Laboratorio 4: Mineria de Textos

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import scipy.stats as stats
import re

data = pd.read_csv('train.csv')
data.head()
```

	id	keyword	location	text	target
0	1	NaN	NaN	Our Deeds are the Reason of this #earthquake M...	1
1	4	NaN	NaN	Forest fire near La Ronge Sask. Canada	1
2	5	NaN	NaN	All residents asked to 'shelter in place' are ...	1
3	6	NaN	NaN	13,000 people receive #wildfires evacuation or...	1
4	7	NaN	NaN	Just got sent this photo from Ruby #Alaska as ...	1

```
# Convertir todo a minuscula
data['text'] = data['text'].str.lower()
# Quitar caracteres especiales
data['text'] = data['text'].apply(lambda x: re.sub(r'[^a-zA-Z\s]', '', x))
# Quitar links
data['text'] = data['text'].apply(lambda x: re.sub(r'http\S+|www\S+|https\S+', '', x, flags=re.MU
# Quitar emoticones
emoji_pattern = re.compile("["
                           u"\U0001F600-\U0001F64F"  # emoticons
                           u"\U0001F300-\U0001F5FF"  # symbols & pictographs
                           u"\U0001F680-\U0001F6FF"  # transport & map symbols
                           u"\U0001F700-\U0001F77F"  # alchemical symbols
                           u"\U0001F780-\U0001F7FF"  # Geometric Shapes Extended
                           u"\U0001F800-\U0001F8FF"  # Supplemental Arrows-C
                           u"\U0001F900-\U0001F9FF"  # Supplemental Symbols and Pictographs
                           u"\U0001FA00-\U0001FA6F"  # Chess Symbols
                           u"\U0001FA70-\U0001FAFF"  # Symbols and Pictographs Extended-A
                           u"\U00002702-\U000027B0"  # Dingbats
                           u"\U000024C2-\U0001F251"
                           "]+", flags=re.UNICODE)

data['text'] = data['text'].apply(lambda x: emoji_pattern.sub(r'', x))
# Quitar signos de puntuacion
data['text'] = data['text'].apply(lambda x: re.sub(r'[^\w\s]', '', x))
```

```
import nltk

from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
nltk.download('stopwords')

stop = stopwords.words('english')
for i in range(len(data)):
    data.loc[i, 'text'] = ' '.join([word for word in data.loc[i, 'text'].split() if word not in (

data['text'] = data['text'].apply(lambda x: re.sub(r'\d+', '', x))
```

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

```
data.head()
```

	id	keyword	location	text	target
0	1	NaN	NaN	deeds reason earthquake may allah forgive us	1
1	4	NaN	NaN	forest fire near la ronge sask canada	1
2	5	NaN	NaN	residents asked shelter place notified officer...	1
3	6	NaN	NaN	people receive wildfires evacuation orders cal...	1
4	7	NaN	NaN	got sent photo ruby alaska smoke wildfires pou...	1

```
from collections import Counter

# Separar el dataset en tweets de desastres y no desastres
disaster_tweets = data[data['target'] == 1]['text']
non_disaster_tweets = data[data['target'] == 0]['text']

# Obtener la frecuencia de palabras para tweets de desastres
disaster_words = ' '.join(disaster_tweets).split()
disaster_word_freq = Counter(disaster_words)

# Obtener las 20 palabras más comunes en tweets de desastres
disaster_common_words = disaster_word_freq.most_common(20)
```

```
non_disaster_words = ' '.join(non_disaster_tweets).split()
non_disaster_word_freq = Counter(non_disaster_words)

# Obtener las 20 palabras más comunes en tweets que no son desastres
non_disaster_common_words = non_disaster_word_freq.most_common(20)
```

```python
from nltk.util import bigrams
def get_bigram_frequency(texts):
    all_bigrams = []
    for text in texts:
        tweet_bigrams = list(bigrams(text.split()))
        all_bigrams.extend(tweet_bigrams)
    return Counter(all_bigrams)

