Problem Statement: The primary goal is to perform sentiment analysis, investigate temporal and geographical trends in user-generated content, and analyze platform-specific user behavior. The project will focus on identifying popular topics through hashtags, exploring engagement levels, and understanding regional differences in sentiment trends.

Dataset : https://www.kaggle.com/datasets/kashishparmar02/social-media-sentiments-analysis-dataset/code

To-Dos:

1. Dataset **acquisition** and initial **exploration**.
2. **Feature Exploration**

- Data manipulation using Numpy and Pandas.
- Exploring the dataset.

3. **EDA & Visualization**

- Data manipulation using Numpy and Pandas.
- Exploring EDA and visualization techniques.
- Select relevant features and formulate the problem statement.

4. Mid-Program **Presentation**: Present progress achieved till the EDA stage.

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
```



```
url = "https://raw.githubusercontent.com/Data-Dogs-NYU-DataScienceBootCamp/Datadog-DataScience-Project/main/sentimentdataset.csv
df = pd.read_csv(url)
```

```
df
```

	Unnamed: 0.1	Unnamed: 0	Text	Sentiment	Timestamp	User	Platform	Hashtags	Retweets	Likes	Cou
0	0	0	Enjoying a beautiful day at the park! ...	Positive	2023-01-15 12:30:00	User123	Twitter	#Nature #Park	15.0	30.0	
1	1	1	Traffic was terrible this morning. ...	Negative	2023-01-15 08:45:00	CommuterX	Twitter	#Traffic #Morning	5.0	10.0	Ca
2	2	2	Just finished an amazing workout! 💪 ...	Positive	2023-01-15 15:45:00	FitnessFan	Instagram	#Fitness #Workout	20.0	40.0	
3	3	3	Excited about the upcoming weekend getaway! ...	Positive	2023-01-15 18:20:00	AdventureX	Facebook	#Travel #Adventure	8.0	15.0	
4	4	4	Trying out a new recipe for dinner tonight. ...	Neutral	2023-01-15 19:55:00	ChefCook	Instagram	#Cooking #Food	12.0	25.0	Aus
...	...	...	...	...	...	...	...	...	...	...	
727	728	732	Collaborating on a science project that receiv...	Happy	2017-08-18 18:20:00	ScienceProjectSuccessHighSchool	Facebook	#ScienceFairWinner #HighSchoolScience	20.0	39.0	
728	729	733	Attending a surprise birthday party organized ...	Happy	2018-06-22 14:15:00	BirthdayPartyJoyHighSchool	Instagram	#SurpriseCelebration #HighSchoolFriendship	Move cell up ⌘/Ctrl+M K	.0	
729	730	734	Successfully fundraising for a school charity ...	Happy	2019-04-05 17:30:00	CharityFundraisingTriumphHighSchool	Twitter	#CommunityGiving #HighSchoolPhilanthropy	22.0	42.0	Ca
730	731	735	Participating in a multicultural festival, cel...	Happy	2020-02-29 20:45:00	MulticulturalFestivalJoyHighSchool	Facebook	#CulturalCelebration #HighSchoolUnity	21.0	43.0	
731	732	736	Organizing a virtual talent show during challe...	Happy	2020-11-15 15:15:00	VirtualTalentShowSuccessHighSchool	Instagram	#VirtualEntertainment #HighSchoolPositivity	24.0	47.0	

732 rows × 15 columns

Step 1: Data Cleaning and Pre-processing

In this section, our goal is to understand the data and try and find any incosistencies or discrepancies by doing data analysis.

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 732 entries, 0 to 731
Data columns (total 15 columns):
 #   Column        Non-Null Count  Dtype  
---  ------        --------------  -----  
 0   Unnamed: 0.1  732 non-null    int64  
 1   Unnamed: 0    732 non-null    int64  
 2   Text          732 non-null    object 
 3   Sentiment     732 non-null    object 
 4   Timestamp     732 non-null    object 
 5   User          732 non-null    object 
 6   Platform      732 non-null    object 
 7   Hashtags      732 non-null    object 
 8   Retweets      732 non-null    float64
 9   Likes         732 non-null    float64
 10  Country       732 non-null    object 
 11  Year          732 non-null    int64  
 12  Month         732 non-null    int64  
 13  Day           732 non-null    int64  
 14  Hour          732 non-null    int64
```

```
dtypes: float64(2), int64(6), object(7)
memory usage: 85.9+ KB
```

```
df.isna().sum() ## cleaning up
```

	0
Unnamed: 0.1	0
Unnamed: 0	0
Text	0
Sentiment	0
Timestamp	0
User	0
Platform	0
Hashtags	0
Retweets	0
Likes	0
Country	0
Year	0
Month	0
Day	0
Hour	0

dtype: int64


```
df.duplicated().sum()
```

```
np.int64(0)
```

```
df.describe()
```

	Unnamed: 0.1	Unnamed: 0	Retweets	Likes	Year	Month	Day	Hour
count	732.000000	732.000000	732.000000	732.000000	732.000000	732.000000	732.000000	732.000000
mean	366.464481	369.740437	21.508197	42.901639	2020.471311	6.122951	15.497268	15.521858
std	211.513936	212.428936	7.061286	14.089848	2.802285	3.411763	8.474553	4.113414
min	0.000000	0.000000	5.000000	10.000000	2010.000000	1.000000	1.000000	0.000000
25%	183.750000	185.750000	17.750000	34.750000	2019.000000	3.000000	9.000000	13.000000
50%	366.500000	370.500000	22.000000	43.000000	2021.000000	6.000000	15.000000	16.000000
75%	549.250000	553.250000	25.000000	50.000000	2023.000000	9.000000	22.000000	19.000000
max	732.000000	736.000000	40.000000	80.000000	2023.000000	12.000000	31.000000	23.000000

```
df['Timestamp'] = pd.to_datetime(df['Timestamp'])
df["Retweets"] = df["Retweets"].astype(int)
df["Likes"] = df["Likes"].astype(int)
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 732 entries, 0 to 731
Data columns (total 15 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Unnamed: 0.1  732 non-null    int64
 1   Unnamed: 0    732 non-null    int64
 2   Text          732 non-null    object
 3   Sentiment     732 non-null    object
 4   Timestamp     732 non-null    datetime64[ns]
 5   User          732 non-null    object
 6   Platform      732 non-null    object
 7   Hashtags      732 non-null    object
 8   Retweets      732 non-null    int64
 9   Likes         732 non-null    int64
 10  Country       732 non-null    object
 11  Year          732 non-null    int64
 12  Month         732 non-null    int64
```

```
 13  Day           732 non-null    int64
 14  Hour          732 non-null    int64
dtypes: datetime64[ns](1), int64(8), object(6)
memory usage: 85.9+ KB
```

```
df.head()
```

	Unnamed: 0.1	Unnamed: 0	Text	Sentiment	Timestamp	User	Platform	Hashtags	Retweets	Likes	Country	Year	Month	Day	Hour
0	0	0	Enjoying a beautiful day at the park! ...	Positive	2023-01-15 12:30:00	User123	Twitter	#Nature #Park	15	30	USA	2023	1	15	12
1	1	1	Traffic was terrible this morning. ...	Negative	2023-01-15 08:45:00	CommuterX	Twitter	#Traffic #Morning	5	10	Canada	2023	1	15	8
2	2	2	Just finished an amazing workout! 💪 ...	Positive	2023-01-15 15:45:00	FitnessFan	Instagram	#Fitness #Workout	20	40	USA	2023	1	15	15
3	3	3	Excited about the upcoming weekend getaway! ...	Positive	2023-01-15 18:20:00	AdventureX	Facebook	#Travel #Adventure	8	15	UK	2023	1	15	18

```
df.tail()
```

	Unnamed: 0.1	Unnamed: 0	Text	Sentiment	Timestamp	User	Platform	Hashtags	Retweets	Likes	Cou
727	728	732	Collaborating on a science project that receiv...	Happy	2017-08-18 18:20:00	ScienceProjectSuccessHighSchool	Facebook	#ScienceFairWinner #HighSchoolScience		39	
728	729	733	Attending a surprise birthday party organized ...	Happy	2018-06-22 14:15:00	BirthdayPartyJoyHighSchool	Instagram	#SurpriseCelebration #HighSchoolFriendship	25	48	
729	730	734	Successfully fundraising for a school charity ...	Happy	2019-04-05 17:30:00	CharityFundraisingTriumphHighSchool	Twitter	#CommunityGiving #HighSchoolPhilanthropy	22	42	Ca
730	731	735	Participating in a multicultural festival, cel...	Happy	2020-02-29 20:45:00	MulticulturalFestivalJoyHighSchool	Facebook	#CulturalCelebration #HighSchoolUnity	21	43	
731	732	736	Organizing a virtual talent show during challe...	Happy	2020-11-15 15:15:00	VirtualTalentShowSuccessHighSchool	Instagram	#VirtualEntertainment #HighSchoolPositivity	24	47	

Creating a broad spectrum sentiment groups

```
mapping = {
    # Neutral group
    'neutral': 'Neutral',
    'confusion': 'Neutral',
    'indifference': 'Neutral',
    'numbness': 'Neutral',
    'nostalgia': 'Neutral',
    'ambivalence': 'Neutral',
    'pensive': 'Neutral',

    # Positive group
    'positive': 'Positive',
    'happiness': 'Positive',
    'joy': 'Positive',
    'love': 'Positive',
    'amusement': 'Positive',
    'enjoyment': 'Positive',
    'admiration': 'Positive',
```

```
'affection': 'Positive',
'awe': 'Positive',
'acceptance': 'Positive',
'adoration': 'Positive',
'anticipation': 'Positive',
'calmness': 'Positive',
'excitement': 'Positive',
'elation': 'Positive',
'euphoria': 'Positive',
'contentment': 'Positive',
'serenity': 'Positive',
'gratitude': 'Positive',
'hope': 'Positive',
'empowerment': 'Positive',
'compassion': 'Positive',
'tenderness': 'Positive',
'arousal': 'Positive',
'enthusiasm': 'Positive',
'fulfillment': 'Positive',
'reverence': 'Positive',
'kind': 'Positive',
'pride': 'Positive',
'zest': 'Positive',
'hopeful': 'Positive',
'grateful': 'Positive',
'empathetic': 'Positive',
'compassionate': 'Positive',
'playful': 'Positive',
'free-spirited': 'Positive',
'inspired': 'Positive',
'confident': 'Positive',
'overjoyed': 'Positive',
'inspiration': 'Positive',
'motivation': 'Positive',
'joyfulreunion': 'Positive',
'satisfaction': 'Positive',
'blessed': 'Positive',
'appreciation': 'Positive',
'confidence': 'Positive',
'accomplishment': 'Positive',
'wonderment': 'Positive',
'optimism': 'Positive',
'enchantment': 'Positive',
'intrigue': 'Positive',
'playfuljoy': 'Positive',
'mindfulness': 'Positive',
'dreamchaser': 'Positive',
'elegance': 'Positive',
'whimsy': 'Positive',
'thrill': 'Positive',
'harmony': 'Positive',
'creativity': 'Positive',
'radiance': 'Positive',
'wonder': 'Positive',
'rejuvenation': 'Positive',
'coziness': 'Positive',
'adventure': 'Positive',
'melodic': 'Positive',
'festivejoy': 'Positive',
'innerjourney': 'Positive',
'freedom': 'Positive',
'dazzle': 'Positive',
'adrenaline': 'Positive',
'artisticburst': 'Positive',
'culinaryodyssey': 'Positive',
'spark': 'Positive',
'marvel': 'Positive',
'positivity': 'Positive',
'kindness': 'Positive',
'friendship': 'Positive',
'success': 'Positive',
'exploration': 'Positive',
'amazement': 'Positive',
'romance': 'Positive',
'captivation': 'Positive',
'tranquility': 'Positive',
'grandeur': 'Positive',
'emotion': 'Positive',
'energy': 'Positive',
'celebration': 'Positive',
```

```
'charm': 'Positive',
'ecstasy': 'Positive',
'colorful': 'Positive',
'hypnotic': 'Positive',
'connection': 'Positive',
'iconic': 'Positive',
'journey': 'Positive',
'engagement': 'Positive',
'touched': 'Positive',
'triumph': 'Positive',
'heartwarming': 'Positive',
'breakthrough': 'Positive',
'joy in baking': 'Positive',
'imagination': 'Positive',
'vibrancy': 'Positive',
'mesmerizing': 'Positive',
'culinary adventure': 'Positive',
'winter magic': 'Positive',
'thrilling journey': 'Positive',
"nature's beauty": 'Positive',
'celestial wonder': 'Positive',
'creative inspiration': 'Positive',
'runway creativity': 'Positive',
"ocean's freedom": 'Positive',
'whispers of the past': 'Positive',
'relief': 'Positive',
'happy': 'Positive',

# Negative group
'negative': 'Negative',
'anger': 'Negative',
'fear': 'Negative',
'sadness': 'Negative',
'disgust': 'Negative',
'disappointed': 'Negative',
'bitter': 'Negative',
'shame': 'Negative',
'despair': 'Negative',
'grief': 'Negative',
'loneliness': 'Negative',
'jealousy': 'Negative',
'resentment': 'Negative',
'frustration': 'Negative',
'boredom': 'Negative',
'anxiety': 'Negative',
'intimidation': 'Negative',
'helplessness': 'Negative',
'envy': 'Negative',
'regret': 'Negative',
'bitterness': 'Negative',
'yearning': 'Negative',
'fearful': 'Negative',
'apprehensive': 'Negative',
'overwhelmed': 'Negative',
'jealous': 'Negative',
'devastated': 'Negative',
'frustrated': 'Negative',
'envious': 'Negative',
'dismissive': 'Negative',
'bittersweet': 'Negative',
'sad': 'Negative',
'hate': 'Negative',
'bad': 'Negative',
'embarrassed': 'Negative',
'mischievous': 'Negative',  # context-dependent; adjust if needed
'lostlove': 'Negative',
'betrayal': 'Negative',
'suffering': 'Negative',
'emotionalstorm': 'Negative',
'isolation': 'Negative',
'disappointment': 'Negative',
'heartbreak': 'Negative',
'sorrow': 'Negative',
'darkness': 'Negative',
'desperation': 'Negative',
'ruins': 'Negative',
'desolation': 'Negative',
'loss': 'Negative',
'heartache': 'Negative',
'obstacle': 'Negative',
```

```
    'pressure': 'Negative',
    'miscalculation': 'Negative',
    'exhaustion': 'Negative'
}

# Function to map each sentiment into a broader category
def map_sentiment(sent):
    # Clean the sentiment string (strip whitespace and convert to lower-case)
    clean_sent = sent.strip().lower()
    # Look up the sentiment in the mapping dictionary
    return mapping.get(clean_sent, 'Other')  # default to 'Other' if not found

# Apply the mapping to create a new column
df['Broad_Sentiment'] = df['Sentiment'].apply(map_sentiment)

# Display the updated DataFrame
print(df.head(10))
```

```
0            0          0
1            1          1
2            2          2
3            3          3
4            4          4
5            5          5
6            6          6
7            7          7
8            8          8
9            9          9

                                          Text    Sentiment  \
0   Enjoying a beautiful day at the park!        ...   Positive
1   Traffic was terrible this morning.           ...   Negative
2   Just finished an amazing workout! 💪          ...   Positive
3   Excited about the upcoming weekend getaway!  ...   Positive
4   Trying out a new recipe for dinner tonight.  ...   Neutral
5   Feeling grateful for the little things in lif...   Positive
6   Rainy days call for cozy blankets and hot coc...   Positive
7   The new movie release is a must-watch!       ...   Positive
8   Political discussions heating up on the timel...   Negative
9   Missing summer vibes and beach days.         ...   Neutral

             Timestamp           User     Platform  \
0 2023-01-15 12:30:00   User123          Twitter
1 2023-01-15 08:45:00   CommuterX        Twitter
2 2023-01-15 15:45:00   FitnessFan      Instagram
3 2023-01-15 18:20:00   AdventureX       Facebook
4 2023-01-15 19:55:00   ChefCook        Instagram
5 2023-01-16 09:10:00   GratitudeNow     Twitter
6 2023-01-16 14:45:00   RainyDays        Facebook
7 2023-01-16 19:30:00   MovieBuff       Instagram
8 2023-01-17 08:00:00   DebateTalk       Twitter
9 2023-01-17 12:20:00   BeachLover       Facebook

                                  Hashtags  Retweets  Likes       Country  \
0   #Nature #Park                                15     30     USA
1   #Traffic #Morning                             5     10     Canada
2   #Fitness #Workout                            20     40   USA
3   #Travel #Adventure                            8     15     UK
4   #Cooking #Food                               12     25    Australia
5     #Gratitude #PositiveVibes                  25     50     India
6   #RainyDays #Cozy                             10     20     Canada
7    #MovieNight #MustWatch                      15     30       USA
8    #Politics #Debate                           30     60     USA
9    #Summer #BeachDays                          18     35    Australia

   Year  Month  Day  Hour Broad_Sentiment
0  2023      1   15    12        Positive
1  2023      1   15     8        Negative
2  2023      1   15    15        Positive
3  2023      1   15    18        Positive
4  2023      1   15    19         Neutral
5  2023      1   16     9        Positive
6  2023      1   16    14        Positive
7  2023      1   16    19        Positive
8  2023      1   17     8        Negative
9  2023      1   17    12         Neutral
```

Analyzing the Categories in the fields - Country, Platform, Hashtags & User.

```
#Computing the categories in the field: Country
# still working on this, not the final code - Shreya
countrs = [ ]
#print(len(countrs))
```

```
for index, rows in df.iterrows():
  countrs.append(rows['Country'].strip().lower())
print(len(countrs))

countries = set(countrs)
print(f'The Countries recorded in the dataset are:{countries}')
print(len(countries))
```

```
732
The Countries recorded in the dataset are:{'denmark', 'germany', 'scotland', 'south africa', 'spain', 'france', 'usa', 'netherlands', 'jo
33
```

```
#Computing the categories in the field: Platform
platf = [ ]
for index, rows in df.iterrows():
  platf.append(rows['Platform'].strip().lower())
print(len(platf))

platformss = set(platf)
print(f'The Platforms recorded in the dataset are:{platformss}')
print(len(platformss))
```

```
732
The Platforms recorded in the dataset are:{'twitter', 'facebook', 'instagram'}
3
```

```
#Computing the categories in the field: Hashtags
hashes = [ ]
df2 = df
df2['Hashtags'] = df2['Hashtags'].astype('string')
for index, rows in df2.iterrows():
  hwords=rows['Hashtags'].strip().lower()
  for word in hwords.split(' '):
    hashes.append(word)

print(len(hashes))
hashts = set(hashes)
print(f'The Hashtags recorded in the dataset are:{hashts}')
print(len(hashts))
```



```
1464
The Hashtags recorded in the dataset are:{'#proud', '#desire', '#naturewhispers', '#brillianttrails', '#calmafterstorm', '#sunnyday', '#i
975
```

```
df2['Hashtags']
```

	Hashtags
0	#Nature #Park
1	#Traffic #Morning
2	#Fitness #Workout
3	#Travel #Adventure
4	#Cooking #Food
...	...
727	#ScienceFairWinner #HighSchoolScience
728	#SurpriseCelebration #HighSchoolFriendship
729	#CommunityGiving #HighSchoolPhilanthropy
730	#CulturalCelebration #HighSchoolUnity
731	#VirtualEntertainment #HighSchoolPositivity

732 rows × 1 columns

dtype: string

```
sentimentss = df['Broad_Sentiment'].values
sent_categ = set(sentimentss)
print(f'No. of sentiments: {len(sent_categ)}.\nThe sentiments are classified into: {sent_categ}')
```

```
No. of sentiments: 4.
The sentiments are classified into: {'Positive', 'Neutral', 'Other', 'Negative'}
```

```
#User's posting-sentiment behavior - To analyze the posting activity of users, as in does a user regularly post negative comments, positive c
user_senti_dic  = { }
for index, rows in df.iterrows():
  if rows['User'] not in user_senti_dic:
    user_senti_dic[rows['User']] = [rows['Broad_Sentiment']]
  else:
    user_senti_dic[rows['User']].append(rows['Broad_Sentiment'])

print(len(user_senti_dic))
user_senti_dic
```

Show hidden output

Step 2: Basic prediction and statistics.

Double-click (or enter) to edit

Step 3: Basic data visualization (plotly)

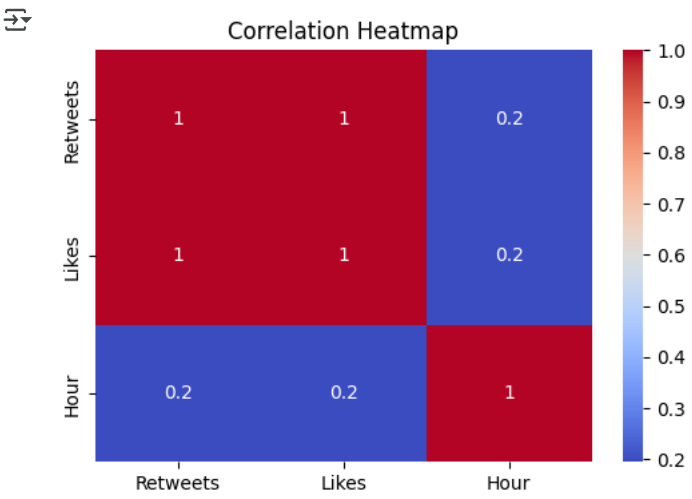
HeatMap

A heatmap can help you see the relationships among numerical features. In your dataset, you might look at how "Retweets", "Likes", and even "Hour" (if it's meaningful) correlate with one another.

```
numeric_cols = ['Retweets', 'Likes', 'Hour']
corr_matrix = df[numeric_cols].corr()

plt.figure(figsize=(6, 4))
sns.heatmap(corr_matrix, annot=True, cmap="coolwarm")
plt.title("Correlation Heatmap")
plt.show()
```

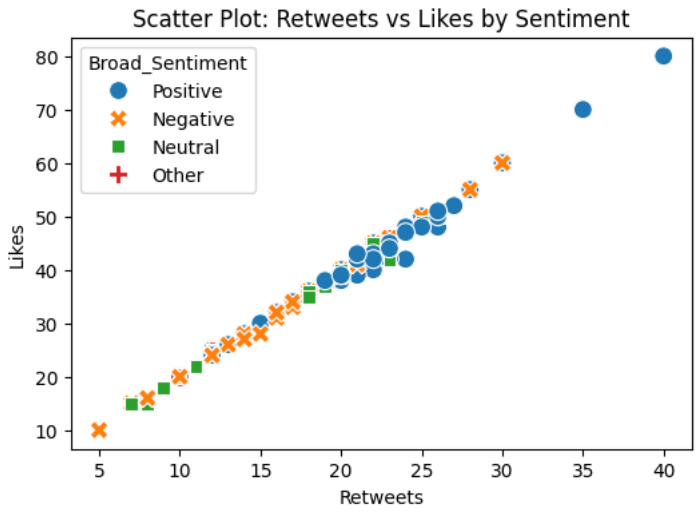
Move cell up
⌘/Ctrl+M K



Scatter Plot

A scatter plot can reveal if there is any pattern between the number of retweets and likes. Coloring by sentiment can add an extra layer of insight.

```
plt.figure(figsize=(6, 4))
sns.scatterplot(data=df, x='Retweets', y='Likes', hue='Broad_Sentiment', style='Broad_Sentiment', s=100)
plt.title("Scatter Plot: Retweets vs Likes by Sentiment")
plt.xlabel("Retweets")
plt.ylabel("Likes")
plt.legend(title='Broad_Sentiment')
plt.show()
```



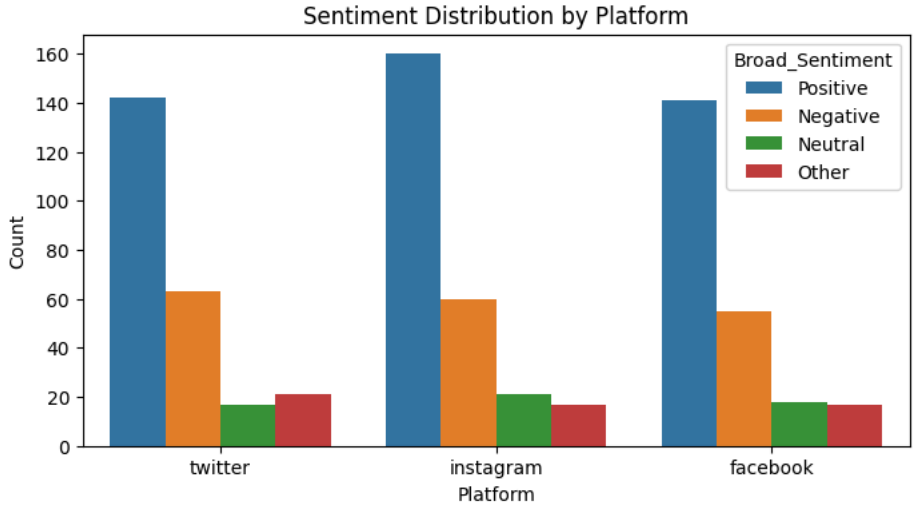
Bar Plot

Understanding how sentiment varies across different platforms (Twitter, Instagram, Facebook, etc.) can be insightful.

```
df['Platform'] = df['Platform'].str.strip().str.lower()
```

```
plt.figure(figsize=(8, 4))
sns.countplot(data=df, x='Platform', hue='Broad_Sentiment')
plt.title("Sentiment Distribution by Platform")
plt.xlabel("Platform")
plt.ylabel("Count")
plt.legend(title='Broad_Sentiment')
plt.show()
```

Move cell up
⌘/Ctrl+M K



Time Series

the activity trend during the day, you can plot the number of tweets or posts by hour. This could be a bar chart or even a line plot.

```
# Count posts per hour
hourly_counts = df.groupby('Hour').size().reset_index(name='Count')

plt.figure(figsize=(8, 4))
sns.barplot(data=hourly_counts, x='Hour', y='Count', palette="viridis")
plt.title("Posts per Hour")
plt.xlabel("Hour of Day")
plt.ylabel("Number of Posts")
plt.show()
```

```
<ipython-input-28-983d56587df9>:5: FutureWarning:
```