# @Restaurant-Review-Analysis-KNN

## Importing Libraries and Files ¶

In [106]:
```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
import seaborn as sns
import re
import nltk
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
from sklearn.model_selection import train_test_split
from sklearn.naive_bayes import GaussianNB
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import confusion_matrix
from sklearn.metrics import accuracy_score
from sklearn.metrics import accuracy_score, recall_score
%matplotlib inline
sns.set()
```

In [107]:
```
dataset = pd.read_csv('Restaurant_Reviews.tsv', delimiter='\t',quoting = 3)
print(dataset)
```

```
                                                Review  Liked
0                             Wow... Loved this place.      1
1                                   Crust is not good.      0
2            Not tasty and the texture was just nasty.      0
3    Stopped by during the late May bank holiday of...      1
4    The selection on the menu was great and so wer...      1
..                                                 ...    ...
995  I think food should have flavor and texture an...      0
996                           Appetite instantly gone.      0
997  Overall I was not impressed and would not go b...      0
998  The whole experience was underwhelming, and I ...      0
999  Then, as if I hadn't wasted enough of my life ...      0

[1000 rows x 2 columns]
```

In [108]:
```
dataset.head()
```

Out[108]:

|   | Review | Liked |
|---|---|---|
| **0** | Wow... Loved this place. | 1 |
| **1** | Crust is not good. | 0 |
| **2** | Not tasty and the texture was just nasty. | 0 |
| **3** | Stopped by during the late May bank holiday of... | 1 |
| **4** | The selection on the menu was great and so wer... | 1 |

## Cleaning the dataset ¶

In [109]:
```
corpus = []
for i in range (0, 1000):
    # Removing unnecessary punctuations and numbers except letters and replacing
    review = re.sub('[^a-zA-Z]', ' ', dataset['Review'][i])
    # Converting review to lowercase
    review = review.lower()
    # Converting review to list(of strings)
    review = review.split()
    ps = PorterStemmer()
    words_to_stem = ['go','gone','going','giving','gave','give','would','will','
    for words in words_to_stem:
        print(words+": "+ps.stem(words))
    words = stopwords.words('english')
    words.remove('not')
    words.remove('but')
    words.remove('is')
    words.remove('the')
    review = [ps.stem(word) for word in review if not word in set(words)]
    review = ' '.join(review)
    corpus.append(review)
```

```
go: go
gone: gone
going: go
giving: give
gave: gave
give: give
would: would
will: will
can: can
could: could
can't: can't
having: have
have: have
have been: have been
has been: has been
had: had
go: go
gone: gone
going: go
```

In [110]:
```
print(corpus)
```

```
izza salad', 'thing went wrong burn the saganaki', 'wait hour breakfast could
done time better home', 'place is amaz', 'hate disagre fellow yelper but husb
and disappoint place', 'wait hour never got either pizza mani around us came
later', 'know slow', 'the staff is great the food is delish incred beer selec
t', 'live the neighborhood disappoint back is conveni locat', 'know pull pork
could soooo delici', 'get incred fresh fish prepar care', 'go gave star rate
pleas know third time eat bachi burger write review', 'love the fact everyth
menu is worth', 'never dine place', 'the food excel servic good', 'good beer
drink select good food select', 'pleas stay away the shrimp stir fri noodl',
'the potato chip order sad could probabl count mani chip box probabl around',
'food realli bore', 'good servic check', 'greedi corpor never see anoth dim
e', 'never ever go back', 'much like go back get pass the atroci servic never
return', 'the summer dine charm outdoor patio delight', 'not expect good', 'f
antast food', 'order toast english muffin came untoast', 'the food good', 'ne
ver go back', 'great food the price is high qualiti hous made', 'the bu boy t
he hand rude', 'point friend basic figur place joke mind make publicli loudli
known', 'back good bbq lighter fare reason price tell the public back the old

way', 'consid the two us left full happi go wrong', 'the bread is made hous',
'the downsid is the servic', 'also the fri without doubt the worst fri ever',
```

In [111]:
```
len(corpus)
```

Out[111]:
```
1000
```

## Creating Bag of Words ¶

In [112]:
```
from sklearn.feature_extraction.text import CountVectorizer
cv = CountVectorizer(max_features = 1500)
X = cv.fit_transform(corpus).todense()
y = dataset.iloc[:,1].values
```

In [113]:
```
# Split dataset into 'test' and 'train' dataset
X_train, X_test, y_train, y_test = train_test_split(X , y, test_size = 0.025, rar
```

## Naive Bayes Classifier ¶

In [114]:
```
classifier = GaussianNB()       # Naive Bayes Classifier
classifier.fit(X_train, y_train)
```