# Ejemplo de uso:
disaster_bigram_freq = get_bigram_frequency(disaster_tweets)
non_disaster_bigram_freq = get_bigram_frequency(non_disaster_tweets)
```

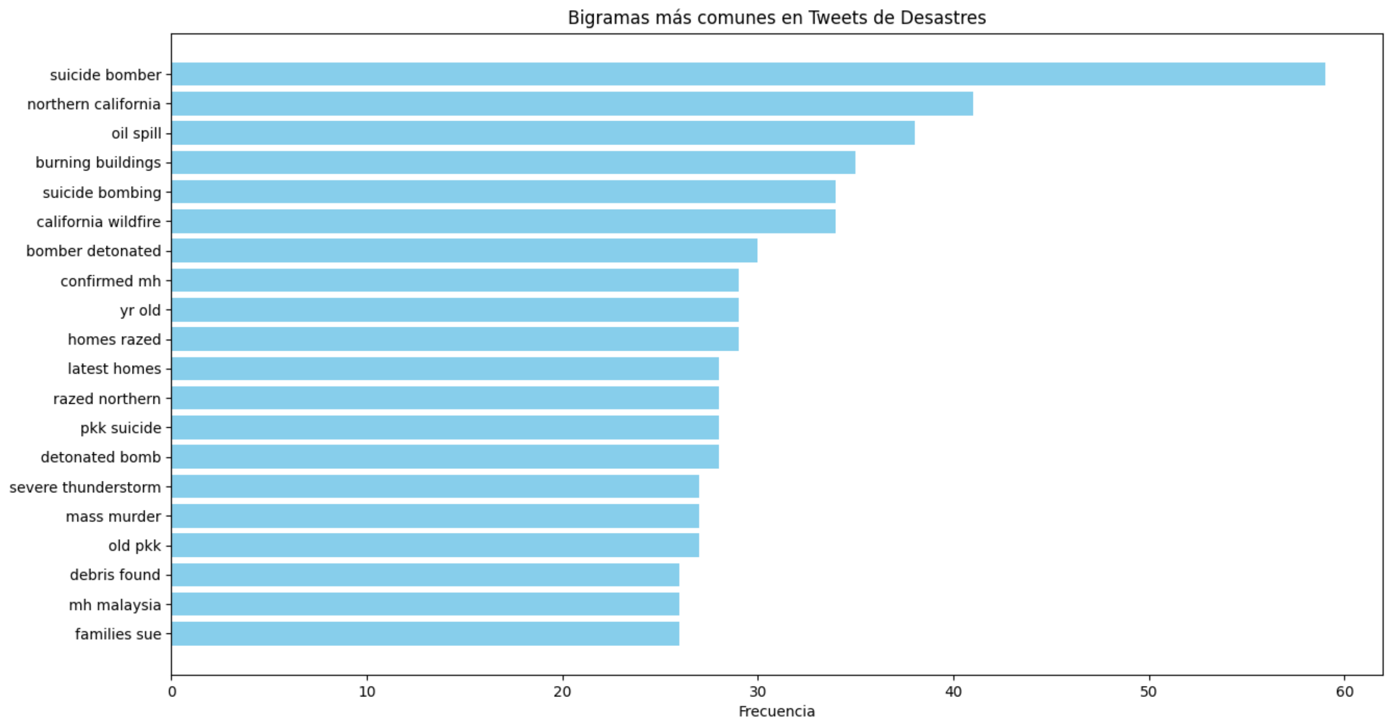
```python
import matplotlib.pyplot as plt

def plot_ngrams(ngram_freq, title, n=20):
    # Obtener los n n-gramas más comunes
    common_ngrams = ngram_freq.most_common(n)

    # Separar n-gramas y sus frecuencias
    ngrams, counts = zip(*common_ngrams)
    ngrams = [" ".join(ng) for ng in ngrams]  # Convertir a cadena para el eje X

    # Crear el gráfico de barras
    plt.figure(figsize=(15, 8))
    plt.barh(ngrams, counts, color='skyblue')
    plt.xlabel('Frecuencia')
    plt.title(title)
    plt.gca().invert_yaxis()  # Invertir el eje y para que el n-grama más común esté arriba
    plt.show()

