tanropndn

March 12, 2025

1 Trump tweets data cleaning

[1]:

```
import pandas as pd
df = pd.read_csv("Final Trump Tweets 2016.csv")
df.head()
```

[1]:

```
        Date                                              Tweet
0  7/19/2016  Will be on @OreillyFactor tonight at 8:30pm @F…
1  7/19/2016  It was truly an honor to introduce my wife, Me…
2  7/19/2016  @RoxaneTancredi: Democrats are coming to TRUMP…
3  7/19/2016  #MakeAmericaWorkAgain#TrumpPence16 #RNCinCLE h…
4  7/19/2016  #MakeAmericaWorkAgain #TrumpPence16 #RNCinCLE …
```

[13]:

```
import pandas as pd
import re
import glob

# Define preprocessing function
def clean_dataset(file_path):
    df = pd.read_csv(file_path)

    # Rename columns
    df = df.rename(columns={'Date_name': 'Date'})

    # df = df.drop('Date_selection1',axis=1)

    # Add Politician name
    df["Politician_name"] = "Donald Trump"

    # Remove ordinal suffixes (st, nd, rd, th) from the 'Date' column
    df['Date'] = df['Date'].str.replace(r'(\d+)(st|nd|rd|th)', r'\1',␣
 ↪regex=True)

    # Remove timezone info (e.g., 'EST')
    df['Date'] = df['Date'].apply(lambda x: re.sub(r'\s-\s.*', '', str(x)))  #␣
 ↪Remove everything after " - "
```

```
    # Convert 'Date' column to datetime format
    df['Date'] = pd.to_datetime(df['Date'], errors='coerce')

    # Format the date as 'YYYY-MM-DD'
    df['Date'] = df['Date'].dt.strftime('%Y-%m-%d')

    df = df.dropna()

    return df

# Load and clean all datasets
file_paths = ["Final Trump Tweets 2016.csv", "Final Trump Tweets 2018.csv",
              "Final Trump Tweets 2020.csv", "Final Trump Tweets 2022.csv"]

cleaned_dfs = [clean_dataset(file) for file in file_paths]

# Optionally, merge all datasets into a single DataFrame
final_df = pd.concat(cleaned_dfs, ignore_index=True)
```

```
All datasets cleaned and saved as 'Cleaned_Trump_Tweets.csv'.
```

[14]:

```
final_df.columns
```

[14]:

```
Index(['Date', 'Tweet', 'Politician_name', 'Date_selection1'], dtype='object')
```

[19]:

```
final_df = final_df.drop('Date_selection1', axis=1)
final_df.columns

# Save the cleaned dataset
final_df.to_csv("Cleaned_Trump_Tweets.csv", index=False)

print("All datasets cleaned and saved as 'Cleaned_Trump_Tweets.csv'.")
```

```
All datasets cleaned and saved as 'Cleaned_Trump_Tweets.csv'.
```

2 Alexandria Ocasio-Cortez Tweets cleaning

[50]:

```
AOC_data = ["AOC-2020.csv", "AOC-2022.csv"]
def cleaning_data(i):
    df = pd.read_csv(i)
    df = df.drop(columns=['Post Type','Video Thumbnail','Image', 'Like',␣
 ↪'Retweet','Reply','Unnamed: 8', 'Unnamed: 9', 'Unnamed: 10',
        'Unnamed: 11'], errors = 'ignore', axis=1)
    df = df.rename(columns={'Content':'Tweet'})
    df['Tweet'] = df['Tweet'].str.split('\n\n')
    df = df.explode('Tweet', ignore_index=True)
```

```python
    df['Date'] = df['Date'].str.split('T').str[0]
    df['Politician_name'] = ['Alexandria Ocasio-Cortez' for i in range(len(df))]
    df = df.dropna()
    print(df.columns)
    print(df.head())
    return df
AOC_cleaned_df = [cleaning_data(i) for i in AOC_data]
final_df = pd.concat(AOC_cleaned_df, ignore_index=True)
print(final_df.columns)
final_df.to_csv("Cleaned_AOC_Tweets.csv", index=False)
print("Cleaned data saved to Cleaned_AOC_Tweets.csv")
```

```
Index(['Date', 'Tweet', 'Politician_name'], dtype='object')
         Date                                              Tweet  \
0  2021-03-30  This is not nearly enough. The important conte…
1  2021-03-30  For context, the COVID package was $1.9T for t…
2  2021-03-30  Needs to be way bigger.The White House is expe…
3  2021-03-30  $650 billion to rebuild U.S. infrastructure\n$…
4  2021-03-30  Amazon workers in my district organized to mee…

            Politician_name
0  Alexandria Ocasio-Cortez
1  Alexandria Ocasio-Cortez
2  Alexandria Ocasio-Cortez
3  Alexandria Ocasio-Cortez
4  Alexandria Ocasio-Cortez
Index(['Date', 'Tweet', 'Politician_name'], dtype='object')
         Date                                              Tweet  \
0  2023-03-30  Oh! Are we proposing trades now? If so, I’d be…
1  2023-03-30  You bet I did. NYC doesn’t play with bigots an…
2  2023-03-30                        Have a great day!
4  2023-03-27  "It’s déjà vu all over again"First Citizens ha…
5  2023-03-23  And they’re rolling this out on April Fool’s d…

            Politician_name
0  Alexandria Ocasio-Cortez
1  Alexandria Ocasio-Cortez
2  Alexandria Ocasio-Cortez
4  Alexandria Ocasio-Cortez
5  Alexandria Ocasio-Cortez
Index(['Date', 'Tweet', 'Politician_name'], dtype='object')
Cleaned data saved to Cleaned_AOC_Tweets.csv
```

3 BernieSanders data cleaning

[53]:

```
bernie_df_sample = pd.read_csv("BernieSanders_all_2021.csv")
print(bernie_df_sample.head())
print("Null\n")
print(bernie_df_sample.isna().sum())
print("Columns:\n")
print(bernie_df_sample.columns)
```

```
                       Date Post Type  \
0  2022-12-29T18:47:40.000Z      text
1  2022-12-25T19:37:46.000Z      text
2  2022-12-23T16:10:27.000Z      text
3  2022-12-19T17:56:19.000Z      text
4  2022-12-06T14:47:50.000Z      text

                                             Content Video Thumbnail Image  \
0  Corporate greed is Southwest getting a $7 bill…             NaN   NaN
1  Jane and I want to wish everyone a wonderful C…             NaN   NaN
2  The American people should not be forced to pa…             NaN   NaN
3  The Republicans are right. 60% of workers are …             NaN   NaN
4  It is unacceptable that while Rutgers Universi…             NaN   NaN

   Like Retweet Reply Unnamed: 8 Unnamed: 9  Unnamed: 10  Unnamed: 11  \
0   55K    9.5K    2K        NaN        NaN          NaN          NaN
1   12K     484   486        NaN        NaN          NaN          NaN
2  4.5K     739   301        NaN        NaN          NaN          NaN
3   42K    4.6K  3.5K        NaN        NaN          NaN          NaN
4  5.1K    1.2K   369        NaN        NaN          NaN          NaN

   Unnamed: 12
0          NaN
1          NaN
2          NaN
3          NaN
4          NaN
Null

Date                 3
Post Type            7
Content              7
Video Thumbnail    525
Image              403
Like                18
Retweet             19
Reply               19
Unnamed: 8         533
```

```
Unnamed: 9       540
Unnamed: 10      545
Unnamed: 11      552
Unnamed: 12      556
dtype: int64
Columns:

Index(['Date', 'Post Type', 'Content', 'Video Thumbnail', 'Image', 'Like',
       'Retweet', 'Reply', 'Unnamed: 8', 'Unnamed: 9', 'Unnamed: 10',
       'Unnamed: 11', 'Unnamed: 12'],
      dtype='object')
```

```
[56]: BernieSanders_data = ['BernieSanders_all_2021.csv','BernieSanders_all_2022.
       ↪csv','BernieSanders_all_2023.csv']
      def cleaning_data(i):
          df = pd.read_csv(i)
          df = df.drop(columns=['Post Type','Video Thumbnail','Image', 'Like',␣
       ↪'Retweet','Reply','Unnamed: 8', 'Unnamed: 9', 'Unnamed: 10',
             'Unnamed: 11', 'Unnamed: 12'], errors = 'ignore', axis=1)
          df = df.rename(columns={'Content':'Tweet'})
          df['Tweet'] = df['Tweet'].str.split('\n\n')
          df = df.explode('Tweet', ignore_index=True)

          df['Date'] = df['Date'].str.split('T').str[0]
          df['Politician_name'] = ['Alexandria Ocasio-Cortez' for i in range(len(df))]
          df = df.dropna()
          # print(df.columns)
          # print(df.head())
          return df
      BernieSanders_cleaned_df = [cleaning_data(i) for i in BernieSanders_data]
      BernieSanders_final_df = pd.concat(BernieSanders_cleaned_df, ignore_index=True)
      print(BernieSanders_final_df.columns)
      print(BernieSanders_final_df.isna().sum())
      BernieSanders_final_df.to_csv("Cleaned_BernieSanders_Tweets.csv", index=False)
      print("Cleaned data saved to Cleaned_BernieSanders_Tweets.csv")
```

```
Index(['Date', 'Tweet', 'Politician_name'], dtype='object')
Date               0
Tweet              0
Politician_name    0
dtype: int64
Cleaned data saved to Cleaned_BernieSanders_Tweets.csv
```

