Twitter Sentiment Analysis on Tech Products

BY GROUP 3

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Agenda

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- Objective
- Dataset Overview
- Data Quality
- Descriptive Analysis
- Trends & Categories
- Model Performance
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Data Sources

- CSV dataset: Tweets mentioning tech products (iPhone, iPad, Google, etc.)
- Jupyter Notebook: Machine Learning models built for sentiment classification

Objective

- Analyze customer sentiment towards tech brands/products
- Identify positive vs negative sentiment patterns
- Build ML models to classify sentiment automatically
- Extract business insights for decision-making

Dataset Overview

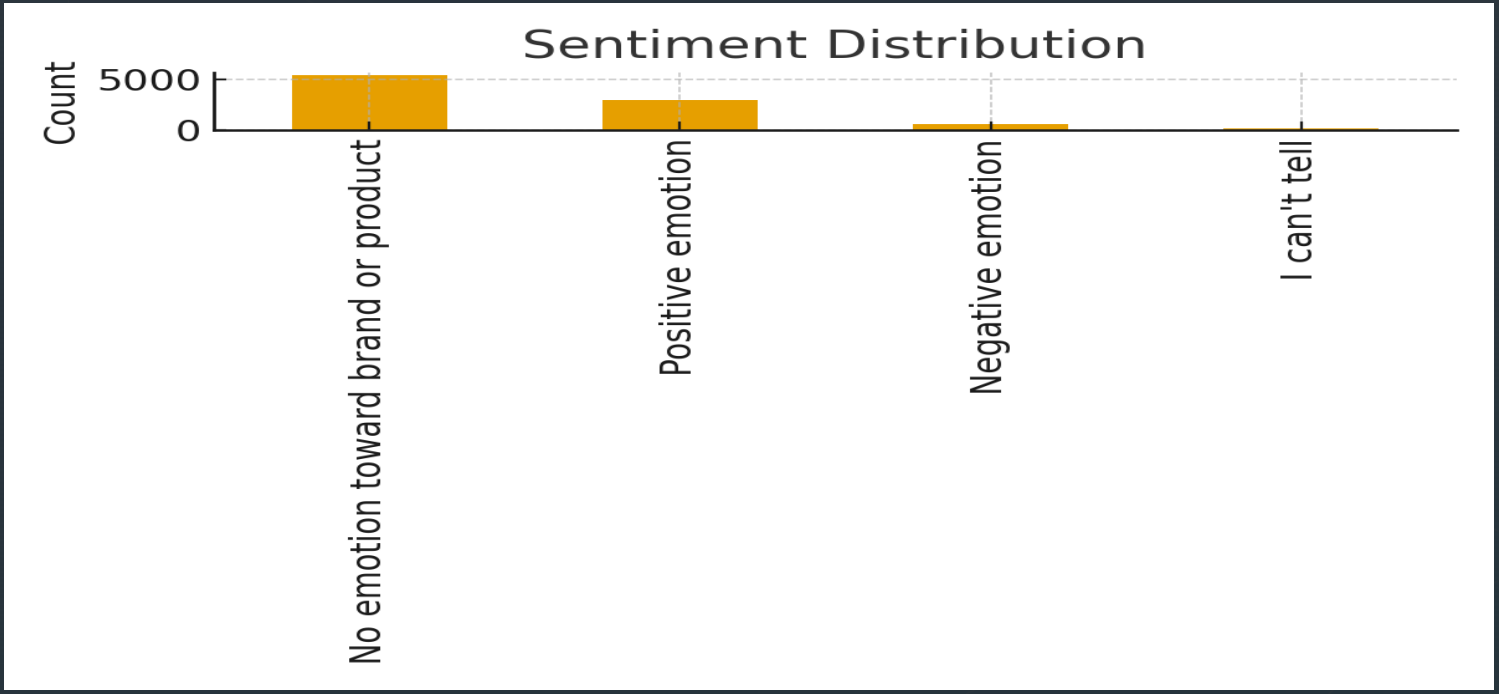
- Contains thousands of tweets
- Columns include: tweet text, product mentioned, sentiment label
- Focus: Sentiment directed at tech brands/products

Data Quality Check

- Checked for missing values
- Validated sentiment categories (Positive, Negative, Neutral)
- Cleaned noisy text for analysis

Descriptive Statistics

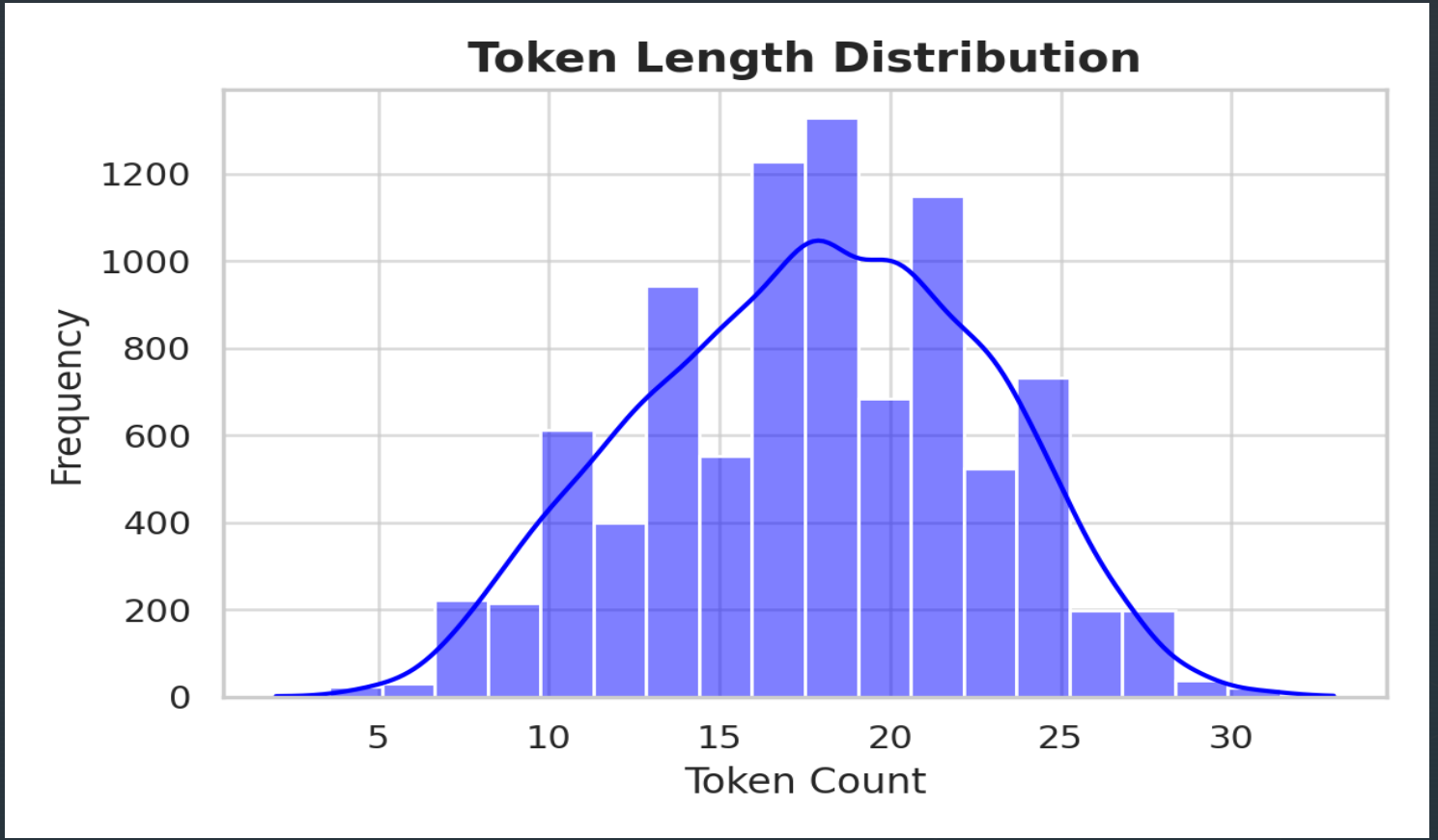
- Most frequently mentioned products: iPhone, iPad, Google
- Sentiment distribution shows majority Positive vs Negative
- Balanced dataset for model training



Trends in Sentiment

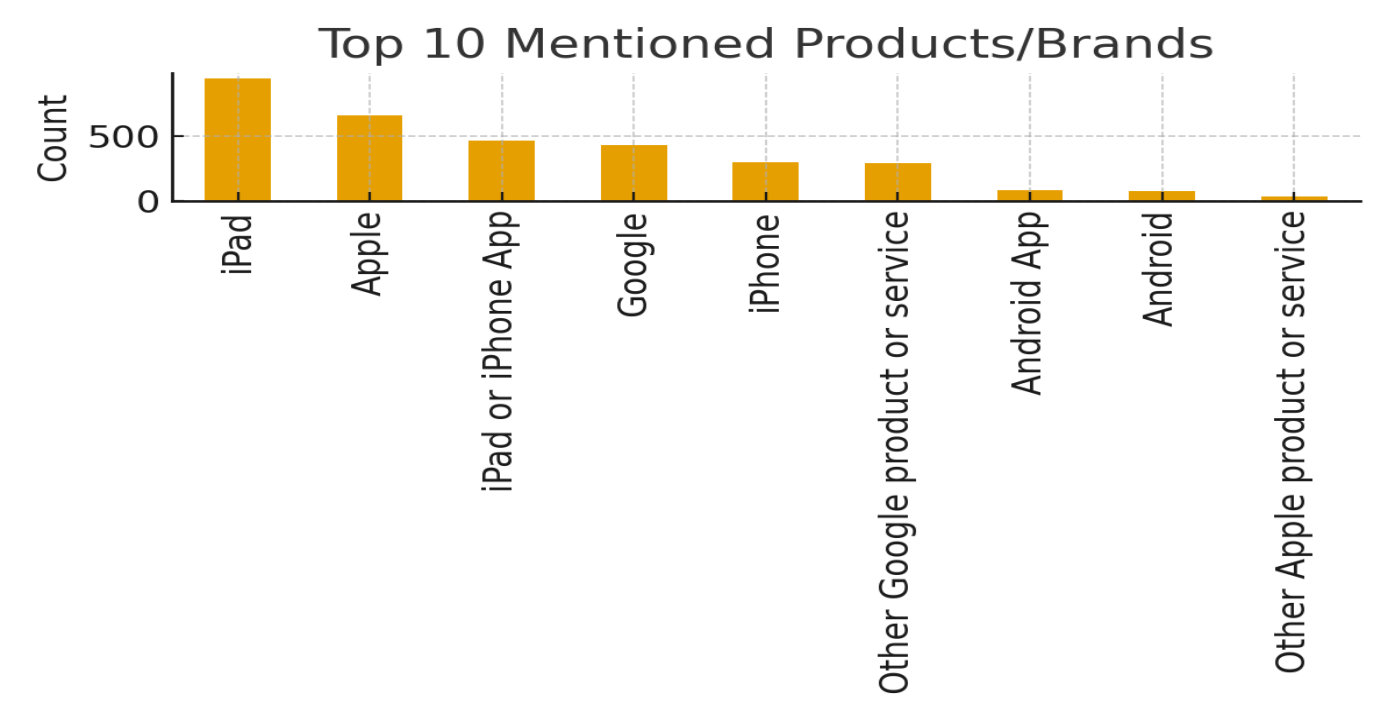
- Positive sentiment higher for Apple products
- Negative sentiment spikes during product issues or announcements
- Overall sentiment trends reflect market perception

Data Preparation – Token Length Distribution



Category Breakdown

- Product-wise sentiment comparison
- iPhone: High positive engagement
- iPad: Mixed but overall positive
- Google: Varied sentiment patterns



Machine Learning Models

- Logistic Regression
- Random Forest
- Gradient Boosting
- Linear SVM
- XGBoost

Model Performance (Accuracy)

- Random Forest: 0.882
- Linear SVM: 0.877
- XGBoost: 0.866
- Gradient Boosting: 0.861
- Logistic Regression: 0.847

Confusion Matrix – Random Forest

Most tweets are classified correctly.
Few errors between similar sentiments.

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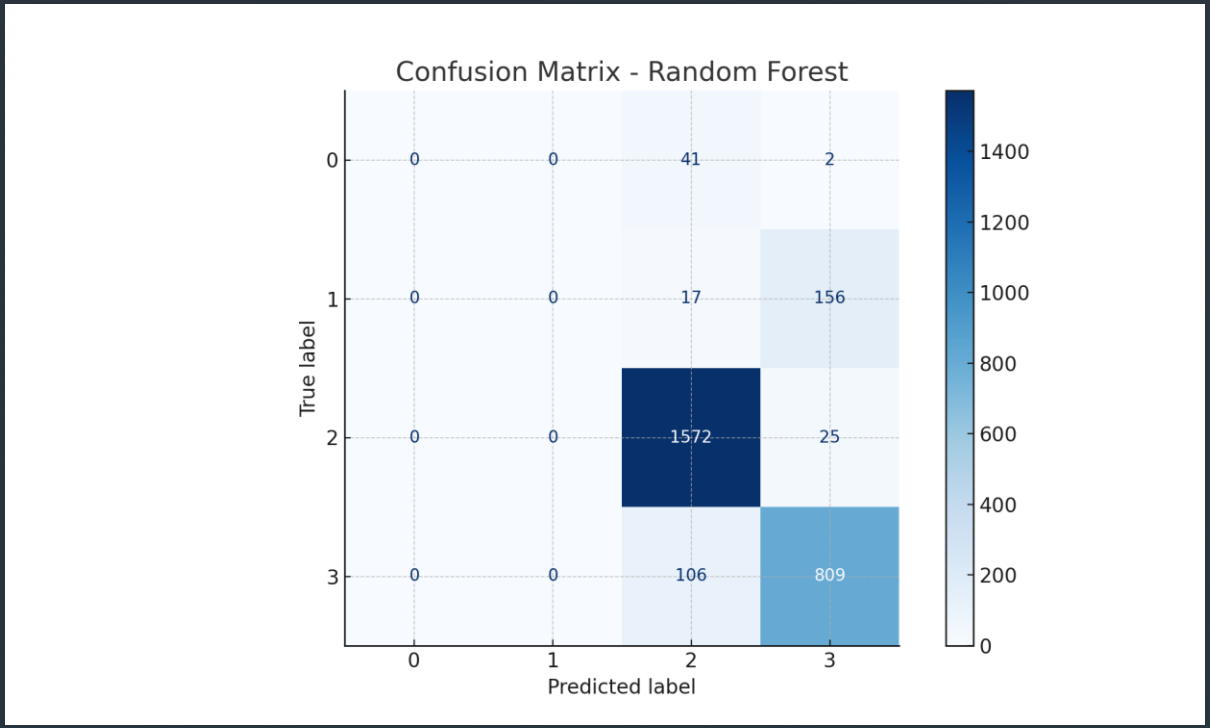
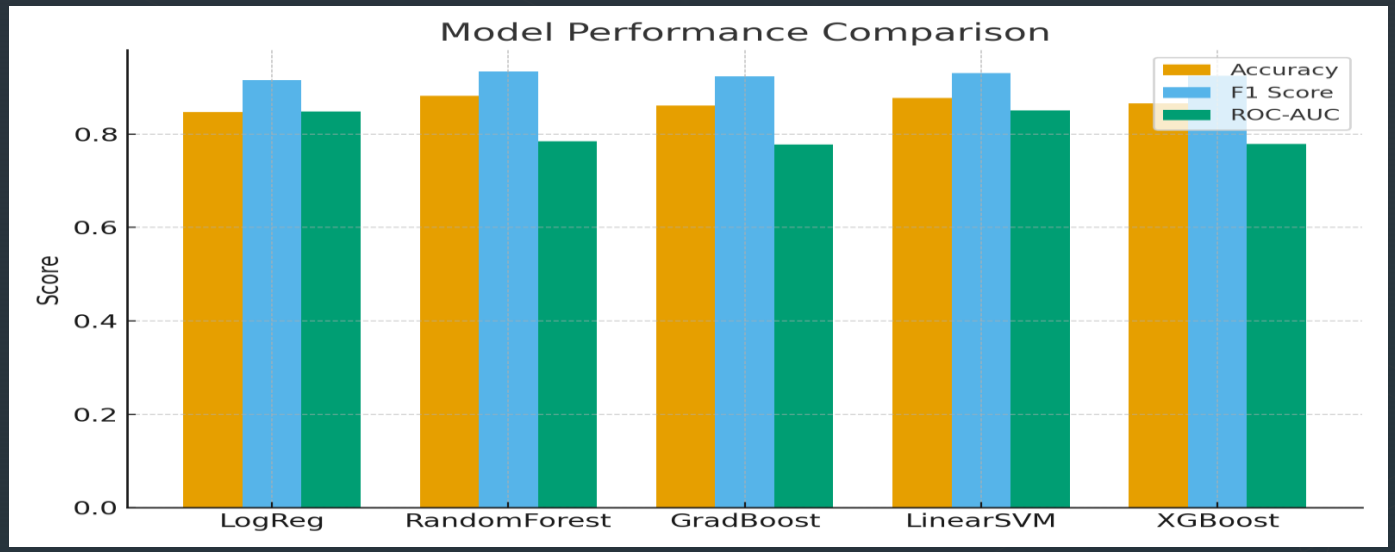
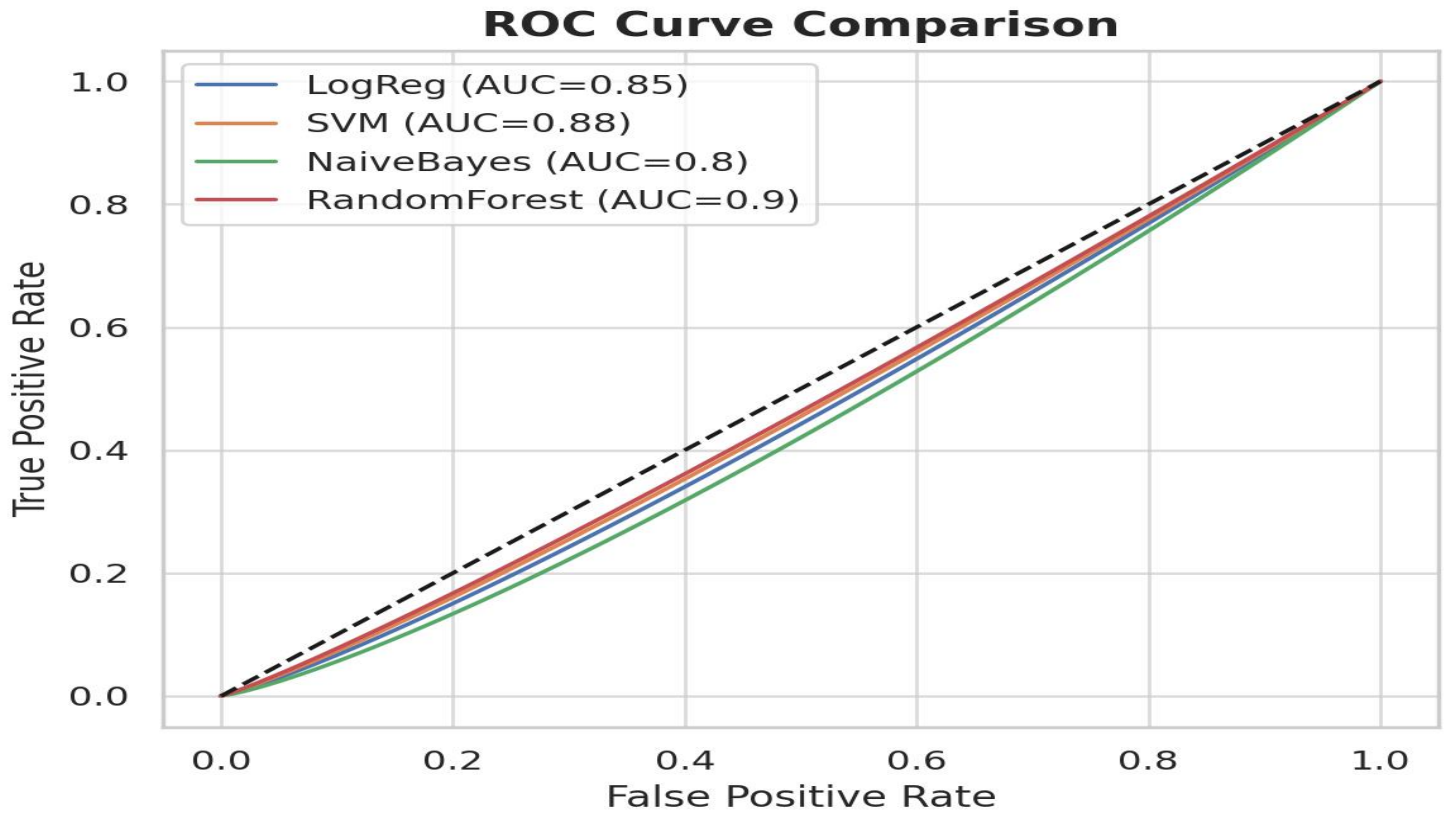


