📌 SECTION 1: Project Introduction

🍽️ Zomato Reviews Sentiment Analysis

This project analyzes customer reviews from Zomato using Natural Language Processing (NLP) techniques. The objective is to classify reviews into **Positive, Negative, and Neutral sentiments** and derive actionable insights that help businesses understand customer satisfaction.

📌 SECTION 2: Business Problem

🎯 Business Problem

Food delivery platforms receive thousands of customer reviews every day. Manually analyzing this feedback is inefficient.

Questions addressed:

- What is the overall customer sentiment?
- Are customers generally satisfied or dissatisfied?
- How can textual feedback be converted into business insights?

📌 SECTION 3: Import Libraries

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

from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from textblob import TextBlob

plt.style.use("default")
```

📌 SECTION 4: Load Dataset

```
df = pd.read_csv("zomato_reviews.csv")
df.head()
```

	Id	Rating	Review
0	0	5	nice
1	1	5	best biryani , so supportive staff of outlet ,...
2	2	4	delivery boy was very decent and supportive. 👌 👍
3	3	1	worst biryani i have tasted in my life, half o...
4	4	5	all food is good and tasty . will order again ...

The dataset contains customer review text collected from Zomato.

📌 SECTION 5: Data Cleaning & Preprocessing

Cleaning function

```
import re

def clean_text(text):
    if pd.isna(text):
        return ""
    text = str(text).lower()
    text = re.sub(r"[^a-zA-Z\s]", "", text)
    return text

df["clean_review"] = df["Review"].apply(clean_text)
```

Empty reviews remove

```
df = df[df["clean_review"].str.strip() != ""]
df.shape
```

```
(5422, 5)
```

Text cleaning includes:

- Lowercasing
- Removal of special characters
- Handling missing values

📌 SECTION 6: NLP-based Sentiment Analysis

Sentiment function

```
def get_sentiment(text):
    polarity = TextBlob(text).sentiment.polarity
    if polarity > 0:
        return "Positive"
    elif polarity < 0:
        return "Negative"
    else:
        return "Neutral"

df["sentiment"] = df["clean_review"].apply(get_sentiment)
df.head()
```

	Id	Rating	Review	clean_review	sentiment
0	0	5	nice	nice	Positive
1	1	5	best biryani , so supportive staff of outlet ,...	best biryani so supportive staff of outlet p...	Positive
2	2	4	delivery boy was very decent and supportive. 👌 👍	delivery boy was very decent and supportive	Positive
3	3	1	worst biryani i have tasted in my life, half o...	worst biryani i have tasted in my life half of...	Negative

Sentiment is assigned using TextBlob polarity:

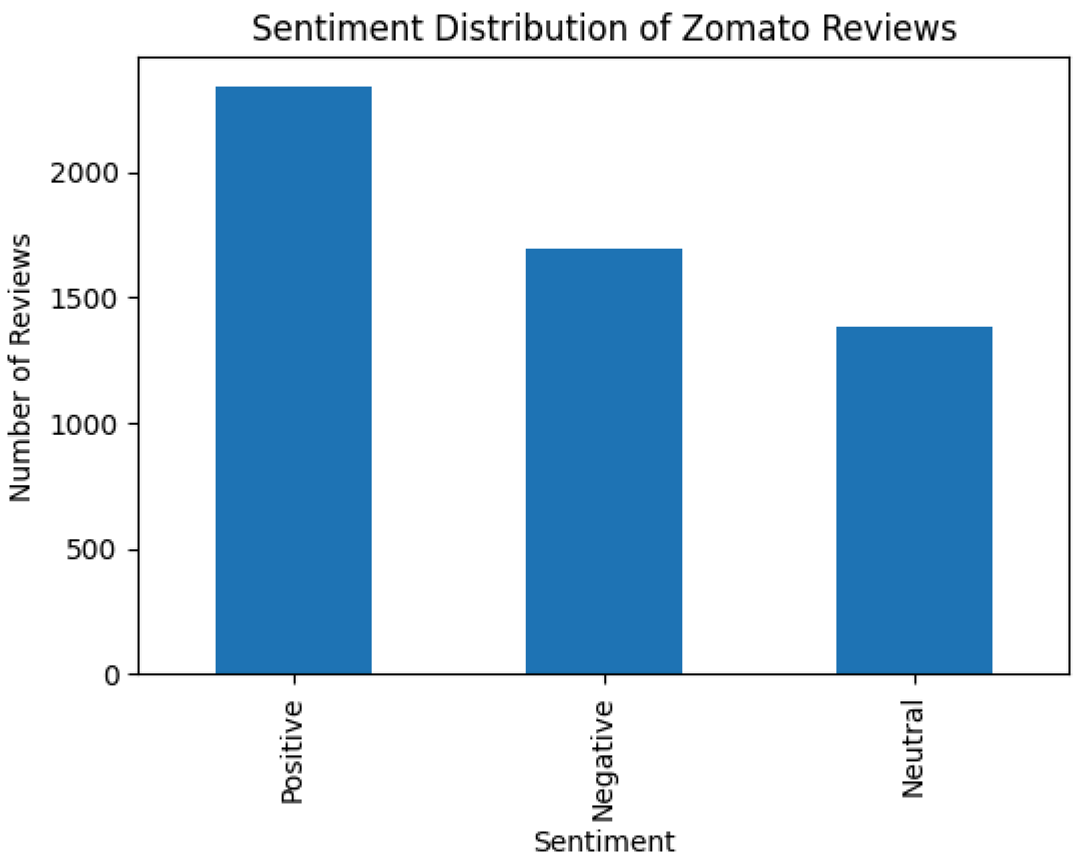
- Positive (> 0)
- Negative (< 0)
- Neutral (= 0)

📌 SECTION 7: Sentiment Distribution (NLP Output)

Bar chart