4 HawleyMO

[57]:
```
Hawley_sample_df = pd.read_csv("HawleyMO-2018.csv")
print(Hawley_sample_df.head())
print("Null\n")
print(Hawley_sample_df.isna().sum())
print("Columns:\n")
print(Hawley_sample_df.columns)
```

```
                       Date Post Type  \
0  2019-03-29T20:14:52.000Z      text
1  2019-03-29T13:57:51.000Z     image
2  2019-03-28T20:47:09.000Z      text
3  2019-03-28T15:21:03.000Z     video
4  2019-03-28T11:57:58.000Z      text

                                             Content Video Thumbnail  \
0  I’ll be introducing legislation next week to f…            NaN
1  Blaise Hawley visits Daddy’s new office - and …            NaN
2  Google should do this in public. What are they…            NaN
3  We need a special counsel to get answers from …            NaN
4  Time for Google to go on the record. Why are t…            NaN

                                               Image  Like Retweet Reply  \
0                                                NaN    95      19    14
1  https://pbs.twimg.com/media/D21MQvWW0AAEKvG?fo…   217      22    14
2                                                NaN   105      53    24
3  https://pbs.twimg.com/ext_tw_video_thumb/11112…  2.9K     784   230
4                                                NaN   151      52    21

   Unnamed: 8  Unnamed: 9
0         NaN         NaN
1         NaN         NaN
2         NaN         NaN
3         NaN         NaN
4         NaN         NaN
Null

Date                 3
Post Type            2
Content              3
Video Thumbnail    189
Image              125
Like                 5
Retweet              5
Reply                4
Unnamed: 8         191
```

```
Unnamed: 9         192
dtype: int64
Columns:

Index(['Date', 'Post Type', 'Content', 'Video Thumbnail', 'Image', 'Like',
       'Retweet', 'Reply', 'Unnamed: 8', 'Unnamed: 9'],
      dtype='object')
```

[58]:
```
HawleyMO_data = ['HawleyMO-2018.csv','HawleyMO-2020.csv','HawleyMO-2022.csv']
def cleaning_data(i):
    df = pd.read_csv(i)
    df = df.drop(columns=['Post Type','Video Thumbnail','Image', 'Like',␣
 ↪'Retweet','Reply','Unnamed: 8', 'Unnamed: 9', 'Unnamed: 10',
        'Unnamed: 11', 'Unnamed: 12'], errors = 'ignore', axis=1)
    df = df.rename(columns={'Content':'Tweet'})
    df['Tweet'] = df['Tweet'].str.split('\n\n')
    df = df.explode('Tweet', ignore_index=True)

    df['Date'] = df['Date'].str.split('T').str[0]
    df['Politician_name'] = ['HawleyMO' for i in range(len(df))]
    df = df.dropna()
    # print(df.columns)
    # print(df.head())
    return df
HawleyMO_cleaned_df = [cleaning_data(i) for i in HawleyMO_data]
HawleyMO_final_df = pd.concat(HawleyMO_cleaned_df, ignore_index=True)
print(HawleyMO_final_df.columns)
print(HawleyMO_final_df.isna().sum())
HawleyMO_final_df.to_csv("Cleaned_HawleyMO_Tweets.csv", index=False)
print("Cleaned data saved to Cleaned_HawleyMO_Tweets.csv")
```

```
Index(['Date', 'Tweet', 'Politician_name'], dtype='object')
Date               0
Tweet              0
Politician_name    0
dtype: int64
Cleaned data saved to Cleaned_HawleyMO_Tweets.csv
```

5 RonDeSantis

[59]:
```
RonDeSantis_sample_df = pd.read_csv("RonDeSantis-2022.csv")
print(RonDeSantis_sample_df.head())
print("Null\n")
print(RonDeSantis_sample_df.isna().sum())
print("Columns:\n")
print(RonDeSantis_sample_df.columns)
```

```
                       Date Post Type  \
0  2023-03-14T13:30:29.000Z     video
1  2023-03-12T17:14:24.000Z     video
2  2023-03-12T03:08:42.000Z     image
3  2023-03-11T00:44:57.000Z     image
4  2023-03-10T17:06:54.000Z     image

                                             Content Video Thumbnail  \
0  Good to be back in the great state of Nevada!\…             NaN
1  THANK YOU, IOWA!\n\nTogether, Iowa and Florida…             NaN
2  Great to be in Nevada tonight to share the pos…             NaN
3  Bold leadership like that of Florida and Iowa …             NaN
4  Thank you for the warm welcome, Davenport! Gre…             NaN

                                               Image  Like Retweet Reply
0    https://pbs.twimg.com/media/FrLrdoFXoAISdfv.jpg  3.1K     371   956
1    https://pbs.twimg.com/media/FrCO9_TXwAQJnOT.jpg  6.5K     774  1.5K
2  https://pbs.twimg.com/media/Fq_PNtcXoAI7ThI?fo…  5.3K     506  1.4K
3  https://pbs.twimg.com/media/Fq5kFrzWcAA0z-3?fo…    4K     355    1K
4  https://pbs.twimg.com/media/Fq32IFlacAEPcGE?fo…  3.2K     319   565
Null

Date                1
Post Type           2
Content             2
Video Thumbnail    57
Image              28
Like                2
Retweet             3
Reply               3
dtype: int64
Columns:

Index(['Date', 'Post Type', 'Content', 'Video Thumbnail', 'Image', 'Like',
       'Retweet', 'Reply'],
      dtype='object')
```

[60]:

```python
RonDeSantis_data = ['RonDeSantis-2022.csv']
def cleaning_data(i):
    df = pd.read_csv(i)
    df = df.drop(columns=['Post Type','Video Thumbnail','Image', 'Like',␣
 ↪'Retweet','Reply','Unnamed: 8', 'Unnamed: 9', 'Unnamed: 10',
       'Unnamed: 11', 'Unnamed: 12'], errors = 'ignore', axis=1)
    df = df.rename(columns={'Content':'Tweet'})
    df['Tweet'] = df['Tweet'].str.split('\n\n')
    df = df.explode('Tweet', ignore_index=True)
    df['Date'] = df['Date'].str.split('T').str[0]
    df['Politician_name'] = ['RonDeSantis' for i in range(len(df))]
    df = df.dropna()
    # print(df.columns)
    # print(df.head())
    return df
RonDeSantis_cleaned_df = [cleaning_data(i) for i in RonDeSantis_data]
RonDeSantis_final_df = pd.concat(RonDeSantis_cleaned_df, ignore_index=True)
print(RonDeSantis_final_df.columns)
print(RonDeSantis_final_df.isna().sum())
RonDeSantis_final_df.to_csv("Cleaned_RonDeSantis_Tweets.csv", index=False)
print("Cleaned data saved to Cleaned_RonDeSantis_Tweets.csv")
```

```
Index(['Date', 'Tweet', 'Politician_name'], dtype='object')
Date               0
Tweet              0
Politician_name    0
dtype: int64
Cleaned data saved to Cleaned_RonDeSantis_Tweets.csv
```

6 SenWarren

[61]:

```
SenWarren_sample_df = pd.read_csv("SenWarren-2018.csv")
print(SenWarren_sample_df.head())
print("Null\n")
print(SenWarren_sample_df.isna().sum())
print("Columns:\n")
print(SenWarren_sample_df.columns)
```

```
                       Date Post Type  \
0  2019-03-29T19:10:34.000Z      text
1  2019-03-28T22:48:46.000Z      text
2  2019-03-28T22:47:07.000Z      text
3  2019-03-28T22:46:29.000Z      text
4  2019-03-28T22:45:31.000Z      text

                                             Content Video Thumbnail Image  \
0  Secretary  is blocking 140,000 students who we…             NaN   NaN
1  I’m glad Tim Sloan got canned, but let’s be cl…             NaN   NaN
2  I kept pushing the Fed to maintain the growth …             NaN   NaN
3  But  kept getting caught cheating - on mortgag…             NaN   NaN
4  That growth cap gave the Fed leverage to force…             NaN   NaN

   Like Retweet Reply Unnamed: 8 Unnamed: 9 Unnamed: 10  Unnamed: 11
0  3.3K    1.2K   299        NaN        NaN         NaN          NaN
1  2.6K     738   337        NaN        NaN         NaN          NaN
2  1.5K     310    47        NaN        NaN         NaN          NaN
```

```
3   469     154    19         NaN        NaN          NaN           NaN
4   328      79    12         NaN        NaN          NaN           NaN
Null

Date                 2
Post Type            5
Content              6
Video Thumbnail    418
Image              357
Like                11
Retweet              9
Reply                9
Unnamed: 8         420
Unnamed: 9         422
Unnamed: 10        423
Unnamed: 11        423
dtype: int64
Columns:

Index(['Date', 'Post Type', 'Content', 'Video Thumbnail', 'Image', 'Like',
       'Retweet', 'Reply', 'Unnamed: 8', 'Unnamed: 9', 'Unnamed: 10',
       'Unnamed: 11'],
      dtype='object')
```

[62]:

```python
SenWarren_data = ['SenWarren-2018.csv', 'SenWarren-2020.csv']
def cleaning_data(i):
    df = pd.read_csv(i)
    df = df.drop(columns=['Post Type','Video Thumbnail','Image', 'Like',␣
 ↪'Retweet','Reply','Unnamed: 8', 'Unnamed: 9', 'Unnamed: 10',
        'Unnamed: 11', 'Unnamed: 12'], errors = 'ignore', axis=1)
    df = df.rename(columns={'Content':'Tweet'})
    df['Tweet'] = df['Tweet'].str.split('\n\n')
    df = df.explode('Tweet', ignore_index=True)

    df['Date'] = df['Date'].str.split('T').str[0]
    df['Politician_name'] = ['SenWarren' for i in range(len(df))]
    df = df.dropna()
    # print(df.columns)
    # print(df.head())
    return df
SenWarren_cleaned_df = [cleaning_data(i) for i in SenWarren_data]
SenWarren_final_df = pd.concat(SenWarren_cleaned_df, ignore_index=True)
print(SenWarren_final_df.columns)
print(SenWarren_final_df.isna().sum())
SenWarren_final_df.to_csv("Cleaned_SenWarren_Tweets.csv", index=False)
print("Cleaned data saved to Cleaned_SenWarren_Tweets.csv")
```

```
Index(['Date', 'Tweet', 'Politician_name'], dtype='object')
```

```
Date              0
Tweet             0
Politician_name   0
dtype: int64
Cleaned data saved to Cleaned_SenWarren_Tweets.csv
```

7 Merge all dataframes

[64]:

```
import pandas as pd

dfs = [
    'Cleaned_AOC_Tweets.csv', 'Cleaned_BernieSanders_Tweets.csv',
    'Cleaned_HawleyMO_Tweets.csv', 'Cleaned_RonDeSantis_Tweets.csv',
    'Cleaned_SenWarren_Tweets.csv', 'Cleaned_Trump_Tweets.csv'
]

merge_data = []  # List to store DataFrames

for i in dfs:
    d = pd.read_csv(i)  # Read CSV file
    merge_data.append(d)  # Append DataFrame, not file name

# Concatenate all DataFrames
merged_df = pd.concat(merge_data, ignore_index=True)

# Save to CSV
merged_df.to_csv("All_politicians_cleaned_tweets.csv", index=False)

print("Merged CSV saved successfully!")
```

```
Merged CSV saved successfully!
```

8 Working with merged Tweets data

[2]:

```
import pandas as pd
df = pd.read_csv("All_politicians_cleaned_tweets.csv")
```

[3]:

```
df.dropna(inplace=True)
df.isna().any()
```

[3]:

```
Date              False
Tweet             False
Politician_name   False
dtype: bool
```

[4]:

```
print(df[~df['Date'].str.match(r'\d{1,2}/\d{1,2}/\d{4}', na=False)])
```

```
                                                    Date  \
144   Says he doesn't want to forgive debts of borro…
1091                                          2022-12-29
1092                                          2022-12-25
1093                                          2022-12-23
1094                                          2022-12-19
…                                                  …
3803                                          2021-02-11
3804                                          2021-02-11
3805                                          2021-02-10
3806                                          2021-02-10
3807                                          2021-02-09

                                                   Tweet  \
144   https://pbs.twimg.com/ext_tw_video_thumb/13618…
1091  Corporate greed is Southwest getting a $7 bill…
1092  Jane and I want to wish everyone a wonderful C…
1093  The American people should not be forced to pa…
1094  The Republicans are right. 60% of workers are …
…                                                  …
3803                              https://bit.ly/2Ni0Zhb
3804  I hope you’ll read ’s powerful new piece on wh…
3805  I hope that my Republican colleagues have had …
3806  . fights from his heart through unthinkable tr…
3807  The SEC has a lot of work to do to aggressivel…

               Politician_name
144   Alexandria Ocasio-Cortez
1091  Alexandria Ocasio-Cortez
1092  Alexandria Ocasio-Cortez
1093  Alexandria Ocasio-Cortez
1094  Alexandria Ocasio-Cortez
…                         …
3803                 SenWarren
3804                 SenWarren
3805                 SenWarren
3806                 SenWarren
3807                 SenWarren

[2002 rows x 3 columns]
```

[5]:

```python
def clean_date(value):
    try:
        # Try converting the value to a datetime object
        date_obj = pd.to_datetime(value, errors='coerce')
        # If conversion is successful, return it in MM-DD-YYYY format
        if pd.notna(date_obj):
            return date_obj.strftime('%m-%d-%Y')
    except:
        pass
    return None  # Return None for non-date values

# Apply the function to the 'date' column
df['Date'] = df['Date'].astype(str).apply(clean_date)

# Remove rows with invalid dates
df = df.dropna(subset=['Date'])
```

8.1 Removing URL and special characters

[6]:

```
import re

def preprocess_text(text):
    # Remove URLs, special characters, and convert text to lowercase
    text = re.sub(r'http\S+|www\S+|https\S+', '', text)  # Remove URLs
    text = re.sub(r'[^A-Za-z0-9\s#]', '', text)  # Remove special characters
    text = text.lower()  # Convert to lowercase
    return text
df['Tweet'] = df['Tweet'].astype(str)
# Apply text preprocessing
df["Tweet"] = df["Tweet"].apply(preprocess_text)
```

[7]:

```
df['Date'] = pd.to_datetime(df['Date'])

# Extract features
df['year'] = df['Date'].dt.year
df['month'] = df['Date'].dt.month
df['day'] = df['Date'].dt.day
df['weekday'] = df['Date'].dt.day_name()
```

[8]:

```
df.to_csv('All_politicians_cleaned_tweets_final.xlsx', index=False)
```

8.2 Extract noun

[9]:

```
import spacy

# Load SpaCy model
nlp = spacy.load("en_core_web_sm", disable=["ner", "parser"])

# Function to extract nouns
def extract_nouns(text):
    doc = nlp(text)
    return [token.text for token in doc if token.pos_ in ['NOUN', 'PROPN']]
```

```python
# Apply the function to the DataFrame
df['nouns'] = df['Tweet'].apply(extract_nouns)

# Display the result
print(df)
```

```
            Date                                              Tweet  \
0     2021-03-30  this is not nearly enough the important contex…
1     2021-03-30  for context the covid package was 19t for this…
2     2021-03-30  needs to be way biggerthe white house is expec…
3     2021-03-30  650 billion to rebuild us infrastructure\n400 …
4     2021-03-30  amazon workers in my district organized to mee…
…          …                                                 …
15620 2021-01-06                     app note text of deleted video
15621 2021-01-06  these are the things and events that happen wh…
15622 2021-01-08
15623 2021-01-08  the 75000000 great american patriots who voted…
15624 2021-01-08  to all of those who have asked i will not be g…

                Politician_name  year  month  day    weekday  \
0      Alexandria Ocasio-Cortez  2021      3   30    Tuesday
1      Alexandria Ocasio-Cortez  2021      3   30    Tuesday
2      Alexandria Ocasio-Cortez  2021      3   30    Tuesday
3      Alexandria Ocasio-Cortez  2021      3   30    Tuesday
4      Alexandria Ocasio-Cortez  2021      3   30    Tuesday
…                         …   …    …  …        …
15620              Donald Trump  2021      1    6  Wednesday
15621              Donald Trump  2021      1    6  Wednesday
15622              Donald Trump  2021      1    8     Friday
15623              Donald Trump  2021      1    8     Friday
15624              Donald Trump  2021      1    8     Friday

                                                   nouns
0                                    [context, t, years]
1         [context, package, t, year, provisions, years]
2       [way, biggerthe, white, house, infrastructure,…
3       [us, infrastructure, housing, infrastructure, …
4       [amazon, workers, district, year, dark, exposu…
…                                                  …
15620                           [app, note, text, video]
15621  [things, events, landslide, election, victory,…
15622                                                 []
15623  [patriots, america, america, voice, future, wa…
15624                      [inauguration, january, 20th]

[15600 rows x 8 columns]
```

[10]:
```
df_grouped = df.groupby('Politician_name')['Tweet'].apply(" ".join).
 ↪reset_index()
```

[11]:
```
from sklearn.feature_extraction.text import TfidfVectorizer
vectorizer = TfidfVectorizer(stop_words="english",ngram_range=(1, 2))
tfidf_matrix_grouped = vectorizer.fit_transform(df_grouped["Tweet"])
```

[12]:
```
tfidf_df_grouped = pd.DataFrame(tfidf_matrix_grouped.toarray(),columns =␣
 ↪vectorizer.get_feature_names_out())
tfidf_df_grouped["Politician_name"] = df_grouped["Politician_name"]
```

[13]:
```
tfidf_df_grouped.head()
```

[13]:
```
        001  001 owns  001 russia       007  007 sean        01    01 389  \
0  0.004233  0.001411    0.002822  0.000000  0.000000  0.004553  0.002822
1  0.000000  0.000000    0.000000  0.000249  0.000249  0.000000  0.000000
2  0.000000  0.000000    0.000000  0.000000  0.000000  0.000000  0.000000
3  0.000000  0.000000    0.000000  0.000000  0.000000  0.000000  0.000000
4  0.000000  0.000000    0.000000  0.000000  0.000000  0.006352  0.000000

     01 pay   01 rose  01 wealthy  …  zuckerberg following  \
0  0.000000  0.002822    0.000000  …              0.000000
1  0.000000  0.000000    0.000000  …              0.000000
2  0.000000  0.000000    0.000000  …              0.004517
3  0.000000  0.000000    0.000000  …              0.000000
4  0.003936  0.000000    0.003936  …              0.000000

   zuckerberg misled  zuckerberg oath  zuckerberg refused  zuckerberg told  \
0           0.001411         0.000000            0.000000          0.00000
1           0.000000         0.000000            0.000000          0.00000
2           0.000000         0.004517            0.004517          0.01355
3           0.000000         0.000000            0.000000          0.00000
4           0.000000         0.000000            0.000000          0.00000

    zuluout  zuluout man    zurich  zurich released          Politician_name
0  0.000000     0.000000  0.000000         0.000000  Alexandria Ocasio-Cortez
1  0.000249     0.000249  0.000249         0.000249              Donald Trump
2  0.000000     0.000000  0.000000         0.000000                 HawleyMO
3  0.000000     0.000000  0.000000         0.000000               RonDeSantis
4  0.000000     0.000000  0.000000         0.000000                 SenWarren

[5 rows x 154409 columns]
```

[14]:
```
def top_words_per_person(df, n=5):
    for _, row in df.iterrows():
        person = row["Politician_name"]
        word_scores = row.drop("Politician_name").astype(float)  # Exclude the␣
↪"person" column
        top_words = word_scores.nlargest(n).index.tolist()  # Get top N words
        print(f"  {person}: {', '.join(top_words)}")
```

[15]:
```
print("\n  Top 3 words per person:")
top_words_per_person(tfidf_df_grouped)
```

```

  Top 3 words per person:
  Alexandria Ocasio-Cortez: workers, people, working, greed, country
  Donald Trump: rt, great, realdonaldtrump, president, trump
  HawleyMO: mosen, bigtech, biden, working, today
  RonDeSantis: florida, desantis speaks, governor desantis, county, governor
  SenWarren: endcorruptionnow, people, federal, families, big
```

[16]:
```
from sklearn.metrics.pairwise import cosine_similarity

similarity_matrix = cosine_similarity(tfidf_matrix_grouped)
similarity_df = pd.DataFrame(similarity_matrix,␣
↪index=df_grouped["Politician_name"], columns=df_grouped["Politician_name"])
print("\n  Similarity between people:")
print(similarity_df)
```

```

  Similarity between people:
Politician_name           Alexandria Ocasio-Cortez  Donald Trump  HawleyMO  \
Politician_name
Alexandria Ocasio-Cortez                  1.000000      0.279368  0.360031
Donald Trump                              0.279368      1.000000  0.289324
HawleyMO                                  0.360031      0.289324  1.000000
RonDeSantis                               0.143293      0.140762  0.116644
SenWarren                                 0.485345      0.259092  0.350130

Politician_name           RonDeSantis  SenWarren
Politician_name
Alexandria Ocasio-Cortez     0.143293   0.485345
Donald Trump                 0.140762   0.259092
HawleyMO                     0.116644   0.350130
RonDeSantis                  1.000000   0.120229
SenWarren                    0.120229   1.000000
```

