipykernel_9732\2465242234.py:2:
ParserWarning: Falling back to the 'python' engine because the 'c' engine
does not support regex separators (separators > 1 char and different from
'\s+' are interpreted as regex); you can avoid this warning by specifying
engine='python'.
  test_data = pd.read_csv('C:\\Users\\vaibhav vishal\\OneDrive\\Documents
\\test_data.txt',sep=':::', names=['ID', 'TITLE', 'GENRE', 'DESCRIPTION'])
C:\Users\vaibhav vishal\AppData\Local\Temp\ipykernel_9732\2465242234.py:3:
ParserWarning: Falling back to the 'python' engine because the 'c' engine
does not support regex separators (separators > 1 char and different from
'\s+' are interpreted as regex); you can avoid this warning by specifying
engine='python'.
  test_solution_data = pd.read_csv('C:\\Users\\vaibhav vishal\\OneDrive\\D
ocuments\\test_data_solution.txt',sep=':::', names=['ID', 'TITLE', 'GENR
E', 'DESCRIPTION'])
```

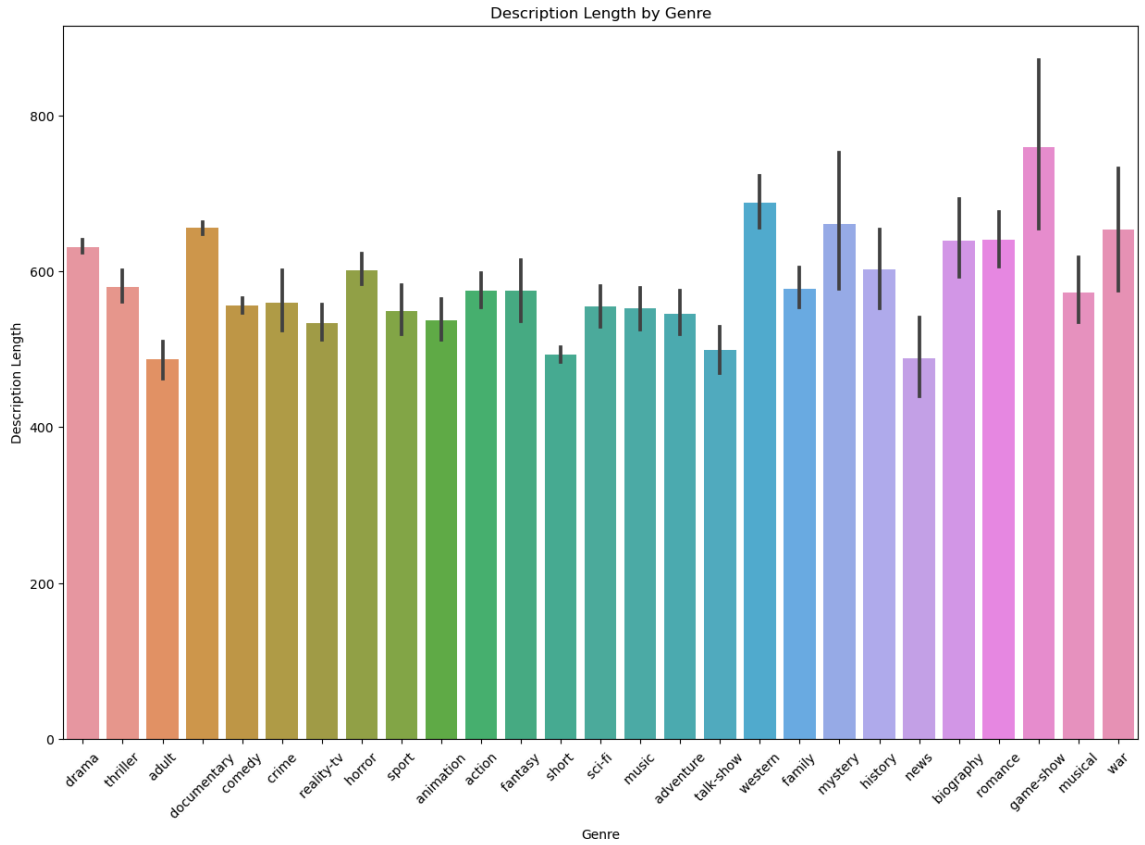
In [5]:
```
print(train_data.head())
print(train_data.shape)
print(test_data.head())
print(test_data.shape)
print(test_solution_data.head())
print(test_solution_data.shape)
```

```
   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...
(54214, 4)
   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)

                                              GENRE  DESCRIPTION
0   L.R. Brane loves his life - his car, his apar...          NaN
1   Spain, March 1964: Quico is a very naughty ch...          NaN
2   One year in the life of Albin and his family ...          NaN
3   His father has died, he hasn't spoken with hi...          NaN
4   Before he was known internationally as a mart...          NaN
(54200, 4)
   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...
(54200, 4)
```

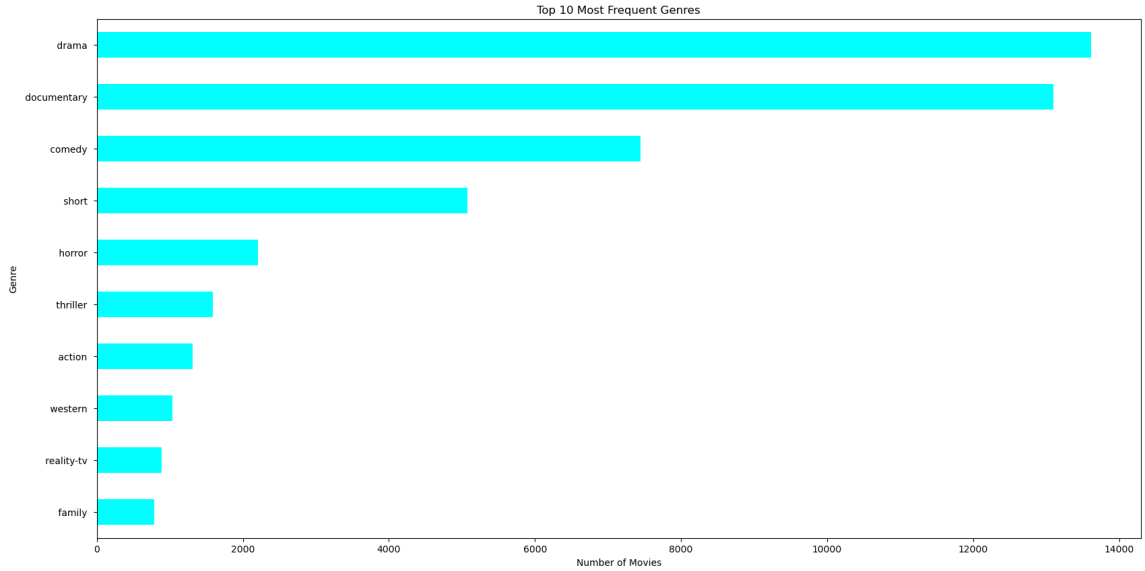
In [6]:
```
plt.figure(figsize=(20,8))
sns.countplot(y=train_data['GENRE'], order = train_data['GENRE'].value_coun
plt.title('Number of Movies per Genre')
plt.xlabel('Number of Movies')
plt.ylabel('Genre')
plt.show()
```



In [7]:
```
train_data['DESCRIPTION_length'] = train_data['DESCRIPTION'].apply(len)
plt.figure(figsize=(15, 10))
sns.barplot(x='GENRE', y='DESCRIPTION_length', data=train_data)
plt.title('Description Length by Genre')
plt.xticks(rotation=45)
plt.xlabel('Genre')
plt.ylabel('Description Length')
plt.show()
```



In [8]:
```
top_genres = train_data['GENRE'].value_counts().head(10)

plt.figure(figsize=(20, 10))
top_genres.plot(kind='barh', color='cyan')
plt.title('Top 10 Most Frequent Genres')
plt.xlabel('Number of Movies')
plt.ylabel('Genre')
plt.gca().invert_yaxis()  # Invert y-axis to have the genre with the most m
plt.show()
```



In [9]:
```
# Handle any potential missing values
train_data['DESCRIPTION'].fillna("", inplace=True)
test_data['DESCRIPTION'].fillna("", inplace=True)

t_v = TfidfVectorizer(stop_words='english', max_features=100000)
X_train = t_v.fit_transform(train_data['DESCRIPTION'])
X_test = t_v.transform(test_data['DESCRIPTION'])

label_encoder = LabelEncoder()
y_train = label_encoder.fit_transform(train_data['GENRE'])
y_test = label_encoder.transform(test_solution_data['GENRE'])
```

In [10]:
```
X_train_sub, X_val, y_train_sub, y_val = train_test_split(X_train, y_train,

clf = LinearSVC()
clf.fit(X_train_sub, y_train_sub)

y_val_pred = clf.predict(X_val)
print("Validation Accuracy:", accuracy_score(y_val, y_val_pred))
print("Validation Classification Report:\n", classification_report(y_val, y
```

```
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\svm\_classes.py:32: Fut
ureWarning: The default value of `dual` will change from `True` to `'aut
o'` in 1.5. Set the value of `dual` explicitly to suppress the warning.
  warnings.warn(

