Measuring Public Perception of Apple and Google on Twitter with Machine Learning

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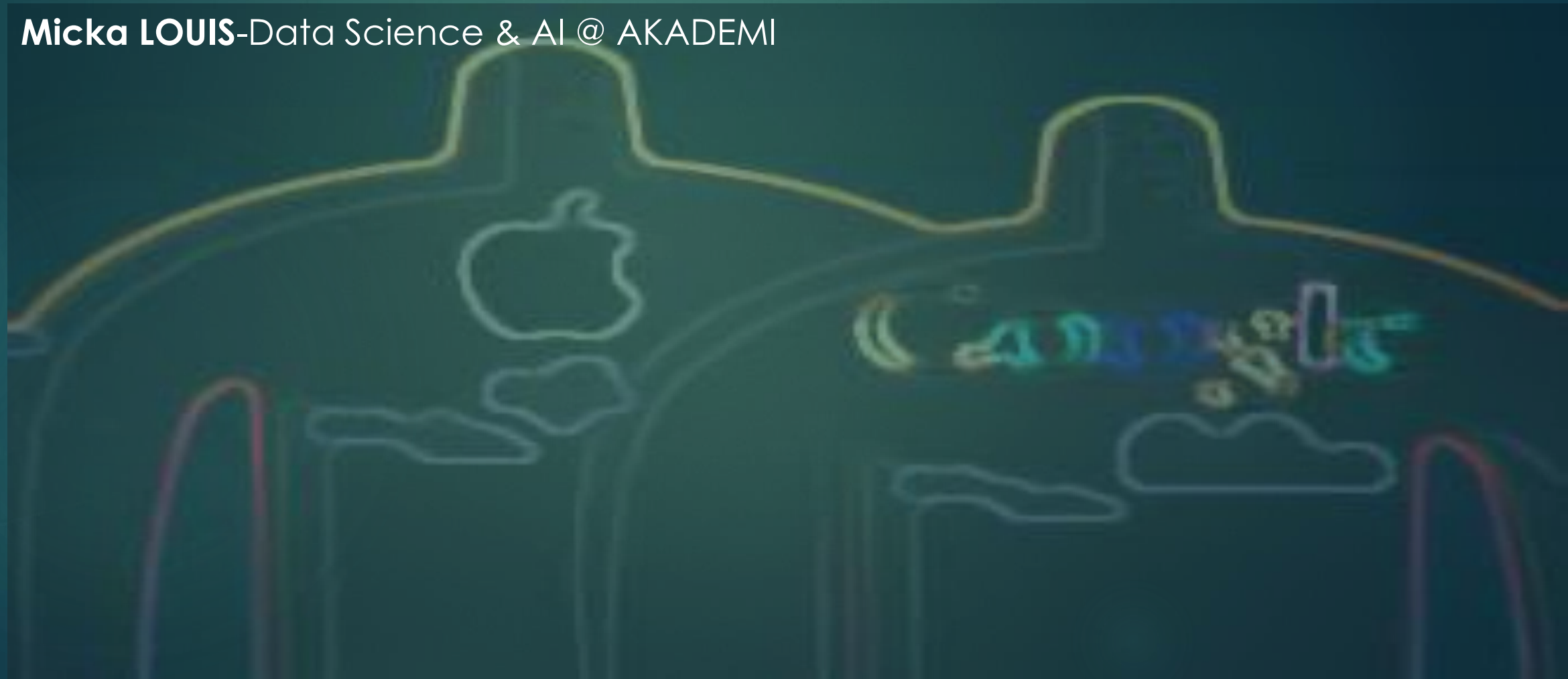


Project Overview

✓ Objective

To analyze how people feel about Apple and Google products on Twitter and transform public opinions into actionable business insights.

✓ Key Question

How do customers perceive Apple and Google based on what they share online?

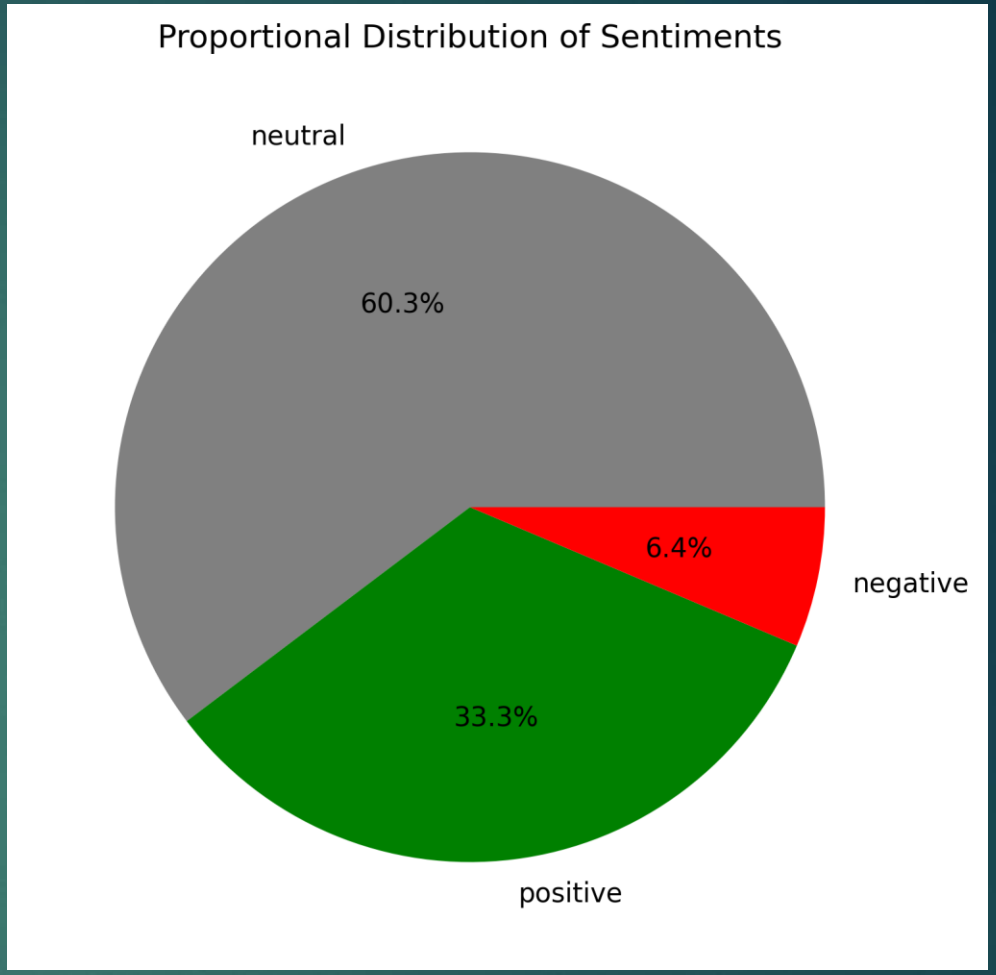
✓ Method

We used Machine Learning models to classify tweets as **positive**, **negative**, or **neutral** and extract trends in public sentiment.

Business Context & Data

- ✓ **Public sentiment directly impacts brand reputation, sales, and customer loyalty. Understanding emotions expressed on social media helps companies to:**
- ❖ Detect issues early (e.g., product complaints, bugs),
- ❖ Identify what customers love,
- ❖ Improve marketing and communication strategies.

- ✓ **Source: Twitter posts mentioning Apple or Google**
- ❖ Features: tweet text, brand, sentiment label
- ❖ Size: about 9000 of tweets labeled as positive, negative or neutral



Why Predict Sentiment?

Transform public conversations on Twitter into actionable insights for Apple and Google.

Key Reasons:

- ✓ **Monitor Brand Health:**

Track real-time public opinion to detect shifts in perception early.

- ✓ **Improve Products & Services:**

Identify recurring issues and prioritize product updates based on customer feedback.

- ✓ **Optimize Marketing Strategies:**

Highlight what customers love and address negative perceptions with targeted campaigns.

- ✓ **Support Data-Driven Decisions:**

Provide marketing, product, and CX teams with measurable KPIs derived from unstructured social media data.

Model Results — Sentiment Prediction

✓ **Multiclass Classification (Positive / Neutral / Negative):**

Model	Accuracy	Macro F1	Key Insights
Logistic Regression	66.1%	0.58	Balanced across sentiments
Random Forest	67.7%	0.52	Highest accuracy, weaker on minority classes
SVM	65.8%	0.58	Best trade-off between precision and recall
XGBoost	68.1%	0.48	Highest accuracy but struggles with imbalance

✓ **Insights:**

•Neutral sentiment dominates and is easiest to predict.

•Positive and negative tweets are harder due to imbalance.

•SVM and Logistic Regression provide the most consistent performance.

Binary Classification (Positive vs. Negative)

Model	Accuracy	Macro F1	Key Insights
Logistic Regression	82.9%	0.73	Best class balance
Random Forest	86.9%	0.65	Highest accuracy overall
SVM	82.4%	0.72	Consistent and reliable
XGBoost	86.2%	0.65	Strong but slightly less balanced

✅ **Insights:**

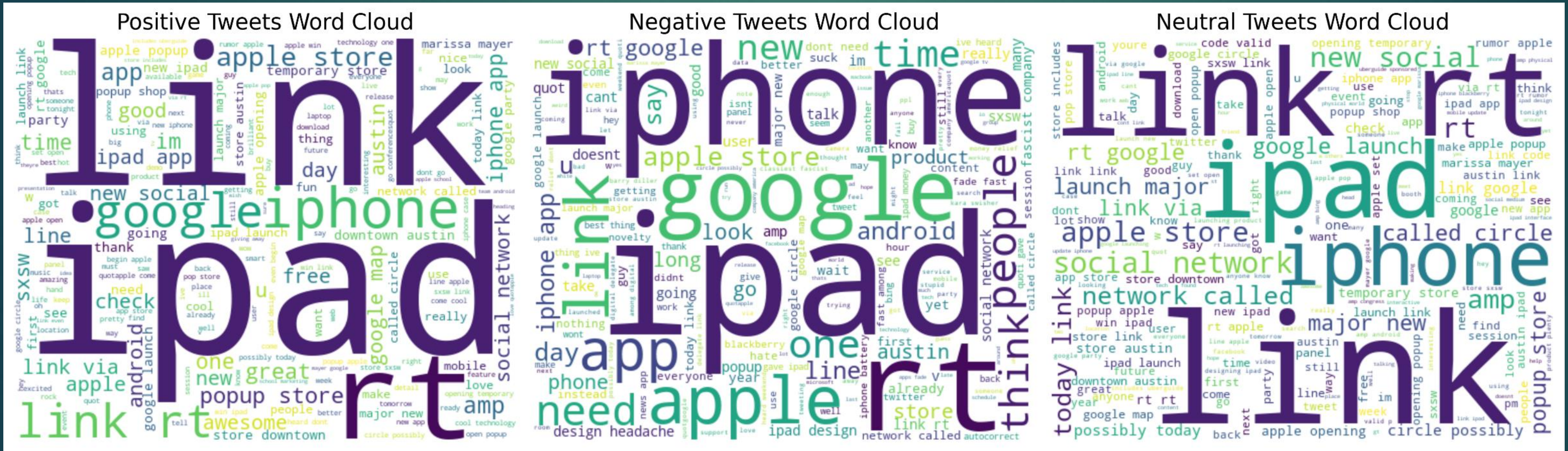
•Performance improved significantly after removing the neutral class.

•Logistic Regression is the most balanced model.

•Random Forest and XGBoost achieve top accuracy but favor the majority class.

Key Findings — What the Data Reveals

- Neutral sentiment is the most common.
- Positive opinions dominate but negatives highlight key issues.
- Negative feedback reveals improvement opportunities.
- ML models effectively track public opinion trends.
- Text features are the strongest predictors.



Business Recommandations

✓ **Enhance Product Features**

Fix issues often mentioned in negative tweets.

Improve features that impact customer satisfaction.

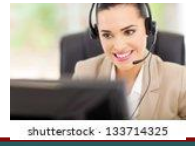
✓ **Optimize Marketing Campaigns**

Highlight features users love.

Use sentiment insights for targeted campaigns.

✓ **Support Strategic Decisions**

Include sentiment KPIs in product planning.



Next Steps

1. ✓ **Handle Class Imbalance**

2. ✓ **Explore Advanced NLP Models (e.g., BERT)**

3. ✓ **Build Real-Time Sentiment Dashboard**

4. ✓ **Continuously Retrain with New Data**

Thank You

Contact

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Github: https://github.com/Micka-Louis/ds-project-phase-4.git

"Every tweet tells a story — and data helps us hear it clearly"