

487-Sentiment Analysis

```
In [1]: import pandas as pd
import re
import nltk
from nltk.corpus import stopwords
from nltk.stem import WordNetLemmatizer
```

```
In [2]: nltk.download('stopwords')
nltk.download('wordnet')
```

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

```
Out[2]: True
```

```
In [5]: file_path = r"file:///C:/Users/HP/Downloads/Restaurant_Reviews.tsv"
data = pd.read_csv(file_path, delimiter='\t')
```

```
In [6]: lemmatizer = WordNetLemmatizer()
stop_words = set(stopwords.words('english'))
```

```
In [7]: def preprocess_text(text):
# Remove special characters, numbers, and punctuation
text = re.sub(r'^a-zA-Z\s', '', text)
# Convert to lowercase
text = text.lower()
# Tokenize the text
tokens = text.split()
# Remove stopwords and lemmatize each token
lemmatized_tokens = [lemmatizer.lemmatize(token) for token in tokens if token not in stop_words]
return ' '.join(lemmatized_tokens), lemmatized_tokens
```

```
In [8]: import nltk
nltk.download('omw-1.4')
nltk.download('wordnet') # Ensures WordNet itself is also available.
```

```
[nltk_data] Downloading package omw-1.4 to
[nltk_data] C:\Users\HP\AppData\Roaming\nltk_data...
[nltk_data] Downloading package wordnet to
[nltk_data] C:\Users\HP\AppData\Roaming\nltk_data...
[nltk_data] Package wordnet is already up-to-date!
```

```
Out[8]: True
```

```
In [9]: from nltk.corpus import stopwords
from nltk.stem import WordNetLemmatizer

# Ensure the required corpora are downloaded
nltk.download('stopwords')
nltk.download('wordnet')

# Initialize resources
stop_words = set(stopwords.words('english'))
lemmatizer = WordNetLemmatizer()
```

```
def preprocess_text(text):
    tokens = text.split()
    lemmatized_tokens = [lemmatizer.lemmatize(token) for token in tokens if token.]
    return ' '.join(lemmatized_tokens), lemmatized_tokens
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]   C:\Users\HP\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
[nltk_data] Downloading package wordnet to
[nltk_data]   C:\Users\HP\AppData\Roaming\nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
```

```
In [10]: data['Cleaned_Review'], data['Lemmatized_Tokens'] = zip(*data['Review'].apply(prepr
```

```
In [11]: print(data[['Review', 'Cleaned_Review', 'Lemmatized_Tokens']].head())
```

```

                                Review \
0                                Wow... Loved this place.
1                                Crust is not good.
2                                Not tasty and the texture was just nasty.
3    Stopped by during the late May bank holiday of...
4    The selection on the menu was great and so wer...

                                Cleaned_Review \
0                                Wow... Loved place.
1                                Crust good.
2                                tasty texture nasty.
3    Stopped late May bank holiday Rick Steve recom...
4                                selection menu great prices.

                                Lemmatized_Tokens
0                                [Wow..., Loved, place.]
1                                [Crust, good.]
2                                [tasty, texture, nasty.]
3    [Stopped, late, May, bank, holiday, Rick, Stev...
4                                [selection, menu, great, prices.]
```

```
In [12]: print(data[['Review', 'Cleaned_Review', 'Lemmatized_Tokens']].tail())
```

```

                                Review \
995    I think food should have flavor and texture an...
996                                Appetite instantly gone.
997    Overall I was not impressed and would not go b...
998    The whole experience was underwhelming, and I ...
999    Then, as if I hadn't wasted enough of my life ...

                                Cleaned_Review \
995                                think food flavor texture lacking.
996                                Appetite instantly gone.
997                                Overall impressed would go back.
998    whole experience underwhelming, think we'll go...
999    Then, wasted enough life there, poured salt wo...

                                Lemmatized_Tokens
995    [think, food, flavor, texture, lacking.]
996    [Appetite, instantly, gone.]
997    [Overall, impressed, would, go, back.]
998    [whole, experience, underwhelming,, think, we'...
999    [Then,, wasted, enough, life, there,, poured, ...]
```

```
In [ ]:
```