Validation Accuracy: 0.5836945494789265
Validation Classification Report:
              precision    recall  f1-score   support

           0       0.44      0.32      0.37       263
           1       0.74      0.44      0.55       112
           2       0.45      0.21      0.28       139
           3       0.47      0.15      0.23       104
           4       0.00      0.00      0.00        61
           5       0.53      0.59      0.56      1443
           6       0.39      0.07      0.11       107
           7       0.69      0.81      0.75      2659
           8       0.56      0.72      0.63      2697
           9       0.36      0.17      0.23       150
          10       0.13      0.03      0.04        74
          11       0.82      0.68      0.74        40
          12       0.00      0.00      0.00        45
          13       0.65      0.66      0.66       431
          14       0.61      0.53      0.57       144
          15       0.25      0.04      0.07        50
          16       0.43      0.05      0.10        56
          17       0.20      0.06      0.09        34
          18       0.49      0.25      0.33       192
          19       0.36      0.06      0.10       151
          20       0.50      0.28      0.36       143
          21       0.44      0.36      0.40      1045
          22       0.60      0.41      0.49        93
          23       0.62      0.25      0.35        81
          24       0.30      0.16      0.21       309
          25       0.50      0.05      0.09        20
          26       0.85      0.83      0.84       200

    accuracy                           0.58     10843
   macro avg       0.46      0.30      0.34     10843
weighted avg       0.56      0.58      0.56     10843
```

In [11]:
```
y_pred = clf.predict(X_test)
print("Test Accuracy:", accuracy_score(y_test, y_pred))
print("Test Classification Report:\n", classification_report(y_test, y_pred
```

```
Test Accuracy: 0.09357933579335793
Test Classification Report:
               precision    recall  f1-score   support

           0       0.00      0.00      0.00      1314
           1       0.00      0.00      0.00       590
           2       0.00      0.00      0.00       775
           3       0.00      0.00      0.00       498
           4       0.00      0.00      0.00       264
           5       0.00      0.00      0.00      7446
           6       0.00      0.00      0.00       505
           7       0.00      0.00      0.00     13096
           8       0.00      0.00      0.00     13612
           9       0.00      0.00      0.00       783
          10       0.00      0.00      0.00       322
          11       0.00      0.00      0.00       193
          12       0.00      0.00      0.00       243
          13       0.00      0.00      0.00      2204
          14       0.00      0.00      0.00       731
          15       0.00      0.00      0.00       276
          16       0.00      0.00      0.00       318
          17       0.00      0.00      0.00       181
          18       0.00      0.00      0.00       883
          19       0.00      0.00      0.00       672
          20       0.00      0.00      0.00       646
          21       0.09      1.00      0.17      5072
          22       0.00      0.00      0.00       431
          23       0.00      0.00      0.00       391
          24       0.00      0.00      0.00      1590
          25       0.00      0.00      0.00       132
          26       0.00      0.00      0.00      1032

    accuracy                           0.09     54200
   macro avg       0.00      0.04      0.01     54200
weighted avg       0.01      0.09      0.02     54200


C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_classificatio
n.py:1469: UndefinedMetricWarning: Precision and F-score are ill-defined a
nd being set to 0.0 in labels with no predicted samples. Use `zero_divisio
n` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_classificatio
n.py:1469: UndefinedMetricWarning: Precision and F-score are ill-defined a
nd being set to 0.0 in labels with no predicted samples. Use `zero_divisio
n` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_classificatio
n.py:1469: UndefinedMetricWarning: Precision and F-score are ill-defined a
nd being set to 0.0 in labels with no predicted samples. Use `zero_divisio
n` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
```

In [12]:
```
from sklearn.naive_bayes import MultinomialNB
Mnb_classifier = MultinomialNB()
Mnb_classifier.fit(X_train, y_train)
```

Out[12]:
```
MultinomialNB
MultinomialNB()
```

In [13]:
```
Mnb_classifier.predict(X_test)
```

Out[13]:
```
array([8, 8, 8, ..., 8, 8, 8])
```

In [16]:
```
def predict_movie(description):
    t_v1 = t_v.transform([description])
    pred_label = clf.predict(t_v1)
    return label_encoder.inverse_transform(pred_label)[0]

sample_descr_for_movie = "A movie where police cashes the criminal and shoo
print(predict_movie(sample_descr_for_movie))

sample_descr_for_movie1 = "A movie where person cashes a girl too get marry
print(predict_movie(sample_descr_for_movie1))
```

```
action
drama
```

In [ ]: