



Phase 4 Group Project- Group 3

TWITTER SENTIMENT ANALYSIS

25 January, 2025



Group Members

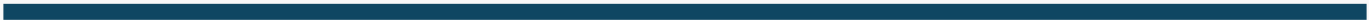
Augustine Komen

Fiona Amugune

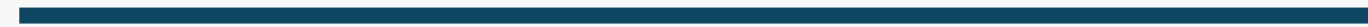
Elizabeth Atieno

Neema Kezia

Peter Ronoh



Overview



Best Buy, a leading retailer of iPhone and Google products, aims to improve inventory choices by analyzing user opinions on these items.

The project involves collecting tweets, preprocessing data, and performing sentiment analysis to understand customer opinions. Insights obtained will help Best Buy align its product selection with customer demand.



Problem Statement

Best Buy, a leading reseller of iPhone and Google products, struggles to align inventory with customer preferences due to limited sentiment analysis on Twitter.

This project leverages Twitter sentiment analysis to understand customer opinions, enabling better stocking decisions to match demand and boost satisfaction and loyalty.

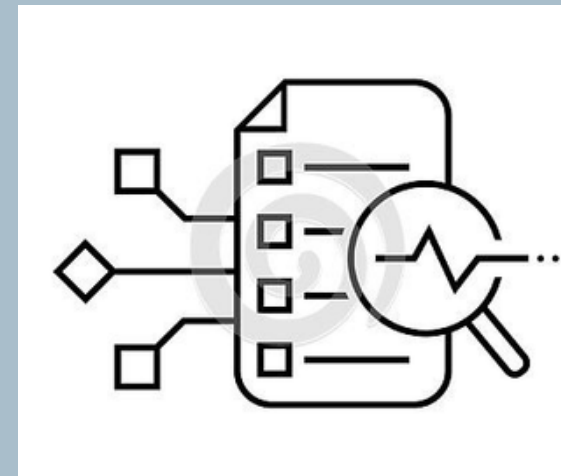


Project Objectives



Analyzing customer opinions

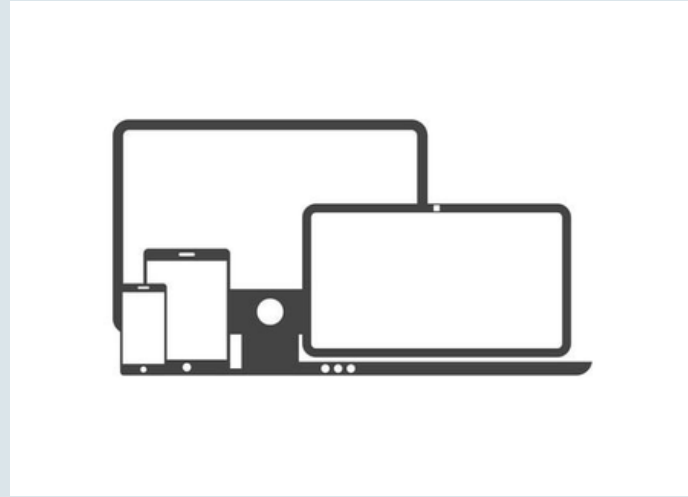
- Identify trends in customer opinions about Google and Apple products
- Positive, negative or neutral sentiments provide insights into what customers like or dislike about specific products, enabling data-driven decisions.



Improving resource allocation

- Prioritize resources towards positively-reviewed products
- Shifting resources towards improvement of products with negative reactions

Project Objectives



Improve product assortment

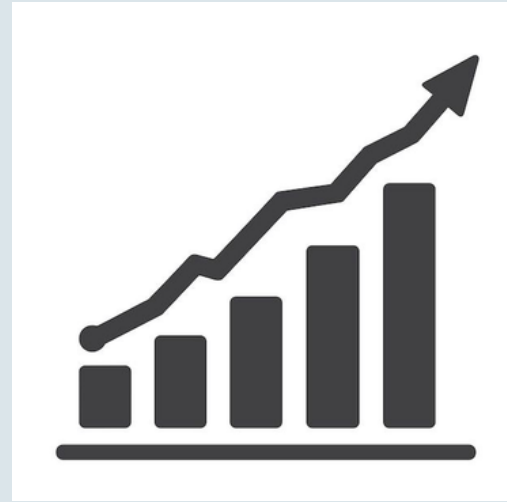
- Analyzing sentiments allows stocking products based on customer demand.
- Products with consistently positive reaction can take precedence, while products with consistent negative reactions can be reconsidered or replaced.



Enhance customer satisfaction

- Addressing customers complaints promptly and directly improves satisfaction fostering positive engagements and trust.

Project Objectives



Increase profitability

- By leveraging sentiment analysis to align inventory and marketing strategies with customer preferences, Best Buy can minimize unsold stock, target high-demand products, and implement more effective promotions, leading to increased sales and higher profitability.

Methodology

Data Cleaning

- Dealing with missing values and duplicates

Exploratory Data Analysis(EDA)

- Analyze, investigate, aggregate and summarize dataset's main characteristics.

Modelling

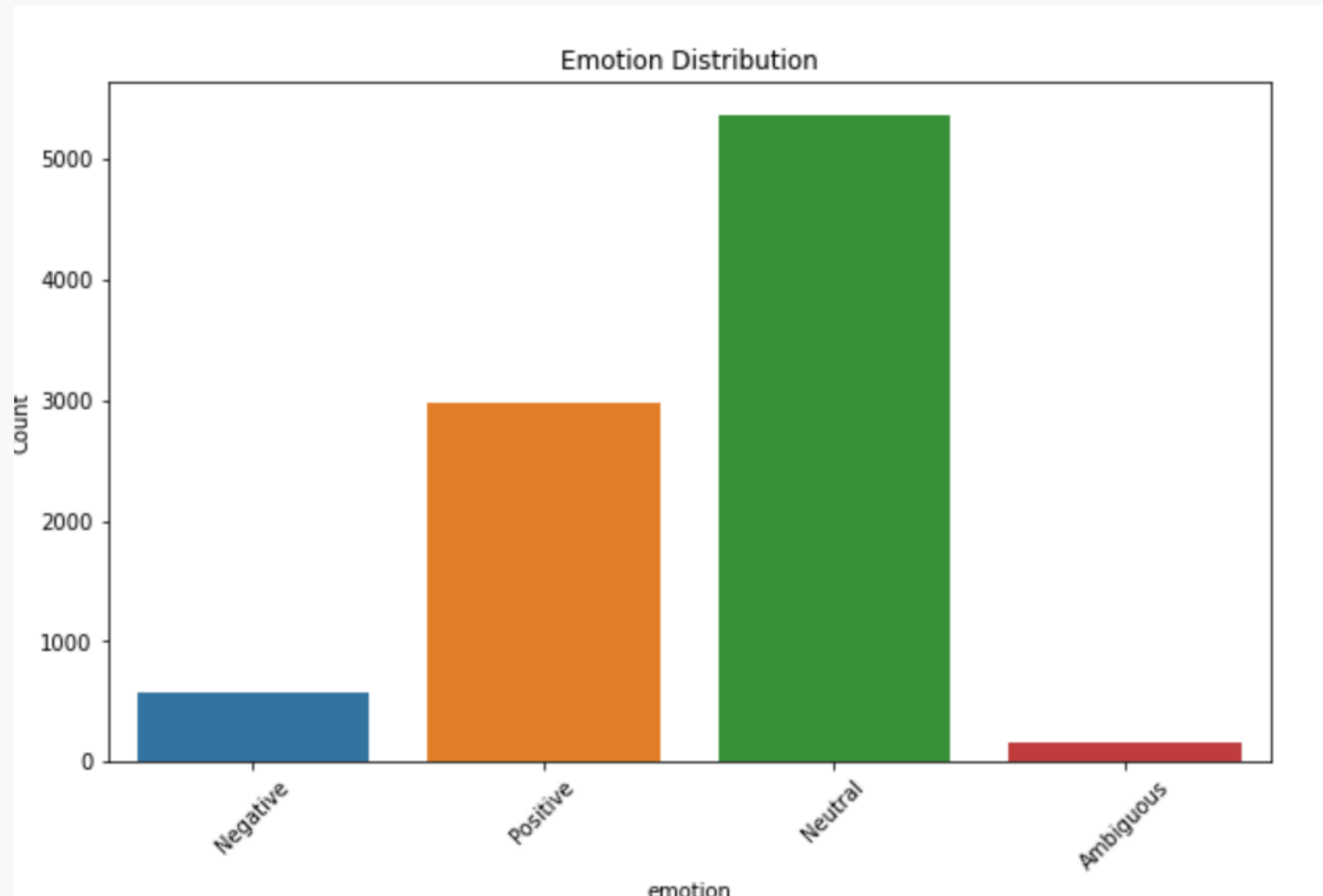
- This approach builds and trains machine learning models on the dataset and selects the most effective model from the problem by systematically comparing performance metrics across multiple models such as Naive Bayes, Random Forest, XGBoost and Neural Networks.

Model Comparison

- Involves evaluating various machine learning models to determine which one best classifies the sentiments.
- The goal is to select the model that offers the highest accuracy, precision, and overall performance in distinguishing positive, negative and neutral sentiments.

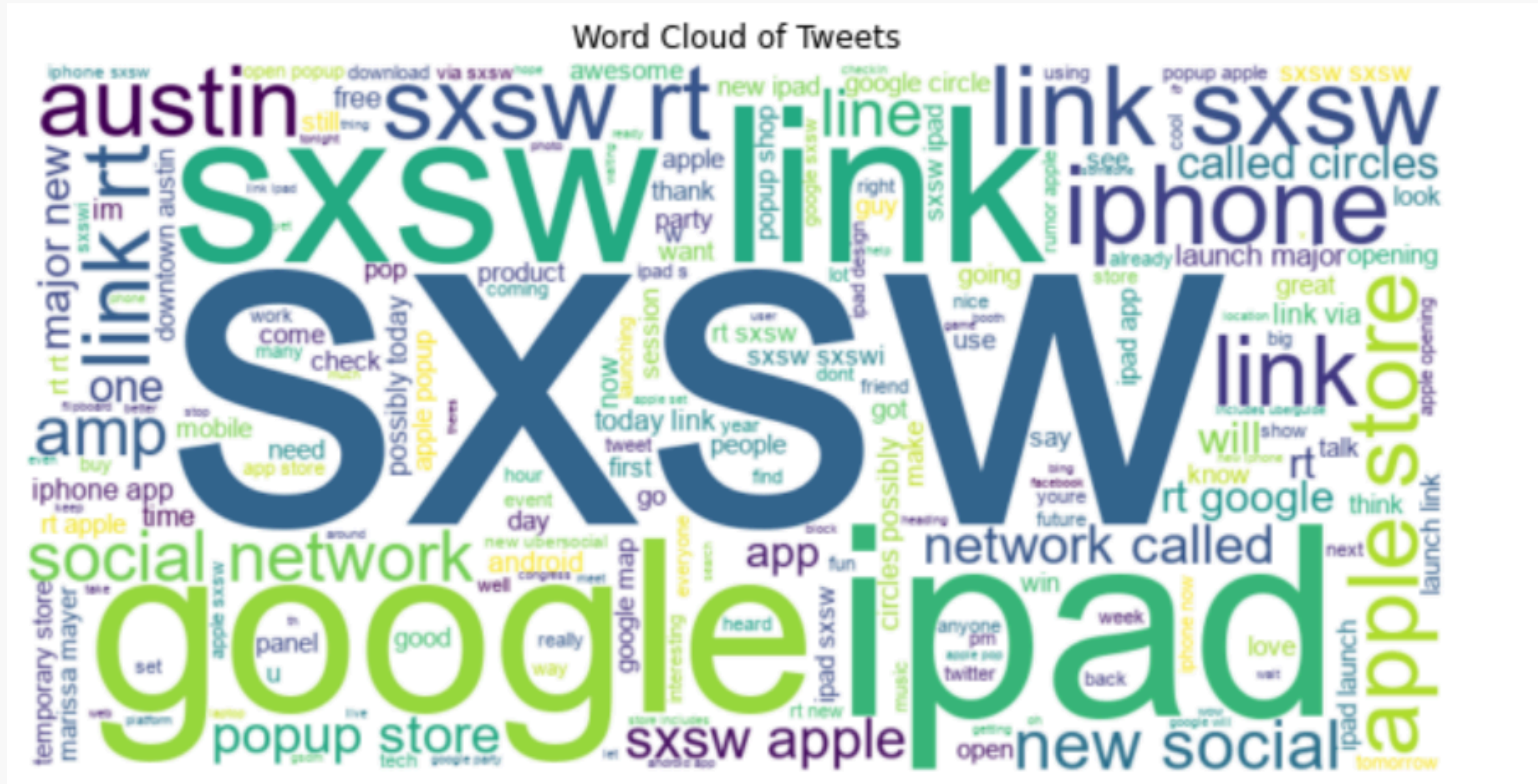


Data Analysis



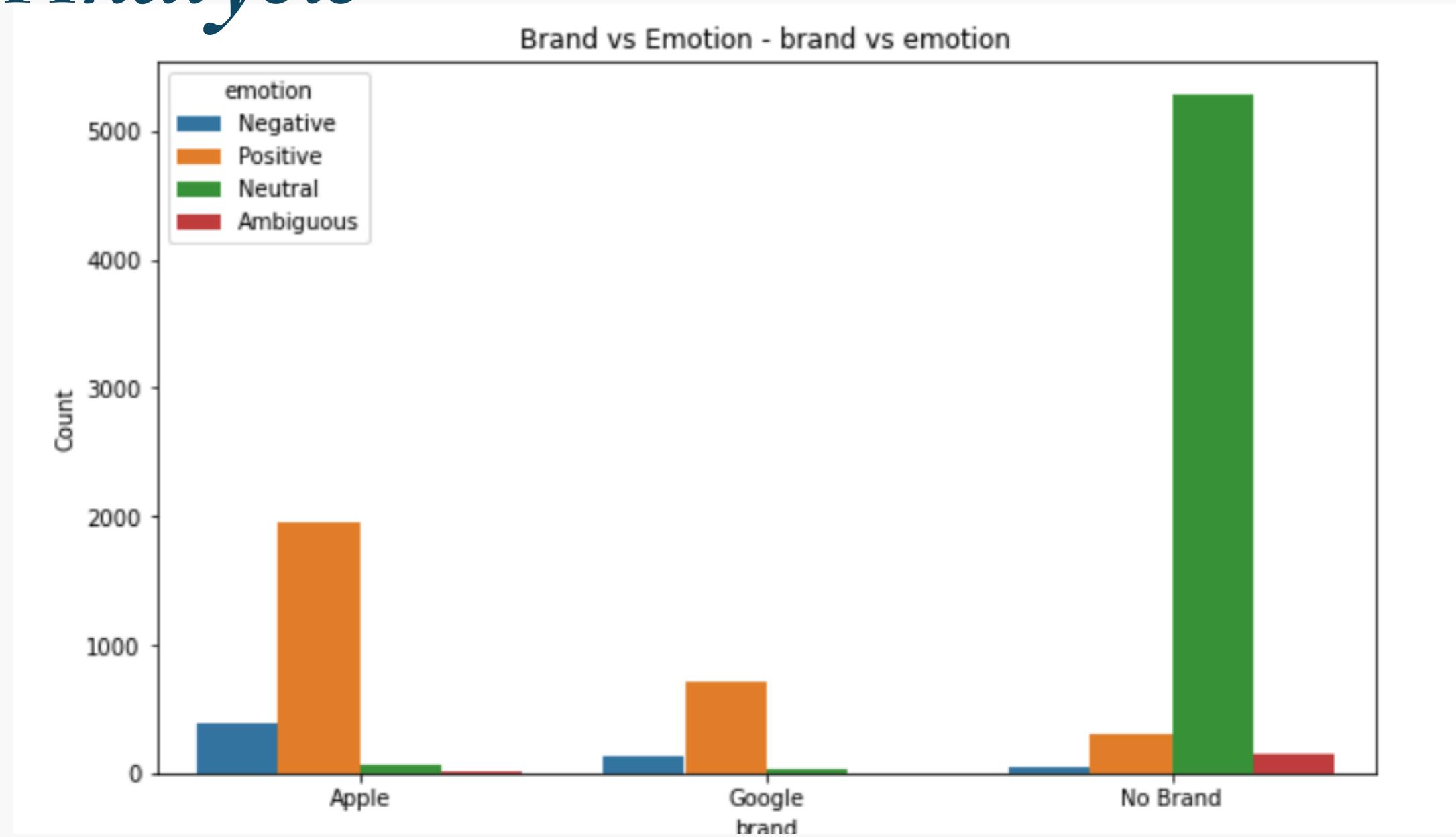
- The majority of the data is categorized as "Neutral," followed by "Positive" emotions. There is a significantly lower count of "Negative" and "Ambiguous" emotions.

Data Analysis



- Prominent words like "SXSW," "Google," "iPhone," and "Austin" appear frequently, indicating that the dataset might revolve around discussions or events related to the South by Southwest (SXSW) festival, technology, and related products.

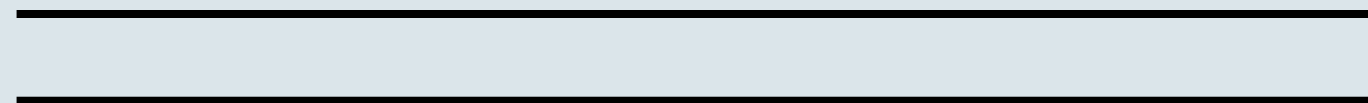
Data Analysis



- The distribution of emotions across these brands provides insights into how people feel about them.
- For Apple and Google, Positive emotions are predominant, indicating favorable sentiment.
- The high count of Neutral emotions for the No Brand category might suggest ambivalence or non-specific sentiment.

Modelling

- The Neural Networks (Fine-Tuned) model has the highest test accuracy and precision, showing that fine-tuning significantly improves its performance.
- Naive Bayes and Random Forest (Default and Fine-Tuned) models show reasonable performance but lag behind the neural network models.
- XGBoost shows a slight improvement after fine-tuning but still underperforms compared to the Neural Networks.
- Each model has its strengths, but based on the metrics provided, the fine-tuned Neural Networks model appears to be the best performer in terms of test accuracy and precision.



Conclusion



1. The sentiment analysis revealed distinct trends in customer opinions about iPhone and Google products. Positive sentiments dominated, reflecting strong customer satisfaction, while negative sentiments provided valuable insights into areas of improvement.
2. Among the models tested, the Fine-Tuned Neural Networks model performed the best with an accuracy of 90%. This demonstrates its suitability for text classification tasks like sentiment analysis.
3. Frequent mentions of specific features, such as "store," "link," and "ipad," highlighted customer priorities and areas of focus for both brands. These terms provided actionable insights into customer needs and preferences.
4. Tweets were effectively categorized into ambiguous, negative, neutral, and positive emotions. This categorization provided a nuanced understanding of customer sentiment, enabling more targeted decision-making.



Recommendations



- 1.Regularly monitor and analyze customer feedback on social media platforms to stay updated on changing preferences and emerging trends.
- 2.Investigate and address the root causes of negative sentiments. For instance, frequent mentions of "store" in a negative context could indicate issues with in-store experiences or product availability.
- 3.Pay attention to commonly mentioned product features and ensure they align with customer expectations. For example, improving features like "ipad" or "link" based on customer discussions can boost satisfaction.
- 4.Adopt and integrate sentiment analysis tools into business processes to automate and scale this analysis for other products and brands.
- 5.Utilize the best-performing model (Neural Networks (Fine-Tuned) for ongoing sentiment analysis tasks. Regularly retrain the model with new data to maintain its accuracy and relevance.
- 6.Expand the sentiment analysis framework to include competitors and other product categories. This can provide a comprehensive view of market dynamics and inform strategic decisions.



Next Steps

We can enhance the accuracy of the model by implementing a systematic process for ongoing monitoring and maintenance once it has been deployed. It is essential to regularly assess its performance, incorporate new data as it becomes accessible, and fine-tune it in response to evolving business requirements and customer behaviors.





Thank you

