```python
# @title import Libraries
import pandas as pd
import numpy as np
import re
import nltk
from nltk.corpus import stopwords
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.naive_bayes import MultinomialNB
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, classification_report
import matplotlib.pyplot as plt
import seaborn as sns
from collections import Counter
from nltk.stem import WordNetLemmatizer
from wordcloud import WordCloud
import datetime  # Import the datetime module

import warnings
warnings.filterwarnings("ignore")

# Download necessary NLTK resources
nltk.download('stopwords')
nltk.download('wordnet')
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Unzipping corpora/stopwords.zip.
[nltk_data] Downloading package wordnet to /root/nltk_data...
```

```
True
```

```python
color_palette = sns.color_palette("plasma")
sns.set_palette(color_palette)
```

```python
# @title 1.Data Collection

df = pd.read_csv("/content/sentimentdataset.csv")#load csv file
df.head().style.background_gradient(cmap='plasma')
```

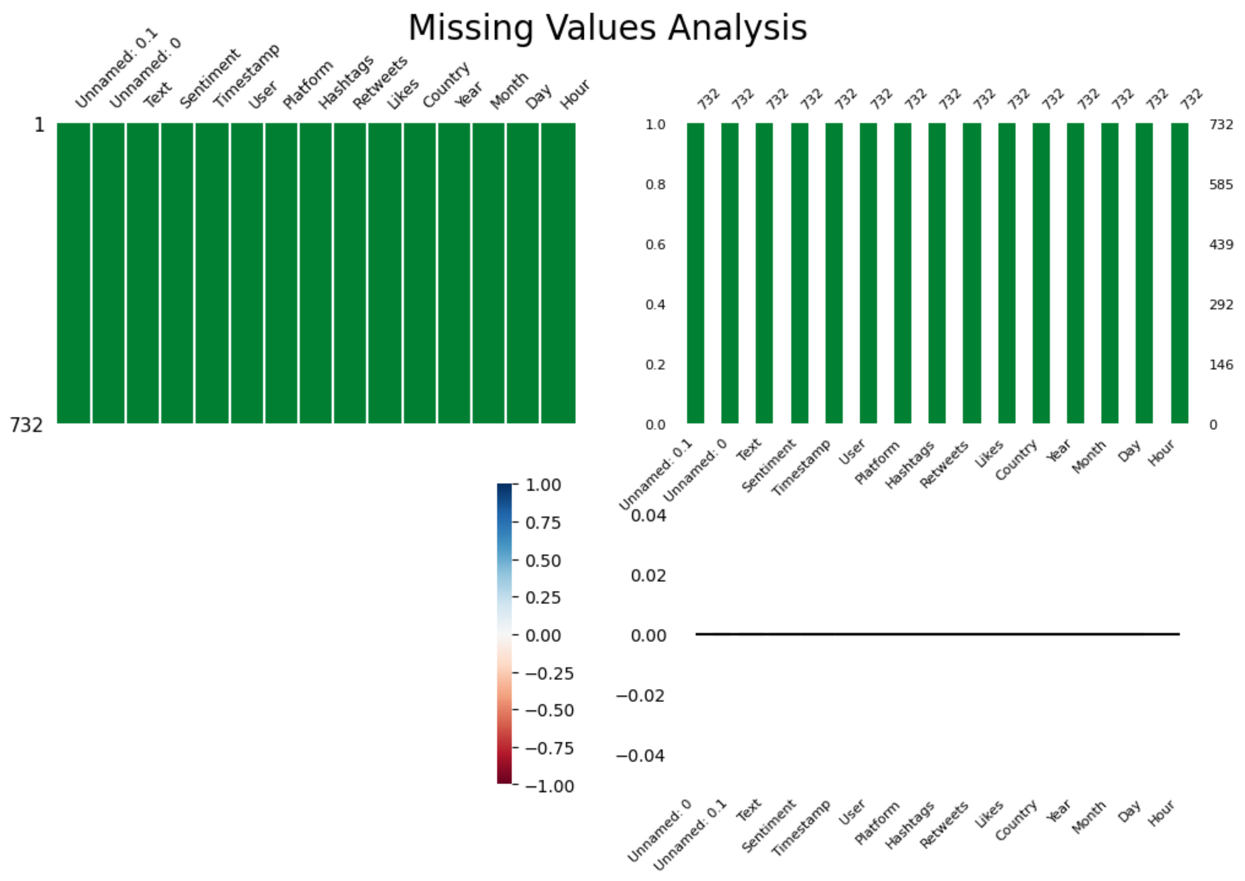
```
<pandas.io.formats.style.Styler at 0x79e0ccadcad0>
```

```python
df.describe().style.background_gradient(cmap='tab20c')
```

```
<pandas.io.formats.style.Styler at 0x79e0cd330710>
```

```python
# @title 1.1 Check The Missing values

import missingno as msno

fig, ax = plt.subplots(2,2,figsize=(12,7))
```

```
axs = np.ravel(ax)
msno.matrix(df,  fontsize=9, color=(0.0,0.5,0.2),ax=axs[0]);
msno.bar(df, fontsize=8, color=(0.0,0.5,0.2), ax=axs[1]);
msno.heatmap(df,fontsize=8,ax=axs[2]);
msno.dendrogram(df,fontsize=8,ax=axs[3], orientation='top')

fig.suptitle('Missing Values Analysis', y=1.01, fontsize=20)

plt.savefig('missing_values_analysis.png')

# Show the plot
plt.show()
```



```
# @title 2.Data Cleaning
def clean_Text(Text):
    """
    Cleans the input text by removing special characters, URLs, and
converting to lowercase.
    """
    if isinstance(Text, str):
        Text= re.sub(r'http\S+|www\S+|@\S+', '', Text,
flags=re.MULTILINE)
```

```
        Text = re.sub(r'[^a-zA-Z]', ' ', Text)
        Text = Text.lower()
        return Text
    else:
        return ""
df['cleaned_Text'] = df['Text'].apply(clean_Text)
print(df[['Text', 'cleaned_Text']].head())

def preprocess_Text(Text):
    """
    Tokenizes, removes stopwords, and lemmatizes the input text.
    """
    words = Text.split()
    stop_words = set(stopwords.words('english'))
    words = [w for w in words if not w in stop_words]
    # Lemmatize the words
    lemmatizer = WordNetLemmatizer()
    words = [lemmatizer.lemmatize(w) for w in words]
    return ' '.join(words)

df['processed_Text'] = df['cleaned_Text'].apply(preprocess_Text)
print(df[['cleaned_Text', 'processed_Text']].head())
```

```
                                               Text  \
0   Enjoying a beautiful day at the park!        ...
1   Traffic was terrible this morning.           ...
2   Just finished an amazing workout! 
3   Excited about the upcoming weekend getaway!  ...
4   Trying out a new recipe for dinner tonight.  ...

                                       cleaned_Text
0   enjoying a beautiful day at the park         ...
1   traffic was terrible this morning            ...
2   just finished an amazing workout             ...
3   excited about the upcoming weekend getaway   ...
4   trying out a new recipe for dinner tonight   ...
                                       cleaned_Text  \
0   enjoying a beautiful day at the park         ...
1   traffic was terrible this morning            ...
2   just finished an amazing workout             ...
3   excited about the upcoming weekend getaway   ...
4   trying out a new recipe for dinner tonight   ...

                      processed_Text
0       enjoying beautiful day park
1          traffic terrible morning
2          finished amazing workout
3  excited upcoming weekend getaway
4  trying new recipe dinner tonight
```

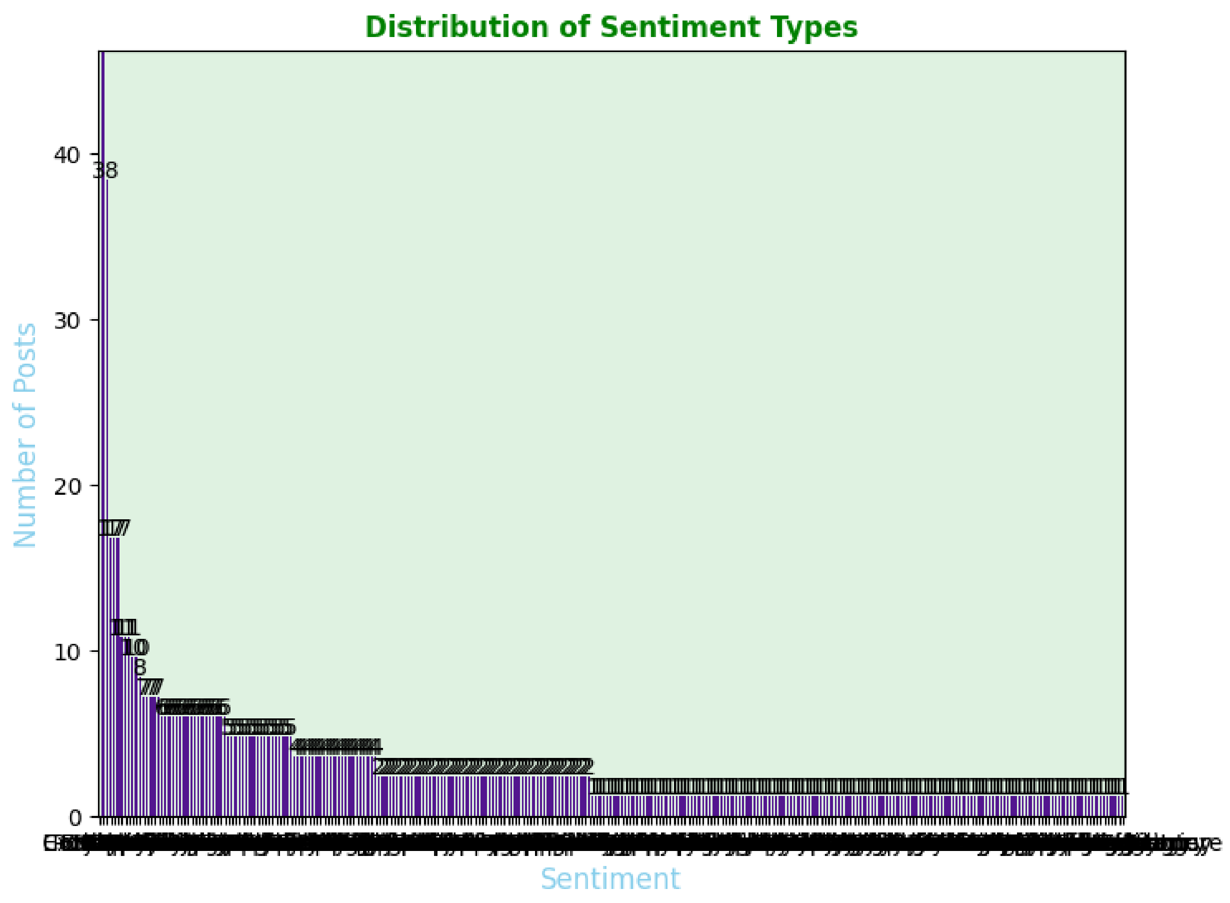
```
# @title 2.1 Handle Missing Values

print("Missing values before handling:")
df.isnull().sum()
```

```
Missing values before handling:

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
cleaned_Text      0
processed_Text    0
dtype: int64
```

```
df['Text'] = df['Text'].fillna('')
df['processed_Text'] = df['processed_Text'].fillna('')
print("\nMissing values after handling:")
df.isnull().sum()
```

```

Missing values after handling:

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
cleaned_Text      0
```

```
processed_Text    0
dtype: int64

# @title 3.Exploratory Data Analysis(EDA) 3.1 Sentiment Distribution
sentiment_counts = df['Sentiment'].value_counts()
print("\nSentiment Distribution:\n", sentiment_counts)
plt.figure(figsize=(8, 6))
ax = sns.barplot(x=sentiment_counts.index, y=sentiment_counts.values)
plt.title('Distribution of Sentiment Types', fontsize = 12, fontweight
= 'bold', color = 'green')
plt.xlabel('Sentiment',fontsize = 12, fontweight = 'normal', color =
'skyblue')
plt.ylabel('Number of Posts',fontsize = 12, fontweight = 'normal',
color = 'skyblue')
plt.gca().set_facecolor('#dff2e1')

for p in ax.patches:
    p.set_width(0.6)
    p.set_height(p.get_height()*1.2)
    ax.annotate(f'{p.get_height():.0f}', (p.get_x() + p.get_width() /
2., p.get_height()),
                ha='center', va='center', xytext=(0, 5),
textcoords='offset pixels')

plt.show()


Sentiment Distribution:
 Sentiment
Positive                 44
Joy                      42
Excitement               32
Happy                    14
Neutral                  14
                         ..
Vibrancy                  1
Culinary Adventure        1
Mesmerizing               1
Thrilling Journey         1
Winter Magic              1
Name: count, Length: 279, dtype: int64
```



```python
# @title 3.2 Sentiment Distribution By Platform

channel_sentiment = df.groupby('Platform')
['Sentiment'].value_counts().unstack(fill_value=0)
print("Sentiment Distribution by Platform:\n", channel_sentiment)
plt.figure(figsize=(12, 6))
ax = channel_sentiment.plot(kind='bar', stacked=True, figsize=(12, 6))
plt.title('Sentiment Distribution by Platform', fontsize = 14,
fontweight = 'bold', color = 'forestgreen')
plt.xlabel('Channel',fontsize = 12, fontweight = 'bold', color =
'pink')
plt.ylabel('Number of Posts',fontsize = 12, fontweight = 'bold', color
= 'pink')
plt.legend(title='Sentiment')
plt.gca().set_facecolor('#dff2e1')

for p in ax.patches:
    width, height = p.get_width(), p.get_height()
    x, y = p.get_xy()
    ax.annotate(f'{height:.0f}', (x + width/2, y + height/2),
                ha='center', va='center', xytext=(0, 0),
textcoords='offset points', color='black')
```

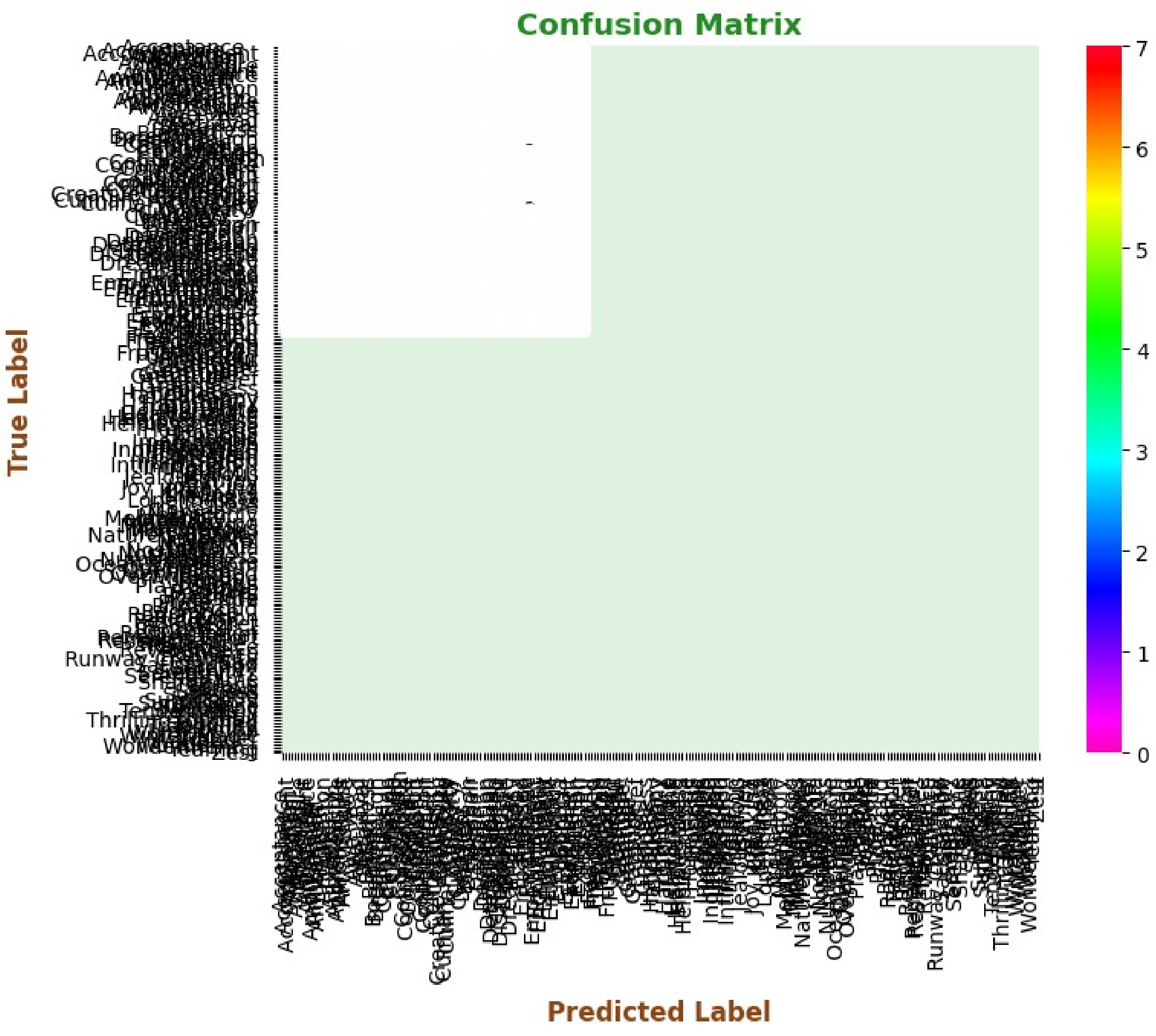
```
plt.show()

Sentiment Distribution by Platform:
 Sentiment   Acceptance     Acceptance       Accomplishment
Admiration   \
Platform

Facebook                 2                 2                3
0
Instagram                0                 2                0
1
Twitter                  0                 0                0
0
Twitter                  1                 1                0
0

Sentiment   Admiration     Admiration      Adoration      Adrenaline
\
Platform

Facebook                 0               0              0
1
Instagram                0               1              0
0
Twitter                  0               0              0
0
Twitter                  2               0              2
0

Sentiment   Adventure   Affection      ...  Vibrancy   Whimsy
\
Platform                               ...

Facebook              0              0  ...         0              0

Instagram             0              2  ...         1              2

Twitter               2              0  ...         0              0

Twitter               1              0  ...         0              0


Sentiment   Whispers of the Past   Winter Magic   Wonder   Wonder
\
Platform

Facebook                          0              1        0            0

Instagram                         0              0        1            1
```

```
Twitter                                1              0        0            0

Twitter                                0              0        0            0


Sentiment   Wonder        Wonderment      Yearning   Zest
Platform
Facebook                 0               0          1      0
Instagram                1               0          1      1
Twitter                  0               0          0      1
Twitter                  0               1          0      0

[4 rows x 279 columns]

<Figure size 1200x600 with 0 Axes>
```

Sentiment
Acceptance
Acceptance
Accomplishment
Admiration
Admiration
Admiration
Adoration
Adrenaline
Adventure
Affection
Amazement
Ambivalence
Ambivalence
Amusement
Amusement
Anger
Anticipation
Anticipation
Anxiety
Anxiety
Appreciation
Apprehensive
Arousal
ArtisticBurst
Awe
Awe
Awe
Awe
Bad
Betrayal
Betrayal
Bitter
Bitterness
Bittersweet
Blessed
Boredom
Boredom
Breakthrough
Calmness
Calmness
Captivation
Celebration
Celestial Wonder
Challenge
Charm
Colorful
Compassion
Compassion
Compassionate
Confidence
Confident
Confusion
Confusion
Confusion
Connection
Contemplation
Contentment
Contentment
Coziness
Creative Inspiration
Creativity
Creativity
Culinary Adventure
CulinaryOdyssey
Curiosity

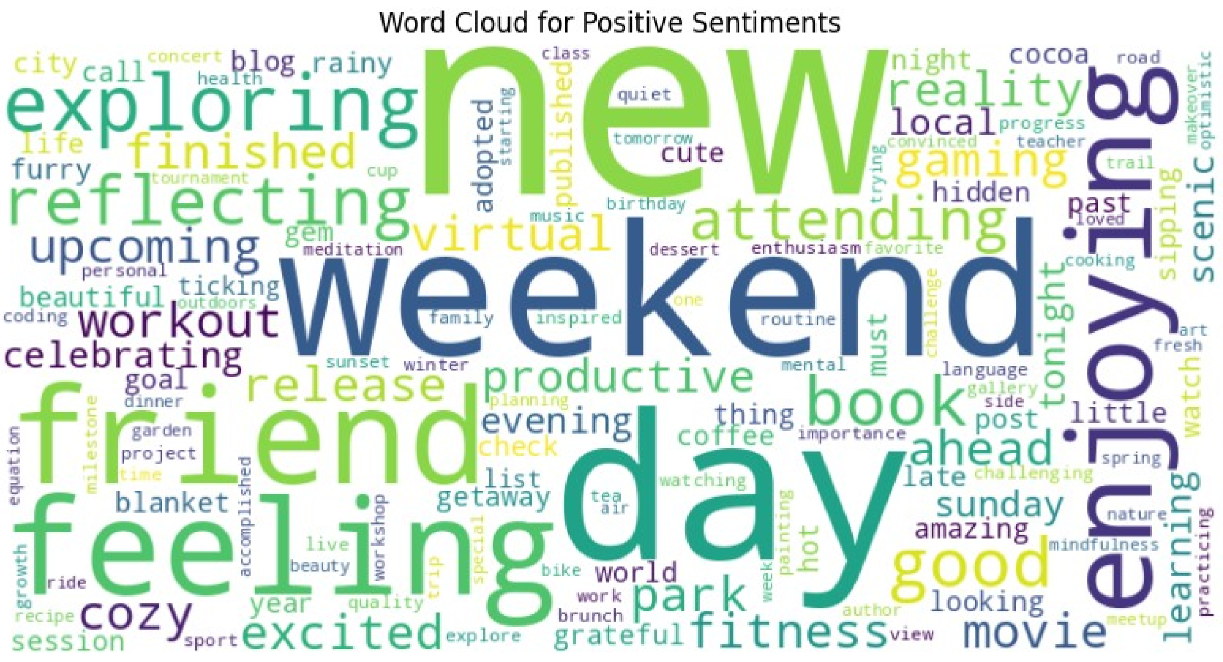
```
# @title 4.Feature Engineering

tfidf_vectorizer = TfidfVectorizer(max_features=5000)
X = tfidf_vectorizer.fit_transform(df['processed_Text'])
y = df['Sentiment']

# @title 4.1 Split The Data

X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# @title 5.Model Building
model = MultinomialNB()

model.fit(X_train, y_train)

MultinomialNB()

# @title 6.Evaluate The Model
from sklearn.metrics import accuracy_score, classification_report,
confusion_matrix
import seaborn as sns
import matplotlib.pyplot as plt

y_pred = model_nb.predict(X_test_tfidf)

accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy:.4f}")
print(classification_report(y_test, y_pred))

# Confusion Matrix
cm = confusion_matrix(y_test, y_pred)
plt.figure(figsize=(8, 6))
sns.heatmap(cm, annot=True, fmt='d', cmap='gist_rainbow_r',
            xticklabels=model_nb.classes_,
yticklabels=model_nb.classes_)
plt.title('Confusion Matrix', fontsize=14, fontweight='bold',
color='forestgreen')
plt.xlabel('Predicted Label', fontsize=12, fontweight='bold',
color='saddlebrown')
plt.ylabel('True Label', fontsize=12, fontweight='bold',
color='saddlebrown')
plt.gca().set_facecolor('#dff2e1')
plt.show()

Accuracy: 0.1088
                        precision    recall  f1-score   support

         Acceptance          0.00      0.00      0.00         2
           Admiration        0.00      0.00      0.00         1
        Admiration           0.00      0.00      0.00         1
```

```
       Affection           0.00      0.00      0.00         1
    Ambivalence            0.00      0.00      0.00         1
       Anger               0.00      0.00      0.00         1
      Anticipation         0.00      0.00      0.00         1
      Arousal              0.00      0.00      0.00         3
                Awe        0.00      0.00      0.00         1
       Awe                 0.00      0.00      0.00         1
                Bad        0.00      0.00      0.00         1
           Betrayal        0.00      0.00      0.00         2
      Betrayal             0.00      0.00      0.00         1
       Bitter              0.00      0.00      0.00         1
         Bitterness        0.00      0.00      0.00         1
        Bittersweet        0.00      0.00      0.00         1
            Boredom        0.00      0.00      0.00         1
       Calmness            0.00      0.00      0.00         1
        Captivation        0.00      0.00      0.00         1
   Celestial Wonder        0.00      0.00      0.00         1
           Colorful        0.00      0.00      0.00         1
    Confusion              0.00      0.00      0.00         3
         Connection        0.00      0.00      0.00         1
      Contemplation        0.00      0.00      0.00         1
        Contentment        0.00      0.00      0.00         3
      Contentment          0.00      0.00      0.00         1
       Coziness            0.00      0.00      0.00         1
       Creativity          0.00      0.00      0.00         1
          Curiosity        0.00      0.00      0.00         2
        Curiosity          0.00      0.00      0.00         1
    Curiosity              0.00      0.00      0.00         2
         Desolation        0.00      0.00      0.00         1
         Devastated        0.00      0.00      0.00         2
            Disgust        0.00      0.00      0.00         1
       Disgust             0.00      0.00      0.00         2
      Elation              0.00      0.00      0.00         3
           Elegance        0.00      0.00      0.00         1
        Embarrassed        0.00      0.00      0.00         1
     EmotionalStorm        0.00      0.00      0.00         1
      Empowerment          0.00      0.00      0.00         1
       Enjoyment           0.00      0.00      0.00         2
         Enthusiasm        0.00      0.00      0.00         1
            Envious        0.00      0.00      0.00         2
Envisioning History        0.00      0.00      0.00         1
       Euphoria            0.00      0.00      0.00         1
         Excitement        0.08      0.33      0.12         3
       Excitement          0.00      0.00      0.00         3
      Excitement           0.00      0.00      0.00         1
       Fear                0.00      0.00      0.00         1
            Fearful        0.00      0.00      0.00         1
         Frustrated        0.00      0.00      0.00         1
        Frustration        0.00      0.00      0.00         3
        Fulfillment         0.00      0.00      0.00         2
            Grateful        0.00      0.00      0.00         1
     Grief                  0.00      0.00      0.00         1
               Happy        0.00      0.00      0.00         6
                Hate        0.00      0.00      0.00         2
          Heartbreak        0.00      0.00      0.00         2
             Hopeful        1.00      1.00      1.00         1
       InnerJourney         0.00      0.00      0.00         1
       Inspiration          0.00      0.00      0.00         1
            Inspired        0.00      0.00      0.00         1
           Isolation        0.00      0.00      0.00         1
         Jealousy           0.00      0.00      0.00         1
                 Joy        0.17      0.88      0.28         8
        Joy                 0.00      0.00      0.00         1
       JoyfulReunion        0.00      0.00      0.00         1
        Kind                0.00      0.00      0.00         1
          Loneliness        0.00      0.00      0.00         1
     Loneliness             0.00      0.00      0.00         1
            LostLove        0.00      0.00      0.00         1
     Melancholy             0.00      0.00      0.00         2
      Miscalculation        0.00      0.00      0.00         1
             Neutral        0.00      0.00      0.00         1
       Nostalgia            0.00      0.00      0.00         1
     Nostalgia              0.00      0.00      0.00         1
     Numbness               0.00      0.00      0.00         1
         Overwhelmed        0.00      0.00      0.00         1
             Playful        0.00      0.00      0.00         2
           Positive         0.08      0.78      0.14         9
               Proud        0.00      0.00      0.00         1
       Reflection           0.00      0.00      0.00         1
      Regret                0.00      0.00      0.00         1
          Resilience        0.00      0.00      0.00         1
           Reverence        0.00      0.00      0.00         1
        Sadness             0.00      0.00      0.00         2
       Satisfaction         0.00      0.00      0.00         1
            Serenity        0.00      0.00      0.00         2
     Serenity               0.00      0.00      0.00         2
            Solitude        0.00      0.00      0.00         1
         Sorrow             0.00      0.00      0.00         1
        Spark               0.00      0.00      0.00         1
        Surprise            0.00      0.00      0.00         1
       Thrill               0.00      0.00      0.00         1
            Vibrancy        0.00      0.00      0.00         1
Whispers of the Past        0.00      0.00      0.00         1
                Zest        0.00      0.00      0.00         1

             accuracy                           0.11       147
            macro avg       0.01      0.03      0.02       147
            weighted avg       0.02      0.11      0.03       147
```



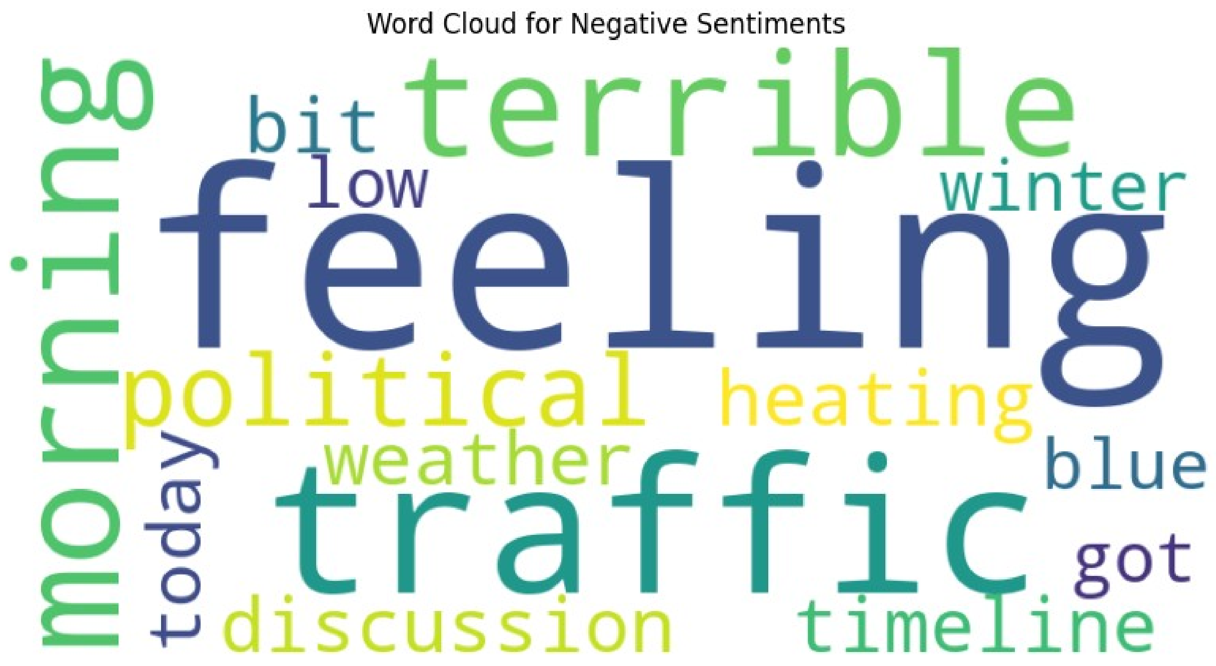
```
# @title 7.Visualization
# @title
def generate_word_cloud(text):
    """
    Generates and displays a word cloud from the given text.
    """
    if not text:
        print("No text available to generate word cloud.")
        return None

    wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(' '.join(text))
    plt.figure(figsize=(10, 5))
    plt.imshow(wordcloud, interpolation='bilinear')
    plt.axis('off')
    plt.title('Word Cloud of Social Media Posts', fontsize = 14,
fontweight = 'bold', color = 'forestgreen')
    plt.gca().set_facecolor('#dff2e1')
    plt.show()
    return True # return True if wordcloud is generated

# @title 7.1 positive
positive_df = df[df['Sentiment'].str.strip().str.lower() ==
'positive']
print("Filtered Positive Rows:", positive_df.shape[0])
print(positive_df[['Sentiment', 'processed_Text']].head())

# Convert to list
Positive_text = positive_df['processed_Text'].dropna().tolist()
Positive_text = [text for text in Positive_text if text.strip() != '']

if Positive_text:
    text = ' '.join(Positive_text)
    wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(text)

    plt.figure(figsize=(10, 5))
    plt.title('Word Cloud for Positive Sentiments')
    plt.imshow(wordcloud, interpolation='bilinear')
    plt.axis('off')
    plt.show()
    print("Positive Word Cloud Generated")
else:
    print("No positive sentiment data available.")
```

```
Filtered Positive Rows: 45
     Sentiment                                  processed_Text
0   Positive              enjoying beautiful day park
2   Positive                   finished amazing workout
3   Positive         excited upcoming weekend getaway
5   Positive       feeling grateful little thing life
6   Positive    rainy day call cozy blanket hot cocoa
```



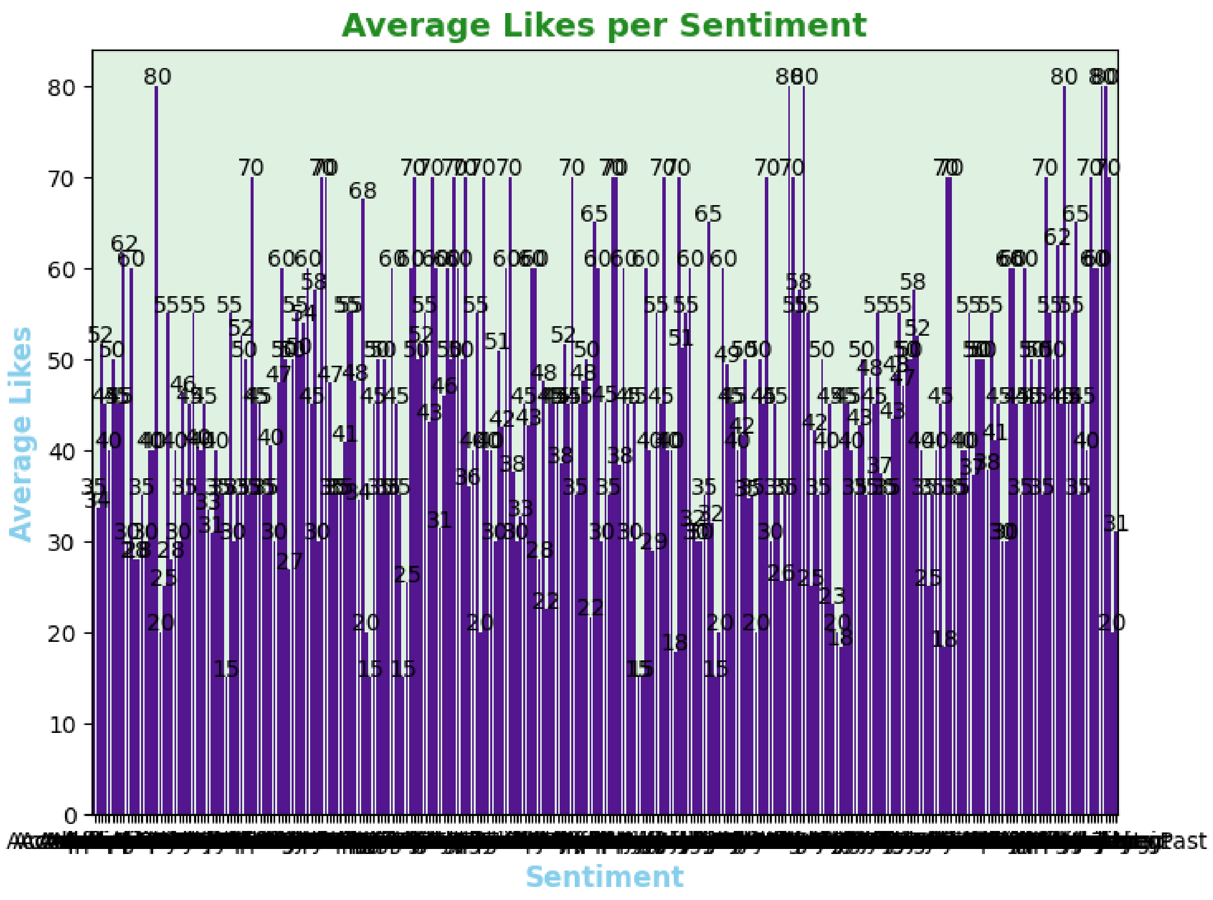
```
Positive Word Cloud Generated

# @title 7.2 Negative

negative_df = df[df['Sentiment'].str.strip().str.lower() ==
'negative']
print("Filtered Negative Rows:", negative_df.shape[0])
print(negative_df[['Sentiment', 'processed_Text']].head())

# Convert to list
Negative_text = negative_df['processed_Text'].dropna().tolist()
Negative_text = [text for text in Negative_text if text.strip() != '']

if Negative_text:
    text = ' '.join(Negative_text)
    wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(text)

    plt.figure(figsize=(10, 5))
    plt.title('Word Cloud for Negative Sentiments')
    plt.imshow(wordcloud, interpolation='bilinear')
    plt.axis('off')
    plt.show()
    print("Negative Word Cloud Generated")
else:
    print("No negative sentiment data available.")


Filtered Negative Rows: 4
      Sentiment                                processed_Text
```

```
1     Negative                  traffic terrible morning
8     Negative    political discussion heating timeline
11    Negative                 feeling bit weather today
19    Negative                winter blue got feeling low
```



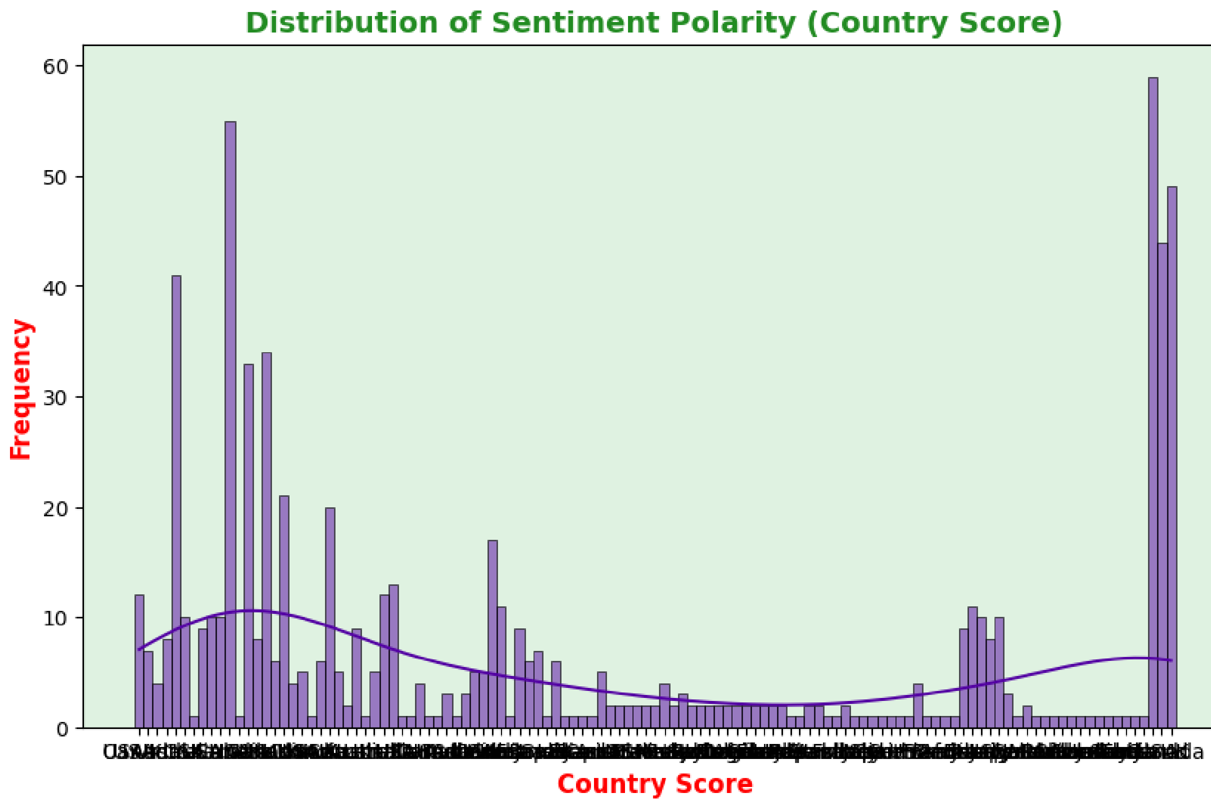
```
Negative Word Cloud Generated

# @title 7.3 Average Likes Per Sentiment
avg_Likes_sentiment = df.groupby('Sentiment')['Likes'].mean()
print("\nAverage Likes per Sentiment:\n", avg_Likes_sentiment)

plt.figure(figsize=(8, 6))
ax = sns.barplot(x=avg_Likes_sentiment.index,
y=avg_Likes_sentiment.values)
plt.title('Average Likes per Sentiment', fontsize = 14, fontweight =
'bold', color = 'forestgreen')
plt.xlabel('Sentiment',fontsize = 12, fontweight = 'bold', color =
'skyblue')
plt.ylabel('Average Likes',fontsize = 12, fontweight = 'bold', color =
'skyblue')
plt.gca().set_facecolor('#dff2e1')

for p in ax.patches:
    ax.annotate(f'{p.get_height():.0f}', (p.get_x() + p.get_width() /
2., p.get_height()),
                ha='center', va='center', xytext=(0, 5),
textcoords='offset pixels')

plt.show()
```

```
Average Likes per Sentiment:
 Sentiment
Acceptance          35.000000
Acceptance          33.600000
Accomplishment      51.666667
Admiration          45.000000
Admiration          40.000000
                      ...
