

```
In [1]: pip install google-api-python-client pandas nltk matplotlib seaborn
```

```
Collecting google-api-python-client
  Downloading google_api_python_client-2.149.0-py2.py3-none-any.whl (12.3 MB)
Requirement already satisfied: pandas in c:\users\nagra\anaconda3\lib\site-packages (1.4.2)
Requirement already satisfied: nltk in c:\users\nagra\anaconda3\lib\site-packages (3.7)
Requirement already satisfied: matplotlib in c:\users\nagra\anaconda3\lib\site-packages (3.5.1)
Requirement already satisfied: seaborn in c:\users\nagra\anaconda3\lib\site-packages (0.11.2)
Collecting uritemplate<5,>=3.0.1
  Downloading uritemplate-4.1.1-py2.py3-none-any.whl (10 kB)
Collecting httplib2<1.dev0,>=0.19.0
  Downloading httplib2-0.22.0-py3-none-any.whl (96 kB)
Collecting google-api-core!=2.0.*,!=2.1.*,!=2.2.*,!=2.3.0,<3.0.0.dev0,>=1.31.5
  Downloading google_api_core-2.21.0-py3-none-any.whl (156 kB)
Collecting google-auth-httplib2<1.0.0,>=0.2.0
  Downloading google_auth_httplib2-0.2.0-py2.py3-none-any.whl (9.3 kB)
Requirement already satisfied: google-auth!=2.24.0,!=2.25.0,<3.0.0.dev0,>=1.32.0 in c:\users\nagra\anaconda3\lib\site-packages (from google-api-python-client) (1.33.0)
Requirement already satisfied: numpy>=1.18.5 in c:\users\nagra\anaconda3\lib\site-packages (from pandas) (1.21.5)
Requirement already satisfied: pytz>=2020.1 in c:\users\nagra\anaconda3\lib\site-packages (from pandas) (2021.3)
Requirement already satisfied: python-dateutil>=2.8.1 in c:\users\nagra\anaconda3\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: regex>=2021.8.3 in c:\users\nagra\anaconda3\lib\site-packages (from nltk) (2022.3.15)
Requirement already satisfied: joblib in c:\users\nagra\anaconda3\lib\site-packages (from nltk) (1.1.0)
Requirement already satisfied: tqdm in c:\users\nagra\anaconda3\lib\site-packages (from nltk) (4.64.0)
Requirement already satisfied: click in c:\users\nagra\anaconda3\lib\site-packages (from nltk) (8.0.4)
Requirement already satisfied: packaging>=20.0 in c:\users\nagra\anaconda3\lib\site-packages (from matplotlib) (21.3)
Requirement already satisfied: pillow>=6.2.0 in c:\users\nagra\anaconda3\lib\site-packages (from matplotlib) (9.0.1)
Requirement already satisfied: cycler>=0.10 in c:\users\nagra\anaconda3\lib\site-packages (from matplotlib) (0.11.0)
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\nagra\anaconda3\lib\site-packages (from matplotlib) (3.0.4)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\nagra\anaconda3\lib\site-packages (from matplotlib) (1.3.2)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\nagra\anaconda3\lib\site-packages (from matplotlib) (4.25.0)
Requirement already satisfied: scipy>=1.0 in c:\users\nagra\anaconda3\lib\site-packages (from seaborn) (1.7.3)
Collecting proto-plus<2.0.0dev,>=1.22.3
  Downloading proto_plus-1.24.0-py3-none-any.whl (50 kB)
Collecting protobuf!=3.20.0,!=3.20.1,!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!=4.21.4,!=4.21.5,<6.0.0.dev0,>=3.19.5
  Downloading protobuf-5.28.2-cp39-cp39-win_amd64.whl (431 kB)
Requirement already satisfied: requests<3.0.0.dev0,>=2.18.0 in c:\users\nagra\anaconda3\lib\site-packages (from google-api-core!=2.0.*,!=2.1.*,!=2.2.*,!=2.3.0,<3.0.0.dev0,>=1.31.5->google-api-python-client) (2.27.1)
Collecting google-auth!=2.24.0,!=2.25.0,<3.0.0.dev0,>=1.32.0
  Downloading google_auth-2.35.0-py2.py3-none-any.whl (208 kB)
```

Collecting googleapis-common-protos<2.0.dev0,>=1.56.2

Downloading googleapis_common_protos-1.65.0-py2.py3-none-any.whl (220 k B)