# Ejemplo de uso:
plot_ngrams(disaster_bigram_freq, 'Bigramas más comunes en Tweets de Desastres')
```

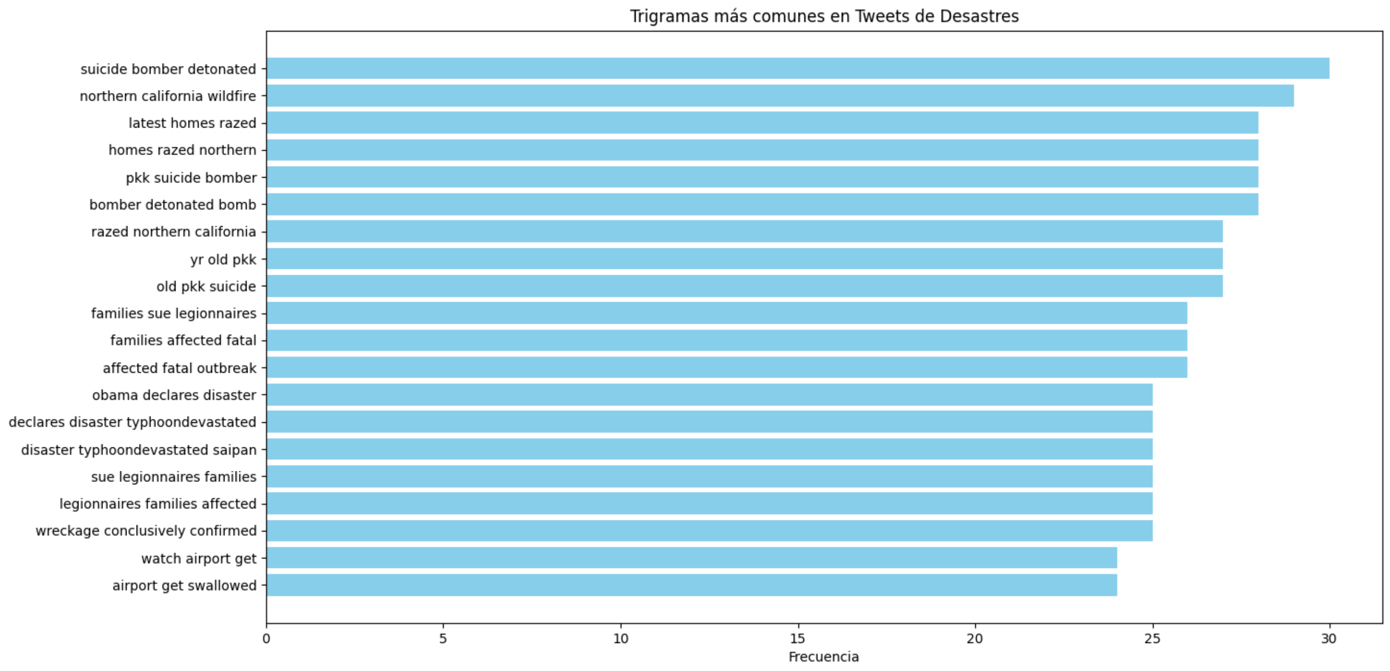


```python
from nltk.util import trigrams

def get_trigram_frequency(texts):
    all_trigrams = []
    for text in texts:
        tweet_trigrams = list(trigrams(text.split()))
        all_trigrams.extend(tweet_trigrams)
    return Counter(all_trigrams)

# Ejemplo de uso:
disaster_trigram_freq = get_trigram_frequency(disaster_tweets)
non_disaster_trigram_freq = get_trigram_frequency(non_disaster_tweets)
```

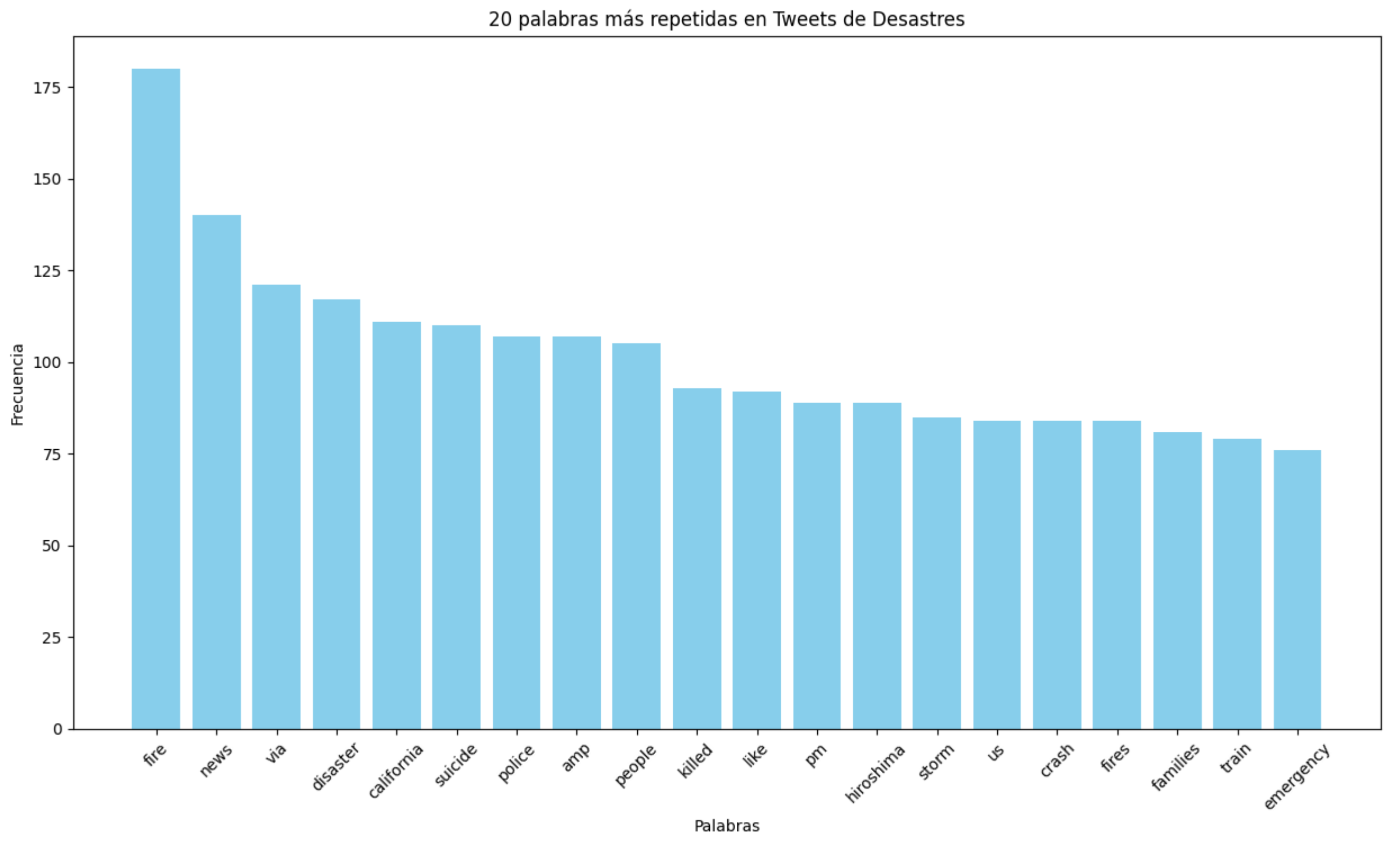
```python
plot_ngrams(disaster_trigram_freq, 'Trigramas más comunes en Tweets de Desastres')
```



Despues de haber realizado los bigramas y trigramas, se puede observar que si tienen sentido y son bastante utiles para el analisis de texto, ya que se puede observar que palabras se encuentran mas relacionadas entre si, y asi poder realizar un analisis mas profundo de los textos.

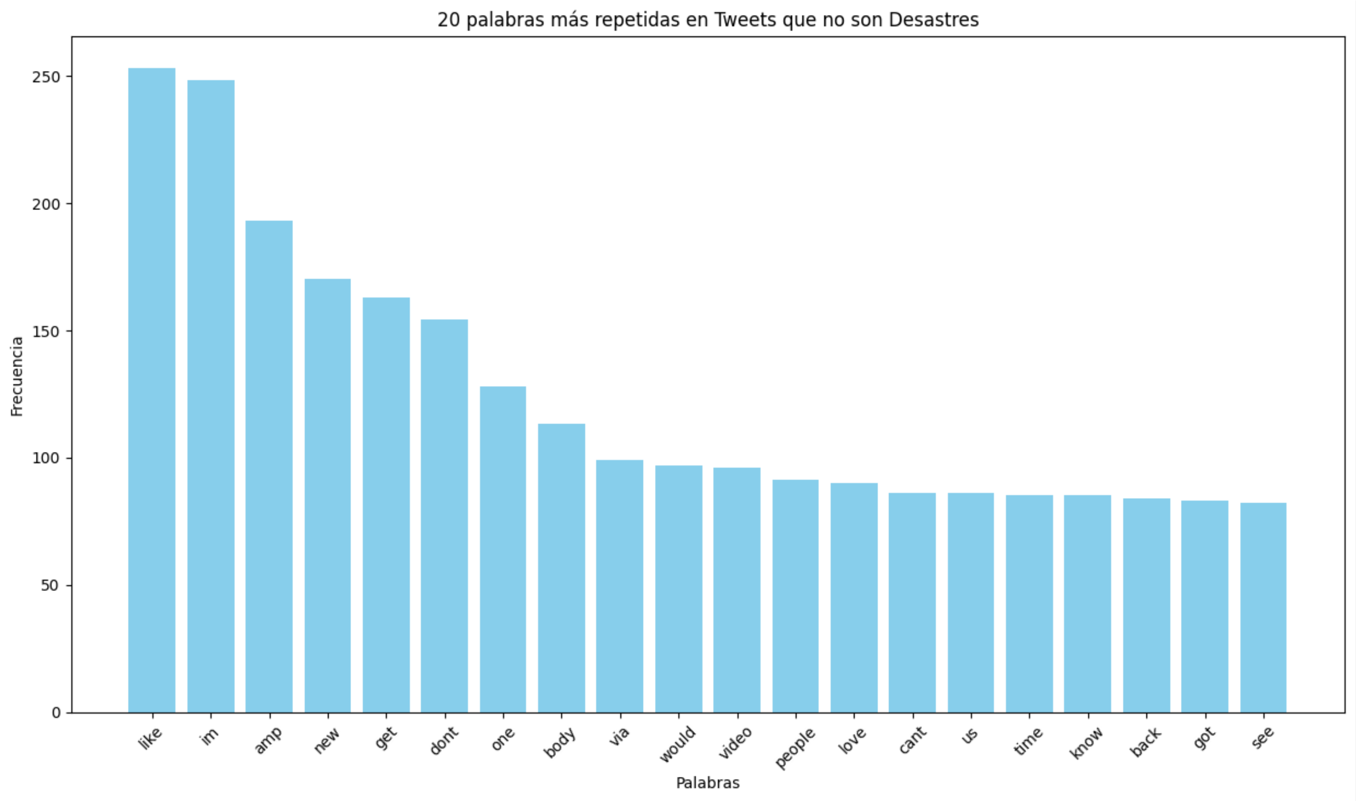
```python
def plot_histogram(word_freq, title, n=20):
    common_words = word_freq.most_common(n)
    words, counts = zip(*common_words)
    plt.figure(figsize=(15, 8))
    plt.bar(words, counts, color='skyblue')
    plt.xlabel('Palabras')
    plt.ylabel('Frecuencia')
    plt.title(title)
    plt.xticks(rotation=45)
    plt.show()

plot_histogram(disaster_word_freq, '20 palabras más repetidas en Tweets de Desastres')
```



Tras observar los las palabras mas frecuentes se puede ver que en que son palabras alarmantes como “fire” o de tendencia como “news”, al igual que otras palabras como amp.

```
plot_histogram(non_disaster_word_freq, '20 palabras más repetidas en Tweets que no son Desastres'
```

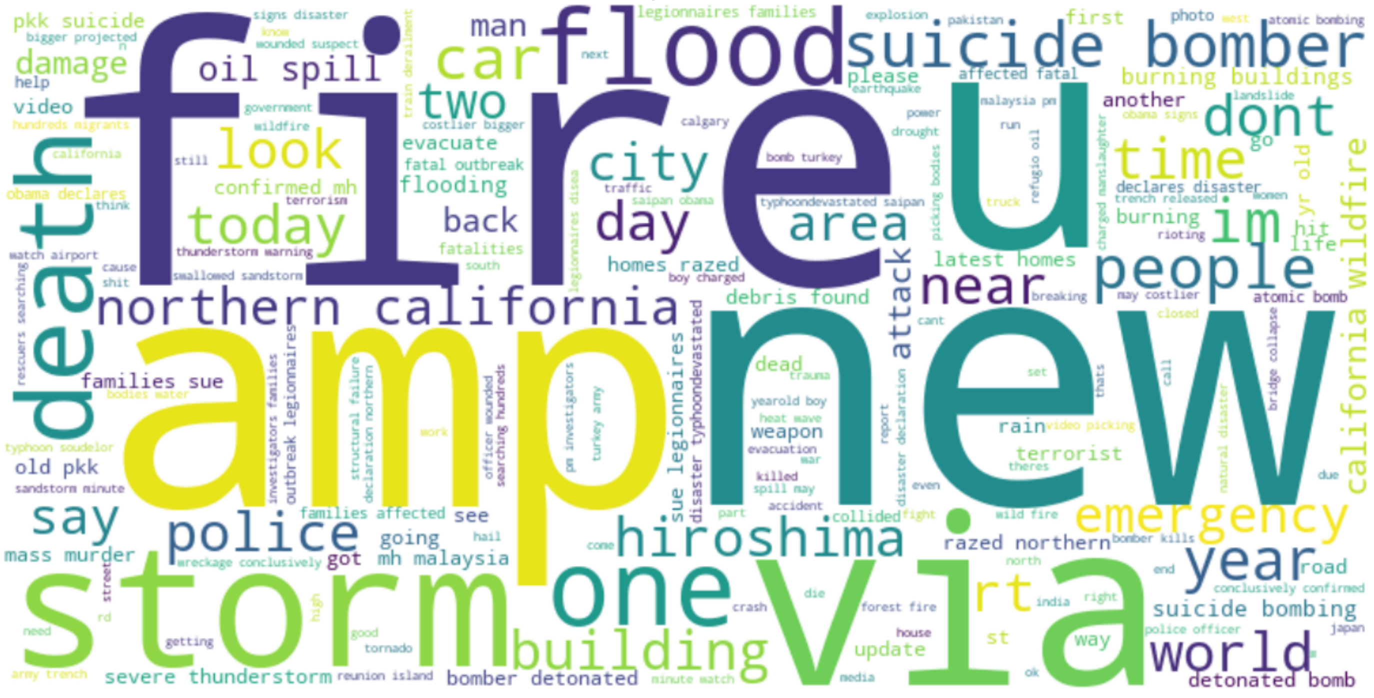


```python
from wordcloud import WordCloud
import matplotlib.pyplot as plt

def plot_wordcloud(text, title):
    wordcloud = WordCloud(width=800, height=400, background_color='white').generate(text)
    plt.figure(figsize=(15, 8))
    plt.imshow(wordcloud, interpolation='bilinear')
    plt.axis('off')
    plt.title(title)
    plt.show()

plot_wordcloud(' '.join(disaster_tweets), 'Nube de Palabras para Tweets de Desastres')
plot_wordcloud(' '.join(non_disaster_tweets), 'Nube de Palabras para Tweets que no son Desastres'
```

Nube de Palabras para Tweets de Desastres



Nube de Palabras para Tweets que no son Desastres

```python
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score

X_train, X_test, y_train, y_test = train_test_split(data['text'], data['target'], test_size=0.3,

# Vectorizar los tweets usando TF-IDF
tfidf_vectorizer = TfidfVectorizer(max_features=5000)
X_train_tfidf = tfidf_vectorizer.fit_transform(X_train)
X_test_tfidf = tfidf_vectorizer.transform(X_test)

clf = LogisticRegression(max_iter=1000)
clf.fit(X_train_tfidf, y_train)

accuracy = accuracy_score(y_test, clf.predict(X_test_tfidf))
accuracy
```

```
0.813922942206655
```

```python
import re

def remove_urls(text):
    url_pattern = re.compile(r'https?://\S+|www\.\S+')
    return url_pattern.sub(r'', text)

def remove_special_characters(text):
    text = re.sub(r'[^a-zA-Z\s]', '', text)
    return text

def remove_numbers(text):
    return ''.join([i for i in text if not i.isdigit()])
```

```
def preprocess_tweet(tweet):
    tweet = remove_urls(tweet)
    tweet = remove_special_characters(tweet)
    tweet = remove_numbers(tweet)
    tweet = tweet.lower()
    return tweet
```

```
def classify_tweet(tweet):
    processed_tweet = preprocess_tweet(tweet)

    tweet_tfidf = tfidf_vectorizer.transform([processed_tweet])

    prediction = clf.predict(tweet_tfidf)

    return "Desastre" if prediction[0] == 1 else "No Desastre"

sample_tweet = "There was a huge earthquake in California today."
classify_tweet(sample_tweet)
```

```
'Desastre'
```