Wonder              80.000000
Wonder              80.000000
Wonderment          70.000000
Yearning            20.000000
Zest                31.000000
Name: Likes, Length: 279, dtype: float64
```

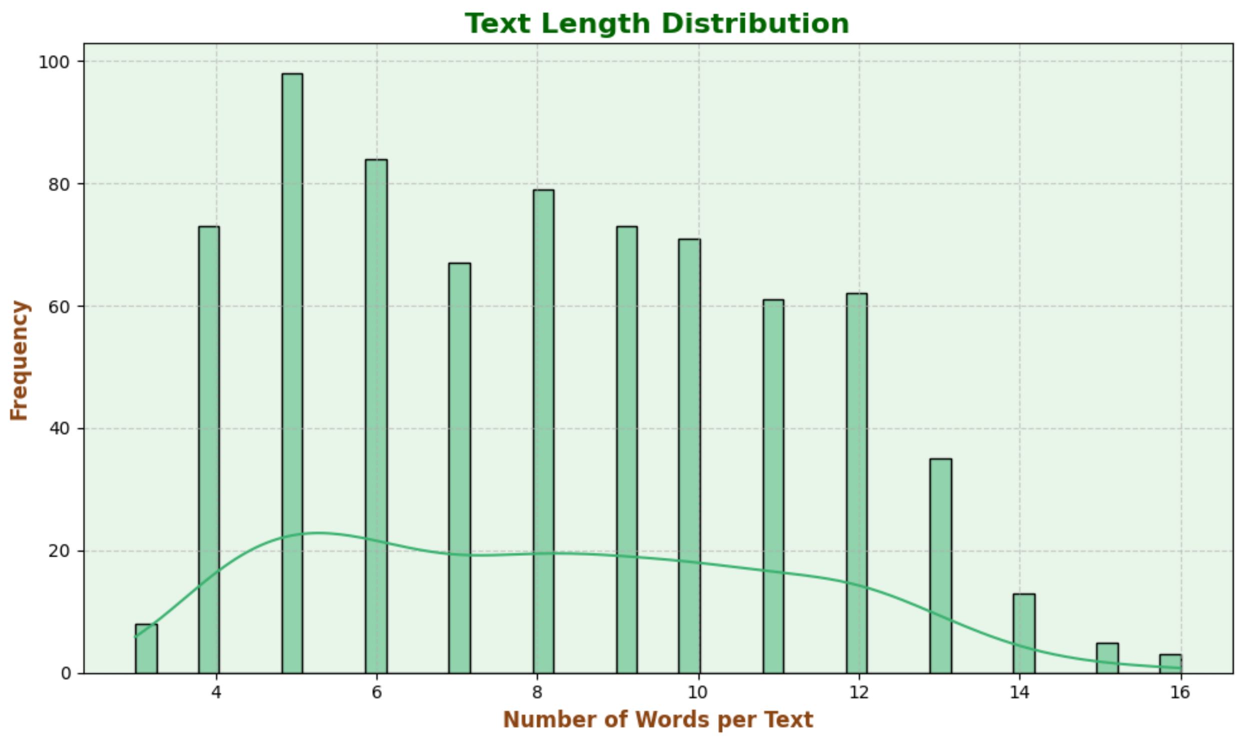


```python
# @title 7.4 Sentiment polarity
plt.figure(figsize=(10, 6))
sns.histplot(df['Country'], bins=30, kde=True)
plt.title('Distribution of Sentiment Polarity (Country Score)',
fontsize = 14, fontweight = 'bold', color = 'forestgreen')
```

```
plt.xlabel('Country Score',fontsize = 12, fontweight = 'bold', color =
'red')
plt.ylabel('Frequency',fontsize = 12, fontweight = 'bold', color =
'red')
plt.gca().set_facecolor('#dff2e1')
plt.show()
```



```
# @title 7.5 Text Length

# Calculate text length in words
text_length = df['processed_Text'].dropna().apply(lambda x:
len(str(x).split()))

print("Text Length Summary:\n", text_length.describe())

plt.figure(figsize=(10, 6))
sns.histplot(text_length, bins=50, kde=True, color='mediumseagreen',
edgecolor='black')

plt.title('Text Length Distribution', fontsize=16, fontweight='bold',
color='darkgreen')
plt.xlabel('Number of Words per Text', fontsize=12, fontweight='bold',
color='saddlebrown')
plt.ylabel('Frequency', fontsize=12, fontweight='bold',
color='saddlebrown')

plt.gca().set_facecolor('#e8f5e9')
plt.grid(visible=True, linestyle='--', alpha=0.6)

# Show the plot
plt.tight_layout()
plt.show()

Text Length Summary:
 count    732.000000
mean       8.132514
std        2.939924
min        3.000000
25%        6.000000
50%        8.000000
75%       10.000000
max       16.000000
Name: processed_Text, dtype: float64
```



```
# @title 8.Deployment
import joblib
import pickle
X_train, X_test, y_train, y_test = train_test_split(
    df['processed_Text'], df['Sentiment'], test_size=0.2,
random_state=42)
tfidf = TfidfVectorizer()
```

```
X_train_tfidf = tfidf.fit_transform(X_train)
X_test_tfidf = tfidf.transform(X_test)
model_nb = MultinomialNB()
model_nb.fit(X_train_tfidf, y_train)
joblib.dump(model_nb, 'best_model_nb.joblib')
joblib.dump(tfidf, 'best_tfidf.joblib')

print("Model and TF-IDF vectorizer saved successfully.")
try:
    loaded_model = joblib.load('best_model_nb.joblib')
    loaded_vectorizer = joblib.load('best_tfidf.joblib')
    print("Model and vectorizer loaded successfully.")
    new_text = ["Absolutely fantastic experience — exceeded my 
expectations!"]
    new_text_vectorized = loaded_vectorizer.transform(new_text)
    prediction = loaded_model.predict(new_text_vectorized)
    print(f"Predicted sentiment: {prediction[0]}")

except Exception as e:
    print(f"Error loading model/vectorizer: {e}")
```

```
Model and TF-IDF vectorizer saved successfully.
Model and vectorizer loaded successfully.
Predicted sentiment:  Positive
```