Requirement already satisfied: pyasn1-modules>=0.2.1 in c:\users\nagra\anaconda3\lib\site-packages (from google-auth!=2.24.0,!<2.25.0,<3.0.0.dev0,>=1.32.0->google-api-python-client) (0.2.8)

Requirement already satisfied: rsa<5,>=3.1.4 in c:\users\nagra\anaconda3\lib\site-packages (from google-auth!=2.24.0,!<2.25.0,<3.0.0.dev0,>=1.32.0->google-api-python-client) (4.7.2)

Requirement already satisfied: cachetools<6.0,>=2.0.0 in c:\users\nagra\anaconda3\lib\site-packages (from google-auth!=2.24.0,!<2.25.0,<3.0.0.dev0,>=1.32.0->google-api-python-client) (4.2.2)

Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in c:\users\nagra\anaconda3\lib\site-packages (from pyasn1-modules>=0.2.1->google-auth!=2.24.0,!<2.25.0,<3.0.0.dev0,>=1.32.0->google-api-python-client) (0.4.8)

Requirement already satisfied: six>=1.5 in c:\users\nagra\anaconda3\lib\site-packages (from python-dateutil>=2.8.1->pandas) (1.16.0)

Requirement already satisfied: idna<4,>=2.5 in c:\users\nagra\anaconda3\lib\site-packages (from requests<3.0.0.dev0,>=2.18.0->google-api-core!=2.0.*,!=2.1.*,!=2.2.*,!=2.3.0,<3.0.0.dev0,>=1.31.5->google-api-python-client) (3.3)

Requirement already satisfied: charset-normalizer~2.0.0 in c:\users\nagra\anaconda3\lib\site-packages (from requests<3.0.0.dev0,>=2.18.0->google-api-core!=2.0.*,!=2.1.*,!=2.2.*,!=2.3.0,<3.0.0.dev0,>=1.31.5->google-api-python-client) (2.0.4)

Requirement already satisfied: certifi>=2017.4.17 in c:\users\nagra\anaconda3\lib\site-packages (from requests<3.0.0.dev0,>=2.18.0->google-api-core!=2.0.*,!=2.1.*,!=2.2.*,!=2.3.0,<3.0.0.dev0,>=1.31.5->google-api-python-client) (2021.10.8)

Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\nagra\anaconda3\lib\site-packages (from requests<3.0.0.dev0,>=2.18.0->google-api-core!=2.0.*,!=2.1.*,!=2.2.*,!=2.3.0,<3.0.0.dev0,>=1.31.5->google-api-python-client) (1.26.9)

Requirement already satisfied: colorama in c:\users\nagra\anaconda3\lib\site-packages (from click->nlTK) (0.4.4)

Installing collected packages: protobuf, proto-plus, httpLib2, googleapis-common-protos, google-auth, uritemplate, google-auth-httpLib2, google-api-core, google-api-python-client

Attempting uninstall: protobuf

Found existing installation: protobuf 3.19.1

Uninstalling protobuf-3.19.1:

Successfully uninstalled protobuf-3.19.1

Attempting uninstall: googleapis-common-protos

Found existing installation: googleapis-common-protos 1.53.0

Uninstalling googleapis-common-protos-1.53.0:

Successfully uninstalled googleapis-common-protos-1.53.0

Attempting uninstall: google-auth

Found existing installation: google-auth 1.33.0

Uninstalling google-auth-1.33.0:

Successfully uninstalled google-auth-1.33.0

Attempting uninstall: google-api-core

Found existing installation: google-api-core 1.25.1

Uninstalling google-api-core-1.25.1:

Successfully uninstalled google-api-core-1.25.1

Successfully installed google-api-core-2.21.0 google-api-python-client-2.149.0 google-auth-2.35.0 google-auth-httpLib2-0.2.0 googleapis-common-protos-1.65.0 httpLib2-0.22.0 proto-plus-1.24.0 protobuf-5.28.2 uritemplate-4.1.1

Note: you may need to restart the kernel to use updated packages.

ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is the source of the following dependency conflicts.

google-cloud-storage 1.31.0 requires google-auth<2.0dev,>=1.11.0, but you have google-auth 2.35.0 which is incompatible.

google-cloud-core 1.7.1 requires google-api-core<2.0.0dev,>=1.21.0, but you have google-api-core 2.21.0 which is incompatible.

google-cloud-core 1.7.1 requires google-auth<2.0dev,>=1.24.0, but you have google-auth 2.35.0 which is incompatible.

```
In [3]: import nltk  
nltk.download('vader_lexicon')
```

```
[nltk_data] Downloading package vader_lexicon to  
[nltk_data] C:\Users\nagra\AppData\Roaming\nltk_data...
```

Out[3]: True

```
In [5]: nltk.download('punkt')
```

```
[nltk_data] Downloading package punkt to  
[nltk_data] C:\Users\nagra\AppData\Roaming\nltk_data...  
[nltk_data] Unzipping tokenizers\punkt.zip.
```

Out[5]: True

```
In [6]: nltk.download('stopwords')
```

```
[nltk_data] Downloading package stopwords to  
[nltk_data] C:\Users\nagra\AppData\Roaming\nltk_data...  
[nltk_data] Unzipping corpora\stopwords.zip.
```

Out[6]: True

```
In [8]: import pandas as pd
import requests
import matplotlib.pyplot as plt

from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from nltk.sentiment import SentimentIntensityAnalyzer
import re

# YouTube API Configuration
API_KEY = '[REDACTED]'
VIDEO_ID = 'VaSjiJMrq24'
COMMENT_URL = f'https://www.googleapis.com/youtube/v3/commentThreads?key={A

# Fetch YouTube comments
def fetch_comments(url):
    comments = []
    while url:
        response = requests.get(url)
        json_response = response.json()
        for item in json_response.get('items', []):
            comment = item['snippet']['topLevelComment']['snippet']['textDi
            comments.append(comment)
        url = json_response.get('nextPageToken')
    if url:
        url = f'https://www.googleapis.com/youtube/v3/commentThreads?ke
    return comments

# Preprocess comments
def preprocess_comments(comments):
    stop_words = set(stopwords.words('english'))
    cleaned_comments = []
    for comment in comments:
        # Remove URLs and special characters
        comment = re.sub(r'http\S+|www\S+|https\S+', '', comment, flags=re.
        comment = re.sub(r'\@|\w+|#', '', comment)
        # Tokenize and remove stop words
        words = word_tokenize(comment.lower())
        filtered_comment = ' '.join([word for word in words if word not in
        cleaned_comments.append(filtered_comment)
    return cleaned_comments

# Analyze sentiment
def analyze_sentiment(comments):
    sia = SentimentIntensityAnalyzer()
    sentiment_scores = []
    for comment in comments:
        score = sia.polarity_scores(comment)
        sentiment_scores.append(score)
    return sentiment_scores

# Visualize sentiment scores (Histogram and Pie Chart)
def visualize_sentiment(sentiment_scores):
    # Convert sentiment scores to DataFrame
    df_sentiment = pd.DataFrame(sentiment_scores)

    # Histogram of sentiment scores
    plt.figure(figsize=(10, 5))
    df_sentiment['compound'].hist(bins=20, color='skyblue')
    plt.title('Sentiment Score Distribution (Histogram)')
    plt.xlabel('Sentiment Score')
```

```

plt.ylabel('Frequency')
plt.grid(False)
plt.show()

# Pie Chart of sentiment classification
sentiment_classification = {
    'Positive': len(df_sentiment[df_sentiment['compound'] > 0.05]),
    'Negative': len(df_sentiment[df_sentiment['compound'] < -0.05]),
    'Neutral': len(df_sentiment[(df_sentiment['compound'] >= -0.05) & (
    )

plt.figure(figsize=(8, 8))
plt.pie(sentiment_classification.values(), labels=sentiment_classification.keys())
plt.title('Sentiment Classification (Pie Chart)')
plt.axis('equal') # Equal aspect ratio ensures that pie chart is circular
plt.show()

# Main function to run the analysis
if __name__ == '__main__':
    # Fetch comments
    comments = fetch_comments(COMMENT_URL)
    print(f'Fetched {len(comments)} comments.')

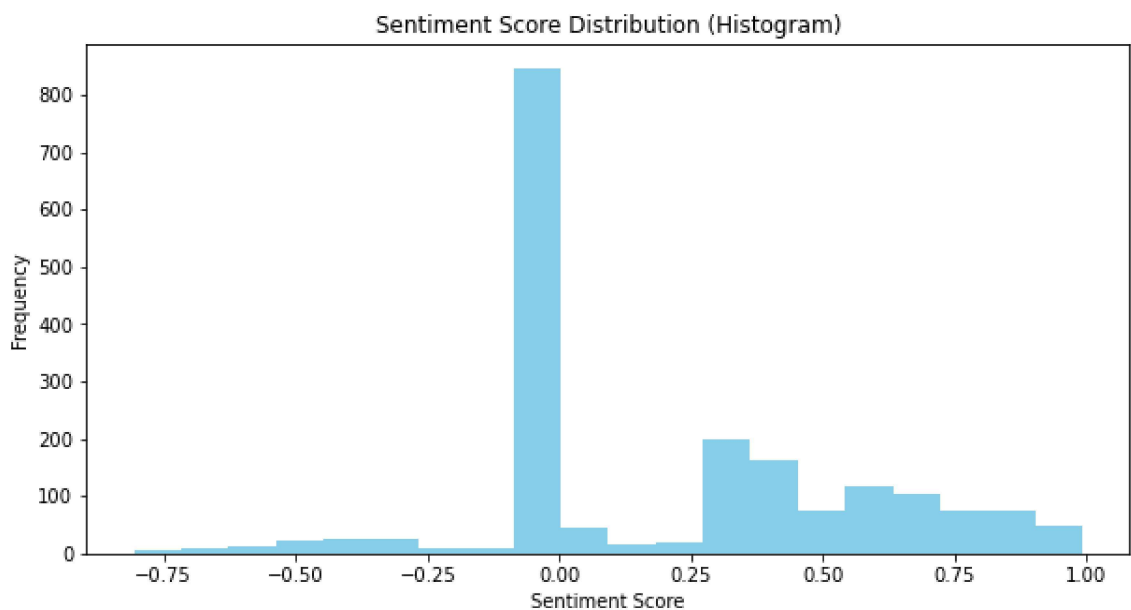
    # Preprocess comments
    cleaned_comments = preprocess_comments(comments)

    # Analyze sentiment
    sentiment_scores = analyze_sentiment(cleaned_comments)

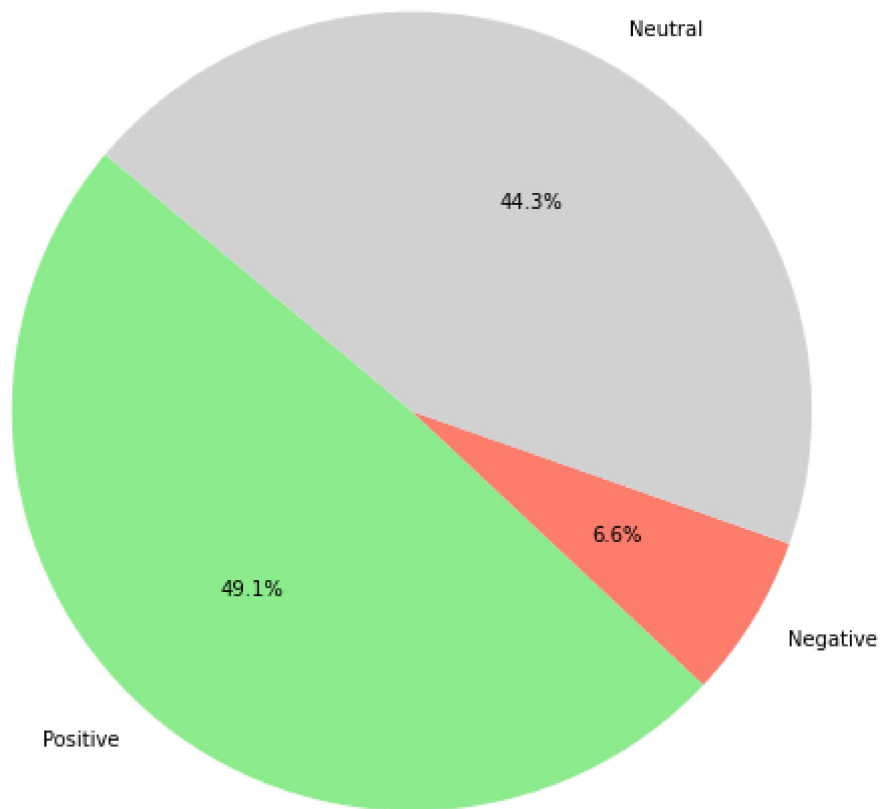
    # Visualize results
    visualize_sentiment(sentiment_scores)

```

Fetched 1902 comments.



Sentiment Classification (Pie Chart)



In []: