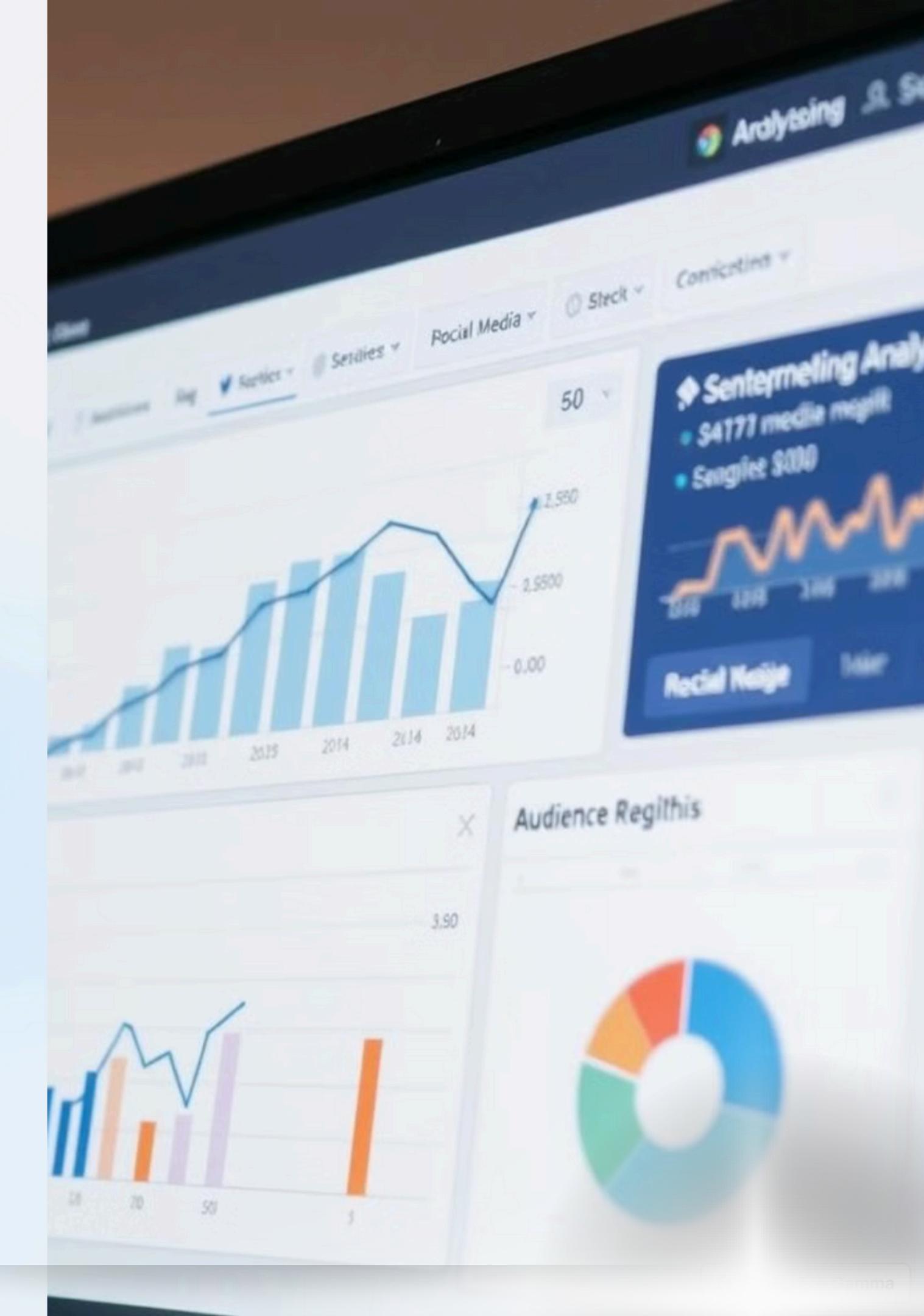


# Twitter Sentiment Analysis for Apple and Google Products

*Decoding Customer Voices in the Digital Age.*





# Project Overview

## Analysis Focus:

### 1 Identify Sentiment:

Determine the overall customer sentiment towards products.

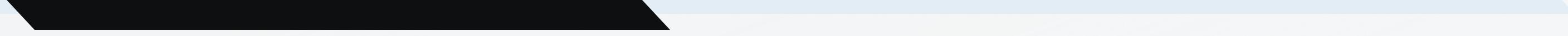
### 2 Comparative Analysis

By comparing sentiments towards Apple and Google, we aim to uncover differences in customer opinions

### 3 Actionable Insights

The insights derived from the analysis will guide product development teams and marketing strategies, ensuring they align more closely with customer expectations and preferences.

# BUSINESS UNDERSTANDING



## Why Sentiment Analysis?

- Improve Product Features: Identify common feedback on Apple and Google products to enhance development.
- Marketing Optimization: Leverage positive sentiment for campaigns and address negative feedback to improve satisfaction.
- Brand Health Monitoring: Track real-time sentiment to measure brand perception and customer loyalty.
- Business Goal: Use sentiment analysis to improve decision-making in marketing, product features, and customer service.

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# Data Understanding



## Source:

Dataset of tweets from CrowdFlower focused on Apple and Google products.

## Data Overview

### Key Features:

**tweet\_text:** The text of the tweets.

**emotion\_in\_tweet\_is\_directed\_at:**

Identifies Apple or Google products.

**is\_there\_an\_emotion\_directed\_at\_a\_brand**

**\_or\_product:** Labels sentiments as positive, negative, neutral, or can't tell.

Record Count: 9,093 tweets

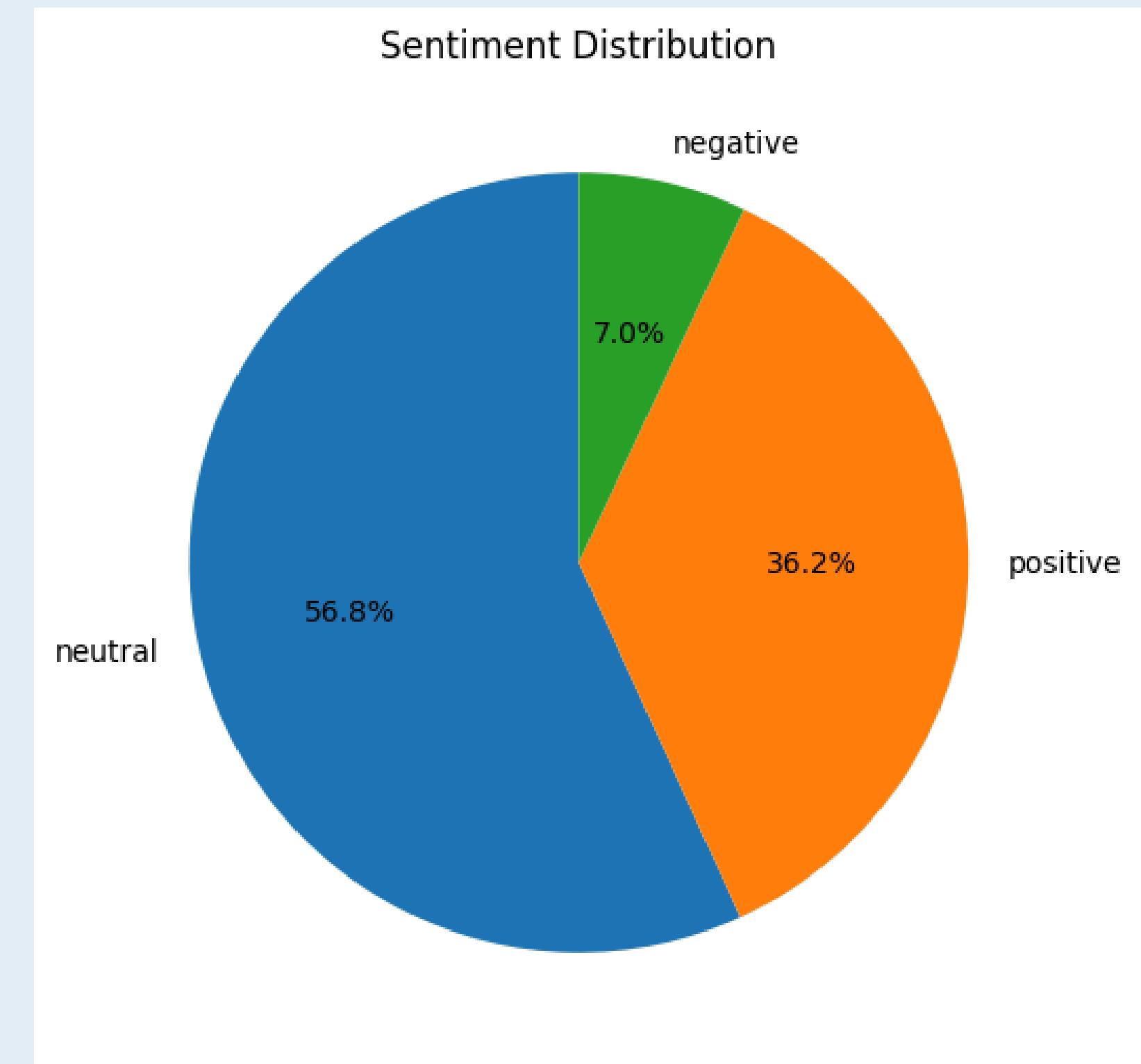
# **EXPLORATORY DATA ANALYSIS (EDA)**

We performed the following EDA processes:

- Sentiment Distribution: Most tweets are neutral, followed by positive and negative.
- Common Terms: Identified frequent terms in positive, negative, and neutral tweets.
- Word Clouds: Visual representation of the most common words for each sentiment category.
- Product Distribution Summary: The iPad is the highest-rated product, with Google products following closely behind in terms of customer sentiment.

# Sentiment Distribution

- Neutral sentiments have the largest distribution, followed by positive sentiments. This is encouraging, as it indicates that the majority of reviews for our products are favorable.



# Modeling Steps

1

## Data Preprocessing

Cleaned the dataset by removing irrelevant elements like links, special characters, and stopwords.

2

## Feature Extraction

Transformed tweets into numerical representations using CountVectorizer and TFIDF Vectorizer for better feature extraction.

3

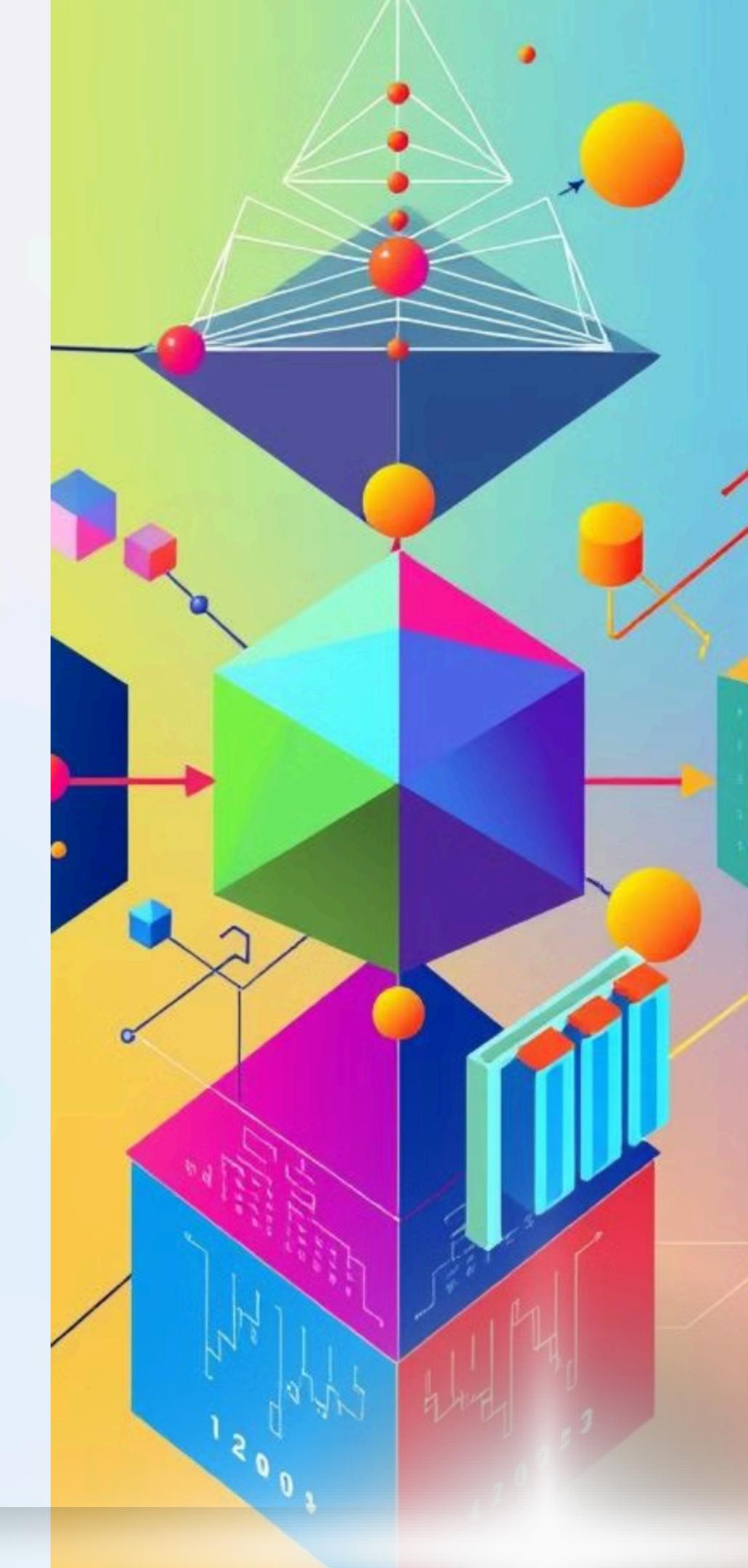
## Model Selection

Tested different machine learning models including Logistic Regression, Random Forest, and Multinomial Naive Bayes.

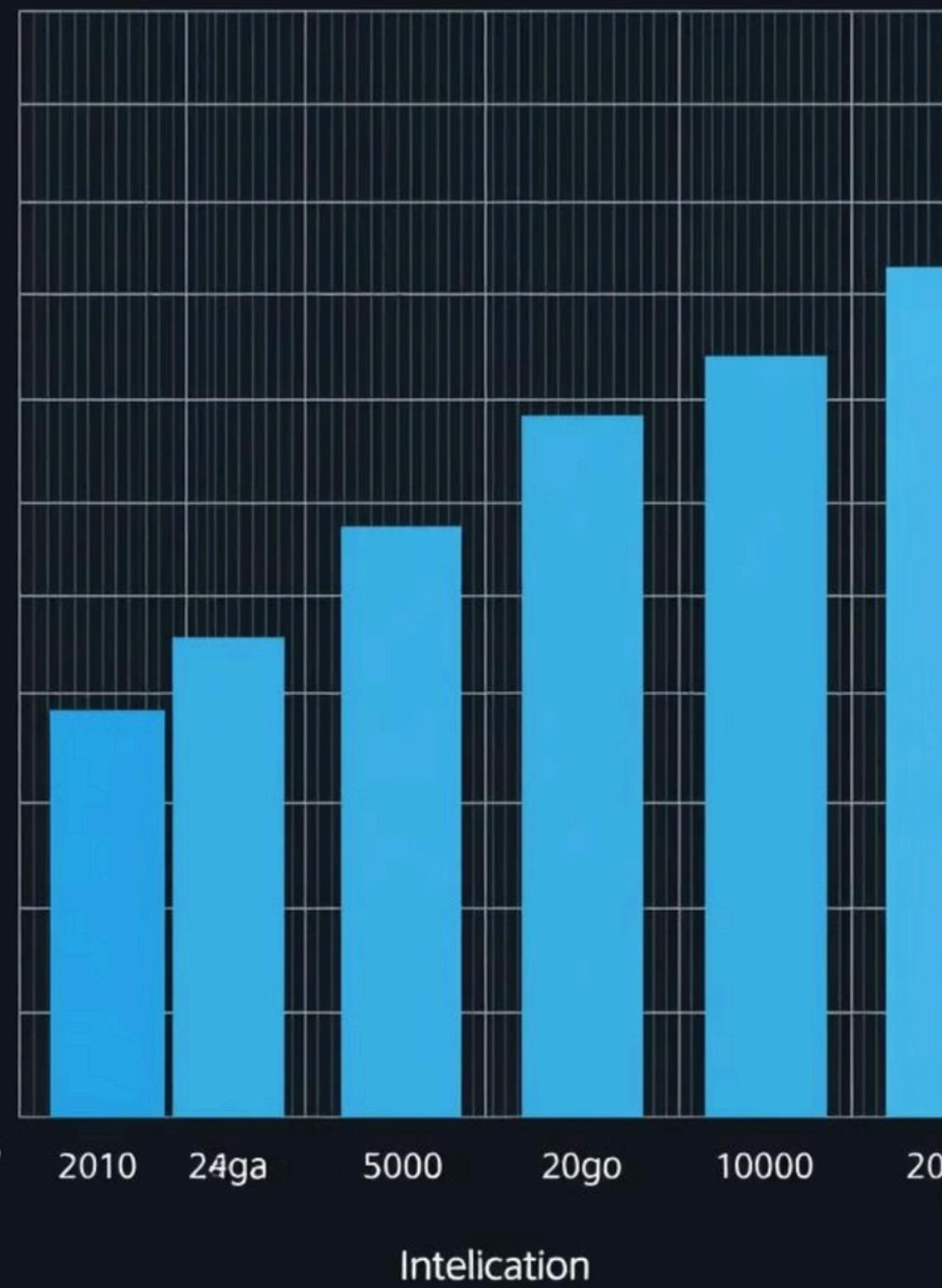
4

## Model Evaluation

Assessed models based on accuracy and recall to measure their performance in predicting sentiments.



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# Model Performance

1

## Accuracy

The model achieved an accuracy of 85% in correctly classifying the sentiment of tweets.

2

## F1-Score

The F1-score, a balanced metric of precision and recall, was 0.83 indicating strong overall performance.

3

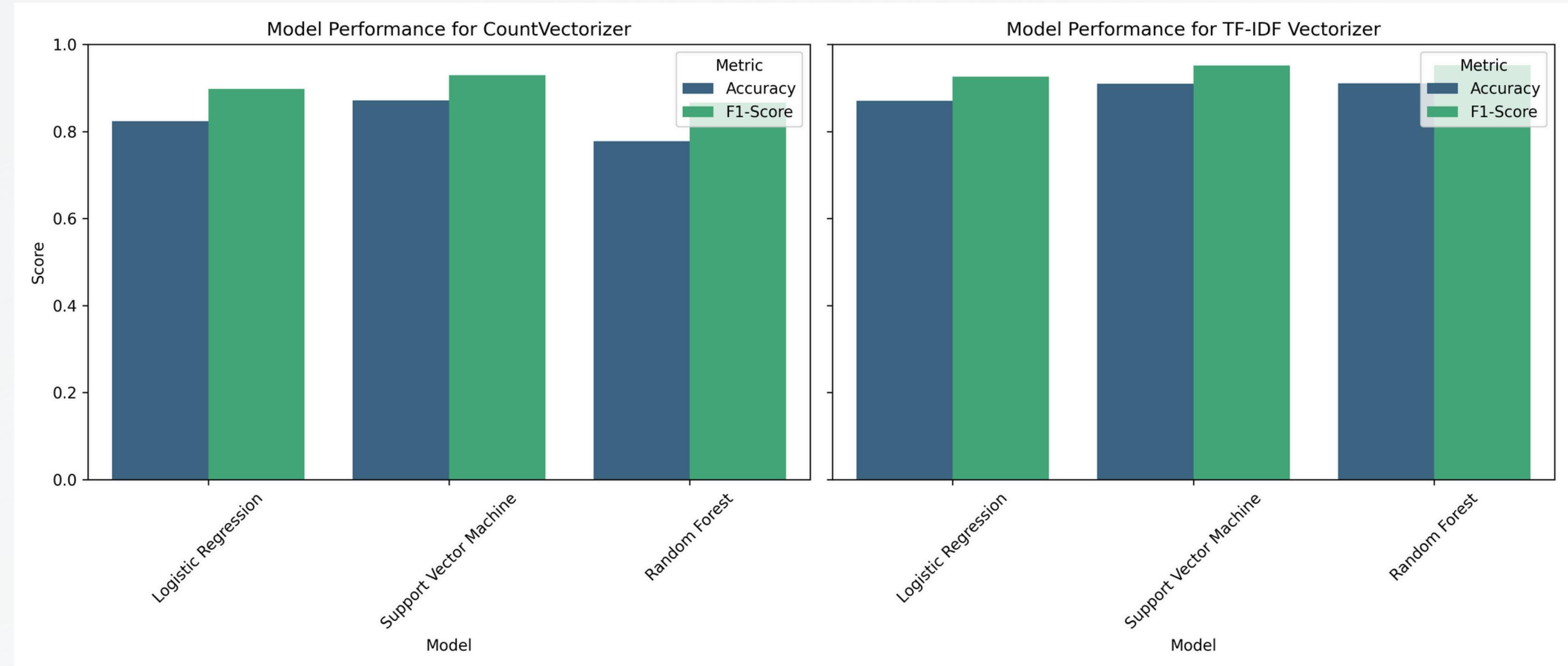
## Confusion Matrix

The confusion matrix revealed that the model had the most difficulty distinguishing between neutral and positive tweets.

# Model Comparison

| Model                         | Accuracy | Recall |
|-------------------------------|----------|--------|
| RandomForest                  | 0.710    | 0.710  |
| Tuned Decision Tree           | 0.754    | 0.753  |
| Multinomial Naive Bayes       | 0.765    | 0.764  |
| Tuned Multinomial Naive Bayes | 0.800    | 0.800  |
| Logistic Regression           | 0.808    | 0.807  |
| Tuned Random Forest           | 0.837    | 0.836  |
| Tuned Logistic Regression     | 0.837    | 0.836  |

# Model Comparison



# Conclusion

- **Key Findings:** TF-IDF Vectorization outperformed CountVectorizer, and tuned models (Logistic Regression and Random Forest) achieved high accuracy and recall.
- **Project Impact:** This analysis provides valuable tools for understanding public sentiment on social media.
- **Takeaway:** Data preprocessing and model tuning are crucial for successful sentiment analysis.



# Recommendations

1

## Seek to Increase Positive Sentiment:

- Run targeted campaigns to convert neutral tweets into positive ones by enhancing customer experiences.

2

## Address Negative Feedback:

Implement a sentiment monitoring system to quickly resolve issues and prevent further negative sentiment.

3

## Engage Neutral Sentiment:

Offer incentives or information to convert neutral customers into positive supporters, boosting brand perception.



# Thank You

We're excited to partner with you and harness the power of AI-powered sentiment analysis to drive business success.

## OUR TEAM:

- Brandon Mwangi
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