8.3 Sentiment analysis

[17]:

```
from textblob import TextBlob
def sentiment(text):
    analysis = TextBlob(str(text))
    return analysis.sentiment.polarity

df['sentiment'] = df['Tweet'].apply(sentiment)
df['sentiment_category'] = df['sentiment'].apply(lambda x:'positive' if x >0␣
 ↪else('negative' if x<0 else 'neutral'))
df.head()
```

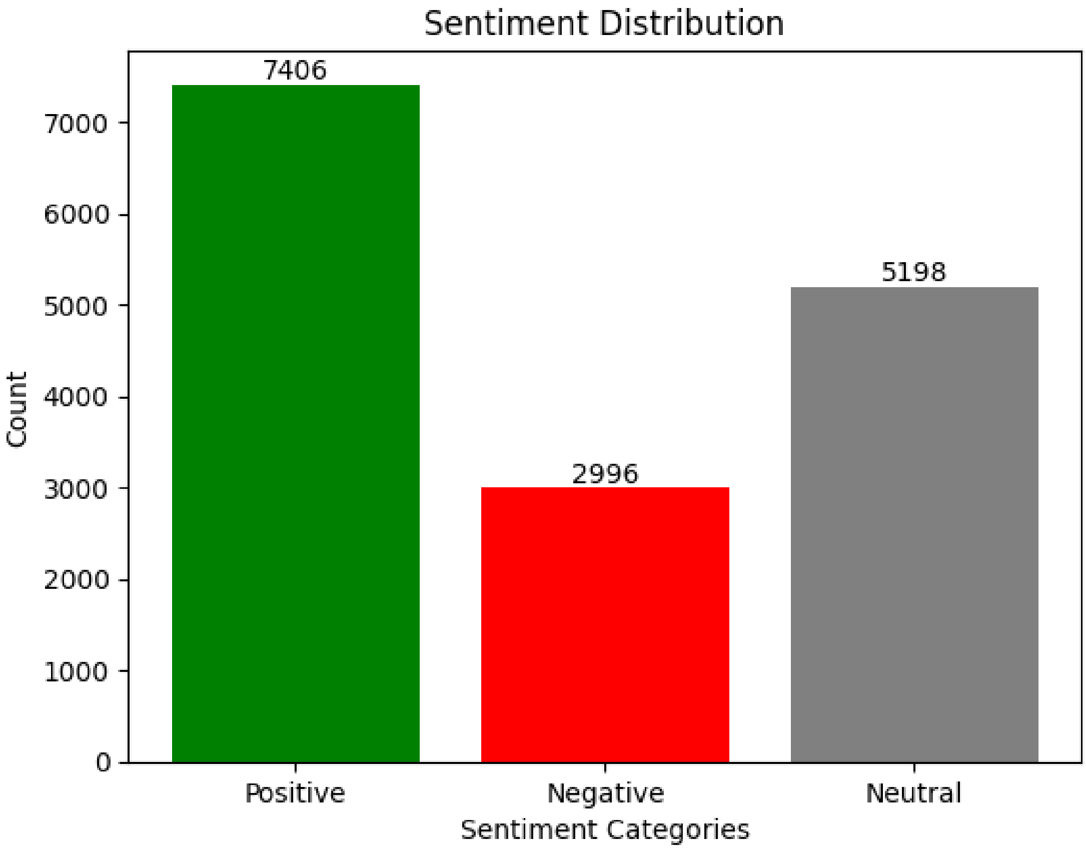
[17]:

```
        Date                                              Tweet  \
0 2021-03-30  this is not nearly enough the important contex…
1 2021-03-30  for context the covid package was 19t for this…
2 2021-03-30  needs to be way biggerthe white house is expec…
3 2021-03-30  650 billion to rebuild us infrastructure\n400 …
4 2021-03-30  amazon workers in my district organized to mee…

            Politician_name  year  month  day  weekday  \
0  Alexandria Ocasio-Cortez  2021      3   30  Tuesday
1  Alexandria Ocasio-Cortez  2021      3   30  Tuesday
2  Alexandria Ocasio-Cortez  2021      3   30  Tuesday
3  Alexandria Ocasio-Cortez  2021      3   30  Tuesday
4  Alexandria Ocasio-Cortez  2021      3   30  Tuesday

                                               nouns  sentiment  \
0                              [context, t, years]     0.2000
1     [context, package, t, year, provisions, years]     0.0000
2  [way, biggerthe, white, house, infrastructure,…    -0.0500
3  [us, infrastructure, housing, infrastructure, …    -0.2000
4  [amazon, workers, district, year, dark, exposu…    -0.0375

  sentiment_category
0           positive
1            neutral
2           negative
3           negative
4           negative
```

[18]:

```
import matplotlib.pyplot as plt
sentiment_count = [
df['sentiment_category'].value_counts().get('positive',0),
df['sentiment_category'].value_counts().get('negative',0),
df['sentiment_category'].value_counts().get('neutral',0)
]
sentiment_categories = ['Positive','Negative','Neutral']
```

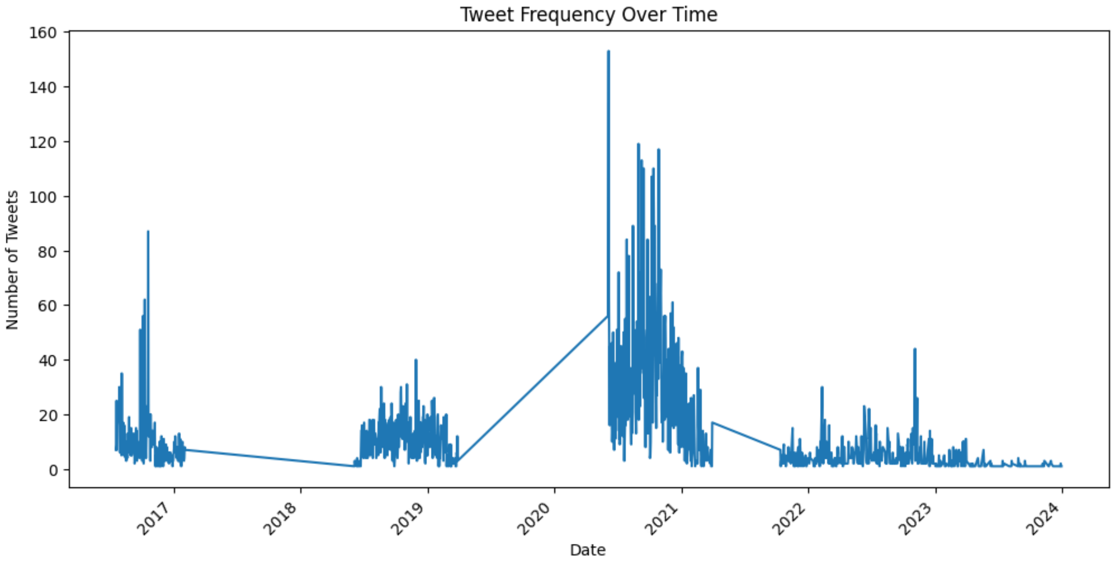
```
plt.bar(sentiment_categories, sentiment_count, color=['green', 'red', 'gray'])

# Add titles and labels
plt.title('Sentiment Distribution')
plt.xlabel('Sentiment Categories')
plt.ylabel('Count')

# Add values on top of the bars
for i, count in enumerate(sentiment_count):
    plt.text(i, count + 0.05, str(count), ha='center', va='bottom', fontsize=10)

plt.show()
```



8.3.1 Tweet Frequency Over Time

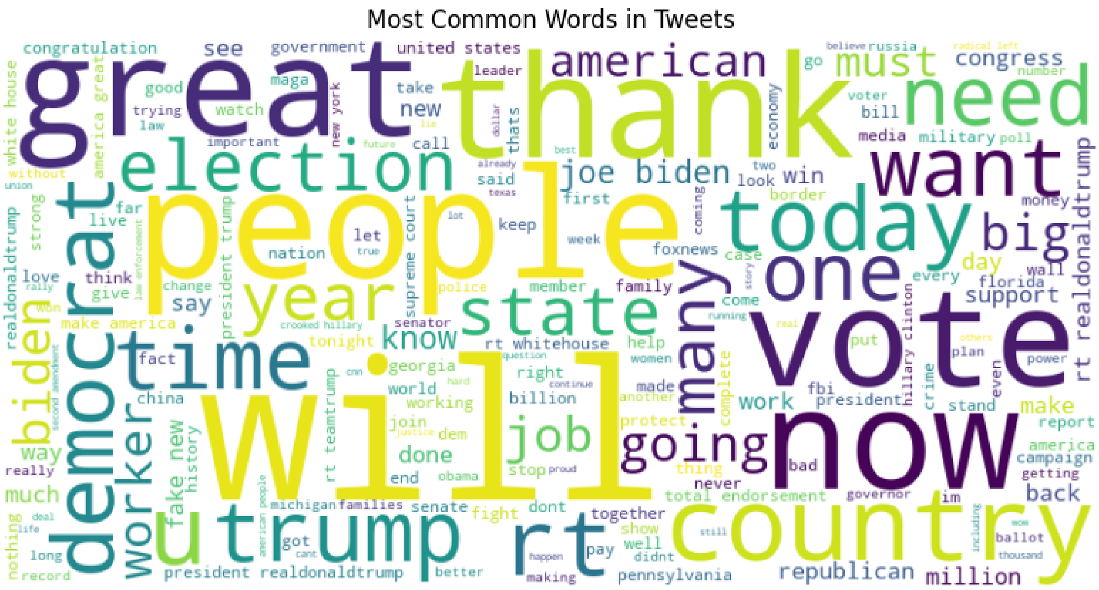
[19]:

```
plt.figure(figsize=(12, 6))
df['Date'].value_counts().sort_index().plot()
plt.title("Tweet Frequency Over Time")
plt.xlabel("Date")
plt.ylabel("Number of Tweets")
plt.xticks(rotation=45)
plt.show()
```



8.3.2 Wordcloud

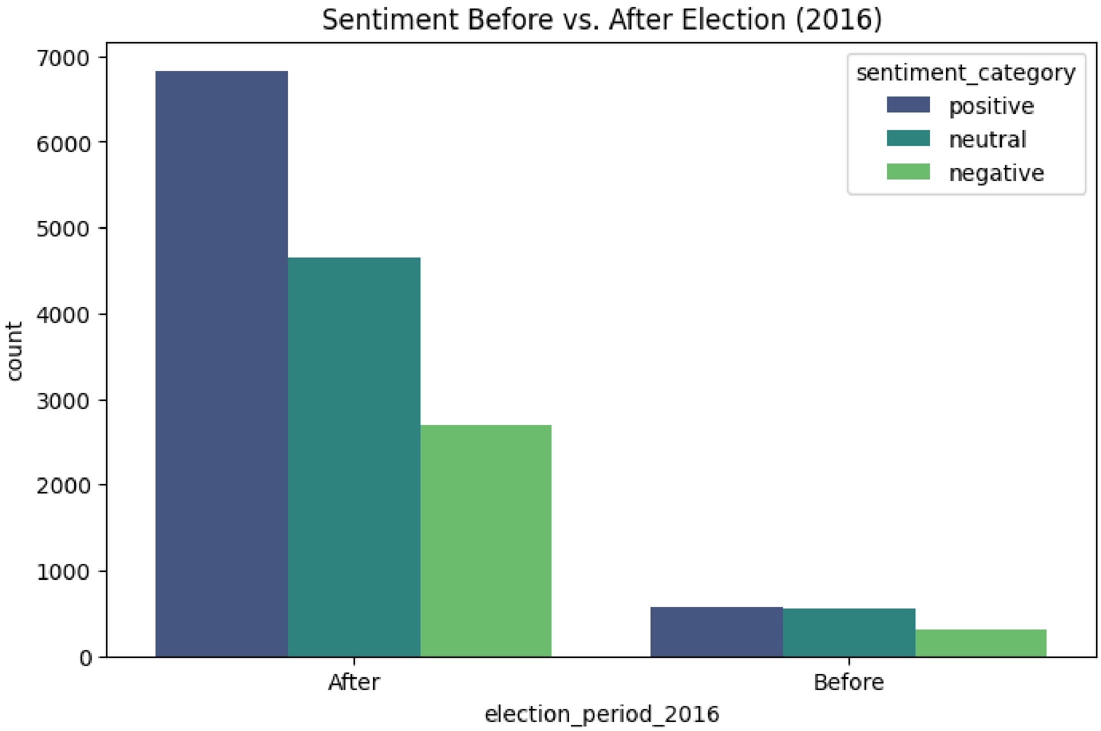
[20]:
```
from wordcloud import WordCloud
tweet_text = " ".join(tweet for tweet in df['Tweet'].dropna())
wordcloud = WordCloud(width=800, height=400, background_color='white').
  ↪generate(tweet_text)
plt.figure(figsize=(10, 5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis("off")
plt.title("Most Common Words in Tweets")
plt.show()
```

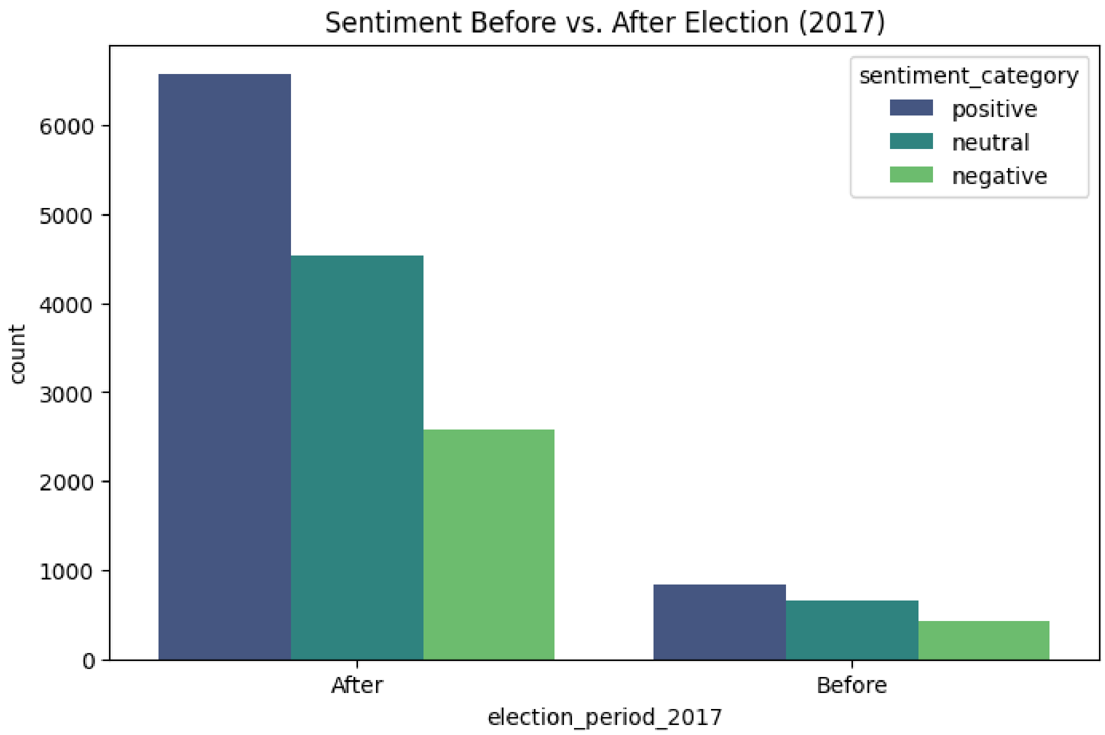


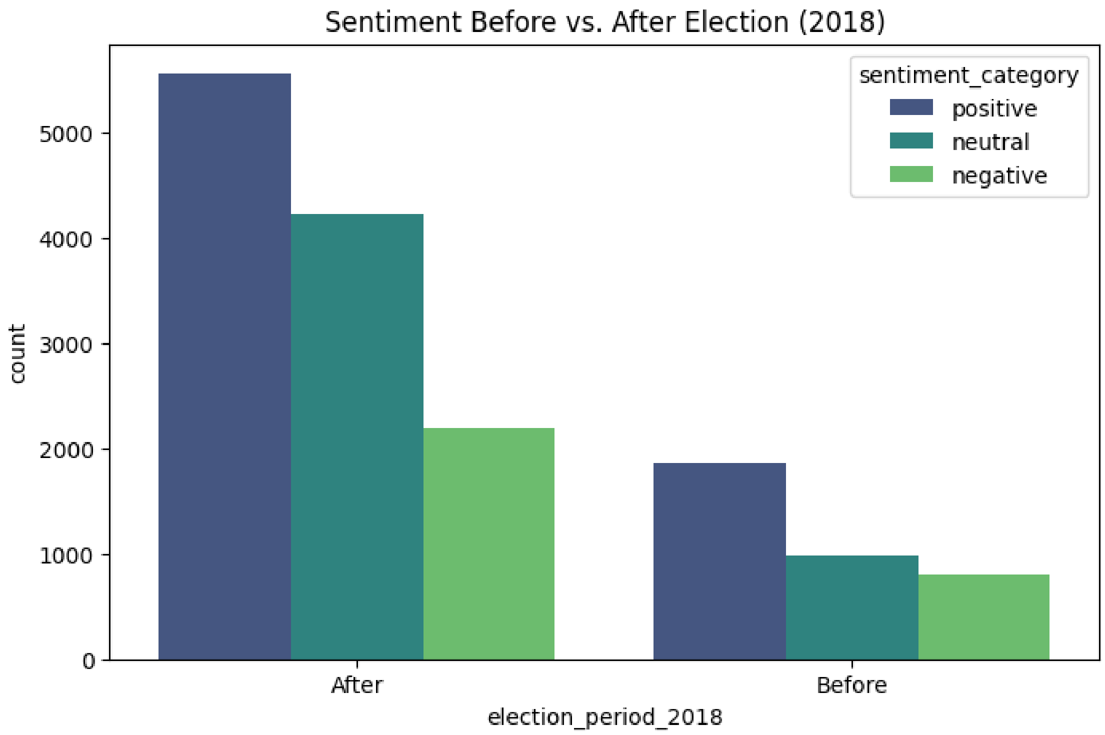
8.3.3 Tweets Before vs. After Elections (Example for 2020 Election)

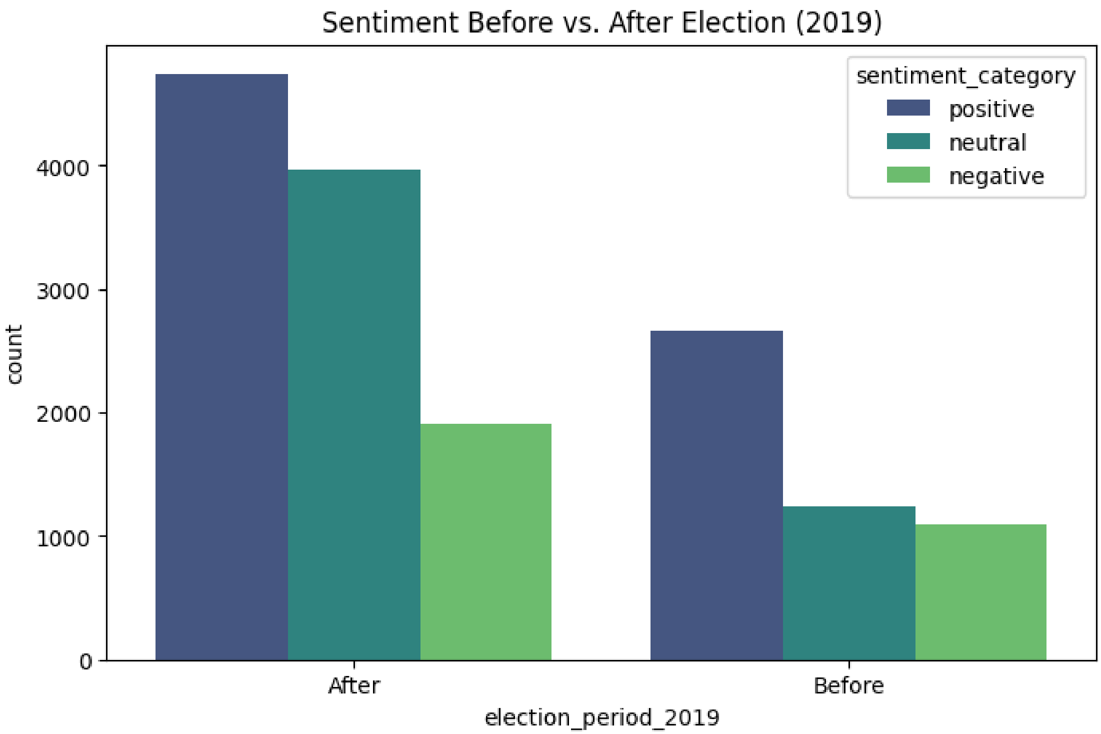
```
[21]: import matplotlib.pyplot as plt
      import seaborn as sns
      from datetime import datetime

      # Define election dates
      election_dates = {
          2016: datetime(2016, 11, 8),
          2017: datetime(2017, 11, 7),
          2018: datetime(2018, 11, 6),
          2019: datetime(2019, 11, 5),
          2020: datetime(2020, 11, 3),
          2021: datetime(2021, 11, 2),
          2022: datetime(2022, 11, 8),
          2023: datetime(2023, 11, 7)
      }

      # Ensure the 'date' column is in datetime format
      df['Date'] = pd.to_datetime(df['Date'])

      # Create plots for each election year
      for year, election_date in election_dates.items():
          df[f'election_period_{year}'] = df['Date'].apply(lambda x: 'Before' if x <␣
       ↪election_date else 'After')

          plt.figure(figsize=(8, 5))
```

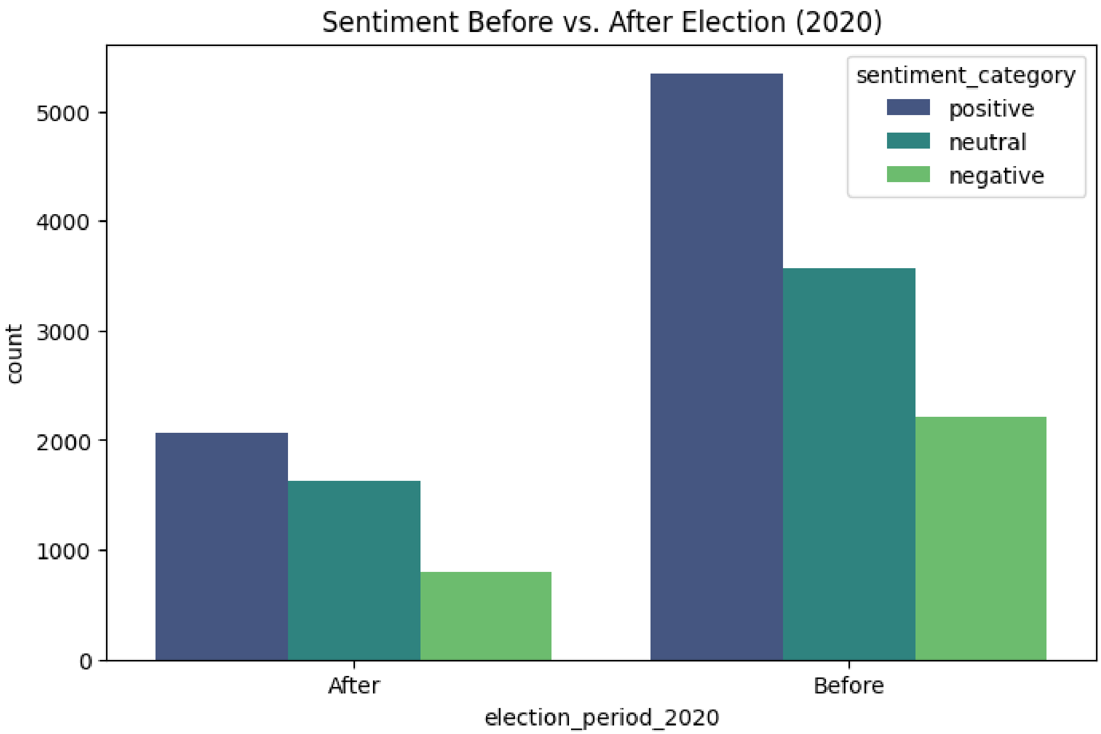
```
    sns.countplot(x=f'election_period_{year}', hue='sentiment_category',␣
↪data=df, palette='viridis')
    plt.title(f"Sentiment Before vs. After Election ({year})")
    plt.show()
```

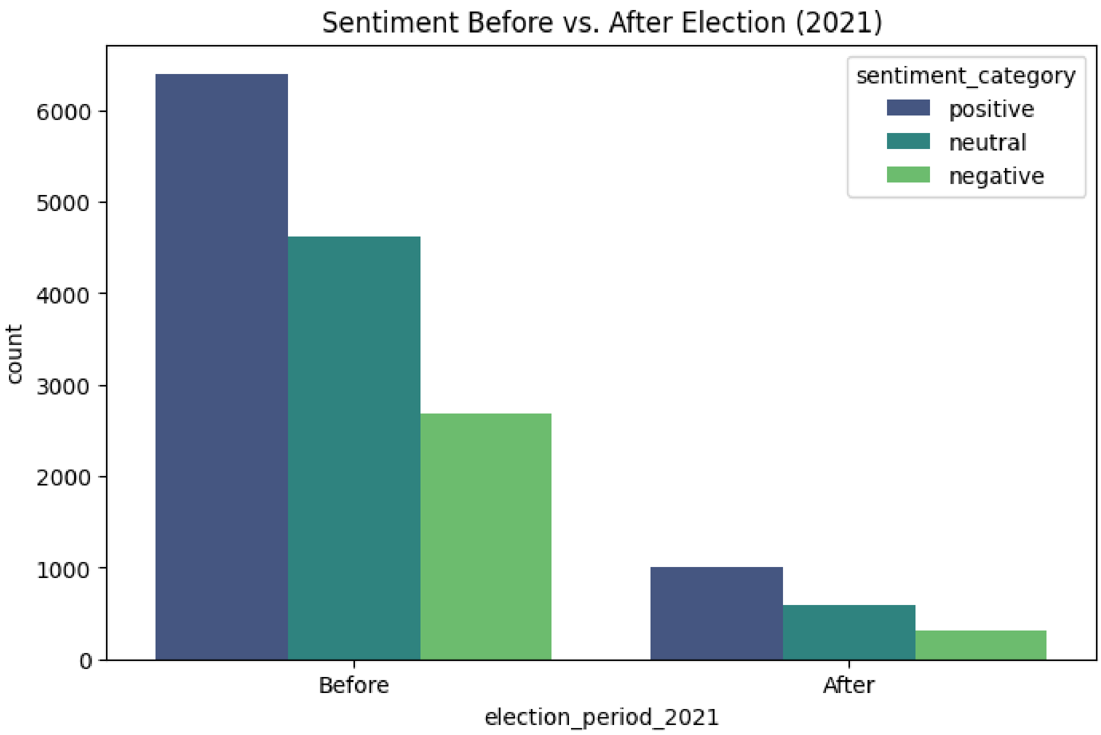


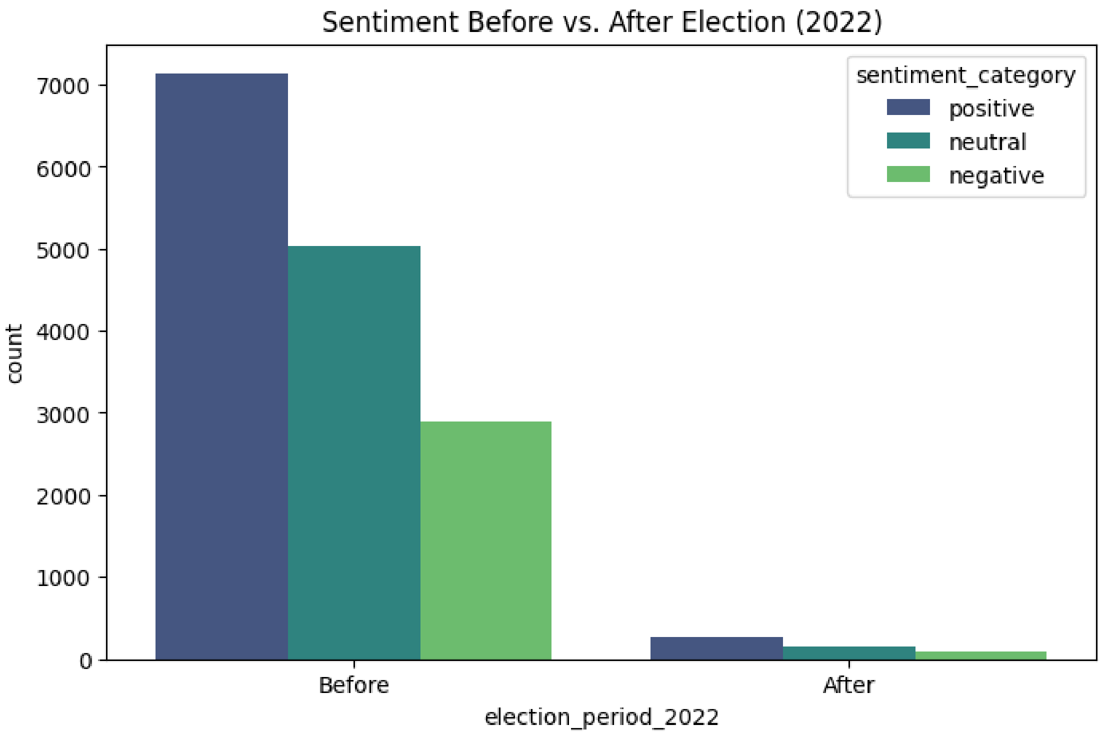

Sentiment Before vs. After Election (2017)
sentiment_category
positive
neutral
negative
count
0
1000
2000
3000
4000
5000
6000
After
Before
election_period_2017

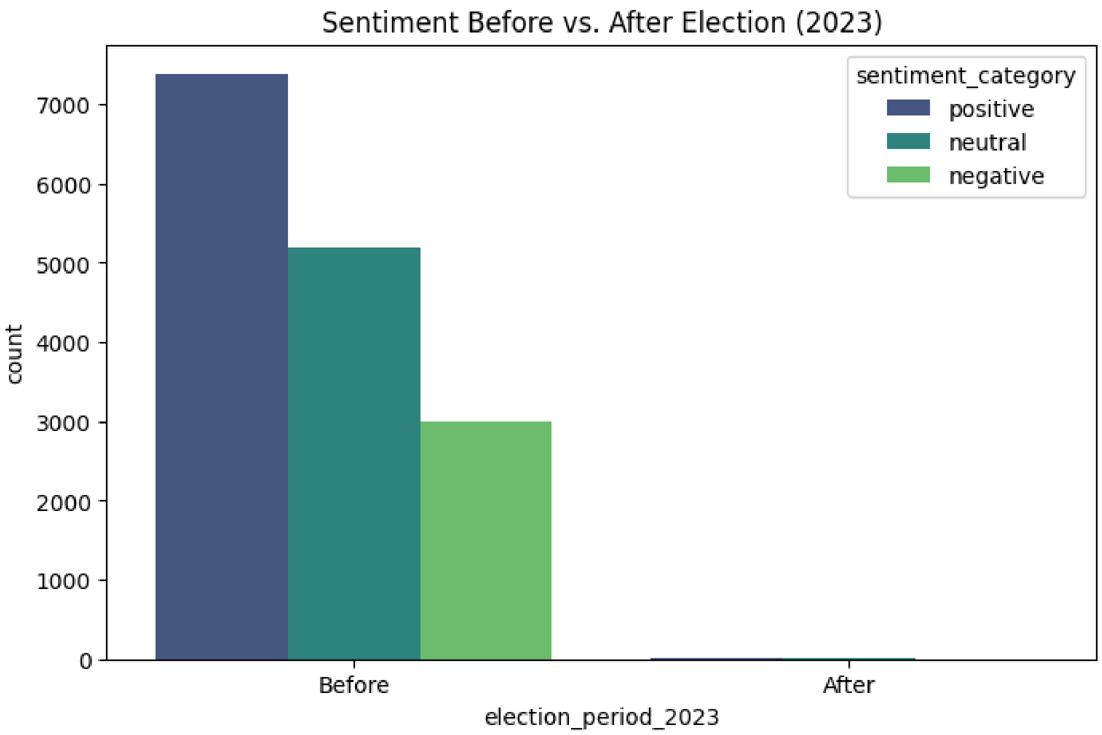

Sentiment Before vs. After Election (2018)
sentiment_category
positive
neutral
negative
count
0
1000
2000
3000
4000
5000
After
Before
election_period_2018


Sentiment Before vs. After Election (2019)
sentiment_category
positive
neutral
negative
count
0
1000
2000
3000
4000
After
Before
election_period_2019


Sentiment Before vs. After Election (2020)
sentiment_category
positive
neutral
negative
count
0
1000
2000
3000
4000
5000
After
Before
election_period_2020


Sentiment Before vs. After Election (2021)
sentiment_category
positive
neutral
negative
count
0
1000
2000
3000
4000
5000
6000
Before
After
election_period_2021


Sentiment Before vs. After Election (2022)
sentiment_category
positive
neutral
negative
count
0
1000
2000
3000
4000
5000
6000
7000
Before
After
election_period_2022

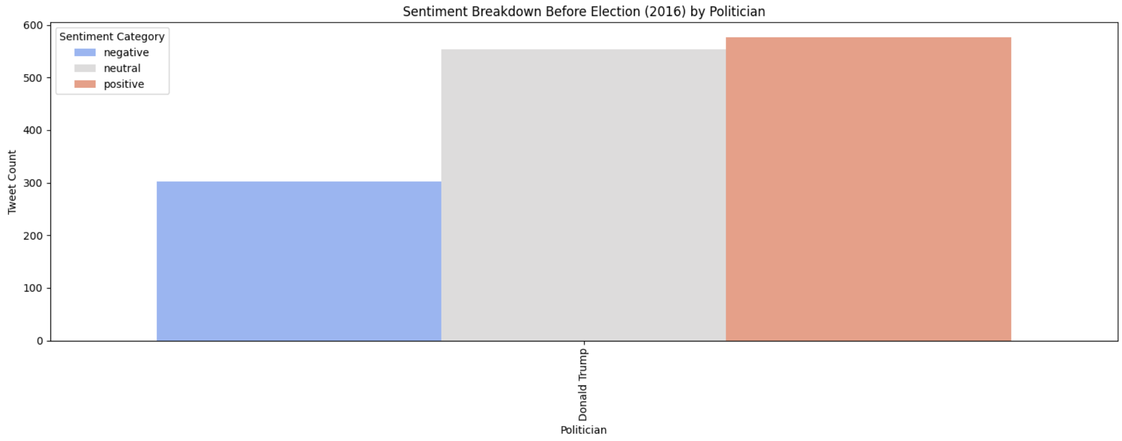


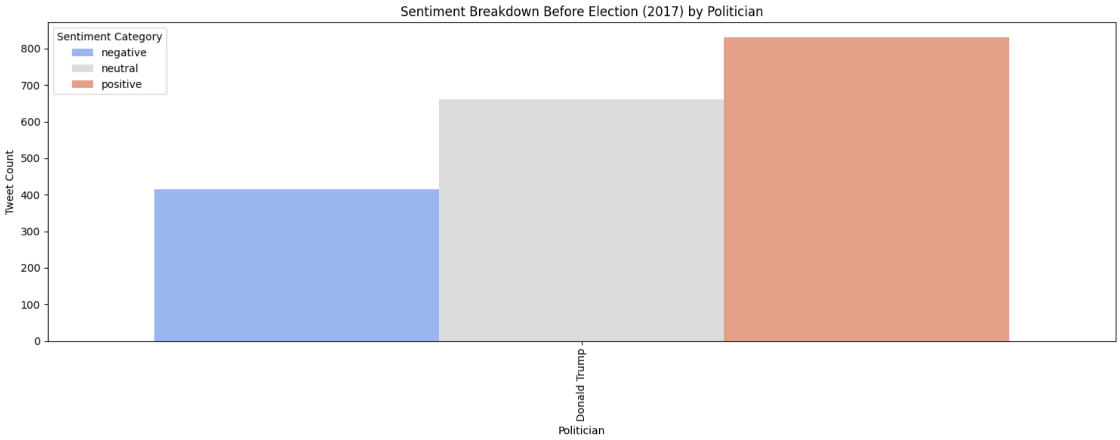
8.3.4 Tweet sentiment by politician before and after elections

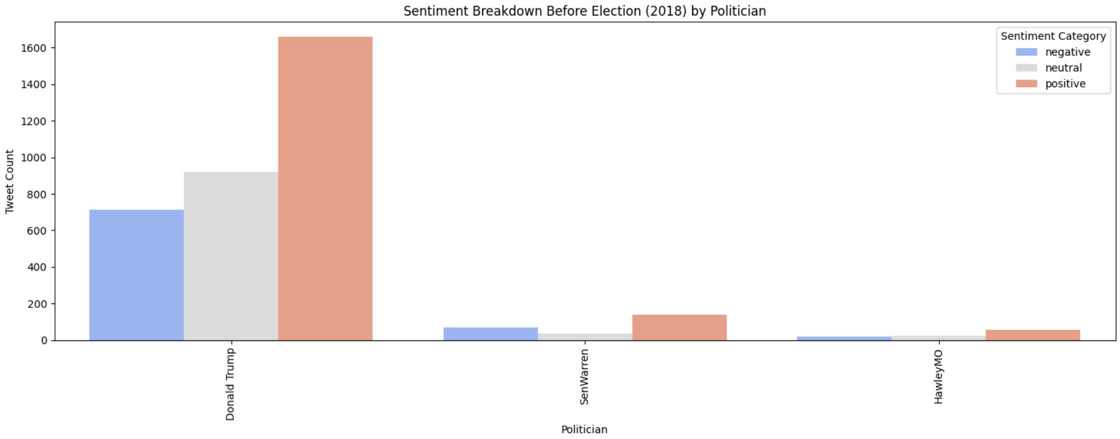
[22]:

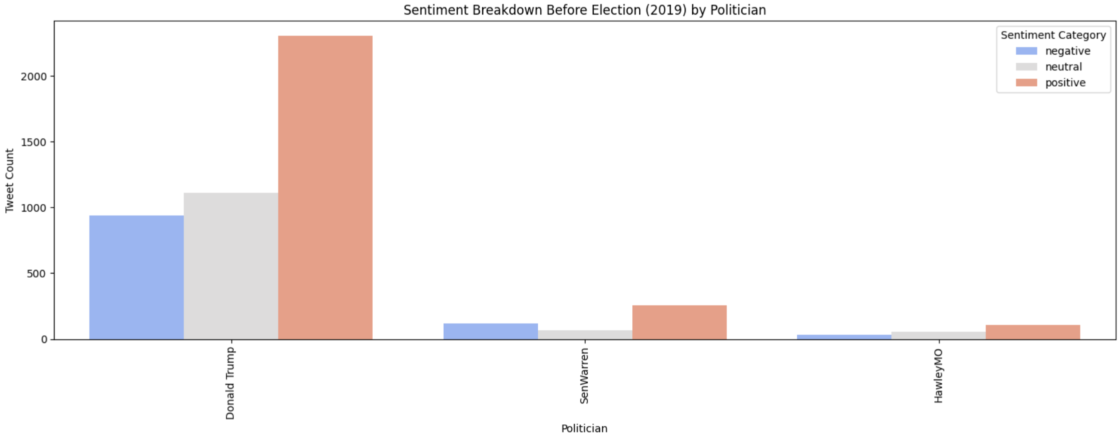
```python
import matplotlib.pyplot as plt
import seaborn as sns
from datetime import datetime
import pandas as pd

# Define election dates
election_dates = {
    2016: datetime(2016, 11, 8),
    2017: datetime(2017, 11, 7),
    2018: datetime(2018, 11, 6),
    2019: datetime(2019, 11, 5),
    2020: datetime(2020, 11, 3),
    2021: datetime(2021, 11, 2),
    2022: datetime(2022, 11, 8),
    2023: datetime(2023, 11, 7)
}

# Ensure 'date' column is in datetime format
df['Date'] = pd.to_datetime(df['Date'])

# Generate sentiment analysis by politician for each election year
```

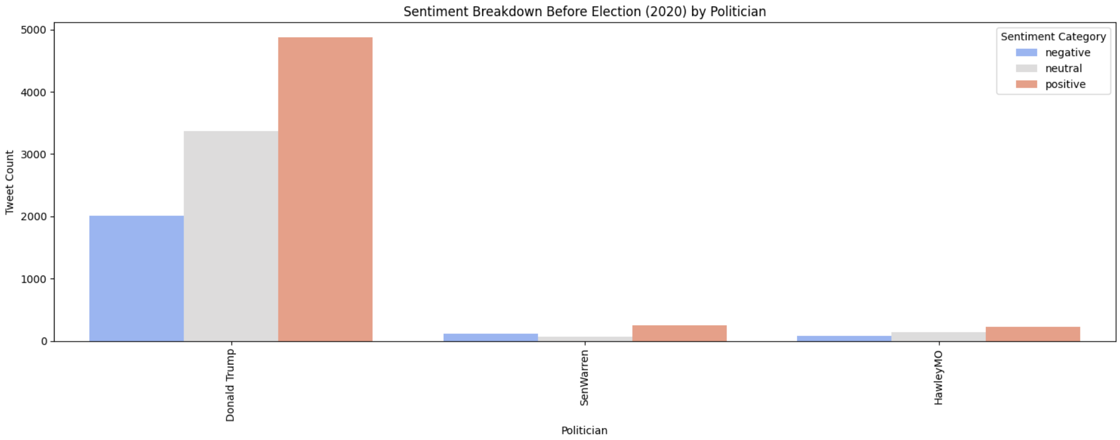
```python
for year, election_date in election_dates.items():
    # Add a column to indicate whether the tweet is before or after the election
    df[f'election_period_{year}'] = df['Date'].apply(lambda x: 'Before' if x < election_date else 'After')

    # Filter data for the current year's election period
    filtered_df = df[df[f'election_period_{year}'] == 'Before']  # You can change this to 'After' if needed

    # Group by politician and sentiment category to get counts
    grouped_df = filtered_df.groupby(['Politician_name', 'sentiment_category']).size().reset_index(name='count')

    # Plot sentiment breakdown per politician
    plt.figure(figsize=(15, 6))
    sns.barplot(
        x="Politician_name",
        y="count",
        hue="sentiment_category",
        data=grouped_df,
        palette='coolwarm',
        order=grouped_df.groupby('Politician_name')['count'].sum().sort_values(ascending=False).index
    )
    plt.title(f"Sentiment Breakdown Before Election ({year}) by Politician")
    plt.xlabel("Politician")
    plt.ylabel("Tweet Count")
    plt.xticks(rotation=90)
    plt.legend(title="Sentiment Category")
    plt.tight_layout()
    plt.show()
```

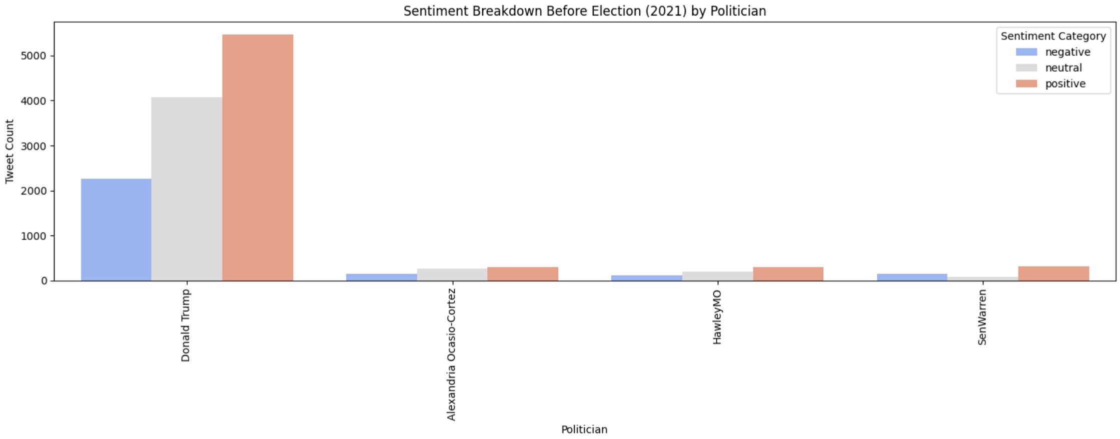


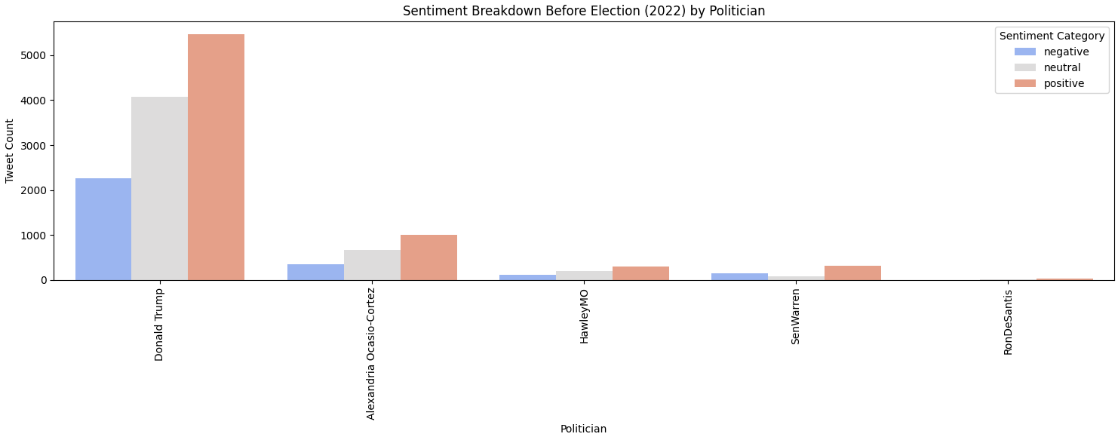

Sentiment Breakdown Before Election (2017) by Politician
Sentiment Category
negative
neutral
positive
Tweet Count
0
100
200
300
400
500
600
700
800
Donald Trump
Politician

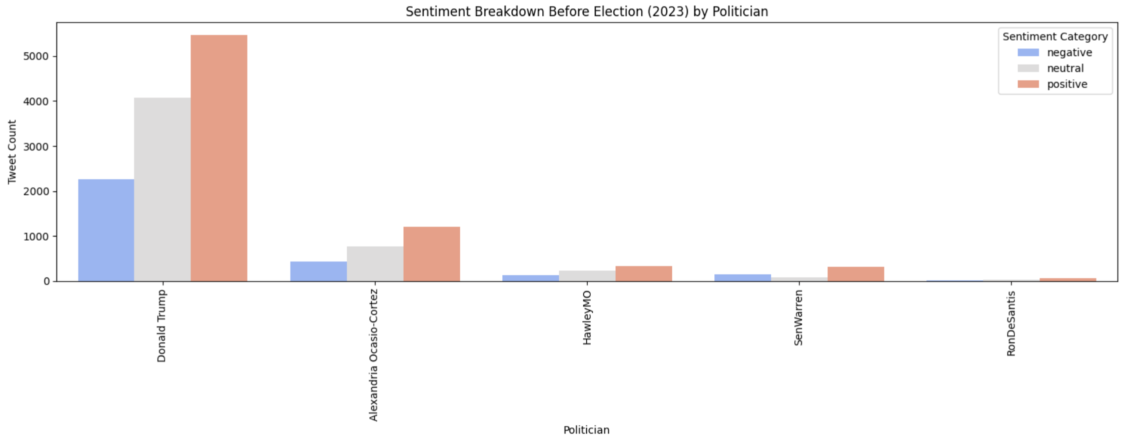

Sentiment Breakdown Before Election (2018) by Politician
Sentiment Category
negative
neutral
positive
Tweet Count
0
200
400
600
800
1000
1200
1400
1600
Donald Trump
SenWarren
HawleyMO
Politician


Sentiment Breakdown Before Election (2019) by Politician
Sentiment Category
negative
neutral
positive
Tweet Count
0
500
1000
1500
2000
Donald Trump
SenWarren
HawleyMO
Politician


Sentiment Breakdown Before Election (2020) by Politician
Tweet Count
0
1000
2000
3000
4000
5000
Donald Trump
SenWarren
HawleyMO
Politician
Sentiment Category
negative
neutral
positive


Sentiment Breakdown Before Election (2021) by Politician
Tweet Count
0
1000
2000
3000
4000
5000
Donald Trump
Alexandria Ocasio-Cortez
HawleyMO
SenWarren
Politician
Sentiment Category
negative
neutral
positive


Sentiment Breakdown Before Election (2022) by Politician
Tweet Count
0
1000
2000
3000
4000
5000
Donald Trump
Alexandria Ocasio-Cortez
HawleyMO
SenWarren
RonDeSantis
Politician
Sentiment Category
negative
neutral
positive



```
[23]: df.to_excel("Final_Cleaned_Tweets_For_PowerBI.xlsx", index=False)
```

```
[ ]:
```