Text Visualization

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Data URL: https://www.kaggle.com/datasets/sameenamujawar/womens-clothing-e-commerce-reviews-1-csv?select=Womens+Clothing+E-Commerce+Reviews+%281%29.csv

Dataset was downloaded from Kaggle site. It is regarding women's clothing e-commerce review.

This dataset has so many columns but Review and Rating were considered for this analysis.

- Data was imported to data frame.

```
[32] import pandas as pd
```

```
[72] file = pd.read_csv("/content/Womens Clothing Review.csv")
     file.head()
```

	Unnamed: 0	Clothing ID	Age	Title	Review Text	Rating	Recommended IND	Positive Feedback Count	Division Name	Department Name	Class Name
0	0	767	33	NaN	Absolutely wonderful - silky and sexy and comf...	4	1	0	Initmates	Intimate	Intimates
1	1	1080	34	NaN	Love this dress! it's sooo pretty. i happene...	5	1	4	General	Dresses	Dresses
2	2	1077	60	Some major design flaws	I had such high hopes for this dress and reall...	3	0	0	General	Dresses	Dresses
3	3	1049	50	My favorite buy!	I love, love, love this jumpsuit. it's fun, fl...	5	1	0	General Petite	Bottoms	Pants
4	4	847	47	Flattering shirt	This shirt is very flattering to all due to th...	5	1	6	General	Tops	Blouses

Next steps: View recommended plots

- Assign Review and Rating columns to new data frame.

```
[73] #Get Review and Rating from the original dataset
     df = file[["Review Text", "Rating"]]
     df.head()
```

	Review Text	Rating
0	Absolutely wonderful - silky and sexy and comf...	4
1	Love this dress! it's sooo pretty. i happene...	5
2	I had such high hopes for this dress and reall...	3
3	I love, love, love this jumpsuit. it's fun, fl...	5
4	This shirt is very flattering to all due to th...	5

- **Data Pre-Processing**

Missing value was checked. There are some blank reviews. All blank review rows were removed from data frame.

```
[74] df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 23486 entries, 0 to 23485
Data columns (total 2 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   Review Text  22641 non-null  object
 1   Rating       23486 non-null  int64 
dtypes: int64(1), object(1)
memory usage: 367.1+ KB
```

```
[75] df.dropna(subset=['Review Text'], inplace=True)
```

```
<ipython-input-75-1d1fe27478c2>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  df.dropna(subset=['Review Text'], inplace=True)
```

```
[76] df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 22641 entries, 0 to 23485
Data columns (total 2 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   Review Text  22641 non-null  object
 1   Rating       22641 non-null  int64 
dtypes: int64(1), object(1)
memory usage: 530.6+ KB
```


After that all the text changed to lower case. Punctuations, non-printable characters, digits, emoji were removed from the text.

```
[78] import re

     def lowerText(text):
         return text.lower()

     def remove_punctuation_InText(text):
         return text.translate(str.maketrans('','', punctuation))

     # Removing all words with digits and standalone digits
     def remove_digits_InText(text):
         return re.sub(r'\d+', '', text)

     def remove_emoji_InText(text):
         emoji_pattern = re.compile("["
                                    u"\U0001F600-\U0001F64F"  # emoticons
                                    u"\U0001F300-\U0001F5FF"  # symbols & pictographs
                                    u"\U0001F680-\U0001F6FF"  # transport & map symbols
                                    u"\U0001F1E0-\U0001F1FF"  # flags (iOS)
                                    u"\U00002702-\U000027B0"
                                    u"\U000024C2-\U0001F251"
                                    "]+", flags=re.UNICODE)
         return emoji_pattern.sub(r'', text)

     # Removing all non-printable symbols like "␣", "␣"
     def remove_non_printable_InText(text):
         text = text.encode("ascii", "ignore")
         return text.decode()

     # One function to clean it all
     def clean_Review(text):
         text = lowerText(text)
         text = remove_punctuation_InText(text)
         text = remove_digits_InText(text)
         text = remove_emoji_InText(text)
         text = remove_non_printable_InText(text)
         return text
```

- Word cloud was plotted.

```
from wordcloud import WordCloud
import matplotlib.pyplot as plt
plt.figure(figsize=(40,25))
text = df.Review.values
cloud=WordCloud(background_color='rgba(255, 255, 255, 0)',colormap="Set2",collocations=False,width=3000,height=2000, min_font_size=10).generate(" ".join(text))

plt.axis('off')
plt.imshow(cloud)
```

```
[]
<matplotlib.image.AxesImage at 0x7e2e1ec29c90>
```

The word cloud shows the words in different sizes. The bigger and bolder word occurs multiple times in review. According to this word cloud “dress” word has high occurrence. Comfy, blouse, body, price, and sale has least important because these words were in smaller text.

- Mask was defined to create word cloud in user image shape. Stop words were defined to ignore in the mask word cloud to get better understanding.

```
[84] import numpy as np
     from PIL import Image
     mask = np.array(Image.open("/content/user.png"))
```

```
     # Create stopword list:
     from wordcloud import WordCloud, STOPWORDS
     stopwords = set(STOPWORDS)
```

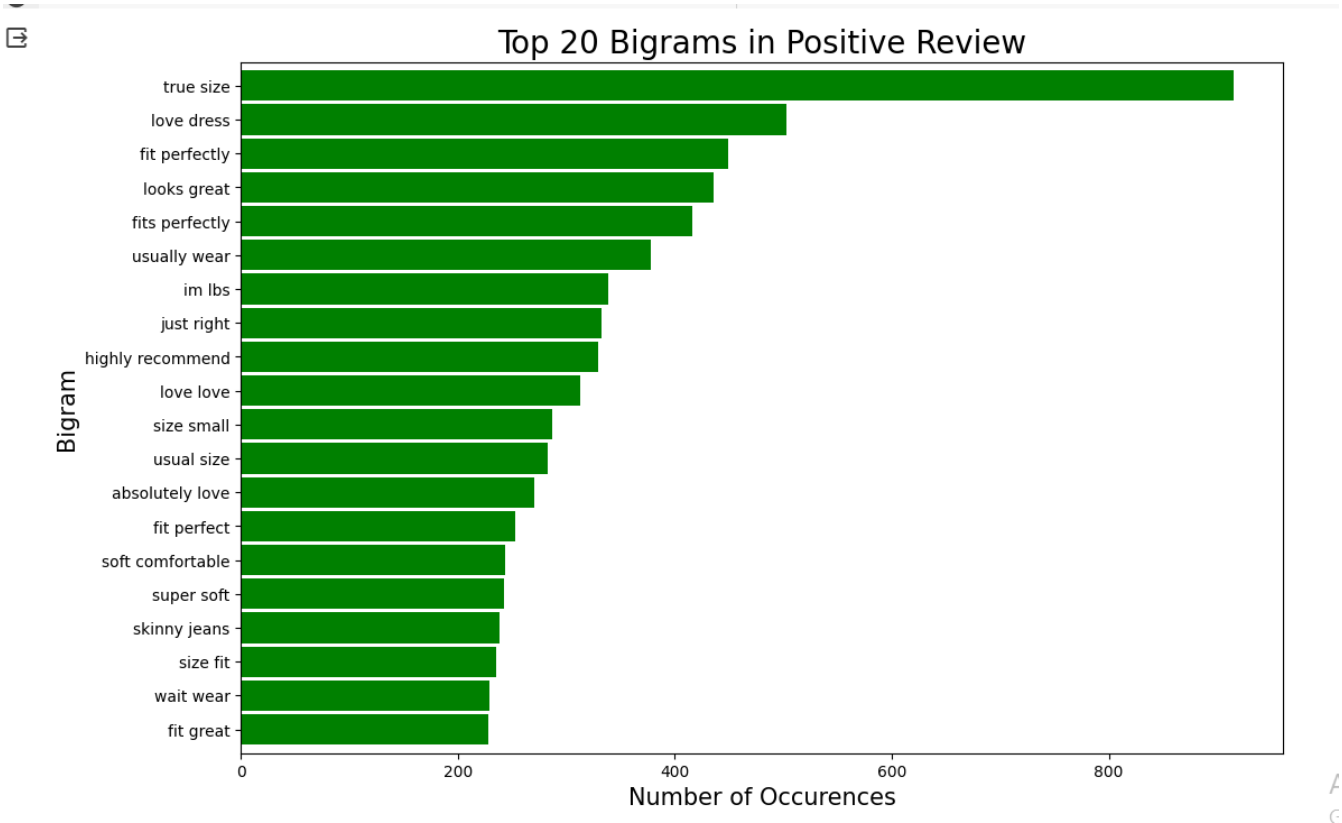
```
[113] #Add more words to ignore
     stopwords.update(["give","normally","cant","keep","seem","may","though","saw","lb","made","doesnt","enough","will","might","felt","like"])
     plt.figure(figsize=(40,25))
     #Word Cloud By Review Rating
     subset1 = df[df['Rating']==5]
     text = subset1.Review.values
     cloud1=WordCloud(mask=mask,background_color='black',colormap="Set2", max_words=1000,min_font_size=4,collocations=True,stopwords=stopwords,width=2500,height=1800).generate(" ".join(text))

     plt.subplot(3, 2, 1)
     plt.axis('off')
     plt.title("Word Cloud for 5 Star Rating Review",fontsize=20)
     plt.imshow(cloud1)
```

5 star rating reviews were considered to plot mask word cloud. It shows dress, love, size, wear has more important than look, fabric, soft, feel words.

- Bigrams were plotted for positive and negative reviews.

```
[118] from sklearn.feature_extraction.text import CountVectorizer

      def get_top_n_gram(corpus,ngram_range,n=None):
          vec = CountVectorizer(ngram_range=ngram_range,stop_words = 'english').fit(corpus)
          bag_of_words = vec.transform(corpus)
          sum_words = bag_of_words.sum(axis=0)
          words_freq = [(word, sum_words[0, idx]) for word, idx in vec.vocabulary_.items()]
          words_freq =sorted(words_freq, key = lambda x: x[1], reverse=True)
          return words_freq[:n]
```

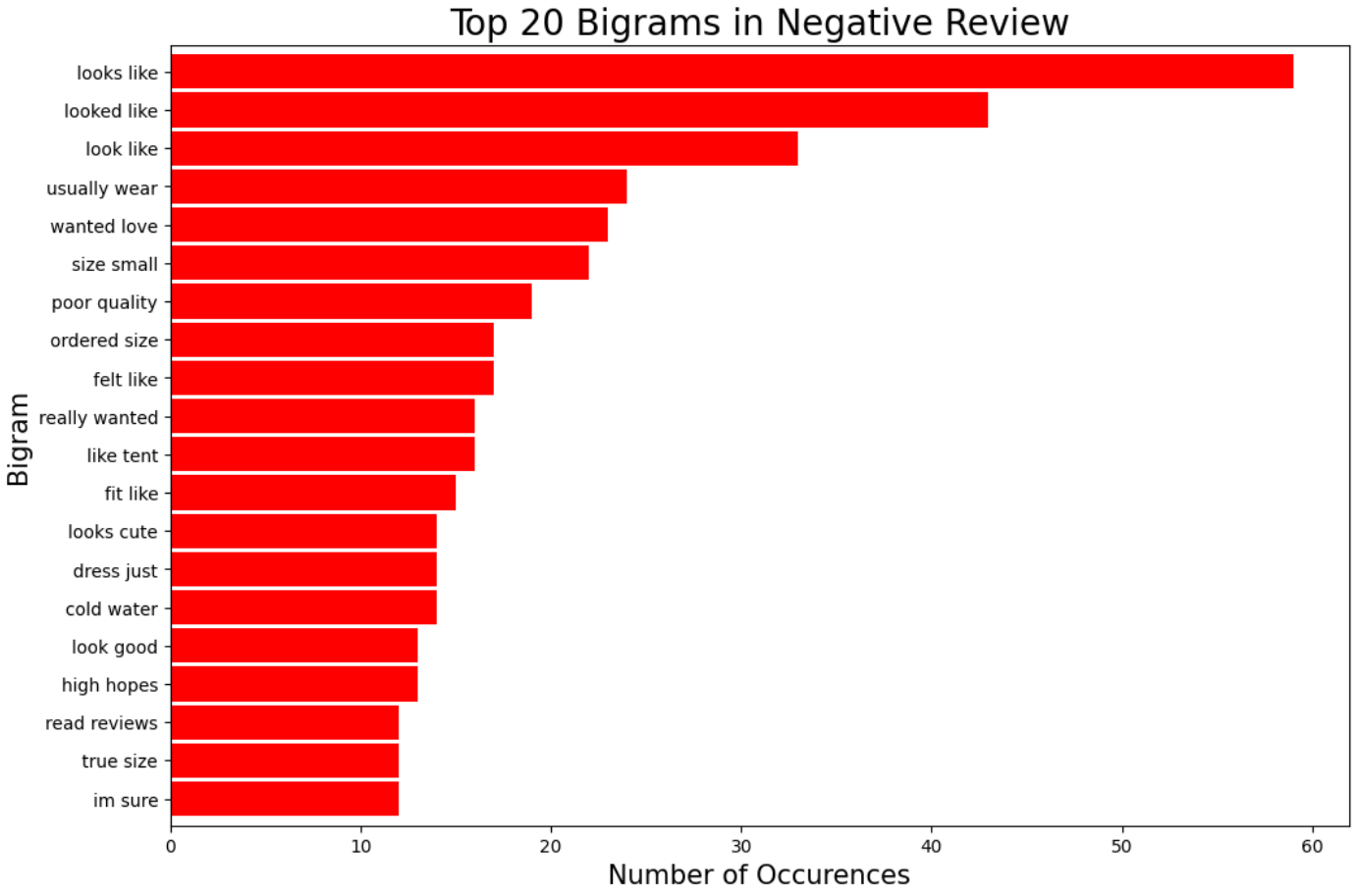
```
[119] pos_bigrams = get_top_n_gram(df[df['Rating']==5].Review,(2,2),20)

      df1 = pd.DataFrame(pos_bigrams, columns = ['Text' , 'Count'])
      df1.groupby('Text').sum()['Count'].sort_values(ascending=True).plot.barh(color='green', width=.9, figsize=(12, 8))
      plt.title('Top 20 Bigrams in Positive Review', fontsize=20)
      plt.ylabel("Bigram", fontsize=15)
      plt.xlabel("Number of Occurences", fontsize=15)
      plt.show()
```



This bar chart clearly shows that true size, love dress, fit perfectly words appeared in review multiple times than fit great, wait wear and size fit.

```
[115] neg_bigrams = get_top_n_gram(df[df['Rating']==1].Review,(2,2),20)


      df2 = pd.DataFrame(neg_bigrams, columns = ['Text' , 'Count'])
      df2.groupby('Text').sum()['Count'].sort_values(ascending=True).plot.barh(color='red', width=.9, figsize=(12, 8))
      plt.title('Top 20 Bigrams in Negative Review', fontsize=20)
      plt.ylabel("Bigram", fontsize=15)
      plt.xlabel("Number of Occurences", fontsize=15)
      plt.show()
```

[115]



This bar chart shows that looks like, poor quality, size small appeared multiple times in review than read reviews, true size, im sure words.

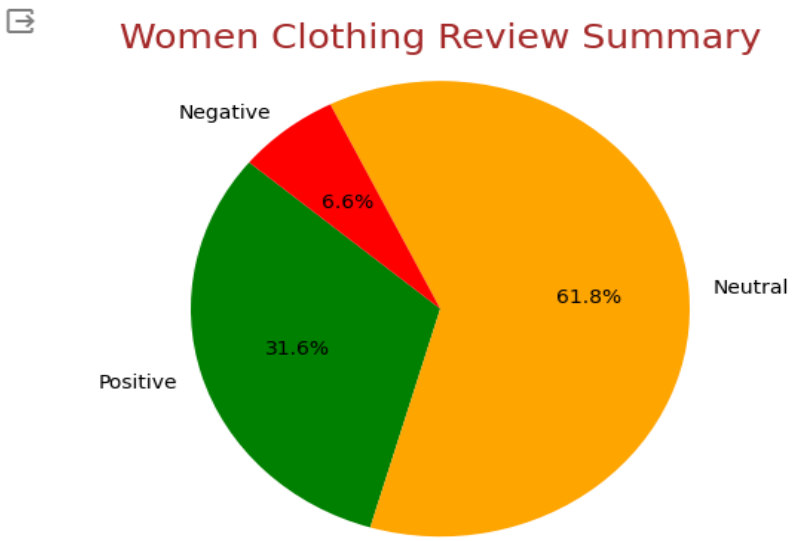
- Reviews were categorized into Positive, Neutral and Negative by using TextBlob library.

```
[124] from textblob import TextBlob

      #Categorize Polarity into Positive, Neutral or Negative
      labels=["Positive","Neutral","Negative"]

      #Initialize count array
      values=[0,0,0]

      #Categorize each review
      for review in df['Review'].values:
          sentiment=TextBlob(review)

          #Custom formula to convert polarity
          # 0 = (Negative) 1 = (Neutral) 2=(Positive)
          polarity=round((sentiment.polarity+1)*3)%3

          #add the summary array
          values[polarity]=values[polarity]+1

      print("Final summarized counts :",values)
```

```
Final summarized counts : [7150, 13992, 1499]
```

Finally pie chart was generated to show the polarity.

```
[129] #Plot a pie chart
      colors=["Green","Orange","Red"]
      plt.pie(values,labels=labels,colors=colors, \
              autopct='%1.1f%%',shadow=False,startangle=140)
      plt.axis('equal')
      plt.title('Women Clothing Review Summary',fontsize=18, c='Brown')
      plt.show()
```



This pie chart clearly illustrates that 31.6% reviews were positive, 6.6 % reviews were negative and other reviews were neutral.