Sentiment Analysis of Video Game Reviews using ML

Multinomial Naive Bayes Classifier

In [3]:
```
# Importing packages
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns; sns.set()
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.naive_bayes import MultinomialNB
from sklearn.linear_model import Perceptron
from sklearn.linear_model import RidgeClassifier
from sklearn.linear_model import PassiveAggressiveClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.svm import LinearSVC
from sklearn.linear_model import SGDClassifier
from sklearn.pipeline import make_pipeline
```

In [4]:
```
# Visualize y_train file (categories / labels)
ytr = np.load ("y_train.npy")
y = ytr.ravel()          # Note: the .rave will convert that array shape to (n,) (transpose it)
#y
```

In [5]:
```
# Visualize X_train file
#with open('X_train.txt','r',encoding = 'utf8') as f:
#    for line in f:
#        print(line)
```

Pre-processing

In [6]:
```
# Assigning each review comment into an element of an array
x = np.array([])
x = open('X_train.txt','r',encoding = 'utf8')
x = x.read().splitlines()
#x
```

In [7]:
```
#Splitting the X_train data into train and test using 70%/30% split

x_train, x_test, y_train , y_test = train_test_split(x, y, test_size = 0.30 , random_state = 123, shuffle = True)
```

In [8]:
```
# Checking lenght of the subsets
len(x_train)
#len(x_test)
#len(y_train)
#len(y_test)
```

Out[8]:
```
700
```

In [9]:
```
# Defining categories:  Positive Review  = 1 , Negative Review = 0
categories = np.array(["1", "0"])
```

In [10]:
```
# Creating a model based on Multinomial Naive Bayes
model = make_pipeline(TfidfVectorizer(min_df=1,stop_words = 'english',),MultinomialNB(alpha = 0.5, class_prior=None, fit
```

In [11]:
```
# Train model
nbmodel = model.fit(x_train, y_train)
```

In [12]:
```
# Test the model (predict)
y_pred = nbmodel.predict(x_test)
len(y_pred)
```

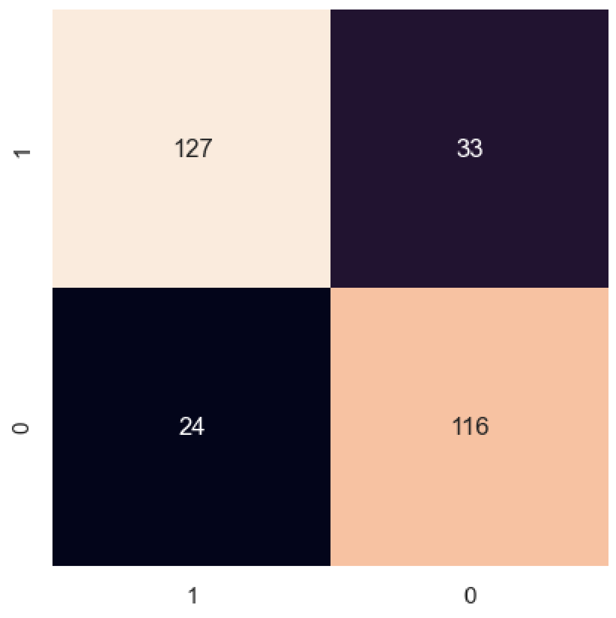
Out[12]:
```
300
```

In [11]:
```
# Display predicted lables for x_test
y_pred
```

Out[11]:
```
array([1, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 1, 1, 1, 1, 1, 1,
       1, 0, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 0, 0, 1,
       0, 0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0,
       0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0,
       1, 1, 1, 0, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0,
       0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 0, 1,
       1, 1, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0,
       0, 0, 0, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 1,
       0, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0,
       1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 1,
       1, 0, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 1, 1, 1, 1, 1, 0, 1, 1, 0, 1,
       0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 1,
       1, 1, 1, 0, 1, 1, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 1, 1,
       1, 1, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0, 1], dtype=int64)
```

In [13]:
```python
# Creating confusion matrix and heat map
from sklearn.metrics import confusion_matrix
mat = confusion_matrix(y_test, y_pred)
sns.heatmap(mat.T , square = True , annot = True, fmt = 'd', cbar = False, xticklabels = categories , yticklabels = cate
```

Out[13]:
```
<AxesSubplot: >
```



In [14]:
```python
# Evaluate model accuracy
from sklearn.metrics import accuracy_score
accuracy_score(y_test, y_pred)
```

Out[14]:
```
0.81
```

In [15]:
```python
# Test the 792 reviews from the X_test file with unknown labels.

x2 = np.array([])
x2 = open('X_test.txt','r',encoding = 'utf8')
x2 = x2.read().splitlines()
x2

y_pred2 = nbmodel.predict(x2)
len(y_pred2)
```

Out[15]:
```
792
```

In [16]:
```python
# Display prediction of the 7
y_pred2
```

```
Out[16]: array([0, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 0, 0,
                1, 0, 1, 1, 1, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1, 1, 0, 1, 1, 0, 0, 1,
                1, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1,
                1, 1, 1, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1, 1, 1, 1, 0, 0, 1,
                1, 1, 0, 0, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 1, 1, 0,
                0, 0, 1, 0, 1, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0,
                1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 1, 0, 1, 0, 1,
                1, 0, 0, 1, 0, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0,
                0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
                1, 0, 0, 1, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0, 1, 1, 1, 1, 0, 0, 0, 1,
                1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0,
                1, 0, 0, 1, 1, 1, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 0, 0, 1, 1, 0, 1,
                1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1,
                1, 0, 1, 1, 0, 0, 0, 0, 1, 1, 0, 0, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0,
                1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 1,
                0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1, 1, 0, 0,
                0, 0, 1, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 0, 1,
                0, 0, 1, 1, 1, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1, 1, 1, 1, 1,
                1, 0, 1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1,
                0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 1,
                1, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0,
                1, 1, 1, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 1,
                1, 0, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 1, 1, 0, 0, 1, 0,
                0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 1, 0, 0, 1, 1,
                1, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1, 0, 1, 1, 0, 0, 0, 1, 1, 0, 1, 1,
                1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 1, 1,
                0, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 1, 1, 0, 1, 1,
                0, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0, 1, 1, 0, 1, 0, 1, 1, 0, 0, 1, 0,
                1, 1, 0, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 1, 0, 0,
                1, 0, 1, 1, 0, 0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 0,
                0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0,
                1, 1, 1, 0, 1, 1, 0, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0, 1, 1, 0, 1, 0,
                0, 1, 1, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 1, 0,
                0, 1, 0, 1, 1, 1, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0,
                1, 0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 1,
                1, 1, 1, 1, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 1, 1, 1],
               dtype=int64)
```

```
In [17]: # Convert array to csv file using pandas
         # pd.DataFrame(y_pred2).to_csv("C:/Users/Checo/Desktop/projectum/github_repos/2022/gameVibe/predictions.csv", header = [
```

```
In [ ]:
```

```
In [ ]:
```