What’s Eating Apple’s Customers?

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Outline

- Background
- Business Problem
- Data
- Methods
- Results
- Conclusions

Background

- A new iPhone and Android has just been released.
- Attendees are voicing their opinions on twitter.
- Using Natural Language Processing (NLP), we can determine what are the most common words being used and what tone.
- Identify the best model for future predictions.

Business Problem

- We are a marketing company , contracted to evaluate these customers tweets based on sentiment.
- Identify what customers are saying about the new phones and company.

Data

- Using the tweet product dataset. Dataset has over 9000 tweets, and 3 columns.
- Contains data including
  - Tweets
  - Focus of the tweet
  - Sentiment

Methods

- Removal of special characters (@,#, etc.)
- Applying NLP Techniques such as Stemming, Lemmatization, and Tokenization.
- Removal of small words (less than 3 characters in length)
- Removing stop words
- WordClouds – Visualizations of most important words

Methods

Build machine learning models with Word Vectorizers to predict future sentiments (using CountVectorizer and Term Frequency - Inverse Document Frequency (TFIDF)

Developed several models to evaluate performance

- Precision – correct predictions vs total predictions
- Recall – Correct predictions vs actual positive predictions
- F1 score – harmonic mean of Precision and Recall
- Accuracy

Methods

A Little bit about the Vectorizer models…

CountVectorizer counts number of times a word appears.

TFIDF (Term Frequency – Inverse Document Frequency) – counts the number of words but considers overall document weightage

Results

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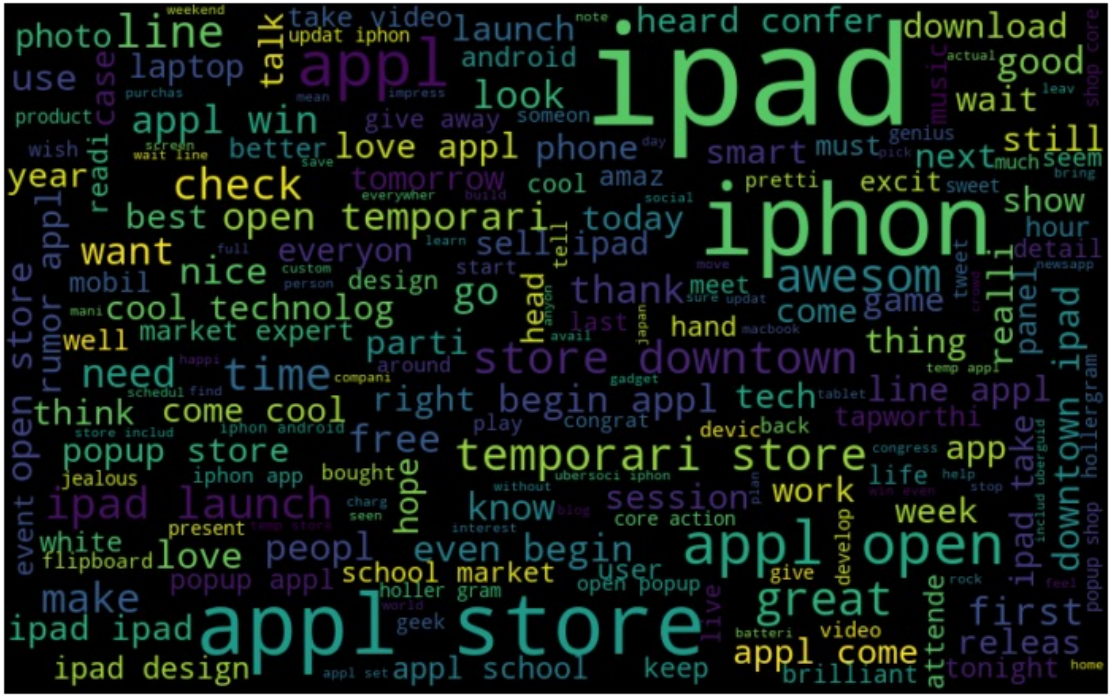
WordCloud for positive Emotion Sentiment (Apple)



Results

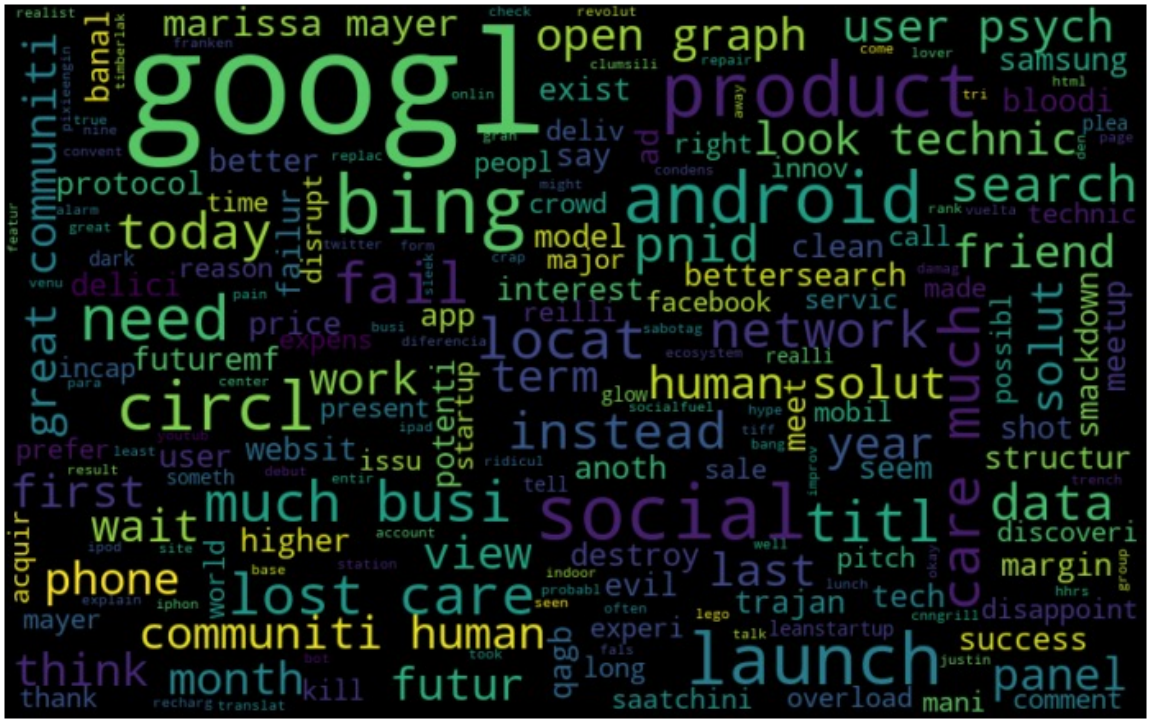
WordCloud for positive Emotion Sentiment (Google / Android)

Results

WordCloud for Negative Emotion Sentiment (Apple)

Results

WordCloud for Negative Emotion Sentiment (Google / Android)

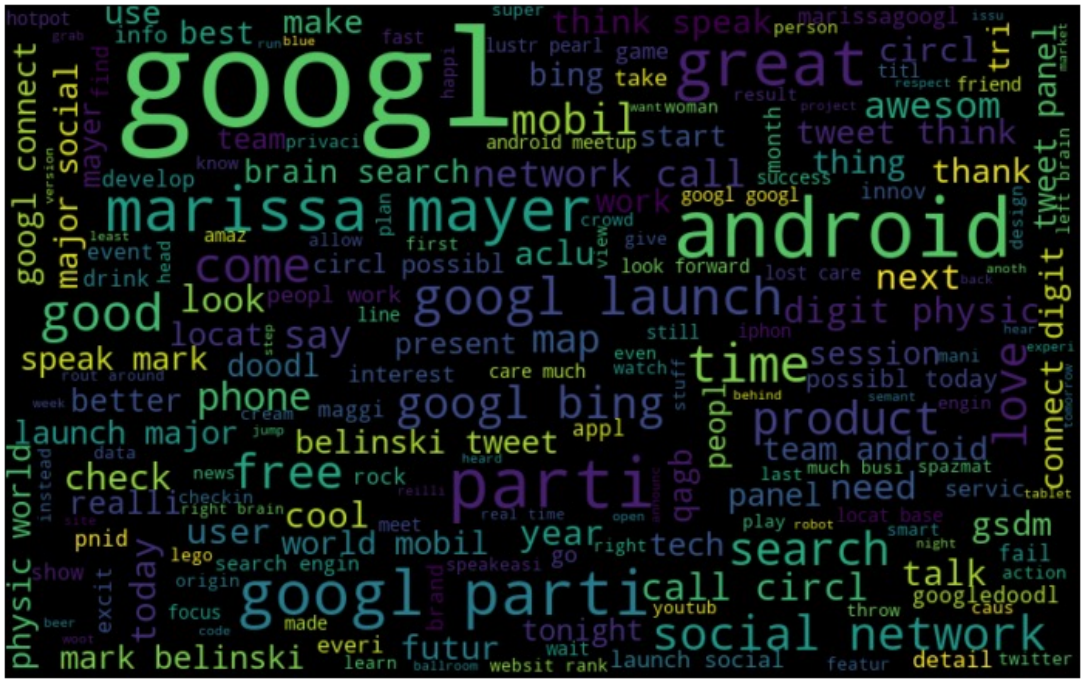


Results

WordCloud for all Apple Sentiments

Results

WordCloud for all Google Sentiments



Results

Evaluation of the Count Vectorizer and TFIDF Model

	Count Vectorizer	TFIDF
PRECISION (negative Emotion)	40%	67%
PRECISION (No Emotion)	69%	71%
PRECISION (Positive Emotion)	58%	70%
RECALL (Negative Emotion)	21%	19%
RECALL (No Emotion)	82%	90%
RECALL (Positive Emotion)	47%	47%
F1 SCORE (Negative Emotion)	0.28	0.30
F1 SCORE (No Emotion)	0.75	0.80
F1 SCORE (Positive Emotion)	0.52	0.57
ACCURACY	64%	70%

Results

DRUM ROLL!!! AND THE WINNER IS….

TFIDF Vectorizer!

Outperformed in almost all sections

Summary of Findings / Conclusion

- Most positive words were associated with events for Google and Apple
- Most negative words associated with the product or negative words (such as battery) for Apple.
- Most negative words were associated with the event for Google.
- The TFIDF Vectorizer is the best for predicting future sentiments.
    - TFIDF Vectorizer outperformed Precision, Recall, F1 score against CountVectorizer

Next Steps...

Next steps...

1) Perform Sentiment analysis at 6 months then a year to see how much better or worse the product has improved.

2) Based on the reviews, make improvements to product to please customer.

3) Perform on other companies that make smart phones such as Nokia, Samsung, Huawei see how they are doing using sentiment analysis

Thank you!