Out[114]:
```
GaussianNB()
```

In [115]:
```
# Support Vector Machine
from sklearn.svm import SVC
clf = SVC(kernel = 'linear')
clf.fit(X_train, y_train)
y_pred = clf.predict(X_test)
Confusion_Matrix = confusion_matrix(y_test, y_pred)
Accuracy_Score = accuracy_score(y_test, y_pred)
```

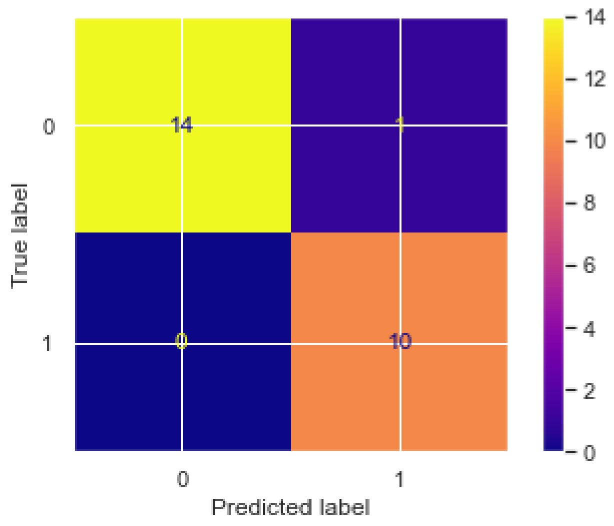
In [116]:
```
# Actual and Predicted value comparision
results = pd.DataFrame({
    'Actual': np.array(y_test).flatten(),
    'Predicted': np.array(y_pred).flatten(),
})
results[1:20]
```

Out[116]:

| | Actual | Predicted |
|---|---|---|
| **1** | 1 | 1 |
| **2** | 1 | 1 |
| **3** | 0 | 0 |
| **4** | 0 | 0 |
| **5** | 0 | 0 |
| **6** | 0 | 0 |
| **7** | 0 | 0 |
| **8** | 0 | 0 |
| **9** | 0 | 0 |
| **10** | 0 | 0 |
| **11** | 0 | 0 |
| **12** | 1 | 1 |
| **13** | 1 | 1 |
| **14** | 1 | 1 |
| **15** | 1 | 1 |
| **16** | 1 | 1 |
| **17** | 0 | 0 |
| **18** | 0 | 0 |
| **19** | 0 | 0 |

In [117]:
```
from sklearn.metrics import plot_confusion_matrix, accuracy_score
plot_confusion_matrix(clf,X_test , y_test, cmap = 'plasma')
accuracy = accuracy_score(y_test, y_pred)
print('Accuracy Score: ',accuracy)
```

```
Accuracy Score:  0.96
```



## K-Nearest Neighbor(KNN) Classifier ¶

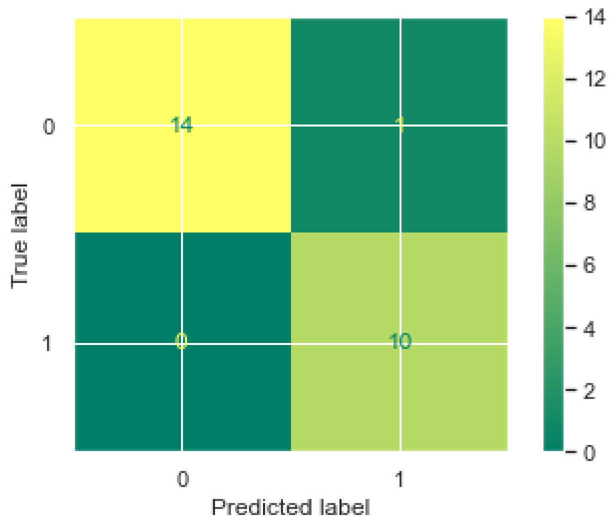
In [118]:
```
knn = KNeighborsClassifier(n_neighbors=5)
knn.fit(X_train, y_train)
```

Out[118]:
```
KNeighborsClassifier()
```

In [119]:
```
# Support Vector Machine
from sklearn.svm import SVC
clf = SVC(kernel = 'linear')
clf.fit(X_train, y_train)
y_pred = clf.predict(X_test)
Confusion_Matrix = confusion_matrix(y_test, y_pred)
Accuracy_Score = accuracy_score(y_test, y_pred)
```

In [120]:
```
from sklearn.metrics import plot_confusion_matrix, accuracy_score
plot_confusion_matrix(clf,X_test , y_test, cmap = 'summer')
accuracy = accuracy_score(y_test, y_pred)
print('Accuracy Score: ',accuracy)
```

```
Accuracy Score:  0.96
```



In [ ]: