Assignment_Week1

December 22, 2024

```
[1]: import pandas as pd
     movies = pd.read_csv("movies.csv")
     IMDB = pd.read_csv("IMDB Dataset.csv")
```

```
[2]: !pip install textblob
     !pip install nltk
     !pip install spacy
```

```
Requirement already satisfied: textblob in
c:\users\rishi\python\python3119\lib\site-packages (0.18.0.post0)
Requirement already satisfied: nltk>=3.8 in
c:\users\rishi\python\python3119\lib\site-packages (from textblob) (3.9.1)
Requirement already satisfied: click in
c:\users\rishi\python\python3119\lib\site-packages (from nltk>=3.8->textblob)
(8.1.7)
Requirement already satisfied: joblib in
c:\users\rishi\python\python3119\lib\site-packages (from nltk>=3.8->textblob)
(1.4.2)
Requirement already satisfied: regex>=2021.8.3 in
c:\users\rishi\python\python3119\lib\site-packages (from nltk>=3.8->textblob)
(2024.5.15)
Requirement already satisfied: tqdm in
c:\users\rishi\python\python3119\lib\site-packages (from nltk>=3.8->textblob)
(4.66.4)
Requirement already satisfied: colorama in
c:\users\rishi\python\python3119\lib\site-packages (from
click->nltk>=3.8->textblob) (0.4.6)
Requirement already satisfied: nltk in
c:\users\rishi\python\python3119\lib\site-packages (3.9.1)
Requirement already satisfied: click in
c:\users\rishi\python\python3119\lib\site-packages (from nltk) (8.1.7)
Requirement already satisfied: joblib in
c:\users\rishi\python\python3119\lib\site-packages (from nltk) (1.4.2)
Requirement already satisfied: regex>=2021.8.3 in
c:\users\rishi\python\python3119\lib\site-packages (from nltk) (2024.5.15)
Requirement already satisfied: tqdm in
c:\users\rishi\python\python3119\lib\site-packages (from nltk) (4.66.4)
Requirement already satisfied: colorama in
```

c:\users\rishi\python\python3119\lib\site-packages (from click->nltk) (0.4.6)
Requirement already satisfied: spacy in
c:\users\rishi\python\python3119\lib\site-packages (3.8.3)
Requirement already satisfied: spacy-legacy<3.1.0,>=3.0.11 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (3.0.12)
Requirement already satisfied: spacy-loggers<2.0.0,>=1.0.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (1.0.5)
Requirement already satisfied: murmurhash<1.1.0,>=0.28.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (1.0.11)
Requirement already satisfied: cymem<2.1.0,>=2.0.2 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (2.0.10)
Requirement already satisfied: preshed<3.1.0,>=3.0.2 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (3.0.9)
Requirement already satisfied: thinc<8.4.0,>=8.3.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (8.3.3)
Requirement already satisfied: wasabi<1.2.0,>=0.9.1 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (1.1.3)
Requirement already satisfied: srsly<3.0.0,>=2.4.3 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (2.5.0)
Requirement already satisfied: catalogue<2.1.0,>=2.0.6 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (2.0.10)
Requirement already satisfied: weasel<0.5.0,>=0.1.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (0.4.1)
Requirement already satisfied: typer<1.0.0,>=0.3.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (0.15.1)
Requirement already satisfied: tqdm<5.0.0,>=4.38.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (4.66.4)
Requirement already satisfied: numpy>=1.19.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (1.26.4)
Requirement already satisfied: requests<3.0.0,>=2.13.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (2.32.3)
Requirement already satisfied: pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (2.10.4)
Requirement already satisfied: jinja2 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (3.1.4)
Requirement already satisfied: setuptools in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (65.5.0)
Requirement already satisfied: packaging>=20.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (24.1)
Requirement already satisfied: langcodes<4.0.0,>=3.2.0 in
c:\users\rishi\python\python3119\lib\site-packages (from spacy) (3.5.0)
Requirement already satisfied: language-data>=1.2 in
c:\users\rishi\python\python3119\lib\site-packages (from
langcodes<4.0.0,>=3.2.0->spacy) (1.3.0)
Requirement already satisfied: annotated-types>=0.6.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4->spacy) (0.7.0)
Requirement already satisfied: pydantic-core==2.27.2 in

```
c:\users\rishi\python\python3119\lib\site-packages (from
pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4->spacy) (2.27.2)
Requirement already satisfied: typing-extensions>=4.12.2 in
c:\users\rishi\python\python3119\lib\site-packages (from
pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4->spacy) (4.12.2)
Requirement already satisfied: charset-normalizer<4,>=2 in
c:\users\rishi\python\python3119\lib\site-packages (from
requests<3.0.0,>=2.13.0->spacy) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in
c:\users\rishi\python\python3119\lib\site-packages (from
requests<3.0.0,>=2.13.0->spacy) (3.7)
Requirement already satisfied: urllib3<3,>=1.21.1 in
c:\users\rishi\python\python3119\lib\site-packages (from
requests<3.0.0,>=2.13.0->spacy) (2.2.2)
Requirement already satisfied: certifi>=2017.4.17 in
c:\users\rishi\python\python3119\lib\site-packages (from
requests<3.0.0,>=2.13.0->spacy) (2024.6.2)
Requirement already satisfied: blis<1.2.0,>=1.1.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
thinc<8.4.0,>=8.3.0->spacy) (1.1.0)
Requirement already satisfied: confection<1.0.0,>=0.0.1 in
c:\users\rishi\python\python3119\lib\site-packages (from
thinc<8.4.0,>=8.3.0->spacy) (0.1.5)
Requirement already satisfied: colorama in
c:\users\rishi\python\python3119\lib\site-packages (from
tqdm<5.0.0,>=4.38.0->spacy) (0.4.6)
Requirement already satisfied: click>=8.0.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
typer<1.0.0,>=0.3.0->spacy) (8.1.7)
Requirement already satisfied: shellingham>=1.3.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
typer<1.0.0,>=0.3.0->spacy) (1.5.4)
Requirement already satisfied: rich>=10.11.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
typer<1.0.0,>=0.3.0->spacy) (13.7.1)
Requirement already satisfied: cloudpathlib<1.0.0,>=0.7.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
weasel<0.5.0,>=0.1.0->spacy) (0.20.0)
Requirement already satisfied: smart-open<8.0.0,>=5.2.1 in
c:\users\rishi\python\python3119\lib\site-packages (from
weasel<0.5.0,>=0.1.0->spacy) (7.1.0)
Requirement already satisfied: MarkupSafe>=2.0 in
c:\users\rishi\python\python3119\lib\site-packages (from jinja2->spacy) (2.1.5)
Requirement already satisfied: marisa-trie>=1.1.0 in
c:\users\rishi\python\python3119\lib\site-packages (from language-
data>=1.2->langcodes<4.0.0,>=3.2.0->spacy) (1.2.1)
Requirement already satisfied: markdown-it-py>=2.2.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
```

```
rich>=10.11.0->typer<1.0.0,>=0.3.0->spacy) (3.0.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in
c:\users\rishi\python\python3119\lib\site-packages (from
rich>=10.11.0->typer<1.0.0,>=0.3.0->spacy) (2.18.0)
Requirement already satisfied: wrapt in
c:\users\rishi\python\python3119\lib\site-packages (from smart-
open<8.0.0,>=5.2.1->weasel<0.5.0,>=0.1.0->spacy) (1.16.0)
Requirement already satisfied: mdurl~=0.1 in
c:\users\rishi\python\python3119\lib\site-packages (from markdown-it-
py>=2.2.0->rich>=10.11.0->typer<1.0.0,>=0.3.0->spacy) (0.1.2)
```

[3]:
```python
import nltk
import textblob
```

1 Part 1: Data Cleaning with Pandas

[4]:
```python
movies = movies.iloc[:, :8]
movies.head()
```

[4]:
```
                             MOVIES          YEAR  \
0                     Blood Red Sky        (2021)
1   Masters of the Universe: Revelation    (2021- )
2                   The Walking Dead  (2010-2022)
3                     Rick and Morty     (2013- )
4                    Army of Thieves        (2021)

                            GENRE  RATING  \
0       \nAction, Horror, Thriller     6.1
1   \nAnimation, Action, Adventure     5.0
2          \nDrama, Horror, Thriller    8.2
3   \nAnimation, Adventure, Comedy     9.2
4          \nAction, Crime, Horror      NaN

                             ONE-LINE  \
0  \nA woman with a mysterious illness is forced …
1  \nThe war for Eternia begins again in what may…
2  \nSheriff Deputy Rick Grimes wakes up from a c…
3  \nAn animated series that follows the exploits…
4  \nA prequel, set before the events of Army of …

                             STARS     VOTES  RunTime
0  \n    Director:\nPeter Thorwarth\n| \n    Star…   21,062    121.0
1  \n          \n     Stars:\nChris Wood, \nSara…   17,870     25.0
2  \n          \n     Stars:\nAndrew Lincoln, \n…  885,805     44.0
3  \n          \n     Stars:\nJustin Roiland, \n…  414,849     23.0
4  \n    Director:\nMatthias Schweighöfer\n| \n  …      NaN      NaN
```

```
[5]: movies.count()
```

```
[5]: MOVIES      9999
     YEAR        9355
     GENRE       9919
     RATING      8179
     ONE-LINE    9999
     STARS       9999
     VOTES       8179
     RunTime     7041
     dtype: int64
```

```
[6]: movies = movies.dropna()
     movies = movies.drop_duplicates()
     movies.head()
```

```
[6]:                               MOVIES        YEAR  \
     0                     Blood Red Sky       (2021)
     1  Masters of the Universe: Revelation    (2021- )
     2                   The Walking Dead  (2010-2022)
     3                     Rick and Morty    (2013- )
     5                       Outer Banks    (2020- )

                                    GENRE  RATING  \
     0        \nAction, Horror, Thriller             6.1
     1  \nAnimation, Action, Adventure             5.0
     2          \nDrama, Horror, Thriller             8.2
     3  \nAnimation, Adventure, Comedy             9.2
     5            \nAction, Crime, Drama             7.6

                                    ONE-LINE  \
     0  \nA woman with a mysterious illness is forced …
     1  \nThe war for Eternia begins again in what may…
     2  \nSheriff Deputy Rick Grimes wakes up from a c…
     3  \nAn animated series that follows the exploits…
     5  \nA group of teenagers from the wrong side of …

                                    STARS      VOTES  RunTime
     0  \n    Director:\nPeter Thorwarth\n| \n    Star…   21,062    121.0
     1  \n              \n    Stars:\nChris Wood, \nSara…   17,870     25.0
     2  \n              \n    Stars:\nAndrew Lincoln, \n…  885,805     44.0
     3  \n              \n    Stars:\nJustin Roiland, \n…  414,849     23.0
     5  \n              \n    Stars:\nChase Stokes, \nMa…   25,858     50.0
```

```
[7]: movies.count()
```

```
[7]: MOVIES      6779
     YEAR        6779
     GENRE       6779
     RATING      6779
     ONE-LINE    6779
     STARS       6779
     VOTES       6779
     RunTime     6779
     dtype: int64
```

2 Part 2: Sentimental Analysis

```
[8]: import textblob
```

```
[9]: IMDB.head()
```

```
[9]:                                          review sentiment
     0  One of the other reviewers has mentioned that …  positive
     1  A wonderful little production. <br /><br />The…  positive
     2  I thought this was a wonderful way to spend ti…  positive
     3  Basically there's a family where a little boy …  negative
     4  Petter Mattei's "Love in the Time of Money" is…  positive
```

```
[13]: IMDB['Label'] = IMDB['sentiment'].apply(lambda x: 1 if x == 'positive'else -1)
```

```
[14]: IMDB.head()
      IMDB.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50000 entries, 0 to 49999
Data columns (total 3 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   review     50000 non-null  object
 1   sentiment  50000 non-null  object
 2   Label      50000 non-null  int64
dtypes: int64(1), object(2)
memory usage: 1.1+ MB
```

```
[15]: import pandas as pd
      from textblob import TextBlob
      from nltk.tokenize.toktok import ToktokTokenizer
      import re
      tokenizer = ToktokTokenizer()
      import spacy
      nlp = spacy.load('en_core_web_sm', disable = ['ner'])
```

```
[16]: label_pos = IMDB[IMDB['Label'] == 1].sample(n = 10000)
      label_neg = IMDB[IMDB['Label'] == -1].sample(n = 10000)
      train = pd.concat([label_pos, label_neg])
      from sklearn.utils import shuffle
      train = shuffle(train)
```

```
[17]: train
```

```
[17]:                                               review sentiment  Label
      6668    Are you familiar with concept of children's ar…  negative     -1
      19767   The main problem with the documentary "Czech D…  negative     -1
      38829   This is a dry and sterile feature filming on o…  negative     -1
      27504   I really liked BATMAN: DEAD END, I thought tha…  positive      1
      17359   This was one of the slowest movies I have ever…  negative     -1
      …                                                  …         …      …
      46889   Ya know when one looks at this Brian DePalma f…  positive      1
      40541   so yes it is quite nostalgic watching the 1st …  positive      1
      10947   There are some really terrific ideas in this v…  negative     -1
      48379   If the creators of this film had made any atte…  positive      1
      21826   Why me? Why should I be subjected to such slau…  negative     -1

      [20000 rows x 3 columns]
```

```
[18]: train.isnull().sum()
```

```
[18]: review       0
      sentiment    0
      Label        0
      dtype: int64
```

```
[19]: import numpy as np
      train.replace(r'^\s*$', np.nan, regex = True, inplace = True)
      train.dropna(axis = 0, how = 'any', inplace = True)
```

```
[20]: train.replace(to_replace=[r"\\t|\\n|\\r", "\t|\n|\r"], value = ["",""], regex =␣
      ↪True, inplace = True)
      print("Escape Sequences removed")
```

```
Escape Sequences removed
```

```
[21]: train
```

```
[21]:                                               review sentiment  Label
      6668    Are you familiar with concept of children's ar…  negative     -1
      19767   The main problem with the documentary "Czech D…  negative     -1
      38829   This is a dry and sterile feature filming on o…  negative     -1
      27504   I really liked BATMAN: DEAD END, I thought tha…  positive      1
      17359   This was one of the slowest movies I have ever…  negative     -1
```

```
  …                                                              …       …     …
46889  Ya know when one looks at this Brian DePalma f…    positive      1
40541  so yes it is quite nostalgic watching the 1st …    positive      1
10947  There are some really terrific ideas in this v…    negative     -1
48379  If the creators of this film had made any atte…    positive      1
21826  Why me? Why should I be subjected to such slau…    negative     -1

[20000 rows x 3 columns]
```

[22]:
```python
train['review'] = train['review'].str.encode('ascii', 'ignore').str.
  ↪decode('ascii')
print("Non ASCII data removed")
```

```
Non ASCII data removed
```

[23]:
```python
def remove_punctuation(review):
    import string
    for punctuation in string.punctuation:
        review = review.replace(punctuation, '')
    return review
train['review'] = train['review'].apply(remove_punctuation)
```

