Web and Social Media Analytics Lab

1. Preprocessing text document using NLTK of Python

a. Stopword elimination
b. Stemming
c. Lemmatization
d. POS tagging
e. Lexical analysis

```
import nltk
from nltk.tokenize import word_tokenize
from nltk.corpus import stopwords
from nltk.stem import PorterStemmer, WordNetLemmatizer
from nltk import pos_tag

# Ensure required NLTK data is downloaded
nltk.download('punkt')
nltk.download('stopwords')
nltk.download('averaged_perceptron_tagger_eng')
nltk.download('wordnet')

# (a) Stopword Elimination
def stopword_elimination(text):
    stop_words = set(stopwords.words('english'))
    filtered_words = [word for word in word_tokenize(text) if word.lower() not in stop_words]
    return filtered_words
text = "This is a sample text with stopwords."
print("Stopword Elimination:", stopword_elimination(text))

# (b) Stemming
def stemming(text):
    ps = PorterStemmer()
    stemmed_words = [ps.stem(word) for word in word_tokenize(text)]
    return stemmed_words
text = "Running runner runs beautifully."
print("Stemming:", stemming(text))


# (c) Lemmatization
def lemmatization(text):
    lemmatizer = WordNetLemmatizer()
    lemmatized_words = [lemmatizer.lemmatize(word) for word in word_tokenize(text)]
    return lemmatized_words
text = "Running runner runs beautifully."
print("Lemmatization:", lemmatization(text))


# (d)  POS Tagging
def pos_tagging(text):
    words = word_tokenize(text)
    tagged_words = pos_tag(words)
    return tagged_words
text = "This is a sample text with POS tagging."
print("POS Tagging:", pos_tagging(text))


# (e) Lexical Analysis
def lexical_analysis(text):
    tokens = word_tokenize(text)
    tagged_tokens = pos_tag(tokens)
    return tagged_tokens
```

```
text = "This is a sample text with lexical analysis."
print("Lexical Analysis:", lexical_analysis(text))
```

<u>Output:</u>

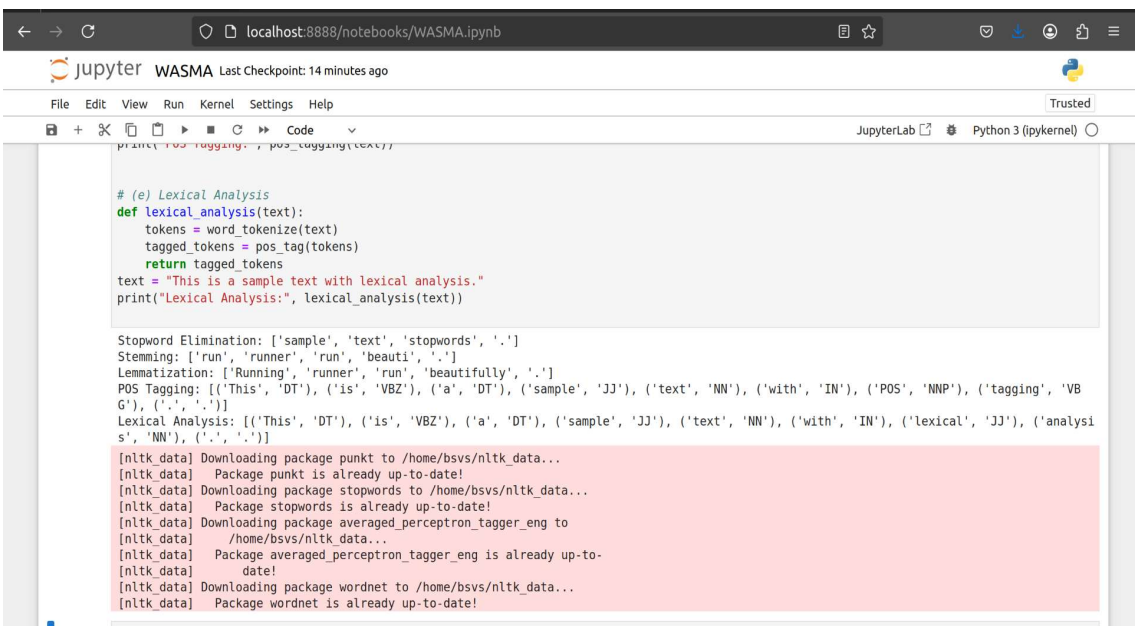
Stopword Elimination: ['sample', 'text', 'stopwords', '.']

Stemming: ['run', 'runner', 'run', 'beauti', '.']

Lemmatization: ['Running', 'runner', 'run', 'beautifully', '.']

POS Tagging: [('This', 'DT'), ('is', 'VBZ'), ('a', 'DT'), ('sample', 'JJ'), ('text', 'NN'), ('with', 'IN'), ('POS', 'NNP'), ('tagging', 'VBG'), ('.', '.')]

Lexical Analysis: [('This', 'DT'), ('is', 'VBZ'), ('a', 'DT'), ('sample', 'JJ'), ('text', 'NN'), ('with', 'IN'), ('lexical', 'JJ'), ('analysis', 'NN'), ('.', '.')]

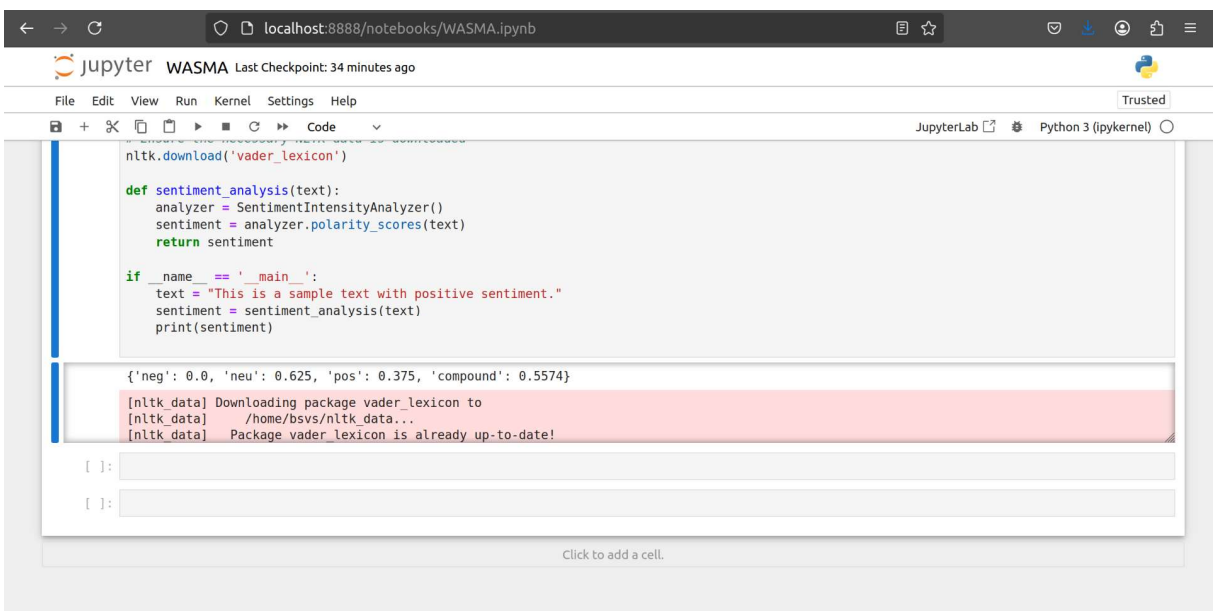


2. Sentiment analysis on customer review on products

```
import nltk
from nltk.sentiment.vader import SentimentIntensityAnalyzer

# Ensure the necessary NLTK data is downloaded
nltk.download('vader_lexicon')

def sentiment_analysis(text):
    analyzer = SentimentIntensityAnalyzer()
    sentiment = analyzer.polarity_scores(text)
    return sentiment

if __name__ == '__main__':
    text = "This is a sample text with positive sentiment."
    sentiment = sentiment_analysis(text)
    print(sentiment)
```

<u>Output:</u>

{'neg': 0.0, 'neu': 0.625, 'pos': 0.375, 'compound': 0.5574}



3. Web analytics
a. Web usage data (web server log data, clickstream analysis)
b. Hyperlink data

```
import requests
from bs4 import BeautifulSoup
from collections import Counter
from urllib.parse import urlparse, urljoin

def get_links(url):
    try:
        # Send a request to the webpage
        response = requests.get(url, timeout=10)
        response.raise_for_status()  # Raise an error for bad responses (4xx, 5xx)

        # Parse the HTML content
        soup = BeautifulSoup(response.text, 'html.parser')

        # Extract all hyperlinks
        links = [a['href'] for a in soup.find_all('a', href=True)]

        return links
    except requests.exceptions.RequestException as e:
        print(f"Error fetching the page: {e}")
        return []

def analyze_links(url, links):
    domain = urlparse(url).netloc
    internal_links = []
    external_links = []

    for link in links:
        full_url = urljoin(url, link)  # Convert relative URLs to absolute
        parsed_url = urlparse(full_url)

        if parsed_url.netloc == domain:
            internal_links.append(full_url)
        else:
            external_links.append(full_url)

    return internal_links, external_links

if __name__ == "__main__":
    url = input("Enter a website URL (including http/https): ")

    # Get all links from the page
    all_links = get_links(url)

    if not all_links:
        print("No links found on the page.")
    else:
        # Analyze internal and external links
        internal_links, external_links = analyze_links(url, all_links)

        # Count the most popular links
        link_counts = Counter(all_links)
```

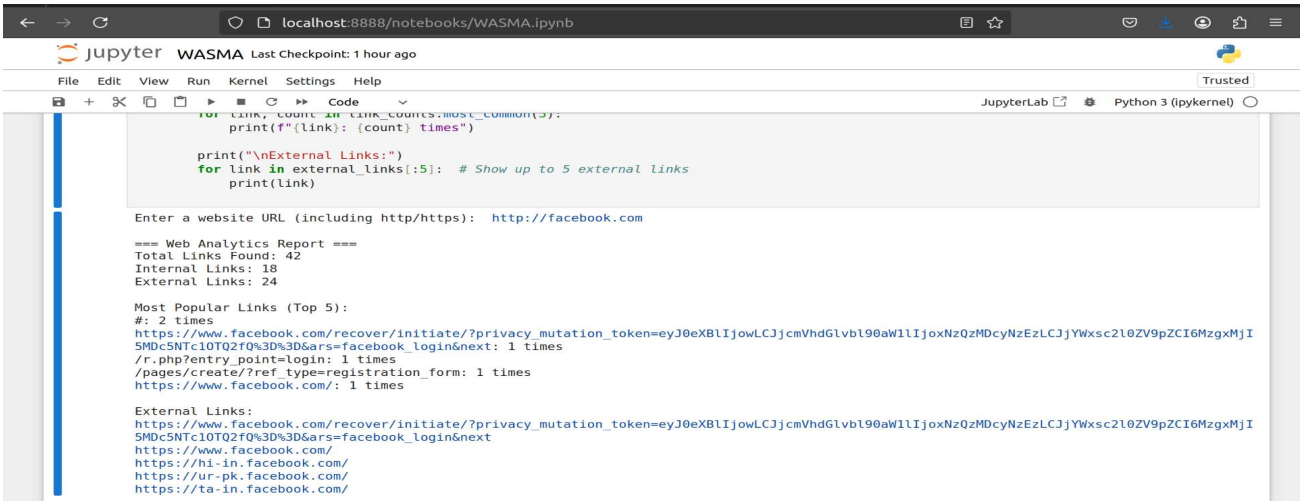
```
# Output results
print("\n=== Web Analytics Report ===")
print(f"Total Links Found: {len(all_links)}")
print(f"Internal Links: {len(internal_links)}")
print(f"External Links: {len(external_links)}")

print("\nMost Popular Links (Top 5):")
for link, count in link_counts.most_common(5):
    print(f"{link}: {count} times")

print("\nExternal Links:")
for link in external_links[:5]:  # Show up to 5 external links
    print(link)
```

Output:

Enter a website URL (including http/https): http://facebook.com
=== Web Analytics Report ===
Total Links Found: 42
Internal Links: 18
External Links: 24

Most Popular Links (Top 5):
#: 2 times
https://www.facebook.com/recover/initiate/?privacy_mutation_token=eyJ0eXBlIjowLCJjcmVhdGlvbl90aW1lIjoxNzQzMDcxNjM1LCJjYWxsc2l0ZV9pZCI6MzgxMjI5MDc5NTc1OTQ2fQ%3D%3D&ars=facebook_login&next: 1 times
/r.php?entry_point=login: 1 times
/pages/create/?ref_type=registration_form: 1 times
https://www.facebook.com/: 1 times

External Links:
https://www.facebook.com/recover/initiate/?privacy_mutation_token=eyJ0eXBlIjowLCJjcmVhdGlvbl90aW1lIjoxNzQzMDcxNjM1LCJjYWxsc2l0ZV9pZCI6MzgxMjI5MDc5NTc1OTQ2fQ%3D%3D&ars=facebook_login&next
https://www.facebook.com/
https://hi-in.facebook.com/
https://ur-pk.facebook.com/
https://ta-in.facebook.com/

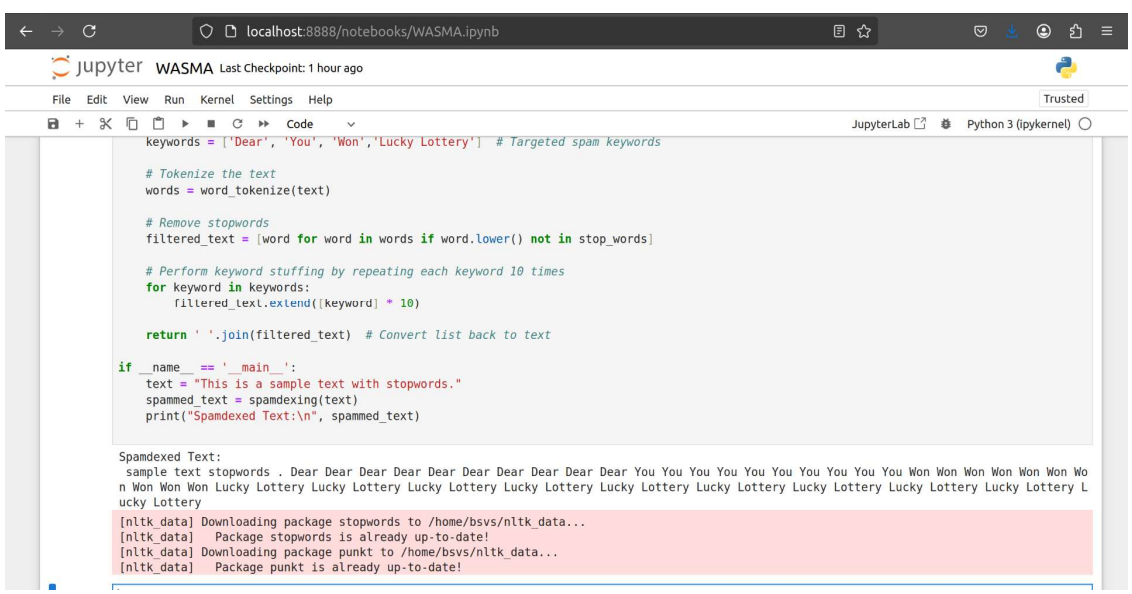


4. Search engine optimization- implement spamdexing

```
import nltk
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize

# Download required NLTK data
nltk.download('stopwords')
nltk.download('punkt')

def spamdexing(text):
    stop_words = set(stopwords.words('english'))
    keywords = ['Dear', 'You', 'Won','Lucky Lottery']  # Targeted spam keywords

    # Tokenize the text
    words = word_tokenize(text)

    # Remove stopwords
    filtered_text = [word for word in words if word.lower() not in stop_words]

    # Perform keyword stuffing by repeating each keyword 10 times
    for keyword in keywords:
        filtered_text.extend([keyword] * 10)

    return ' '.join(filtered_text)  # Convert list back to text

if __name__ == '__main__':
    text = "This is a sample text with stopwords."
    spammed_text = spamdexing(text)
    print("Spamdexed Text:\n", spammed_text)
```

Output:

Spamdexed Text:
Sample text stopwords . Dear Dear Dear Dear Dear Dear Dear Dear Dear Dear You You You You You You You You You You Won Won Won Won Won Won Won Won Won Won Lucky Lottery Lucky Lottery Lucky Lottery Lucky Lottery Lucky Lottery Lucky Lottery Lucky Lottery Lucky Lottery Lucky Lottery Lucky Lottery



5. Use Google analytics tools to implement the following
a. Conversion Statistics
b. Visitor Profiles

Install python required libraries

```
!pip install google-api-python-client pandas
```

```
from googleapiclient.discovery import build
import pandas as pd

# Your API key and channel ID
API_KEY = 'AIzaSyCisHBOLsG4o4u5k01qhe5TNxOAF5l7Dh0'
CHANNEL_ID = 'UCO_6bvpeed4bcyA3lLv_RLQ'

def get_youtube_service():
    """Builds the YouTube Data API client."""
    return build('youtube', 'v3', developerKey=API_KEY)

def get_channel_statistics(service, channel_id):
    """Fetches channel statistics."""
    request = service.channels().list(
        part='snippet,statistics',
        id=channel_id
    )
    response = request.execute()
    return response

def print_channel_stats(response):
    """Prints and formats the channel statistics."""
    stats = response['items'][0]['statistics']
    snippet = response['items'][0]['snippet']
    data = {
        'Channel Title': snippet['title'],
        'Subscribers': stats.get('subscriberCount', 'N/A'),
        'Total Views': stats.get('viewCount', 'N/A'),
        'Total Videos': stats.get('videoCount', 'N/A'),
        'Description': snippet['description'],
    }
    df = pd.DataFrame([data])
    print("\nYouTube Channel Statistics:")
    print(df)

# Get the YouTube service
youtube_service = get_youtube_service()

# Fetch and print channel statistics
response = get_channel_statistics(youtube_service, CHANNEL_ID)
print_channel_stats(response)
```

Output:

```
YouTube Channel Statistics:
  Channel Title Subscribers Total Views Total Videos Description
  0    Crazy Kids          88           19742                  250
```

localhost:8889/notebooks/WASMA.ipynb

jupyter WASMA Last Checkpoint: 3 days ago

File Edit View Run Kernel Settings Help Trusted

Code JupyterLab Python 3 (ipykernel)

```python
def print_channel_stats(response):
    """Prints and formats the channel statistics."""
    stats = response['items'][0]['statistics']
    snippet = response['items'][0]['snippet']
    data = {
        'Channel Title': snippet['title'],
        'Subscribers': stats.get('subscriberCount', 'N/A'),
        'Total Views': stats.get('viewCount', 'N/A'),
        'Total Videos': stats.get('videoCount', 'N/A'),
        'Description': snippet['description'],
    }
    df = pd.DataFrame([data])
    print("\nYouTube Channel Statistics:")
    print(df)

# Get the YouTube service
youtube_service = get_youtube_service()

# Fetch and print channel statistics
response = get_channel_statistics(youtube_service, CHANNEL_ID)
print_channel_stats(response)
```

```
YouTube Channel Statistics:
  Channel Title Subscribers Total Views Total Videos Description
0    Crazy Kids          88       19742          250
```

6. Use Google analytics tools to implement the Traffic Sources.

Install python required libraries

```
!pip install google-auth google-auth-oauthlib google-auth-httplib2 google-api-python-client pandas

from google.oauth2.credentials import Credentials

from google_auth_oauthlib.flow import InstalledAppFlow

from googleapiclient.discovery import build

import pandas as pd

# Path to your OAuth 2.0 client secret file

CLIENT_SECRET_FILE = 'client_secret_585961444636-
fl5k3fheu8mi3m0nna76r23ulc543lqa.apps.googleusercontent.com.json'

SCOPES = ['https://www.googleapis.com/auth/yt-analytics.readonly']

def get_authenticated_service():

    """Authenticate and return the YouTube Analytics API service."""

    flow = InstalledAppFlow.from_client_secrets_file(CLIENT_SECRET_FILE, SCOPES)

    credentials = flow.run_local_server(port=0)

    return build('youtubeAnalytics', 'v2', credentials=credentials)

def get_traffic_sources(service, channel_id):

    """Fetches traffic source statistics."""

    request = service.reports().query(

        ids='channel==={}'.format(channel_id),

        startDate='2024-01-01',

        endDate='2024-12-31',

        metrics='views',

        dimensions='insightTrafficSourceType',

        sort='-views'

    )

    response = request.execute()
```

```
    return response

def print_traffic_sources(response):

    """Prints traffic source statistics."""

    rows = response.get('rows', [])

    columns = response.get('columnHeaders', [])

    data = []

    for row in rows:

        data.append(dict(zip([col['name'] for col in columns], row)))

    df = pd.DataFrame(data)

    print("\nYouTube Traffic Source Statistics:")

    print(df)

# Get the authenticated YouTube Analytics service

youtube_analytics_service = get_authenticated_service()

# Replace with your channel ID

CHANNEL_ID = 'UCO_6bvpeed4bcyA3lLv_RLQ'

# Fetch and print traffic source statistics

response = get_traffic_sources(youtube_analytics_service, CHANNEL_ID)

print_traffic_sources(response)
```

Output:

Please visit this URL to authorize this application:
https://accounts.google.com/o/oauth2/auth?response_type=code&client_id=585961444636-fl5k3fheu8mi3m0nna76r23ulc543lqa.apps.googleusercontent.com&redirect_uri=http%3A%2F%2Flocalhost%3A40337%2F&scope=https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fyt-analytics.readonly&state=bOcdGU9HWS5LNQFynSXbGubsQybwjt&access_type=offline

```
YouTube Traffic Source Statistics:
  insightTrafficSourceType  views
0                   SHORTS    458
1                YT_SEARCH    419
2               YT_CHANNEL    221
3                  EXT_URL     19
4                 PLAYLIST     14
5               SOUND_PAGE     13
6               SUBSCRIBER     10
7             NO_LINK_OTHER      3
```

8	NOTIFICATION	3
9	YT_OTHER_PAGE	2
10	HASHTAGS	2