

PHASE 4 PROJECT

TWITTER
SENTIMENT
ANALYSIS
APPLE & GOOGLE



GROUP 2 PRESENTATION

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PROJECT - OVERVIEW

Apple and Google product launches spark discussions on Twitter (X).

NLP-based sentiment analysis helps reveal customer opinions, brand perception, and insights for better marketing and product decisions.

STAKEHOLDERS

- Apple and Google Product Teams - to understand user feedback.
- Marketing & Brand Managers - to track brand perception.
- Business Analysts & Data Scientists - to monitor sentiment trends.

PROJECT GOALS

Main Objective

To develop an effective sentiment analysis model that is able to automatically classify tweets discussing Apple and Google products as positive, negative or neutral

Specific Objectives

- Identify patterns in user sentiments.
- Compare the performances of both binary and multiclass algorithms.
- Provide sufficient recommendations to the companies on how to go about the sentiment



B I N A R Y - M O D E L

Binary Classification	Accuracy	Precision	F1-score
Logistic Regression	84.7 %	84 %	84 %
Naive-Bayes	85.3 %	85 %	85 %
SVM	89.1 %	89 %	89 %

B E S T M O D E L : S V M w i t h 8 9 . 1 % A c c u r a c y

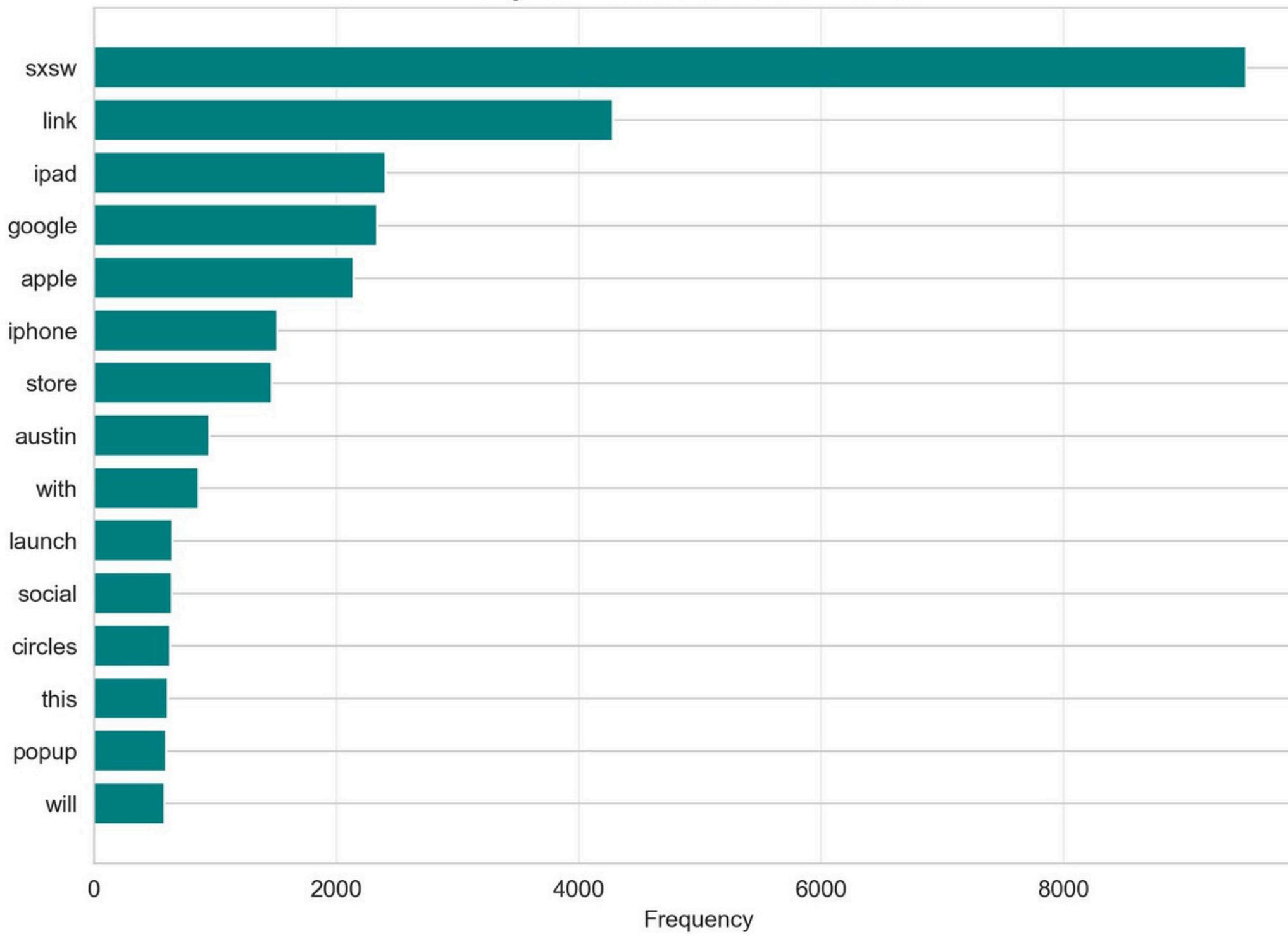
M U L T I - C L A S S M O D E L

Multiclass Model Results (Positive, Negative, Neutral)

