

## Customer Sentiment Analysis

```
from bs4 import BeautifulSoup
from selenium import webdriver
from selenium.webdriver.common.by import By
from selenium.webdriver.common.keys import Keys
import requests
import time
```

```
driver = webdriver.Chrome()
```

```
names = []
reviews = []
dates = []
cities = []
```

```
url = "https://www.flipkart.com/apple-iphone-15-blue-128-gb/product-reviews/itm6f14ef54f645d?pid=MOBGTAGPAQNVFZZY&lid=LSTMOBGTAGPAQNVFZZYQRLPCQ&marketplace=IN&from=merchandising"
driver.get(url)
```

```
for i in range(2,5):
```

```
    time.sleep(2)
    soup = BeautifulSoup(driver.page_source,"html.parser")
```

```
    Names = soup.find_all("p",{"class": "_2NsDsF AWS1CA"})
    for i in Names :
        names.append(i.text)
```

```
    Reviews = soup.find_all("div",{"class": "ZmyHeo"})
    for i in Reviews :
        reviews.append(i.text)
```

```
    Cities = soup.find_all("p",{"class": "MztJPv"})
    for i in Cities:
        cities.append(i.text)
```

```
    Dates = soup.find_all("p",{"class": "_2NsDsF"})
    for i in Dates:
        dates.append(i.text)
```

```
    for i in dates :
        act_dates = dates[1::2]
```

```
time.sleep(2)
```

```
driver.find_element(By.XPATH, "//*[@html/body/div/div/div[3]/div/div[1]/div[2]/div[2]/div]").click()
```

```
import pandas as pd
df = pd.DataFrame({"Names":names, "Citites":cities,"Dates":act_dates, "Reviews":reviews})
df
```

	Names	Citites	Dates	Reviews
0	Flipkart Customer	Certified Buyer, Agartala	10 months ago	Using this Iphone 15 from 1month and it has be...
1	Ajin V	Certified Buyer, Balaghat	Oct, 2023	High quality camera 🥰 READ MORE
2	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	Very niceREAD MORE
3	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	Just go for it.Amazing one.Beautiful camera wi...
4	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	Switch from OnePlus to iPhone I am stunned wit...
5	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	Camera Quality Is Improved Loving ItREAD MORE
6	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	Awesome photography experience. Battery backup...
7	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	So beautiful, so elegant, just a vowww 🥰❤️ READ ...
8	Sheetla Prasad Maurya	Certified Buyer, Sultanpur	Oct, 2023	Best mobile phoneCamera quality is very nice B...
9	Arunji Govindaraju	Certified Buyer, Chennai	Feb, 2024	Awesome product very happy to hold this. Bette...
10	Flipkart Customer	Certified Buyer, Agartala	10 months ago	Using this Iphone 15 from 1month and it has be...
11	Ajin V	Certified Buyer, Balaghat	Oct, 2023	High quality camera 🥰 READ MORE
12	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	Very niceREAD MORE
13	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	Just go for it.Amazing one.Beautiful camera wi...
14	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	Switch from OnePlus to iPhone I am stunned wit...
15	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	Camera Quality Is Improved Loving ItREAD MORE
16	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	Awesome photography experience. Battery backup...
17	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	So beautiful, so elegant, just a vowww 🥰❤️ READ ...
18	Sheetla Prasad Maurya	Certified Buyer, Sultanpur	Oct, 2023	Best mobile phoneCamera quality is very nice B...
19	Arunji Govindaraju	Certified Buyer, Chennai	Feb, 2024	Awesome product very happy to hold this. Bette...
20	Flipkart Customer	Certified Buyer, Agartala	10 months ago	Using this Iphone 15 from 1month and it has be...
21	Ajin V	Certified Buyer, Balaghat	Oct, 2023	High quality camera 🥰 READ MORE
22	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	Very niceREAD MORE
23	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	Just go for it.Amazing one.Beautiful camera wi...
24	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	Switch from OnePlus to iPhone I am stunned wit...
25	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	Camera Quality Is Improved Loving ItREAD MORE
26	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	Awesome photography experience. Battery backup...
27	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	So beautiful, so elegant, just a vowww 🥰❤️ READ ...

```
df["Reviews"] = df["Reviews"].str.lower()
df
```

	Names	Citites	Dates	Reviews
0	Flipkart Customer	Certified Buyer, Agartala	10 months ago	using this iphone 15 from 1month and it has be...
1	Ajin V	Certified Buyer, Balaghat	Oct, 2023	high quality camera 📷 read more
2	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	very niceread more
3	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	just go for it.amazing one.beautiful camera wi...
4	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	switch from oneplus to iphone i am stunned wit...
5	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	camera quality is improved loving itread more
6	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	awesome photography experience. battery backup...
7	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	so beautiful, so elegant, just a vowwww 🥰❤️ read ...
8	Sheetla Prasad Maurya	Certified Buyer, Sultanpur	Oct, 2023	best mobile phonecamera quality is very nice b...
9	Arunji Govindaraju	Certified Buyer, Chennai	Feb, 2024	awesome product very happy to hold this. bette...
10	Flipkart Customer	Certified Buyer, Agartala	10 months ago	using this iphone 15 from 1month and it has be...
11	Ajin V	Certified Buyer, Balaghat	Oct, 2023	high quality camera 📷 read more
12	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	very niceread more
13	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	just go for it.amazing one.beautiful camera wi...
14	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	switch from oneplus to iphone i am stunned wit...
15	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	camera quality is improved loving itread more
16	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	awesome photography experience. battery backup...
17	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	so beautiful, so elegant, just a vowwww 🥰❤️ read ...
18	Sheetla Prasad Maurya	Certified Buyer, Sultanpur	Oct, 2023	best mobile phonecamera quality is very nice b...
19	Arunji Govindaraju	Certified Buyer, Chennai	Feb, 2024	awesome product very happy to hold this. bette...
20	Flipkart Customer	Certified Buyer, Agartala	10 months ago	using this iphone 15 from 1month and it has be...
21	Ajin V	Certified Buyer, Balaghat	Oct, 2023	high quality camera 📷 read more
22	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	very niceread more
23	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	just go for it.amazing one.beautiful camera wi...
24	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	switch from oneplus to iphone i am stunned wit...
25	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	camera quality is improved loving itread more
26	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	awesome photography experience. battery backup...
27	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	so beautiful, so elegant, just a vowwww 🥰❤️ read ...

```
#nltk and TextBlob Libraries for Tokenizing = Break down into List of sentences into different sentences
```

```
import nltk
from nltk.corpus import stopwords
from nltk.tokenize import sent_tokenize
from nltk.tokenize import word_tokenize #Similarly, word tokenize breaks down diff words.
from textblob import TextBlob
import string
```

```
nltk.download('stopwords')
nltk.download('wordnet')
nltk.download('punkt')
```

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

```
True
```

```
import nltk
nltk.download('punkt')
```

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

```
True
```

```
df["Reviews_t"] = df['Reviews'].apply(sent_tokenize)
df
```

	Names	Citites	Dates	Reviews	Reviews_t
0	Flipkart Customer	Certified Buyer, Agartala	10 months ago	using this iphone 15 from 1month and it has be...	[using this iphone 15 from 1month and it has b...
1	Ajin V	Certified Buyer, Balaghat	Oct, 2023	high quality camera 📷 read more	[high quality camera 📷 read more]
2	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	very niceread more	[very niceread more]
3	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	just go for it.amazing one.beautiful camera wi...	[just go for it.amazing one.beautiful camera w...
4	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	switch from oneplus to iphone i am stunned wit...	[switch from oneplus to iphone i am stunned wi...
5	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	camera quality is improved loving itread more	[camera quality is improved loving itread more]
6	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	awesome photography experience. battery backup...	[awesome photography experience., battery backup...
7	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	so beautiful, so elegant, just a vovwww 🥰❤️ read ...	[so beautiful, so elegant, just a vovwww 🥰❤️ read...

```

from statistics import mean

def get_polarity(sentences):
    return [TextBlob(sentence).sentiment.polarity for sentence in sentences]

df['Polarity'] = df['Reviews'].apply(get_polarity)

def calculate_average_polarity(polarities):
    return mean(polarities) if polarities else 0

df['Average_Polarity'] = df['Polarity'].apply(calculate_average_polarity)

df.head(10)

```

	Names	Cities	Dates	Reviews	Reviews_t	Polarity	Average_Polarity
0	Flipkart Customer	Certified Buyer, Agartala	10 months ago	using this iphone 15 from 1month and it has be...	[using this iphone 15 from 1month and it has b...	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
1	Ajin V	Certified Buyer, Balaghat	Oct, 2023	high quality camera 🥰 read more	[high quality camera 🥰 read more]	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
2	Mousam Guha Roy	Certified Buyer, Matialihat	Oct, 2023	very niceread more	[very niceread more]	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
3	bijaya mohanty	Certified Buyer, Baleshwar	9 months ago	just go for it.amazing one.beautiful camera wi...	[just go for it.amazing one.beautiful camera w...	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
4	Nikhil Kumar	Certified Buyer, Meerut Division	Jan, 2024	switch from oneplus to iphone i am stunned wit...	[switch from oneplus to iphone i am stunned wi...	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
5	Prithivi Boruah	Certified Buyer, Bokajan	Oct, 2023	camera quality is improved loving itread more	[camera quality is improved loving itread more]	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
6	Flipkart Customer	Certified Buyer, Aizawl	Jan, 2024	awesome photography experience. battery backup...	[awesome photography experience, battery back...	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
7	Akshay Meena	Certified Buyer, Jaipur	Nov, 2023	so beautiful, so elegant, just a vovwww 🥰❤️ read ...	[so beautiful, so elegant, just a vovwww 🥰❤️ read...	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
8	Sheetla Prasad Maurya	Certified Buyer, Sultanpur	Oct, 2023	best mobile phonecamera quality is very nice b...	[best mobile phonecamera quality is very nice ...]	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0
9	Arunji Govindaraju	Certified Buyer, Chennai	Feb, 2024	awesome product very happy to hold this. bette...	[awesome product very happy to hold this, bet...	[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, ...]	0.0

```
df["Average_Polarity"].mean()
```

```
np.float64(0.0)
```