Capstone

October 10, 2025

[4]:
```
from bs4 import BeautifulSoup
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from textblob import TextBlob
import requests

#create lists to store data within.

Names = []
Cities = []
Posted_on = []
Ratings = []
Reviews = []
Occasion = []
```

[5]:
```
#fetch the data from site(FlowerAura)

url = "https://www.floweraura.com/reviews/p/6617/10-red-roses-bouquet?page="

for i in range(1,51):
    cnp = url+str(i)
    url_new = cnp

    r = requests.get(url_new)

    soup = BeautifulSoup(r.text, "html.parser")
    soup


    main = soup.find("div",{"class":"review-left-container"})
    sub = main.find_all("div",{"class":"new-review-card-container"})

    for i in sub:
        name= i.find("span",{"class":"review-author-name"})
        Names.append(name.text.title())
```

```
        city= i.find_all("span",{"class":"review-meta-details"})
        Cities.append(city[0].text.title())

        try:
            Occasion.append(city[1].text.title())
        except:
            Occasion.append(np.nan)

        date = i.find_all("span")
        try:
            Posted_on.append(date[4].text)
        except:
            Posted_on.append(np.nan)

        rating = i.find("span",{"class":"star-count-container"})
        Ratings.append(rating.text)

        review = i.find_all("div")
        Reviews.append(review[-1].text)
```

[6]:
```
# Raw dataframe

df = pd.DataFrame({"Names":Names,"Cities":Cities,"Posted_on":
 ↪Posted_on,"Occasion":Occasion,"Reviews":Reviews,"Ratings":Ratings})
df
```

[6]:
```
               Names      Cities                   Posted_on  \
0      Suraj Chaunal       Noida  Posted On : 23rd Sep 2025
1      Bakiyalakshmi   Bangalore  Posted On : 22nd Sep 2025
2        Pulak.Pal77     Kolkata  Posted On : 19th Sep 2025
3              Inaya     Udaipur  Posted On : 31st Aug 2025
4    Nallapandiyan D  Coimbatore  Posted On : 11th Jul 2025
..               …         …                          …
495          Shweta         Goa   Posted On : 6th Sep 2023
496            Arun   Hyderabad   Posted On : 9th Sep 2023
497     Prernasaini     Gurgaon   Posted On : 8th Sep 2023
498   Jhanvi Jaiswal      Mumbai   Posted On : 7th Sep 2023
499       Shashikala    Varanasi   Posted On : 5th Sep 2023

                        Occasion  \
0          Occassion : Birthday
1       Occassion : Anniversary
2          Occassion : Birthday
3                           NaN
4          Occassion : Birthday
..                          …
495  Occassion : Love & Romance
```

```
496                          NaN
497                          NaN
498                          NaN
499         Occassion : Birthday
```

	Reviews	Ratings
0	the flowers were fresh and colorful. TBH they …	5
1	Very fresh flowers, delivered on time with bea…	5
2	Roses quality is very nice.	5
3	Very beautifull on tome delivered.	5
4	Thanks for the timely delivery.	4
..	…	…
495	Tnx… it was on time n perfect	5
496	Thanks for the flowers	4
497	Thank you so much	5
498	Thankyou somuch for helping and making my surp…	5
499	Loved it	5

[500 rows x 6 columns]

[7]:
```
#lets get dates as date's standard format:-

a = "Posted On : 31st Aug 2025"
x = a.index(":")
print(a[x+2:])
```

```
31st Aug 2025
```

[8]:
```
#create function which will extract all dates & occasions within the DF in␣
 ↪there standard format:-
def extract(value):
    try:
        x = value.index(":")
        return value[x+2:]
    except:
        return np.nan
df["Posted_on"]= df["Posted_on"].apply(extract)
df["Occasion"]= df["Occasion"].apply(extract)
df
```

[8]:

	Names	Cities	Posted_on	Occasion	\
0	Suraj Chaunal	Noida	23rd Sep 2025	Birthday	
1	Bakiyalakshmi	Bangalore	22nd Sep 2025	Anniversary	
2	Pulak.Pal77	Kolkata	19th Sep 2025	Birthday	
3	Inaya	Udaipur	31st Aug 2025	NaN	
4	Nallapandiyan D	Coimbatore	11th Jul 2025	Birthday	
..	…	…	…	…	
495	Shweta	Goa	6th Sep 2023	Love & Romance	

```
496            Arun   Hyderabad   9th Sep 2023             NaN
497      Prernasaini     Gurgaon   8th Sep 2023             NaN
498   Jhanvi Jaiswal      Mumbai   7th Sep 2023             NaN
499       Shashikala    Varanasi   5th Sep 2023        Birthday

                                                 Reviews Ratings
0    the flowers were fresh and colorful. TBH they …       5
1    Very fresh flowers, delivered on time with bea…       5
2                          Roses quality is very nice.       5
3                  Very beautifull on tome delivered.       5
4                     Thanks for the timely delivery.       4
..                                                  …     …
495                   Tnx… it was on time n perfect       5
496                            Thanks for the flowers       4
497                                 Thank you so much       5
498  Thankyou somuch for helping and making my surp…       5
499                                          Loved it       5

[500 rows x 6 columns]
```

[9]:
```
#removing all suffix:-

rep = ["th","st","rd","nd"]
for i in rep:
    df["Posted_on"]= df["Posted_on"].str.replace(i,"")
df
```

[9]:
```
               Names      Cities    Posted_on        Occasion  \
0      Suraj Chaunal       Noida  23 Sep 2025        Birthday
1      Bakiyalakshmi   Bangalore  22 Sep 2025     Anniversary
2        Pulak.Pal77     Kolkata  19 Sep 2025        Birthday
3              Inaya     Udaipur  31 Aug 2025             NaN
4    Nallapandiyan D  Coimbatore  11 Jul 2025        Birthday
..               …         …          …              …
495          Shweta         Goa   6 Sep 2023  Love & Romance
496            Arun   Hyderabad   9 Sep 2023             NaN
497      Prernasaini     Gurgaon   8 Sep 2023             NaN
498   Jhanvi Jaiswal      Mumbai   7 Sep 2023             NaN
499       Shashikala    Varanasi   5 Sep 2023        Birthday

                                                 Reviews Ratings
0    the flowers were fresh and colorful. TBH they …       5
1    Very fresh flowers, delivered on time with bea…       5
2                          Roses quality is very nice.       5
3                  Very beautifull on tome delivered.       5
4                     Thanks for the timely delivery.       4
..                                                  …     …
```

```
495                    Tnx… it was on time n perfect       5
496                              Thanks for the flowers       4
497                                   Thank you so much       5
498  Thankyou somuch for helping and making my surp…       5
499                                              Loved it       5

[500 rows x 6 columns]
```

[10]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 500 entries, 0 to 499
Data columns (total 6 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   Names      500 non-null    object
 1   Cities     500 non-null    object
 2   Posted_on  500 non-null    object
 3   Occasion   388 non-null    object
 4   Reviews    500 non-null    object
 5   Ratings    500 non-null    object
dtypes: object(6)
memory usage: 23.6+ KB
```

[11]:
```
df["Posted_on"] = pd.to_datetime(df["Posted_on"])
df["Ratings"] = df["Ratings"].astype("float")
df["Polarity"] = [TextBlob(i).sentiment.polarity for i in df["Reviews"]]
df["Subjectivity"] = [TextBlob(i).subjectivity for i in df["Reviews"]]
df
```

[11]:
```
                Names      Cities  Posted_on        Occasion  \
0      Suraj Chaunal       Noida 2025-09-23        Birthday
1      Bakiyalakshmi   Bangalore 2025-09-22     Anniversary
2        Pulak.Pal77     Kolkata 2025-09-19        Birthday
3              Inaya     Udaipur 2025-08-31             NaN
4    Nallapandiyan D  Coimbatore 2025-07-11        Birthday
..               …         …        …              …
495           Shweta         Goa 2023-09-06  Love & Romance
496             Arun   Hyderabad 2023-09-09             NaN
497      Prernasaini     Gurgaon 2023-09-08             NaN
498   Jhanvi Jaiswal      Mumbai 2023-09-07             NaN
499       Shashikala    Varanasi 2023-09-05        Birthday

                                              Reviews  Ratings  Polarity  \
0    the flowers were fresh and colorful. TBH they …      5.0  0.262500
1    Very fresh flowers, delivered on time with bea…      5.0  0.532381
2                          Roses quality is very nice.      5.0  0.780000
3                  Very beautifull on tome delivered.      5.0  0.200000
```

```
4                      Thanks for the timely delivery.      4.0  0.200000
..                                                   …      …       …
495                    Tnx… it was on time n perfect        5.0  1.000000
496                              Thanks for the flowers      4.0  0.200000
497                                   Thank you so much      5.0  0.200000
498  Thankyou somuch for helping and making my surp…        5.0  0.408333
499                                            Loved it      5.0  0.700000

     Subjectivity
0        0.400000
1        0.740476
2        1.000000
3        0.300000
4        0.200000
..            …
495      1.000000
496      0.200000
497      0.200000
498      0.758333
499      0.800000

[500 rows x 8 columns]
```

[12]:
```
#adding Polarity to know how it has been performing:-

p = df["Polarity"].mean()
if p <= 0:
    print("Negative")
else:
    print("Positive")
```

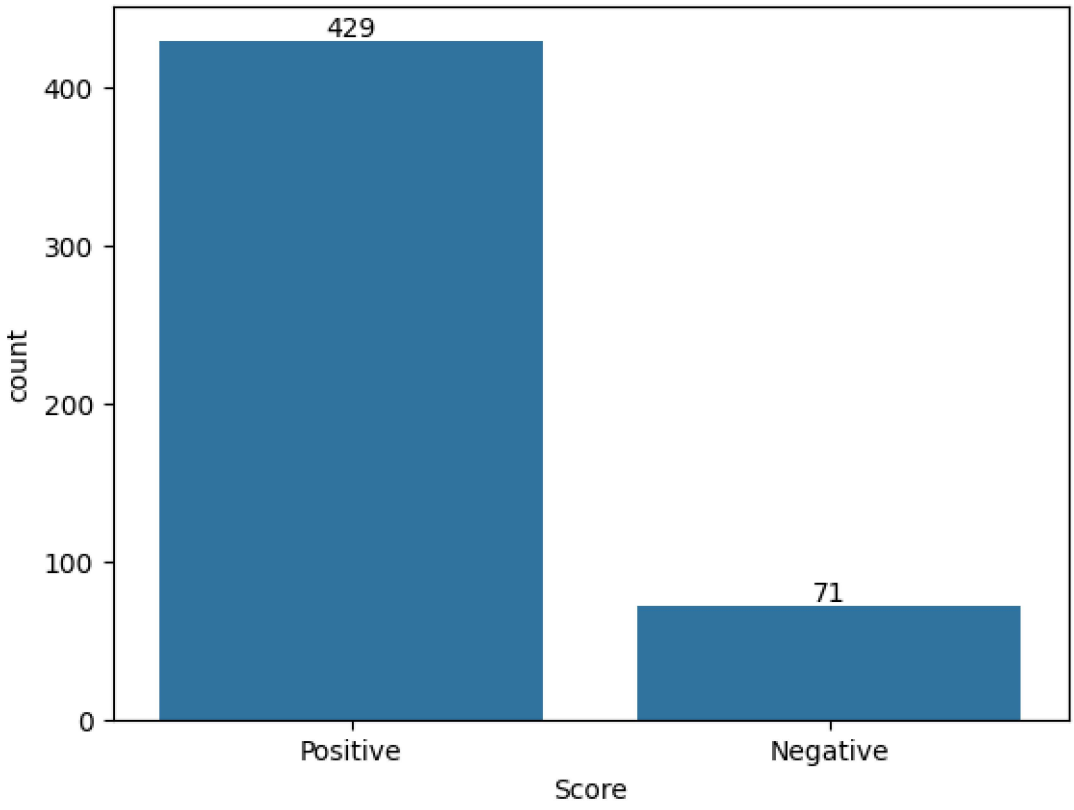
```
Positive
```

[13]:
```
def score(value):
    if value <= 0:
        return"Negative"
    else:
        return"Positive"
df["Score"]= df["Polarity"].apply(score)
df
```

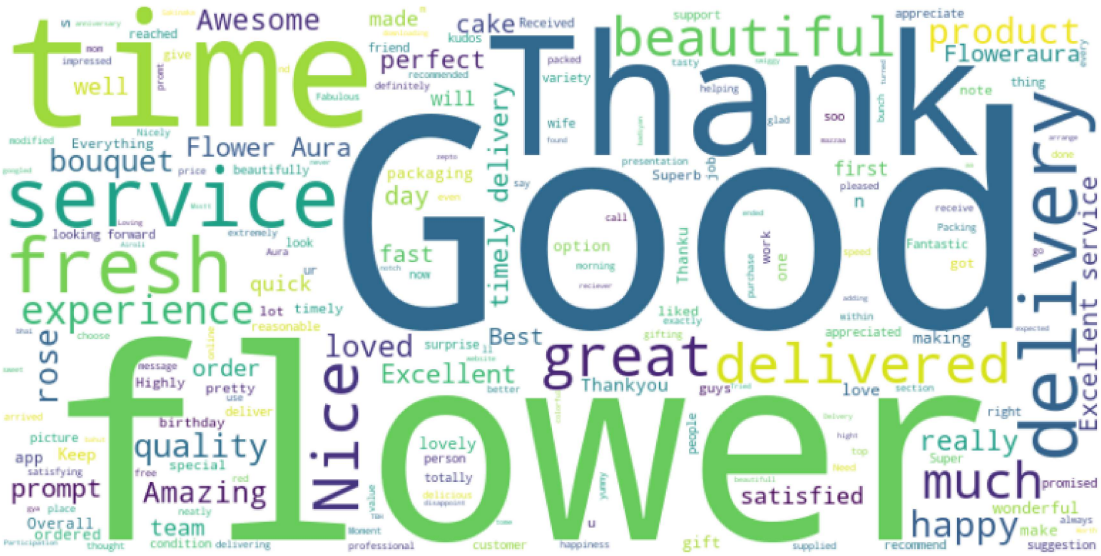
[13]:
```
               Names      Cities  Posted_on        Occasion  \
0      Suraj Chaunal       Noida 2025-09-23        Birthday
1      Bakiyalakshmi    Bangalore 2025-09-22     Anniversary
2        Pulak.Pal77     Kolkata 2025-09-19        Birthday
3              Inaya     Udaipur 2025-08-31             NaN
4    Nallapandiyan D  Coimbatore 2025-07-11        Birthday
..               …         …         …              …
```

```
495           Shweta         Goa 2023-09-06  Love & Romance
496             Arun   Hyderabad 2023-09-09             NaN
497      Prernasaini     Gurgaon 2023-09-08             NaN
498   Jhanvi Jaiswal      Mumbai 2023-09-07             NaN
499       Shashikala    Varanasi 2023-09-05        Birthday

                                              Reviews  Ratings  Polarity  \
0    the flowers were fresh and colorful. TBH they …      5.0  0.262500
1    Very fresh flowers, delivered on time with bea…      5.0  0.532381
2                          Roses quality is very nice.      5.0  0.780000
3                  Very beautifull on tome delivered.      5.0  0.200000
4                     Thanks for the timely delivery.      4.0  0.200000
..                                                …      …       …
495                  Tnx… it was on time n perfect      5.0  1.000000
496                           Thanks for the flowers      4.0  0.200000
497                                Thank you so much      5.0  0.200000
498  Thankyou somuch for helping and making my surp…      5.0  0.408333
499                                        Loved it      5.0  0.700000

     Subjectivity     Score
0        0.400000  Positive
1        0.740476  Positive
2        1.000000  Positive
3        0.300000  Positive
4        0.200000  Positive
..            …       …
495      1.000000  Positive
496      0.200000  Positive
497      0.200000  Positive
498      0.758333  Positive
499      0.800000  Positive

[500 rows x 9 columns]
```

[14]:
```
#adding barplot to get the idea of positive and negative reviews:-

ax = sns.countplot(x=df["Score"], data = df)

ax.bar_label(container = ax.containers[0])
plt.show()
```



[17]:
```
from wordcloud import WordCloud , STOPWORDS
import matplotlib.pyplot as plt

#Two DataFrame created for postive and negative wordcloud

df_pos = df.loc[(df["Score"]=="Positive")]
df_neg = df.loc[(df["Score"]=="Negative")]

# For Positive wordcloud

text = " ".join(text for text in df_pos["Reviews"])
wordcloud = WordCloud(width=800, height=400,
                      background_color='white').generate(text)

plt.figure(figsize=(10,5))
plt.imshow(wordcloud, interpolation="bilinear")
plt.axis("off")
plt.show()
```

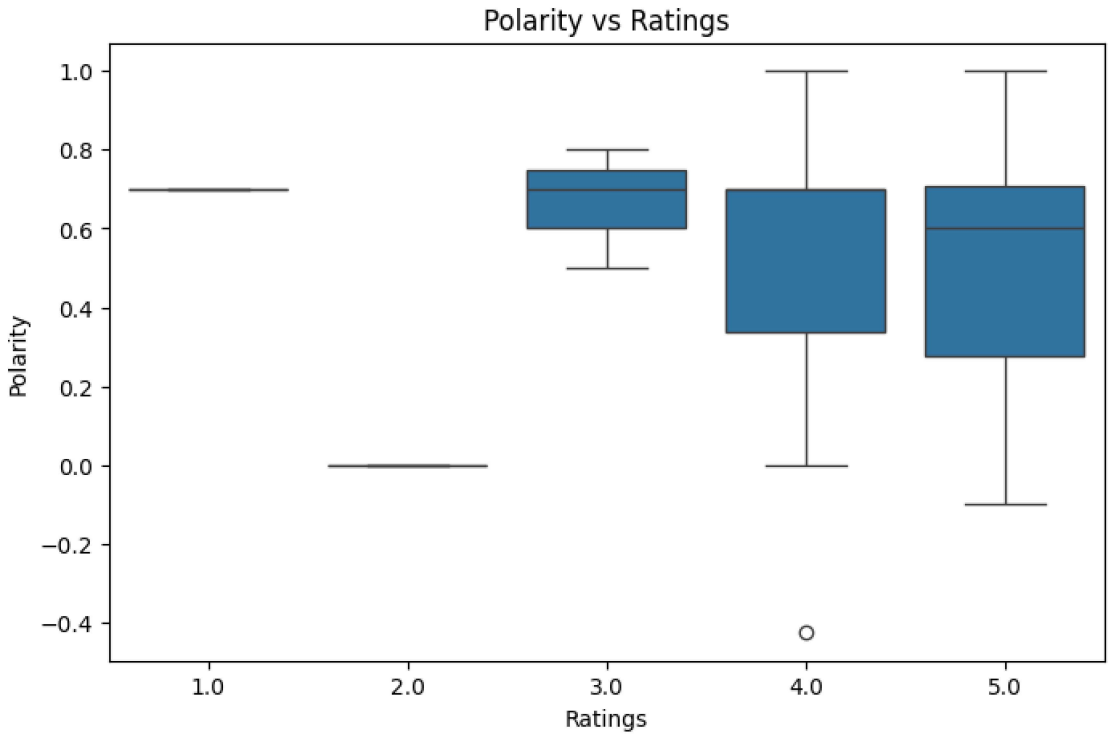


[18]:
```
#For negative wordcloud


text = " ".join(text for text in df_neg["Reviews"])
wordcloud = WordCloud(width=800, height=400,
                      background_color='white').generate(text)

plt.figure(figsize=(10,5))
plt.imshow(wordcloud, interpolation="bilinear")
plt.axis("off")
plt.show()
```

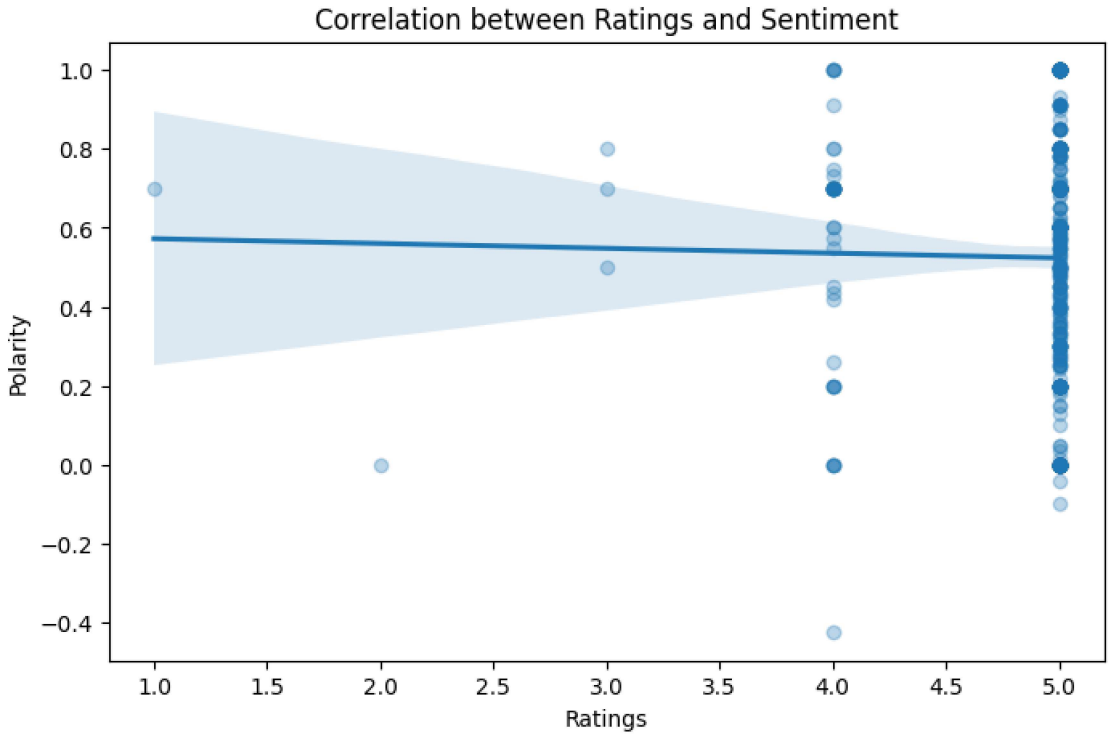
[19]:
```
# finding correlation between ratings and polarity:-

correlation = df["Ratings"].corr(df["Polarity"])
print("Correlation between Ratings and Polarity:", correlation)
```

```
Correlation between Ratings and Polarity: -0.014541348587567443
```

[20]:
```
plt.figure(figsize=(8,5))
sns.boxplot(x="Ratings", y="Polarity", data=df)
plt.title("Polarity vs Ratings")
plt.show()
```



[21]:
```
plt.figure(figsize=(8,5))
sns.regplot(x="Ratings", y="Polarity", data=df, scatter_kws={"alpha":0.3})
plt.title("Correlation between Ratings and Sentiment")
plt.show()
```



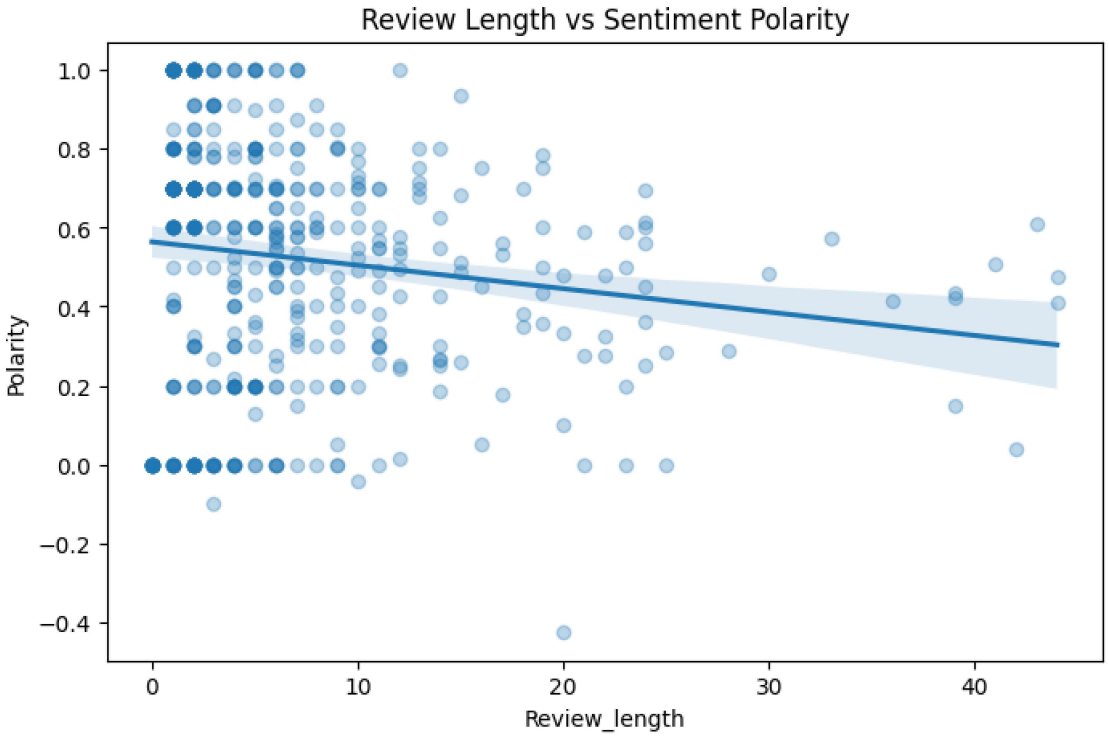
[22]:
```
#calculatig review length written by customers whether it is Positive or␣
 ↪negative:-

df["Review_length"] = df["Reviews"].apply(lambda x: len(str(x).split()))  #␣
 ↪word count
df["Review_length"]
```

[22]:
```
0      14
1      17
2       5
3       5
4       5
       ..
495     7
496     4
497     4
498    44
499     2
Name: Review_length, Length: 500, dtype: int64
```

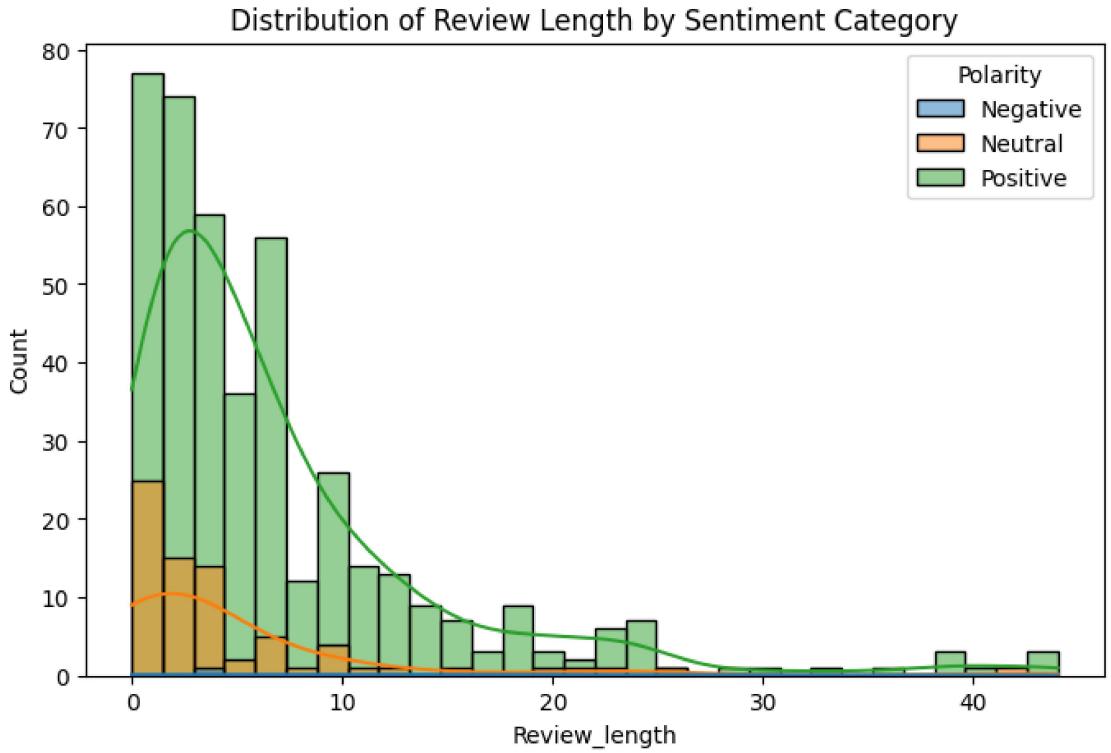
[23]:
```
corr = df["Review_length"].corr(df["Polarity"])
print("Correlation between Review Length and Sentiment Polarity:", corr)
```

```
Correlation between Review Length and Sentiment Polarity: -0.14094743322237901
```

[24]:
```
plt.figure(figsize=(8,5))
sns.regplot(x="Review_length", y="Polarity", data=df, scatter_kws={"alpha":0.3})
plt.title("Review Length vs Sentiment Polarity")
plt.show()
```



[25]:
```
plt.figure(figsize=(8,5))
sns.histplot(data=df, x="Review_length", hue=pd.cut(df["Polarity"], bins=[-1,-0.
↪1,0.1,1], labels=["Negative","Neutral","Positive"]), kde=True)
plt.title("Distribution of Review Length by Sentiment Category")
plt.show()
```



[ ]:
```
#Sentiment Analysis Report - 10 Red Roses Bouquet (FlowerAura)

1. Data Overview

We collected and cleaned customer reviews (handled missing values, standardized
↪text).
Additionally, we engineered two features:

Sentiment Polarity → captures positivity/negativity strength

Review Length → helps analyze expression patterns in customer opinions

2. Sentiment Analysis Results

Review Distribution → Majority of reviews were positive, but a fair share of
↪neutral/negative ones exist.

Ratings vs Sentiment → 4–5 ratings aligned strongly with positive sentiments,
↪while 1–2 ratings leaned negative.
```

- Average Sentiment per Rating → Clear upward trend → higher rating = more positive sentiment.

- Review Length → Longer reviews reflected stronger emotions (either highly satisfied or quite unhappy).

- 3. Key Insights

- What Customers Loved

Freshness

Fragrance

Elegant packaging

Quick & smooth delivery

Beautiful presentation

- Common Complaints

Late deliveries

Inconsistent flower quality

Slightly higher pricing

- Patterns Observed

Happy customers → write longer, descriptive reviews

Unhappy customers → leave short, sharp complaints

- 4. Recommendations

- Fix Delivery Issues → Streamline logistics to ensure timely deliveries.

- Maintain Quality → Consistency in freshness & flower quality will reduce negatives.

- Leverage Strengths → Highlight fragrance, freshness & premium packaging in ads/social media.

- Engage Customers → Encourage satisfied buyers to share reviews & photos online for organic promotion.

```
Price Positioning → If priced higher, market the bouquet as a premium, luxury
↪experience.



In a nutshell: Customers adore the freshness, fragrance & presentation of the
↪Red Roses ,
   but addressing delivery speed & quality consistency will elevate
↪FlowerAura's bouquet into an undisputed favorite .
```