```
!unzip /content/Tweets.csv.zip -d /content/
```

```
Archive:  /content/Tweets.csv.zip
  inflating: /content/Tweets.csv
```

```
import pandas as pd

df = pd.read_csv('/content/Tweets.csv')
display(df.head())
```

	tweet_id	airline_sentiment	airline_sentiment_confidence	negativ
0	570306133677760513	neutral	1.0000	
1	570301130888122368	positive	0.3486	
2	570301083672813571	neutral	0.6837	
3	570301031407624196	negative	1.0000	Ba
4	570300817074462722	negative	1.0000	C

```
def __init__(font_pat
ranks_only=None, pref
color_func=None, max_
stopwords=None, rando
max_font_size=None, f
relative_scaling='aut
colormap=None, normal
contour_color='black'
min_word_length=0, co
```

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Word cloud object for ger

Parameters

```
import re
import nltk
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from sklearn.feature_extraction.text import TfidfVectorizer

# Download necessary NLTK data (if not already downloaded)
try:
    nltk.data.find('corpora/stopwords')
except LookupError:
    nltk.download('stopwords')
try:
    nltk.data.find('tokenizers/punkt')
except LookupError:
```

```
    nltk.download('punkt')
# Explicitly download 'punkt_tab' if needed, as indicated by previous error
try:
    # This attempts to find a common component of punkt_tab to verify it's ther
    nltk.data.find('tokenizers/punkt_tab/english/averaged_perceptron_tagger.pic
except LookupError:
    nltk.download('punkt_tab')

def preprocess_text(text):
    # 1. Remove URLs, mentions, hashtags
    text = re.sub(r'http\S+|www\S+|https\S+', '', text, flags=re.MULTILINE) # R
    text = re.sub(r'@\w+', '', text) # Remove mentions
    text = re.sub(r'#\w+', '', text) # Remove hashtags

    # 2. Tokenize and remove stopwords
    tokens = word_tokenize(text.lower()) # Tokenize and convert to lowercase
    stop_words = set(stopwords.words('english'))
    filtered_tokens = [word for word in tokens if word.isalpha() and word not i

    return " ".join(filtered_tokens)

df['processed_text'] = df['text'].apply(preprocess_text)

print("Original Text Sample:")
display(df[['text', 'processed_text']].head())
```

```
[nltk_data] Downloading package punkt_tab to /root/nltk_data...
[nltk_data]   Unzipping tokenizers/punkt_tab.zip.
Original Text Sample:
```

	text	processed_text
0	@VirginAmerica What @dhepburn said.	said
1	@VirginAmerica plus you've added commercials t...	plus added commercials experience tacky
2	@VirginAmerica I didn't today... Must mean I n...	today must mean need take another trip
3	@VirginAmerica it's really aggressive to blast...	really aggressive blast obnoxious entertainmen...
4	@VirginAmerica and it's a really big bad thing...	really big bad thing

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```
# 3. Compute TF-IDF on tweet text
tfidf_vectorizer = TfidfVectorizer(max_features=5000) # Limiting to 5000 featur
tfidf_matrix = tfidf_vectorizer.fit_transform(df['processed_text'])

print("TF-IDF Matrix Shape:", tfidf_matrix.shape)
print("Sample TF-IDF Features (first 5 tweets, first 10 features):")
display(pd.DataFrame(tfidf_matrix[:5, :10].toarray(), columns=tfidf_vectorizer.
```

```
TF-IDF Matrix Shape: (14640, 5000)
Sample TF-IDF Features (first 5 tweets, first 10 features):
```

	aa	aadvantage	abandoned	abc	ability	able	aboard	abq	absolute	absolut
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

```
# Filter for negative sentiment tweets
negative_tweets_df = df[df['airline_sentiment'] == 'negative']
```

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```
# Transform the processed text of negative tweets using the *already fitted*
negative_tfidf_matrix = tfidf_vectorizer.transform(negative_tweets_df['proce

# Sum the TF-IDF scores for each term across all negative tweets
# The sum will give us an idea of the overall importance of each term in neg
# Use .A1 to ensure a 1-dimensional numpy array from the sparse matrix sum
sum_tfidf_scores = negative_tfidf_matrix.sum(axis=0).A1

# Get feature names (terms)
feature_names = tfidf_vectorizer.get_feature_names_out()

# Create a DataFrame to hold terms and their summed TF-IDF scores
term_scores_df = pd.DataFrame({'term': feature_names, 'tfidf_score': sum_tfi

# Sort by TF-IDF score in descending order to get the top terms
top_negative_terms = term_scores_df.sort_values(by='tfidf_score', ascending=

print("\nTop 20 TF-IDF terms for negative sentiment:")
display(top_negative_terms.head(20))
```

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```
Top 20 TF-IDF terms for negative sentiment:
```

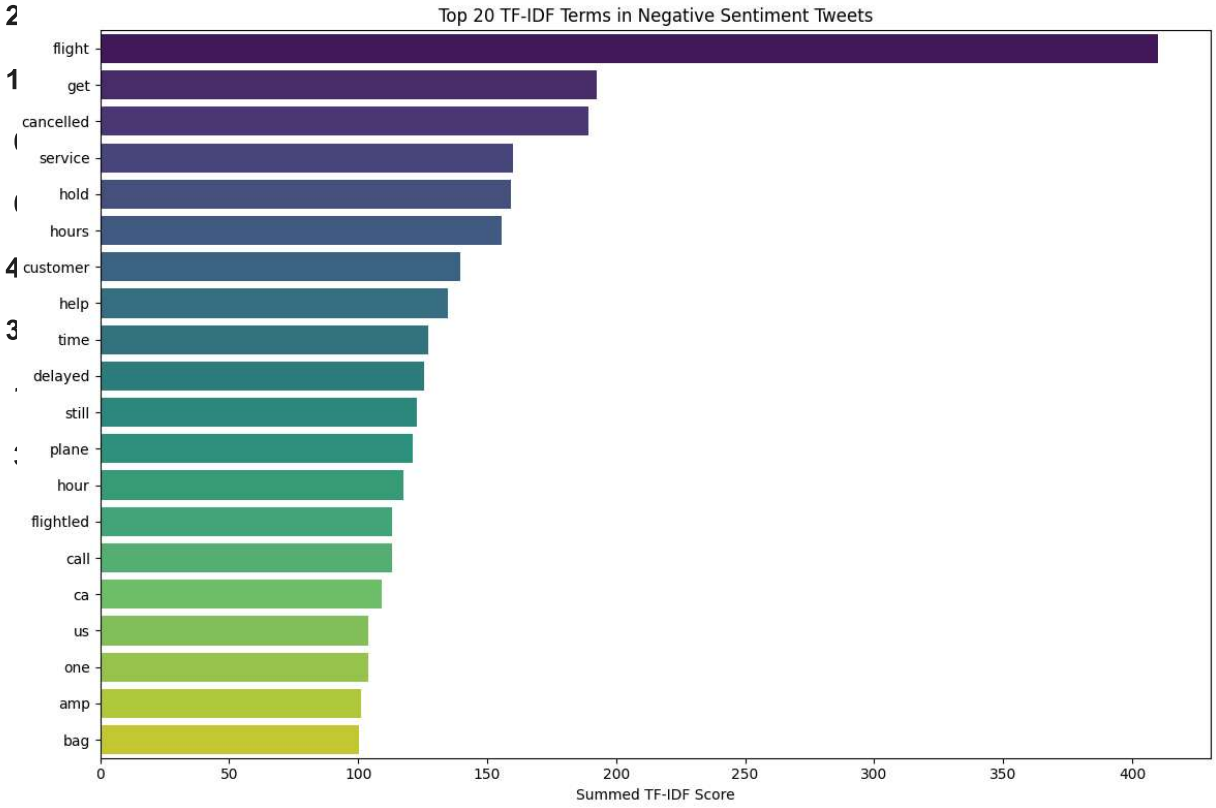
	term	tfidf_score
1716	flight	409.940860
1883	get	192.412607
1194	delayed	125.439821
4251	still	122.741445
3260	plane	121.326106

```
import matplotlib.pyplot as plt
import seaborn as sns

# Bar chart for top 20 terms
plt.figure(figsize=(12, 8))
sns.barplot(x='tfidf_score', y='term', data=top_negative_terms.head(20), palett
plt.title('Top 20 TF-IDF Terms in Negative Sentiment Tweets')
plt.xlabel('Summed TF-IDF Score')
plt.ylabel('Term')
plt.tight_layout()
plt.show()
```

```
/tmp/ipython-input-2168000755.py:6: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0
  sns.barplot(x='tfidf_score', y='term', data=top_negative_terms.head(20), palett
```




```
from wordcloud import WordCloud

# Create a dictionary of terms and their TF-IDF scores for the word cloud
# We'll use all terms, but the word cloud will naturally emphasize higher sc
```

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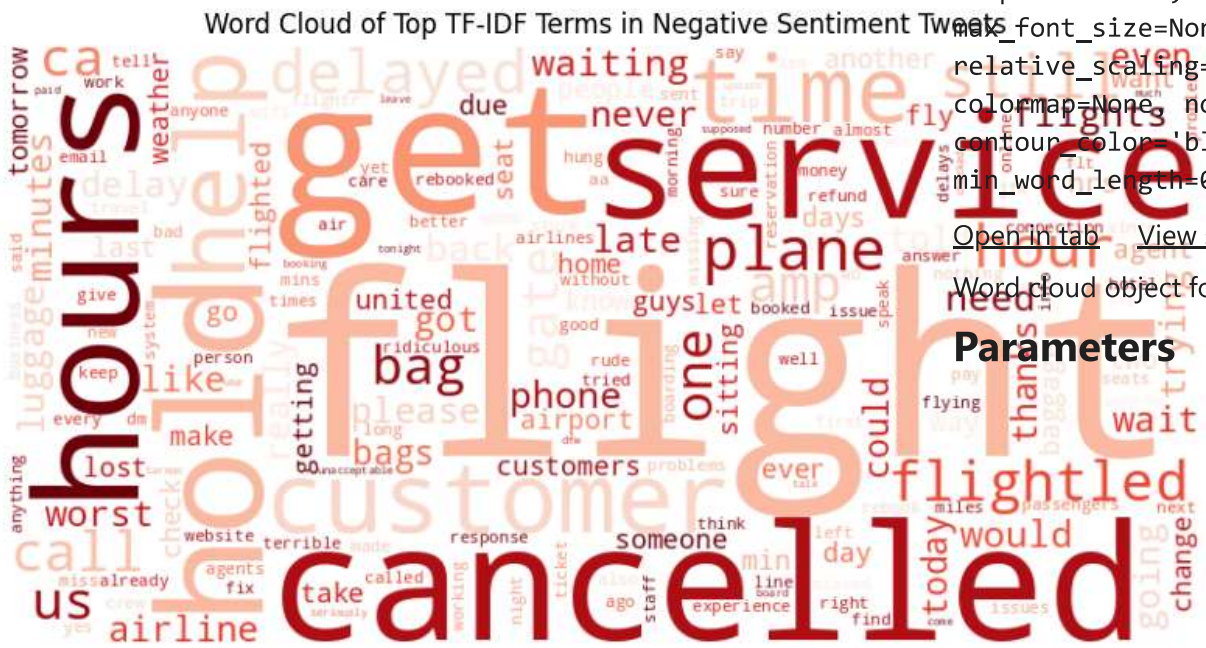
```
wordcloud_data = dict(zip(top_negative_terms['term'], top_negative_terms['tf

# Generate the word cloud
wordcloud = WordCloud(width=800, height=400, background_color='white', color

# Display the word cloud
plt.figure(figsize=(10, 5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title('Word Cloud of Top TF-IDF Terms in Negative Sentiment Tweets')
plt.show()
```

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