Model	Accuracy	Precision	F1-Score
Logistic Regression	67.5 %	68 %	68 %
Naive Bayes	62.0 %	69 %	63 %
SVM (Tuned)	69.1 %	69 %	69 %

Best Model : Tuned SVM with 69.1% accuracy.

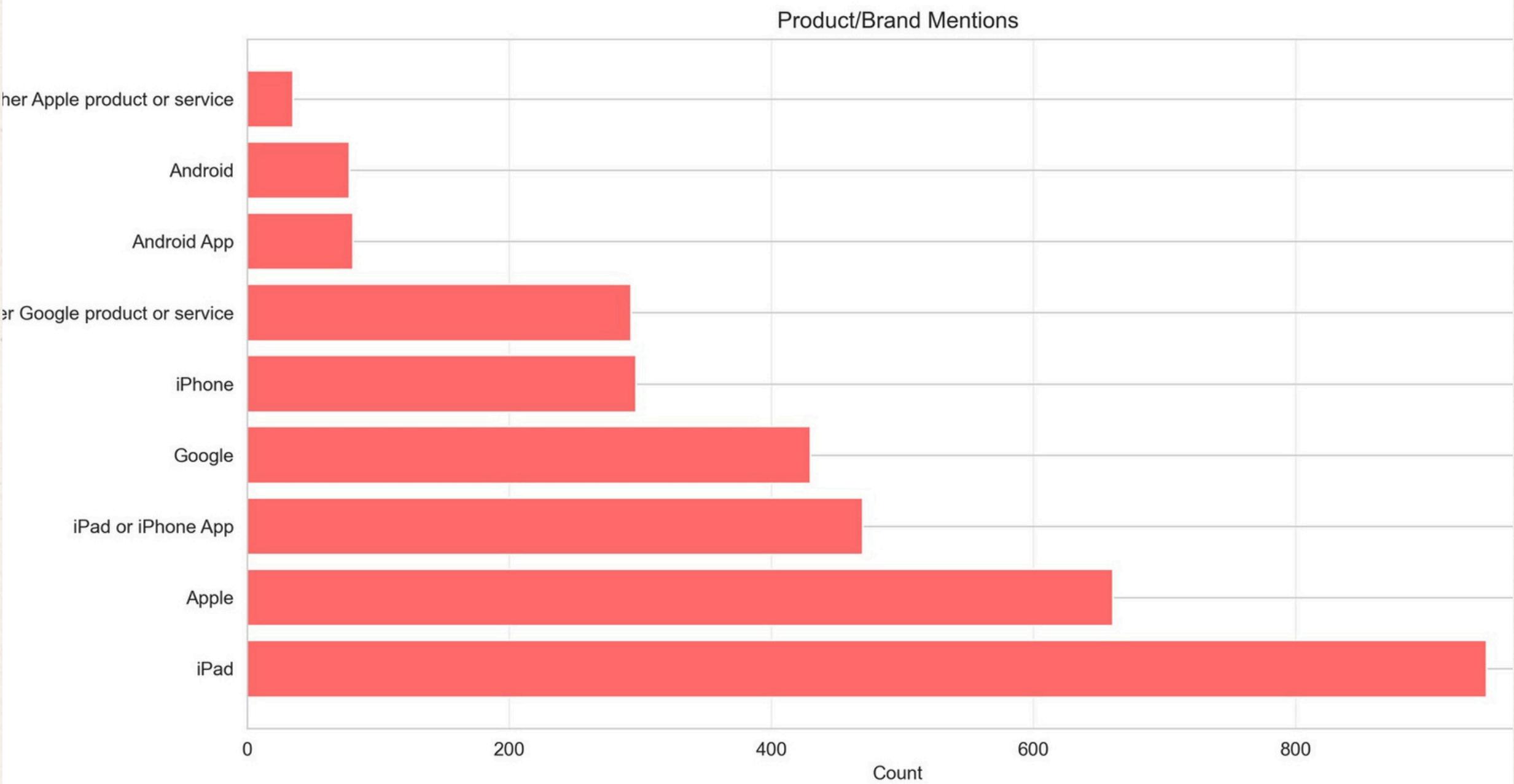
Top 15 Most Common Words



As seen ,the most common words are; sxsw, link and
ipad while the least common words are; will, popup and
this

