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[8]: #description
# with the rapid growth of online platforms for sharing opinions and reviews,restarunts often rely
#on the customer feedback to improve their services and attract a new customers.
#Analyzing the sentiment of these reviews can provide valuable insights into customer satisfaction.

In [7]: #Problem statement
#develop a sentiment analysis model to classify restarunt reviews as positive or negative

In [9]: pip install pandas

Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: pandas in c:\programdata\anaconda3\lib\site-packages (1.4.2)
Requirement already satisfied: numpy>=1.18.5 in c:\programdata\anaconda3\lib\site-packages (from pandas) (1.21.5)
Requirement already satisfied: python-dateutil<=2.8.1 in c:\programdata\anaconda3\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\programdata\anaconda3\lib\site-packages (from pandas) (2021.3)
Requirement already satisfied: six>=1.5 in c:\programdata\anaconda3\lib\site-packages (from python-dateutil<=2.8.1->pandas) (1.16.0)
Note: you may need to restart the kernel to use updated packages.

In [10]: import pandas as pd

In [6]: data = pd.read_csv('Reviews.csv')

In [6]: data

Out[6]:
```

	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

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In [ ]:
In [ ]:
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In [11]: data.head() # Top 5 rows of the data set

Out[11]:
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	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

```
In [12]: data.tail() # Last 5 rows of the data set

Out[12]:
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	Review	Liked
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

```
In [13]: data.info() # information of the dat set like , data type , memory usage

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 2 columns):
 # Column Non-Null Count Dtype
---  ---
 0 Review 1000 non-null object
 1 Liked 1000 non-null int64
dtypes: int64(1), object(1)
memory usage: 15.5+ KB

In [14]: data.describe() # stastical information of the data set

Out[14]:
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	Liked
count	1000.000000
mean	0.500000
std	0.500225
min	0.000000
25%	0.000000
50%	0.500000
75%	1.000000
max	1.000000

```
In [15]: #checking the null values of the data set
data.isnull().sum()

Out[15]:
Review      0
Liked       0
dtype: int64

In [16]: data.duplicated()

Out[16]:
0      False
1      False
2      False
3      False
4      False
...
995     False
996     False
997     False
998     False
999     False
Length: 1000, dtype: bool

In [17]: #checking the value counts
value_counts = data['Liked'].value_counts()
print(value_counts)

1      500
0       500
Name: Liked, dtype: int64


In [18]: pip install matplotlib

Defaulting to user installation because normal site-packages is not writeableNote: you may need to restart the kernel to use updated packages.
Requirement already satisfied: matplotlib in c:\programdata\anaconda3\lib\site-packages (3.5.1)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\programdata\anaconda3\lib\site-packages (from matplotlib) (1.3.2)
Requirement already satisfied: packaging>=20.0 in c:\programdata\anaconda3\lib\site-packages (from matplotlib) (21.3)
Requirement already satisfied: pyparsing<=2.2.1 in c:\programdata\anaconda3\lib\site-packages (from matplotlib) (3.0.4)
Requirement already satisfied: numpy>=1.17 in c:\programdata\anaconda3\lib\site-packages (from matplotlib) (1.21.5)
Requirement already satisfied: python-dateutil<=2.7 in c:\programdata\anaconda3\lib\site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: cycler>=0.10 in c:\programdata\anaconda3\lib\site-packages (from matplotlib) (0.11.0)
Requirement already satisfied: pillow<=6.2.0 in c:\programdata\anaconda3\lib\site-packages (from matplotlib) (9.0.1)
Requirement already satisfied: six>=1.5 in c:\programdata\anaconda3\lib\site-packages (from python-dateutil<=2.7->matplotlib) (1.16.0)

In [19]: import matplotlib.pyplot as plt
import seaborn as sns

In [20]: value_counts.plot(kind = 'bar', color = ['blue', 'green'])
plt.title("Sentiment value counts")
plt.xlabel('Liked')
plt.ylabel('Count')
plt.xticks(ticks=[0,1] , labels=['Positive','Negative'],rotation=0)
plt.show()

Sentiment value counts
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In [ ]:
In [ ]:
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In [23]: from collections import Counter

In [20]: target_words = ['food','place','restaurant']
all_words = " ".join(data['Review']).lower().split()
word_counts = Counter(all_words)
target_word_counts = {word:word_counts[word] for word in target_words}
plt.figure(figsize=(8,6))
plt.bar(target_word_counts.keys(),target_word_counts.values(), color = ['blue','green','orange'])
plt.xlabel('words')
plt.ylabel('Frequency')
plt.title('Frequency of specific words in Reviews')
plt.show()

Frequency of specific words in Reviews
```



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In [24]: #Text preprocessing

In [25]: #convert a data set into lower case
lowercased_text = data['Review'].str.lower()

In [26]: print(lowercased_text)

0      wow... loved this place.
1      crust is not good.
2      not tasty and the texture was just nasty.
3      stopped by during the late may bank holiday of...
4      the selection on the menu was great and so wer...
...
995  i think food should have flavor and texture an...
996  appetite instantly gone.
997  overall i was not impressed and would not go b...
998  the whole experience was underwhelming, and i ...
999  then, as if i hadn't wasted enough of my life ...
Name: Review, Length: 1000, dtype: object

In [27]: #tokenization
from nltk.tokenize import word_tokenize

In [ ]:

In [ ]: print(data['Tokens'])

In [ ]: data.info()

In [ ]: data['Review'].value_counts()

In [ ]: import string

In [ ]: data['Review'] = data['Review'].str.replace(f"[(string.punctuation)]"," ",regex = True)

In [ ]: print(data['Review'])

In [ ]: data['Review'].value_counts()

#Removing the stop words like this, is, are ,was
from nltk.corpus import stopwords
stop_words = set(stopwords.words('english'))

In [ ]: data['Tokens'] = data['Review'].apply(lambda x: [word for word in word_tokenize(x) if word not in stop_words])

In [ ]: print(data['Tokens'])

In [ ]: #stemming
#stemming is the process of reducing the a word into root or base word form by removng suffix
#example : driving stemmed is drive

In [ ]: #Stemming
from nltk.stem import PorterStemmer
from nltk.tokenize import word_tokenize

In [ ]: stemmer = PorterStemmer()

In [ ]: data['stemmed'] = data['Review'].apply(lambda x : ' '.join([stemmer.stem(word) for word in word_tokenize(x)]))

In [ ]:

In [31]: #Lemmatization
#Lemmatization is the process transforming a word into its base or dictionary form
#example is better is lemmatized to good

In [ ]:

In [44]: from nltk.stem import WordNetLemmatizer
from nltk.tokenize import word_tokenize
from nltk.corpus import wordnet

In [45]: lemmatizer = WordNetLemmatizer()

In [46]: data['Lemmatized'] = data['Review'].apply(lambda x : ' '.join([lemmatizer.lemmatize(word , pos = wordnet.VERB) for word in word_tokenize(x)]))

In [47]: print(data['Lemmatized'])

0      Wow Loved this place
1      Crust is not good
2      Not tasty and the texture was just nasty
3      Stopped by during the late May bank holiday of...
4      The selection on the menu be great and so be t...
...
995  I think food should have flavor and texture an...
996  Appetite instantly gone
997  Overall I be not impress and would not go b...
998  The whole experience was underwhelming and I ...
999  Then as if I hadn t waste enough of my life th...
Name: Lemmatized, Length: 1000, dtype: object

In [48]: #Removing the numbers from reviews
import re
data['No_Numbers'] = data['Review'].apply(lambda x : re.sub(r'\d+', ' ',x))

In [49]: print(data['No_Numbers'])

0      Wow      Loved this place
1      Crust is not good
2      Not tasty and the texture was just nasty
3      Stopped by during the late May bank holiday of...
4      The selection on the menu was great and so wer...
...
995  I think food should have flavor and texture an...
996  Appetite instantly gone
997  Overall I was not impressed and would not go b...
998  The whole experience was underwhelming and I ...
999  Then as if I hadn t wasted enough of my life ...
Name: No_Numbers, Length: 1000, dtype: object

In [50]: #Removing special characters like @ # %, "
data['cleaned'] = data['Review'].apply(lambda x: re.sub(r'([A-Za-z0-9\s])', ' ',x))

In [51]: print(data['cleaned'])

0      Wow      Loved this place
1      Crust is not good
2      Not tasty and the texture was just nasty
3      Stopped by during the late May bank holiday of...
4      The selection on the menu was great and so wer...
...
995  I think food should have flavor and texture an...
996  Appetite instantly gone
997  Overall I was not impressed and would not go b...
998  The whole experience was underwhelming and I ...
999  Then as if I hadn t wasted enough of my life ...
Name: cleaned, Length: 1000, dtype: object

In [52]: #expanding method
# don't eat food in this hotel , when we apply expanted text it will convert into do not eat food in this hotel

In [53]: import contractions
data['Expanded'] = data['Review'].apply(contractions.fix)

In [54]: print(data['Expanded'])

0      Wow      Loved this place
1      Crust is not good
2      Not tasty and the texture was just nasty
3      Stopped by during the late May bank holiday of...
4      The selection on the menu was great and so wer...
...
995  I think food should have flavor and texture an...
996  Appetite instantly gone
997  Overall I was not impressed and would not go b...
998  The whole experience was underwhelming and I ...
999  Then as if I hadn t wasted enough of my life ...
Name: Expanded, Length: 1000, dtype: object

In [55]: #Removing emojis
!pip install emoji
Requirement already satisfied: emoji in c:\users\dell\appdata\local\programs\python\python312\lib\site-packages (2.12.1)
Requirement already satisfied: typing-extensions>=4.7.0 in c:\users\dell\appdata\local\programs\
```