[24]:
```python
import nltk
nltk.download('stopwords')
```

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

[24]: True

[25]:
```python
from nltk.corpus import stopwords
print(stopwords.words('english'))
```

```
['i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', "you're",
"you've", "you'll", "you'd", 'your', 'yours', 'yourself', 'yourselves', 'he',
'him', 'his', 'himself', 'she', "she's", 'her', 'hers', 'herself', 'it', "it's",
'its', 'itself', 'they', 'them', 'their', 'theirs', 'themselves', 'what',
'which', 'who', 'whom', 'this', 'that', "that'll", 'these', 'those', 'am', 'is',
'are', 'was', 'were', 'be', 'been', 'being', 'have', 'has', 'had', 'having',
'do', 'does', 'did', 'doing', 'a', 'an', 'the', 'and', 'but', 'if', 'or',
'because', 'as', 'until', 'while', 'of', 'at', 'by', 'for', 'with', 'about',
'against', 'between', 'into', 'through', 'during', 'before', 'after', 'above',
'below', 'to', 'from', 'up', 'down', 'in', 'out', 'on', 'off', 'over', 'under',
'again', 'further', 'then', 'once', 'here', 'there', 'when', 'where', 'why',
'how', 'all', 'any', 'both', 'each', 'few', 'more', 'most', 'other', 'some',
'such', 'no', 'nor', 'not', 'only', 'own', 'same', 'so', 'than', 'too', 'very',
's', 't', 'can', 'will', 'just', 'don', "don't", 'should', "should've", 'now',
'd', 'll', 'm', 'o', 're', 've', 'y', 'ain', 'aren', "aren't", 'couldn',
```

```
"couldn't", 'didn', "didn't", 'doesn', "doesn't", 'hadn', "hadn't", 'hasn',
"hasn't", 'haven', "haven't", 'isn', "isn't", 'ma', 'mightn', "mightn't",
'mustn', "mustn't", 'needn', "needn't", 'shan', "shan't", 'shouldn',
"shouldn't", 'wasn', "wasn't", 'weren', "weren't", 'won', "won't", 'wouldn',
"wouldn't"]
```

[26]:
```python
stopwords_list = nltk.corpus.stopwords.words('english')
stopwords_list.remove('no')
stopwords_list.remove('not')
```

[27]:
```python
def custom_remove_stopwords(text, is_lower_case = False):
    tokens = tokenizer.tokenize(text)
    tokens = [token.strip() for token in tokens]
    if is_lower_case:
        filtered_tokens = [token for token in tokens if token not in␣
 ↪stopwords_list]
    else:
        filtered_tokens = [token for token in tokens if token.lower() not in␣
 ↪stopwords_list]
    filtered_text = ''.join(filtered_tokens)
    return filtered_text
```

[28]:
```python
train['review'] = train['review'].apply(custom_remove_stopwords)
```

[29]:
```python
def remove_special_characters(text):
    text = re.sub('[^a-zA-z0-9\s]', '', text)
    return text
```

[30]:
```python
train['review'] = train['review'].apply(remove_special_characters)
```

[31]:
```python
def remove_html(text):
    import re
    html_pattern = re.compile('<.*?>')
    return html_pattern.sub(r' ', text)
```

[32]:
```python
train['review'] = train['review'].apply(remove_html)
```

[33]:
```python
def remove_URL(text):
    url = re.compile(r'https?://\S+|www\.\S+')
    return url.sub(r' ', text)
```

[34]:
```python
train['review'] = train['review'].apply(remove_URL)
```

[35]:
```python
def remove_numbers(text):
    text = ''.join([i for i in text if not i.isdigit()])
    return text
```