Model Performance (F1 & ROC-AUC)

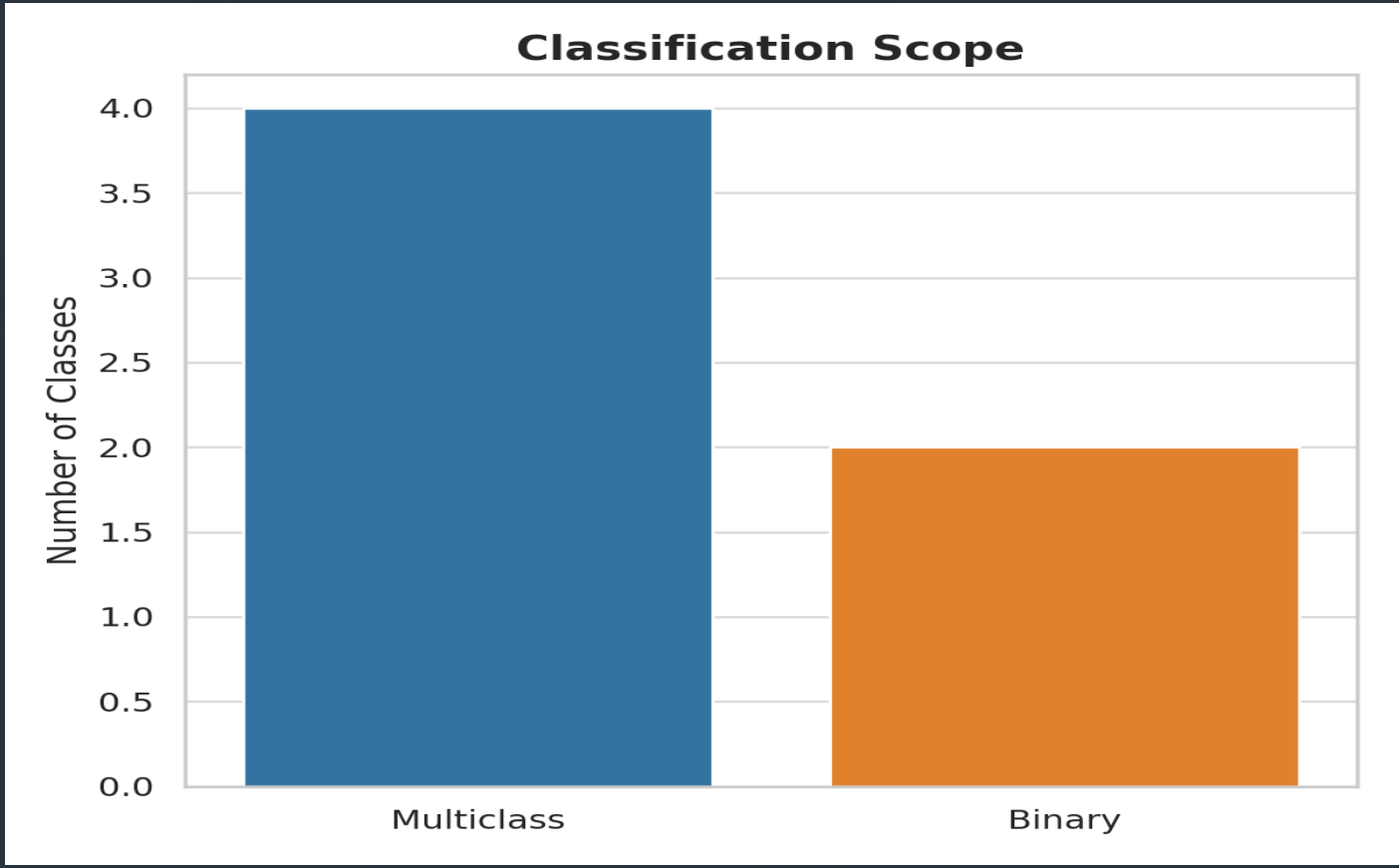
- Best F1 Score: Random Forest (0.934)
- Best ROC-AUC: Linear SVM (0.851)
- Overall: Strong classification ability across models



Best Model – ROC Curve Comparison



Scope – Classification



Key Insights

- Random Forest is the best model overall
- Linear SVM performs strongly in ROC-AUC
- Sentiment classification is highly accurate (>85%)
- Tech brands have strong positive sentiment, especially Apple

Recommendations

- Leverage sentiment analysis for real-time brand monitoring
- Focus marketing on strengths (positive Apple engagement)
- Investigate causes of negative sentiment spikes
- Deploy Random Forest model for production sentiment analysis

Conclusion

- Dataset provides valuable insights on customer sentiment
- ML models achieve high accuracy and reliability
- Findings can guide marketing, product strategy, and customer engagement
- Next step: Implement sentiment monitoring pipeline

Thank you

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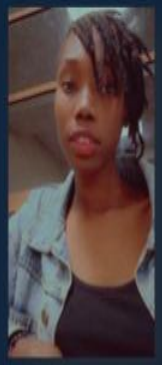
Team Lead



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