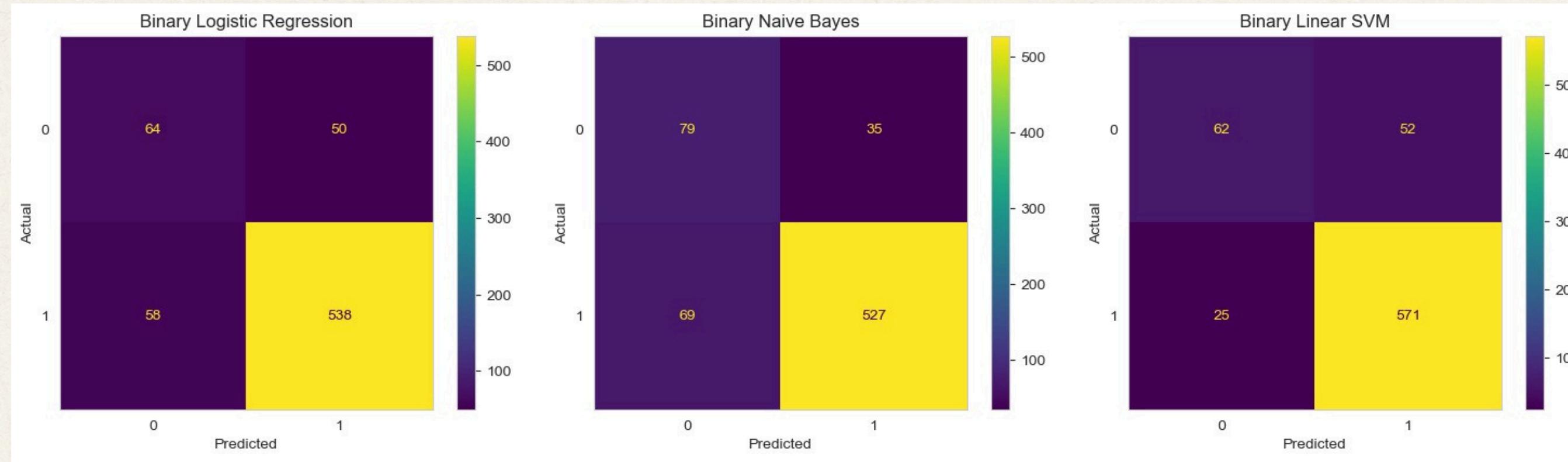
Insights

Insights



As seen above, ipad had the most tweets which could mean there were a lot of sentiments towards the product. Apple, ipad/iphone app and google followed with other Apple product or service and google where the least tweeted products/brand

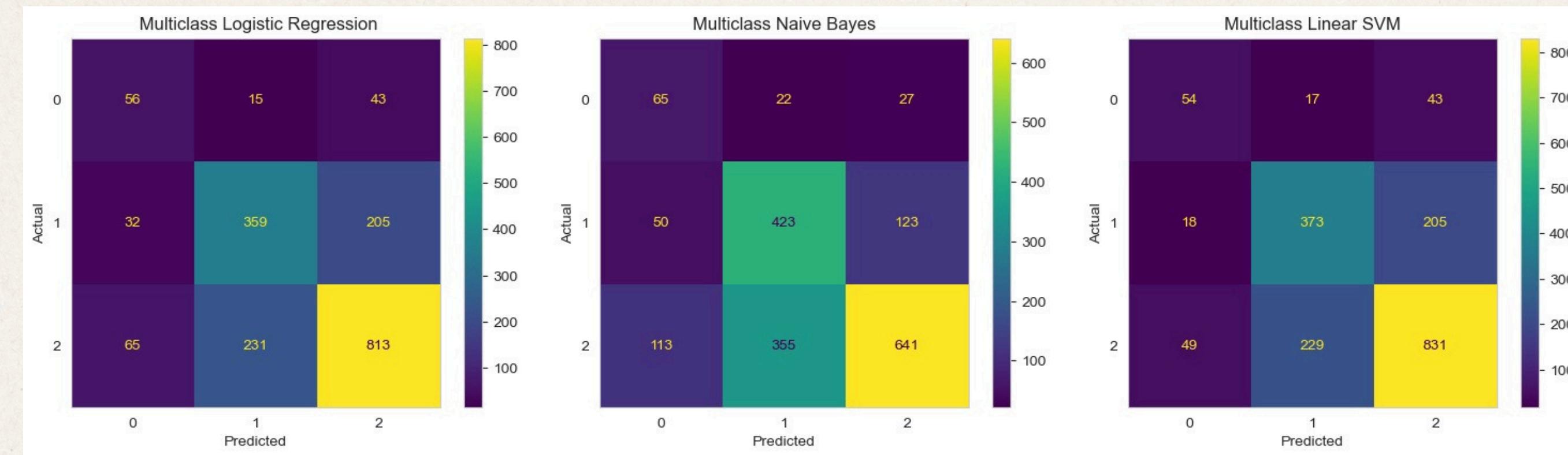
BINARY MODEL PERFORMANCE



From the above matrix confusion matrix, we can conclude that:

- 1. The linear svm produced the best model out of the three as it was able to predict accurately of the time.**
- 2. The Svm model had a higher false positive (Type 1 error) reading compared to Multinomial Naive Bayes, but a lower false negative (Type 2 error)**
- 3. Logistic regression performed the poorest out of the 3 with an accuracy score 84.7 %. Multinomial had an accuracy score of 85.3%.**

MULTI-CLASS MODEL PERFORMANCE



- **SVM performed best with 69.1% accuracy, predicting sentiments most accurately.**
- **Logistic Regression followed with 67.5%, outperforming Naive Bayes (65.0%).**
- **SVM and Logistic Regression showed more false positives, while Naive Bayes had more false negatives.**

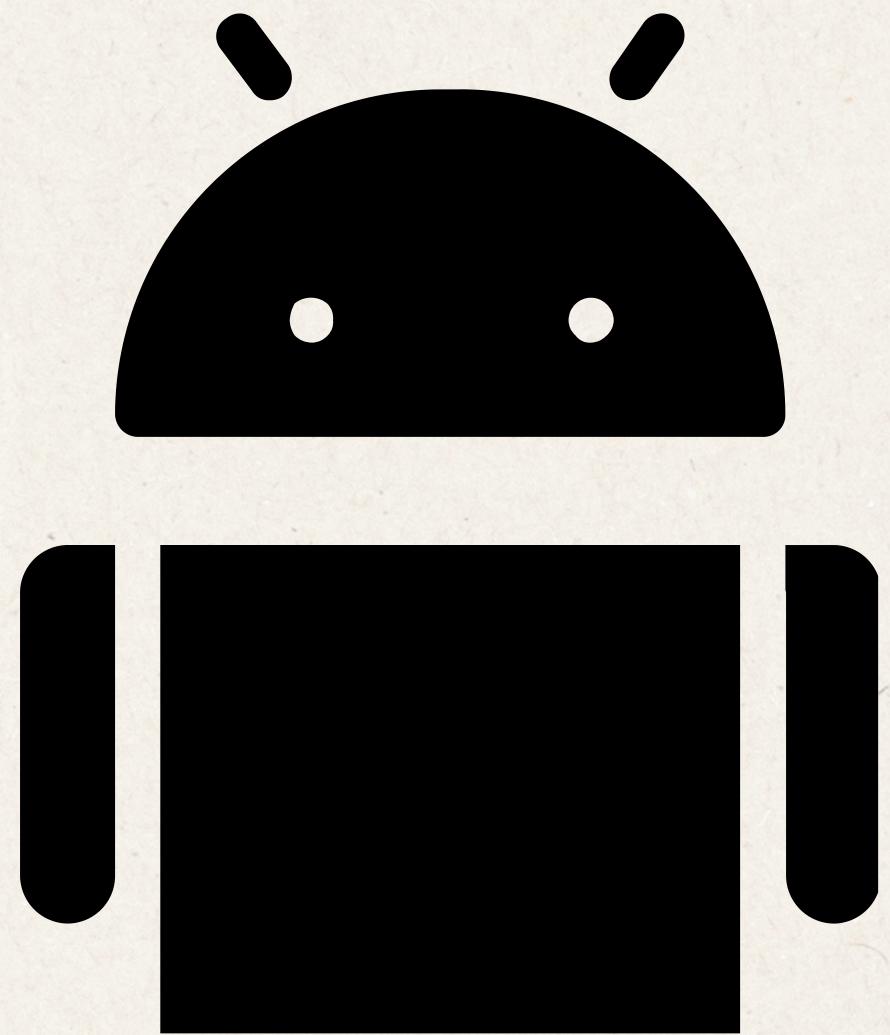
SUMMARY OF MODELLING RESULTS

THE MODELLING PHASE IMPLEMENTED BINARY AND MULTI-CLASS SENTIMENT CLASSIFICATION USING TF-IDF AND SMOTE, ENSURING BALANCED AND INTERPRETABLE RESULTS.

- **BINARY CLASSIFICATION:** NAIVE BAYES ACHIEVED THE HIGHEST ACCURACY (85.3%), SLIGHTLY OUTPERFORMING LOGISTIC REGRESSION (84.7%).
- **MULTI-CLASS CLASSIFICATION:** TUNED LINEARSVC REACHED 85% TRAINING AND 69% TESTING ACCURACY, EFFECTIVELY BALANCING BIAS AND VARIANCE.



Thank you!



Questions and Comments are welcomed!