```
sentiment_counts = df["sentiment"].value_counts()

plt.figure(figsize=(6,4))
sentiment_counts.plot(kind="bar")
plt.title("Sentiment Distribution of Zomato Reviews")
plt.xlabel("Sentiment")
plt.ylabel("Number of Reviews")
plt.show()
```



Percentage

```
(df["sentiment"].value_counts(normalize=True) * 100).round(2)
```

```
           proportion
 sentiment
 Positive       43.18
 Negative       31.30
 Neutral        25.53

dtype: float64
```

The majority of reviews are positive, indicating overall customer satisfaction.

📌 SECTION 8: Rating-based Sentiment Mapping

```
def rating_to_sentiment(rating):
    if rating >= 4:
        return "Positive"
    elif rating == 3:
        return "Neutral"
    else:
        return "Negative"

df["rating_sentiment"] = df["Rating"].apply(rating_to_sentiment)
```

Customer ratings are converted into sentiment categories to validate NLP-based sentiment results.

📌 SECTION 9: Rating vs NLP Sentiment Comparison

Crosstab

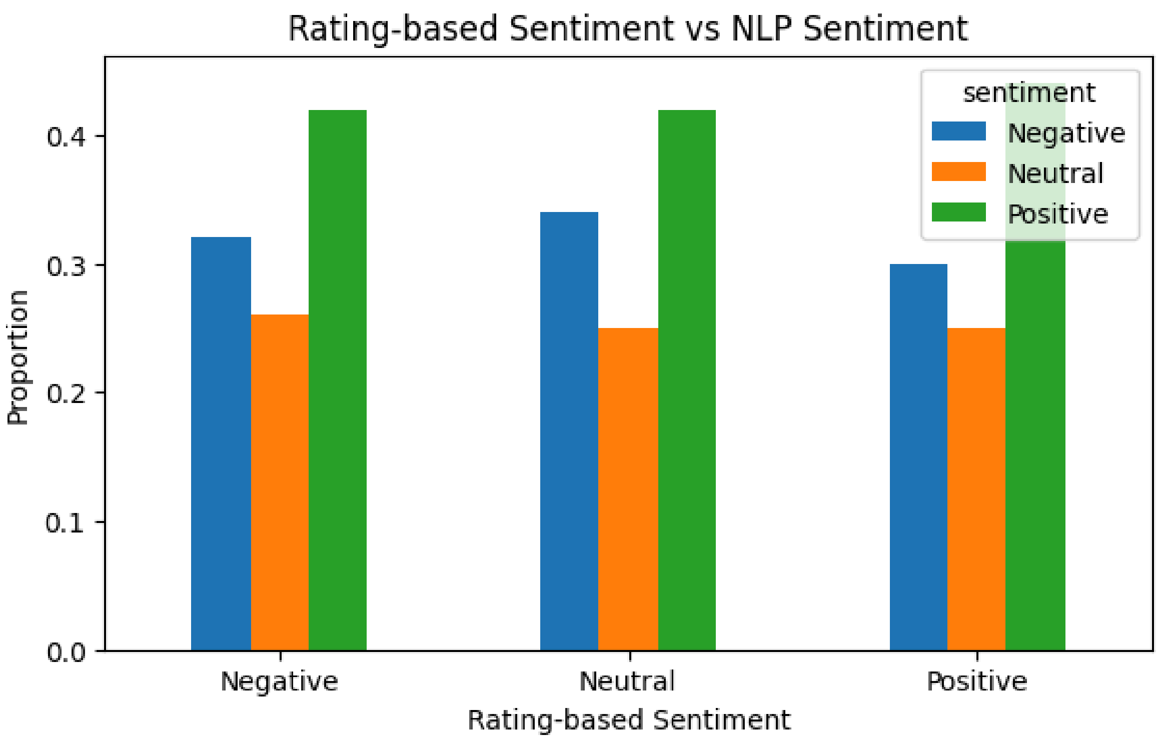
```
comparison = pd.crosstab(
    df["rating_sentiment"],
    df["sentiment"],
    normalize="index"
).round(2)

comparison
```

sentiment	Negative	Neutral	Positive
rating_sentiment			
Negative	0.32	0.26	0.42
Neutral	0.34	0.25	0.42
Positive	0.30	0.25	0.44

Comparison chart

```
comparison.plot(kind="bar", figsize=(7,4))
plt.title("Rating-based Sentiment vs NLP Sentiment")
plt.xlabel("Rating-based Sentiment")
plt.ylabel("Proportion")
plt.xticks(rotation=0)
plt.show()
```



This comparison validates NLP sentiment classification.

- High ratings (4–5) mostly align with Positive sentiment
- Low ratings (1–2) align with Negative sentiment
- This confirms model reliability

FINAL INSIGHTS

📌 Key Insights

- Majority of customer reviews are positive
- Negative reviews highlight delivery and food quality issues
- NLP sentiment strongly aligns with customer ratings
- Text reviews can be converted into actionable insights

📌 Learning Outcomes

🧠 Learning Outcomes

- Practical NLP implementation
- Text preprocessing and sentiment classification
- Business-oriented data analysis
- Validation of NLP models using ratings

📌 Limitations & Future Scope

⚠️ Limitations & Future Improvements

- TextBlob may misclassify sarcasm
- Emojis and slang are ignored
- VADER or ML models can improve accuracy
- Emoji sentiment mapping can be added