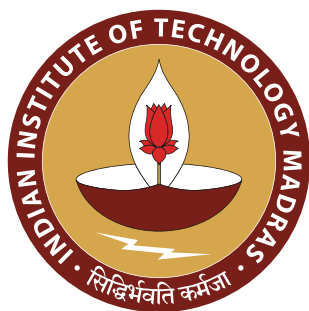


Social Media Listening

(Exploring Consumer Sentiments on Leading Smartphones)

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Roll no: **MA23C023**



GitHub Repository Link of all the code files for this project can be found at
<https://github.com/narender288/Social-Media-Listening>.

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Overview

Introduction

Smartphones, including popular brands like iPhone, Samsung, OnePlus, and Xiaomi, are essential in our everyday lives. With new models released regularly, it is important to understand why these phones are in high demand and what makes them stand out.

This report will compare the strengths and weaknesses of each brand based on key features like performance, battery life, camera quality, price, and design. By doing so, I aim to help smartphone companies understand consumer preferences and improve their products.

Motivation for this Report

For many years, the smartphone market has been dominated by iPhone and Samsung, with Apple focusing on privacy and simplicity and Samsung offering advanced features and innovation. However, other brands like OnePlus and Xiaomi have gained popularity by offering high-performance phones at more affordable prices.

In this report, I will not only compare iPhone and Samsung but also include OnePlus and Xiaomi, evaluating important factors such as battery life, camera, storage, display, performance, and more.

Data Extraction

To gather genuine consumer opinions, data was collected from popular online communities, including the subreddits (r/iphone), (r/samsung), (r/oneplus), and (r/xiaomi).

I extracted the Title to identify the main focus of each post, Upvotes to understand how popular and relevant the feedback was, and the URL to link back to the original post for reference. The Created date was recorded to ensure the data is current, and the Text (Comment) that provided the detailed feedback on key features such as battery life, camera quality, and performance. This approach allowed for a thorough analysis based on real-world experiences, helping to compare the smartphones effectively.

Data Preparation and Cleaning

To gather more data, I initially tried extracting up to 10,000 posts from each subreddit. However, much of the data was repetitive. After experimenting with various batch sizes, I was able to consistently extract an average of 1,500 unique posts.

To enhance data quality, I cleaned the Comment/text by converting it to lowercase, removing punctuation and non-alphabetic characters, and eliminating stopwords. I also removed any extra spaces. Finally, I converted the Created column, which contained timestamps, into a readable date and time format, ensuring the data was properly organized for analysis.

Sentiment Analysis Methods and Models

In this report, four sentiment analysis models— **VADER**, **TextBlob**, **BERT**, and **RoBERTa**—were applied to classify sentiment in social media posts. VADER was used to analyze short, informal texts, TextBlob for polarity-based sentiment classification, BERT for capturing nuanced sentiment, and RoBERTa for deeper analysis of complex language.

Each model analyzed sentiment at different complexities. VADER classified posts into positive, negative, or neutral based on compound scores. TextBlob assigned polarity scores for similar categorization.

BERT used a 1-5 star scale for sentiment prediction, while RoBERTa analyzed sentences and used a majority vote for overall sentiment classification.

Model	iPhone	Samsung	Xiaomi	OnePlus
VADER	0.096088	0.275894	0.154609	0.160322
TextBlob	0.030274	0.100506	0.071520	0.070942
BERT	0.434871	0.417484	0.419577	0.433831
RoBERTa	0.439093	0.440381	0.440439	0.439859

Table 1: Mean Sentiment Scores of Models across Phone Brands

From the table, several key conclusions can be drawn. Firstly, **VADER** and **TextBlob** show that **Samsung** consistently has the highest sentiment scores, indicating a more positive perception compared to the other brands. **iPhone**, on the other hand, has the lowest sentiment in both models, suggesting more neutral or slightly negative sentiment. In contrast, **BERT** and **RoBERTa**, which are more sophisticated models, show very similar sentiment scores across all brands. This suggests that these models provide a more balanced and subtle sentiment analysis, with minimal variation between the brands. While **BERT** slightly favors **iPhone**, the differences are quite small, indicating that the advanced models offer a more neutral view of sentiment overall.

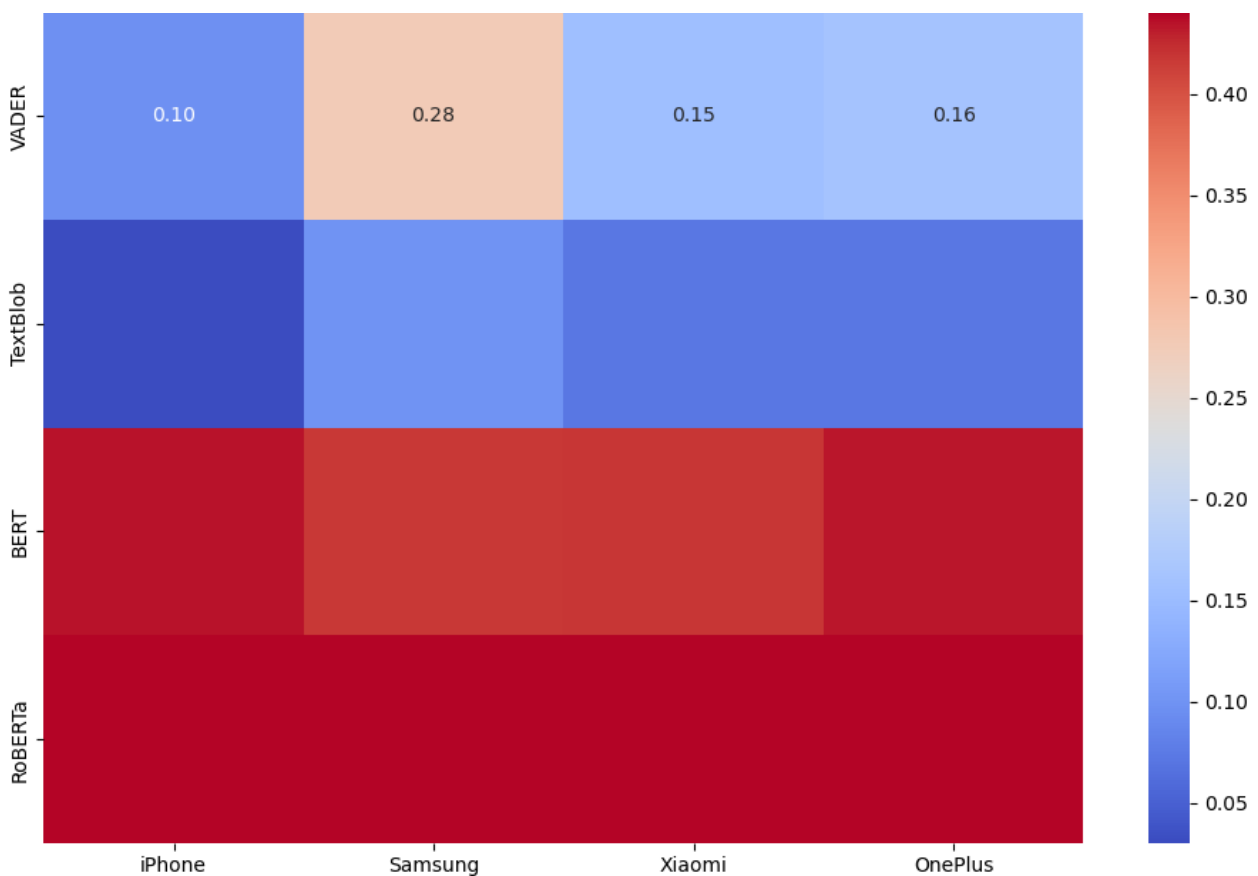


Figure 1: Smartphone Sentiment Scores Across Models

Temporal Sentiment Analysis Observations

As Temporal sentiment analysis allowed us to track sentiment trends over time, uncovering patterns and shifts in customer reactions. By analyzing sentiment at various points in time, I was able to observe how opinions about smartphones evolve, particularly in relation to key product releases, software updates, or marketing campaigns.

I observed a "zig-zag" motion in the average sentiment of comments about different brands, indicating fluctuations in public opinion throughout the month. These variations were likely influenced by various factors such as events, promotions, product launches, or news related to the respective smartphone brands.

From recent data, I observed a significant shift in sentiment following major product releases and updates. For example, on January 9, 2025, Apple announced that the certification authority (CA) for the Apple Push Notification Service (APNs) would be changing. This news was not well received by users, and the sentiment reflected a clear decline. As shown in the plot (Figure 2), there is a noticeable drop in sentiment on January 9, which is evident in the data from the previous week.

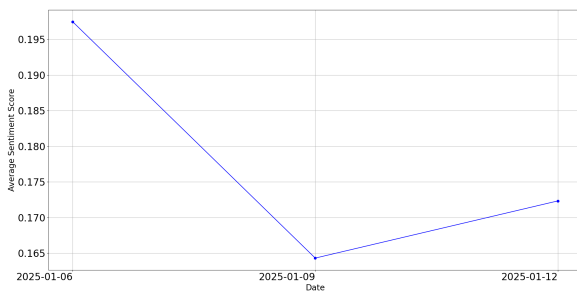


Figure 2: For iPhone

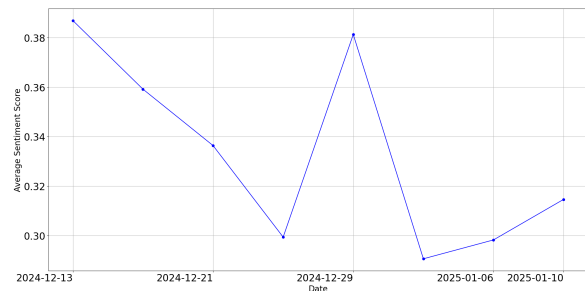


Figure 3: For Samsung

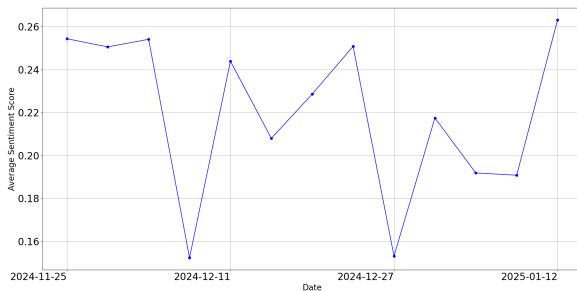


Figure 4: For Xiaomi

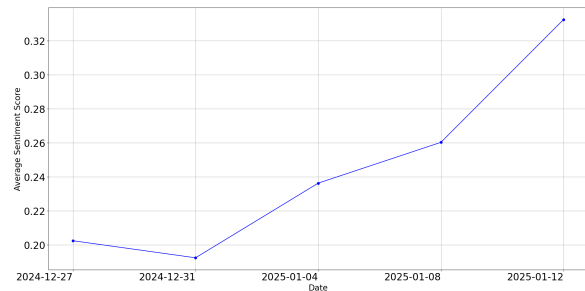


Figure 5: For OnePlus

Model-wise Aspect-Based Sentiment Analysis

Before conducting Aspect-Based Sentiment Analysis, I performed **Keyword Analysis** to identify the key themes and topics mentioned in user comments. This helped me understand what aspects of the product (e.g., camera, battery life, performance) were most frequently discussed by the public, setting the stage for the more detailed sentiment analysis that followed.

KEY-ASPECTS: Camera, Battery, Software, Look/Design, Water Resistance, Gaming Features, Safety/Privacy, Charging, and Processor/Speed.

IPHONE

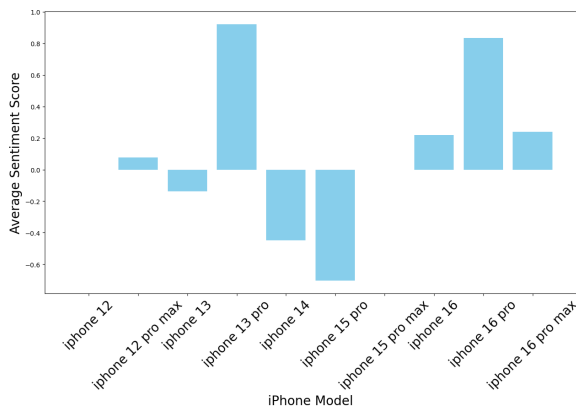
A total of 30 iPhone models were mentioned by the public in their comments, and they are as follows: iPhone 11, iPhone 16, iPhone 15 Pro, iPhone 16 Pro Max, iPhone 15, iPhone 16 Promax, iPhone 16 Pro, iPhone 5, iPhone 14, iPhone 13 Pro, iPhone 8, iPhone 4, iPhone 6, iPhone 13, iPhone 15 Pro Max, iPhone 3, iPhone 12, iPhone 8 Plus, iPhone 16 Plus, iPhone 14 Pro, iPhone 12 Pro Max, iPhone 13 Mini, iPhone 13 Pro Max, iPhone 7, iPhone 14 Pro Max, iPhone 7 Plus, iPhone 10, iPhone 15 Plus, iPhone 12 Mini, and iPhone 11 Pro.

So I decided to focus on analyzing the sentiment for a specific set of recent iPhone models that are either newly launched or currently available for sale in the market. The selected models include the **iPhone 16 series** (Pro Max, Pro, and 16), **iPhone 15 series** (Pro Max, Pro, 15, and 15 Plus), the **iPhone 14 series** (Pro Max, Pro, 14, and 14 Plus), the **iPhone 13 series** (Pro Max, Pro, 13, and 13 Mini), and the **iPhone 12 series** (Pro Max, Pro, and 12).

Then, I filtered the dataset to focus on the recently launched models or those that are currently available for sale in the market. This allowed me to analyze sentiment specifically for the most relevant and up-to-date smartphones, ensuring that the data reflects current trends and consumer opinions.

For Camera:

I used predefined keywords like 'MP', 'megapixels', 'camera', and 'lens' to extract camera details from user reviews. If no camera-related information is found, I label the review as "No camera-related info" and remove it from further analysis. Then, I analyze sentiment using VADER and group reviews by iPhone model to calculate the average sentiment for each.



Modelwise Comparison of iPhone wrt Camera

iPhone Model	Sentiment Score
iPhone 13 Pro	0.920000
iPhone 16 Pro	0.834800
iPhone 16 Pro Max	0.240567
iPhone 16	0.219625
iPhone 12 Pro Max	0.078300
iPhone 12	0.000000
iPhone 15 Pro Max	0.000000
iPhone 13	-0.138267
iPhone 14	-0.448800
iPhone 15 Pro	-0.704150

Figure 6: Sentiment Scores for iPhone-Camera

Similarly, I used predefined keywords to extract details from reviews for different phone features. For battery, I look for terms like 'battery', 'mAh', and 'charging'. For software, I focus on keywords like 'iOS', 'version', and 'update'. For design, I check like 'material', 'color', and 'finish'. For display, I use terms like 'screen', 'resolution', and 'pixels'. For water resistance, I look for 'water resistant' and 'IP'. For charging, I target keywords like 'fast charging' and 'wireless charging'. For privacy, I search for 'Face ID' and 'biometric'. For the processor, I look for 'chipset', 'A12', and other related terms. For RAM, I focus on 'GB', 'DDR4', and 'memory'. For audio, I use keywords like 'stereo speakers' and 'Dolby'. Lastly, for gaming, search for terms like 'gaming', 'frame rate', and 'smooth gameplay'. These keywords help me extract specific feature-related information from reviews.

Aspects	Top-Most Model	Second-Most Model	Least Model
Camera	iPhone 13 Pro	iPhone 16 Pro	iPhone 15 Pro
Battery	iPhone 12 Pro Max	iPhone 12	iPhone 15 Pro
Software	iPhone 13 Pro	iPhone 15 Pro Max	iPhone 14 Pro
Design	iPhone 12 Pro Max	iPhone 12	iPhone 13 Pro
Display	iPhone 12 Pro Max	iPhone 15 Pro Max	iPhone 15 Pro
Power	iPhone 12 Pro Max	iPhone 12	iPhone 15 Pro
Weight	iPhone 12 Pro Max	iPhone 14	iPhone 15
Safety	iPhone 12 Pro Max	N/A	iPhone 15 Pro
Speaker	iPhone 16	iPhone 15	iPhone 13 Pro

Table 2: Comparison of iPhone Models Across Various Aspects

SAMSUNG

A total of 21 Galaxy models were identified, which include the Galaxy S22, Galaxy A52, Galaxy S23, Galaxy A32, Galaxy S21, Galaxy A25, Galaxy S24, Galaxy S10, Galaxy A12, Galaxy S6, Galaxy S25, Galaxy S7, Galaxy S8, Galaxy S20, Galaxy A9, Galaxy A14, Galaxy A54, Galaxy A30, Galaxy A35, Galaxy A55, and Galaxy A9.

Additionally, there are 47 models from the Samsung S and A series, which include the Samsung S24, S25, S26, S27, S28, S90, S95, S6, S7, S8, S9, S10, S20, S21, S22, S23, S89, S85, S5, S3, S2, and S1 Pro Max, along with the following models from the A series: A03, A7, A9, A12, A14, A15, A30, A32, A33, A34, A35, A50, A53, A54, A55, A63, A65, A70, A73, A8, A9, A10, A11, A12, A20, A25, A30, A32, A55, A63, and A6.

In total, 68 models were mentioned by the public in their comments.

Same that I done for iPhone will repeat for Samsung, the analysis focuses on a selection of recent models from both the Galaxy S and A series. The selected models include the Samsung **S24 series** (S24, S24+, S24 Ultra), Samsung **S23 series** (S23, S23+, S23 Ultra), Samsung **A series** (A35, A55, A25, A34, A54, A15, Galaxy A32, Galaxy A12), and other notable models such as the Samsung **S25** and **S26**.

Features	Best Model	Runner-Up Model	Lowest Rated Model
Camera	Samsung A15	Samsung S23	Samsung A35
Battery	Samsung A15	Samsung A34	Samsung Galaxy A25
Software	Samsung A15	Samsung A54	Samsung Galaxy A25
Design	Samsung S24	Samsung S23	Samsung S25
Display	Samsung Galaxy A32	Samsung A35	Samsung S25
Charging	Samsung S24	Samsung A15	Samsung S25
Weight	Samsung A15	Samsung Galaxy A32	Samsung S24
Processor	Samsung S23	Samsung A15	Samsung S24
Speaker	Samsung S23	Samsung S24	Samsung A35
Gaming	Samsung S23	Samsung S24	Samsung S23

Table 3: Comparison of Samsung Models Based on Various Aspects

XIAOMI

A total of 26 models of Xiaomi have been mentioned by users in comments.

These include popular models such as the Redmi A3, Mi 11, Redmi Note 13, Redmi 13, Redmi 12, Mi 10, Redmi Note 9, Mi 2, Mi 9, Redmi 13C, Redmi 9t, Redmi Note 10, Redmi Note 11, Redmi 9C, Redmi 10C, Redmi Note 8, Mi 13, Redmi 14c, Redmi 10, Redmi 13c, Mi 11, Redmi Pad, Redmi 14C, Redmi 7, Redmi 6, and Redmi Note 7.

Similarly for Xiaomi, the analysis focuses on a variety of models from both the Redmi and Mi series. The selected models include the **Redmi Note 13, Redmi 12, Redmi 13, Redmi 13C, Mi 10, Redmi Note 9, Mi 9, Redmi 9C, Redmi 9, and Redmi Note 11.**

Features	Best Model	Runner-Up Model	Lowest Rated Model
Camera	Redmi Note 13	Redmi 13	Redmi 13C
Battery	Redmi 9C	Redmi Note 11	Redmi Note 13
Software	Mi 9	Redmi Note 13	Redmi 12
Display	Redmi Note 13	Mi 9	Redmi 13
Power	Redmi Note 9	Redmi Note 13	N/A
Processor	Redmi 9C	Redmi Note 11	N/A
Speaker	Redmi 13	Redmi Note 13	N/A
Gaming	Redmi 13C	Redmi Note 11	N/A

Table 4: Comparison of Xiaomi Models Based on Various Features

ONEPLUS

Similarly for OnePlus, the analysis covers a range of recent and popular models from the OnePlus series. The selected models include the **OnePlus 13, OnePlus 12, OnePlus 12R, OnePlus 11, OnePlus 10 Pro, OnePlus 10T, OnePlus 10R, OnePlus 9, OnePlus 9 Pro, OnePlus 8T, and OnePlus 8 Pro** out of 25 OnePlus models have been mentioned by users,

Features	Best Model	Runner-Up Model	Lowest Rated Model
Camera	OnePlus 13	OnePlus 12	OnePlus 11
Battery	OnePlus 11	OnePlus 10T	OnePlus 9
Software	OnePlus 13	OnePlus 8T	OnePlus 12
Display	OnePlus 13	OnePlus 10 Pro	OnePlus 9 Pro
Charging	OnePlus 10T	OnePlus 11	OnePlus 12R
Weight	OnePlus 12	OnePlus 13	OnePlus 12R
Safety	OnePlus 13	N/A	N/A
Speed	OnePlus 13	OnePlus 12R	OnePlus 12
Speaker	OnePlus 12	OnePlus 13	N/A
Gaming	OnePlus 12	N/A	OnePlus 9 Pro

Table 5: Comparison of Oneplus Models Based on Various Features

Cross-Brand Model Comparison Based on Key Aspects

For Cross-Brand Model Comparison, the user review data of **iPhone**, **Samsung**, **Xiaomi**, and **OnePlus** were combined into a single dataset and Sentiment analysis was performed using *Roberta*. Neutral reviews were filtered out to focus on positive and negative feedback only. A group-by operation was performed to aggregate sentiment counts for each model, allowing for clear comparisons across brands.

Features	Top Models	Weak Models
Camera	OnePlus 13 and Samsung S23	iPhone 10 and Samsung S24
Battery	OnePlus 13 and OnePlus 7	Samsung S22 and Samsung S24
Software	Samsung S25 and OnePlus 13	Samsung Galaxy A22 and Samsung S23
Design	OnePlus 13 and Samsung S24	Samsung Galaxy A22 and Samsung S23
Display	OnePlus 13 and Samsung S24	iPhone 12 and OnePlus 12
Safety	Samsung S23	Samsung S22
Charging	OnePlus 13 and Samsung S22	iPhone 15 Pro and Samsung S5
Speed	Samsung S23 and iPhone 12 Pro Max	OnePlus 13 and Samsung A15
Gaming	Samsung S23 and Samsung S24	Samsung S24 and iPhone 12
Water Resistance	iPhone 16 Pro Max and Samsung S10	Samsung S24 and iPhone 12
Speaker	Samsung A14	iPhone 13 Pro and Samsung S24

Table 6: Comparison of Top and Weak Models Brandwise by Features

Strengths	
Samsung	Battery life, Camera quality, Speed, Design, Gaming
Apple	Water resistance, Speaker quality, Camera performance
OnePlus	Camera, Battery life, Charging speed, Software performance
Xiaomi	Camera quality, Battery life, Display performance
Weaknesses	
Samsung	Speaker quality, Charging speed, Water resistance
Apple	Battery life, Display quality, Slower charging speeds
OnePlus	Design, Gaming performance, Speed
Xiaomi	Software performance, Charging, Gaming capabilities

Table 7: Strengths and Weaknesses of Different Brands

The table above highlights the major strengths and problems raised by the public in comments regarding each smartphone brand.

Sentiment-Based Brand Comparison

Finally, a thorough comparison of the four brands was performed using sentiment analysis with TextBlob. Sentiment scores were calculated for each brand, and the data was grouped and ranked based on positive, neutral, and negative sentiments.

This analysis provides a clear insight into consumer perceptions and the relative standing of each brand. Based on the data and plot analysis, **Samsung** ranks 1st with the highest sentiment score of 0.100506. **Xiaomi** follows in 2nd place with a score of 0.071520, reflecting generally positive sentiment but still behind Samsung. **OnePlus** comes in 3rd with a score of 0.070942, showing mixed reactions and a noticeable gap from the top two. Finally, **iPhone** ranks 4th with the lowest score of 0.030274, receiving the least positive sentiment.

This ranking highlights Samsung as the most favored brand, while iPhone models receive the most critical feedback.

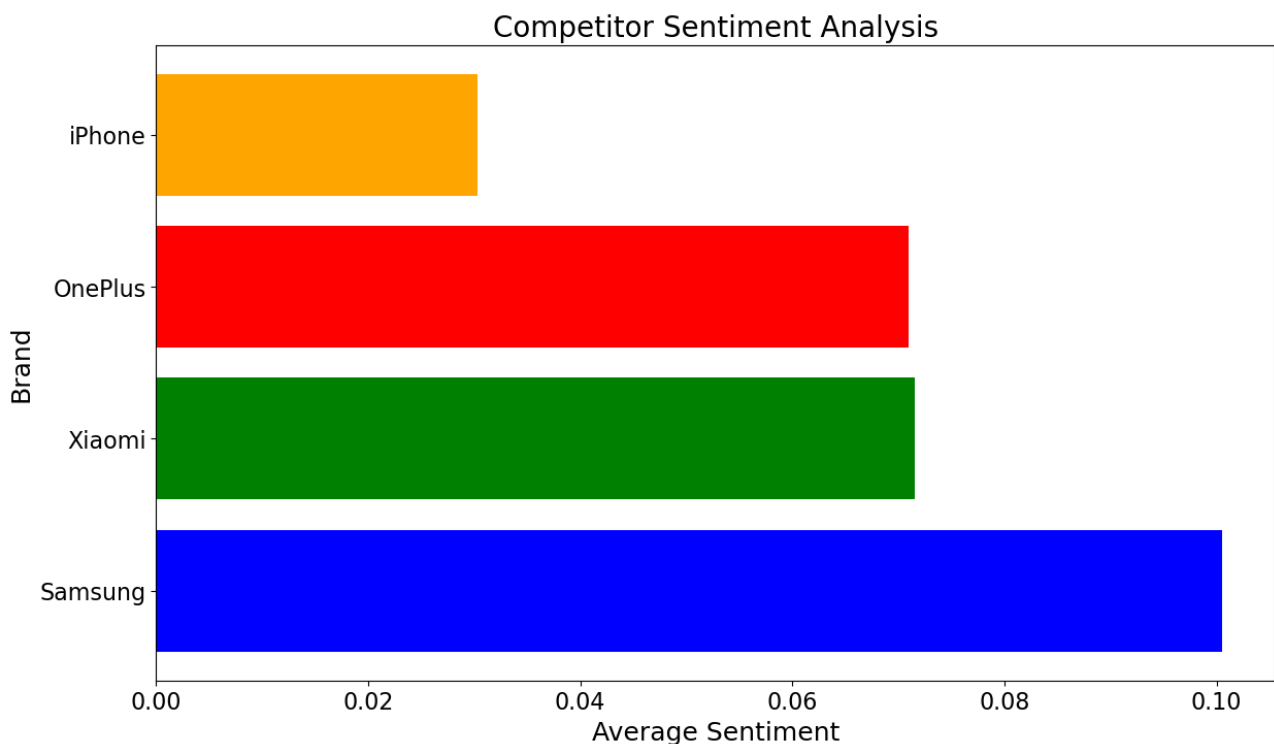


Figure 7: Overall Brand Comparison

Gender-Based Sentiment Analysis of Brands

The purpose of conducting a gender-based sentiment analysis is to gain a deeper understanding of which brands are preferred by males and females.

To classify the comments by gender, predefined gendered terms (such as “he,” “she,” etc.) were used, and a function was developed to infer gender based on these terms. Sentiment analysis was then performed using TextBlob’s `get_sentiment` function. Finally, the data was grouped by gender to provide a clearer and better understanding of how different genders perceive each brand.

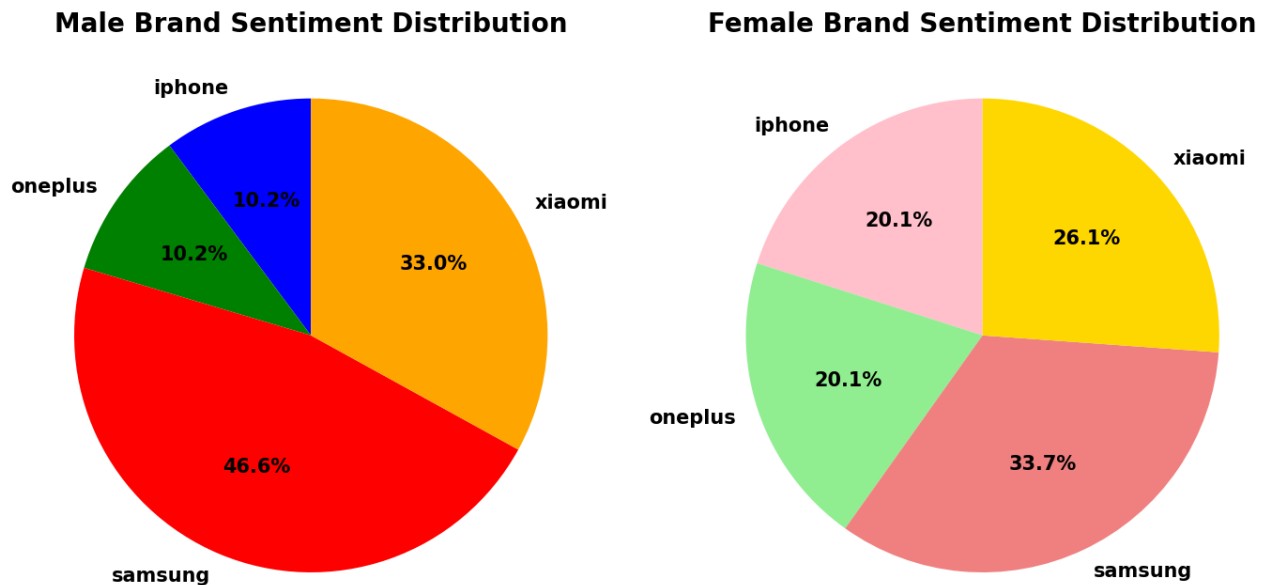


Figure 8: Demographics Analysis Across Brands

Brand Sentiment Comparison

Samsung has the highest sentiment scores, particularly among males, while iPhone and OnePlus have the lowest, with iPhone showing the most negative sentiment, especially from male users. OnePlus's sentiment remains consistently low across both genders.

Gender-Based Sentiment Analysis

iPhone sees higher sentiment from females than males, while Samsung shows the opposite trend with higher sentiment from males. Xiaomi maintains nearly identical sentiment scores across genders, and OnePlus has balanced sentiment for both.

Country-Wise Smartphone Sentiment Analysis

Smartphone sentiment varies across countries, making it important for businesses to understand regional opinions. This analysis seeks to uncover whether users in various countries love or dislike smartphones.

Below table highlights the countries where each brand is most loved and least favored.

Brand	Top Country	Second Top Country	Least Favorite Country
iPhone	United States	India	Romania
OnePlus	Romania	Germany	Cambodia
Samsung	India	Japan	Costa Rica
Xiaomi	New Zealand	Cambodia	Hong Kong

Table 8: Smartphone Brand Popularity by Region

From the data, I observe that India's sentiment for iPhone and Samsung is exceptionally high, reflecting strong brand loyalty. Romania's affection for OnePlus is notably impressive, while New Zealand leads in Xiaomi's popularity. On the flip side, Romania is the least favorable for iPhone, and Cambodia shows a negative sentiment for OnePlus.

By this report, I gained an understanding of consumer sentiment towards smartphone brands across different countries, with sentiment scores represented through pie charts for each nation. These charts provide insights into the relative fanbase of each smartphone brand within the respective regions.

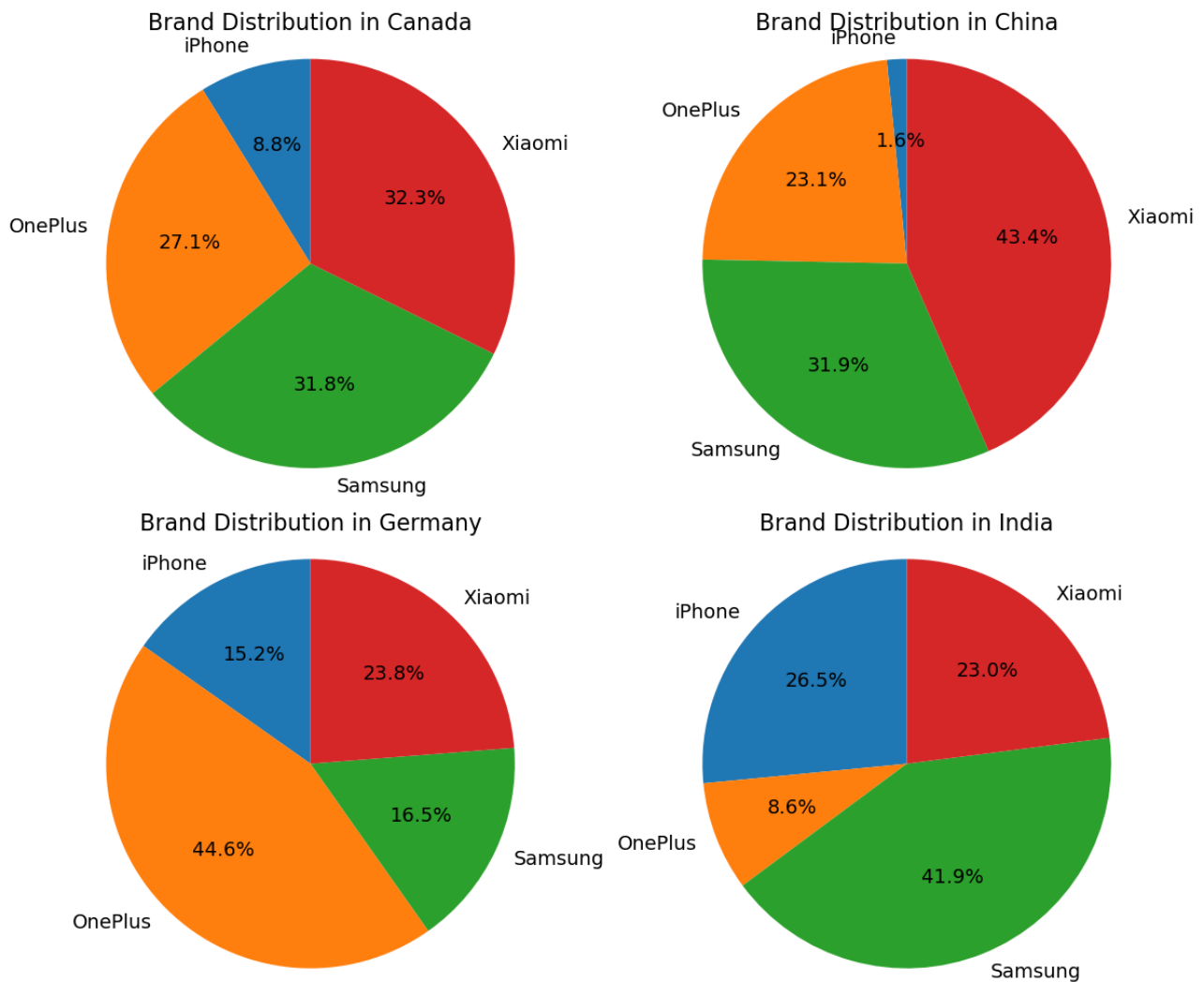


Figure 9: Popularity Trends of Smartphone Brands by Country

In India, Samsung has the highest sentiment score, showing a strong preference and large customer base for the brand. iPhone also has good popularity, with a positive sentiment indicating strong consumer interest. Xiaomi and OnePlus, although less popular, still have a loyal but smaller fanbase, as seen in their lower sentiment scores.

Thank You!