[36]:
```python
train['review'] = train['review'].apply(remove_numbers)
```

```
[37]: def cleanse(word):
          rx = re.compile(r'\D*\d')
          if rx.match(word):
              return ' '
          return word

      def remove_alphanumeric(strings):
          nstrings = [" ".join(filter(None, (
                      cleanse(word) for word in string.split())))
                  for string in strings.split()]
          str1 = ' '.join(nstrings)
          return str1
```

```
[38]: train['review'] = train['review'].apply(remove_alphanumeric)
```

```
[39]: train
```

```
[39]:                                              review sentiment  Label
      6668   familiarconceptchildrensartworknotgreatestPica…   negative     -1
      19767  mainproblemdocumentaryCzechDreamisntreallysayi…   negative     -1
      38829  drysterilefeaturefilmingoneinterestingeventsWW…   negative     -1
      27504  reallylikedBATMANDEADENDthoughttheatricalfeelg…   positive      1
      17359  oneslowestmovieseverdispleasuresittingintroduc…   negative     -1
      …                                               …          …     …
      46889  YaknowonelooksBrianDePalmafilmtodayImsureallot…   positive      1
      40541  yesquitenostalgicwatchingstepisodeoneepisodede…   positive      1
      10947  reallyterrificideasviolentmovieexecutedclearly…   negative     -1
      48379  creatorsfilmmadeattemptintroducingrealityplotw…   positive      1
      21826  subjectedslaughtercouldmadeinterestingplotleas…   negative     -1

      [20000 rows x 3 columns]
```

```
[40]: def lemmatize_text(text):
          text = nlp(text)
          text = ' '.join([word.lemma_ if word.lemma_ != "-PRON-" else word.text for
       ↪word in text])
          return text
```

```
[41]: train['review'] = train['review'].apply(lemmatize_text)
```

```
[42]: train['Sentiment'] = train['review'].apply(lambda x: TextBlob(x).sentiment)
```

```
[43]: train
```

```
[43]:                                              review sentiment  Label  \
      6668   familiarconceptchildrensartworknotgreatestpica…   negative     -1
      19767  mainproblemdocumentaryczechdreamisntreallysayi…   negative     -1
```

```
38829   drysterilefeaturefilmingoneinterestingeventsww…   negative   -1
27504   reallylikedbatmandeadendthoughttheatricalfeelg…   positive    1
17359   oneslowestmovieseverdispleasuresittingintroduc…   negative   -1
…                                               …           …      …
46889   yaknowonelooksbriandepalmafilmtodayimsureallot…   positive    1
40541   yesquitenostalgicwatchingstepisodeoneepisodede…   positive    1
10947   reallyterrificideasviolentmovieexecutedclearly…   negative   -1
48379   creatorsfilmmadeattemptintroducingrealityplotw…   positive    1
21826   subjectedslaughtercouldmadeinterestingplotleas…   negative   -1

        Sentiment
6668    (0.0, 0.0)
19767   (0.0, 0.0)
38829   (0.0, 0.0)
27504   (0.0, 0.0)
17359   (0.0, 0.0)
…              …
46889   (0.0, 0.0)
40541   (0.0, 0.0)
10947   (0.0, 0.0)
48379   (0.0, 0.0)
21826   (0.0, 0.0)

[20000 rows x 4 columns]
```

```python
sentiment_series = train['Sentiment'].tolist()
```

```python
columns = ['polarity', 'subjectivity']
df1 = pd.DataFrame(sentiment_series, columns = columns, index = train.index)
```

```python
result = pd.concat([train,df1], axis = 1)
```

```python
result.drop(['Sentiment'], axis = 1, inplace = True)
```

```python
result.loc[result['polarity'] >= 0.4, 'Sentiment_feeling'] = 'POSITIVE'
result.loc[(result['polarity'] > -0.4) & (result['polarity'] <= 0.4),
 ↪'Sentiment_feeling'] = 'NEUTRAL'
result.loc[result['polarity'] <= -0.4, 'Sentiment_feeling'] = 'NEGATIVE'
```

```python
result
```

```python
result.loc[result['Label'] == 1, 'Sentiment_label'] = 1
result.loc[result['Label'] == 0, 'Sentiment_label'] = 0
```

```python
result
```

```python

```