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Outline

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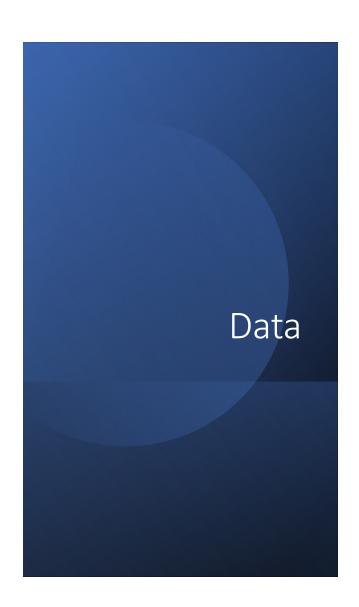


Background

- 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.



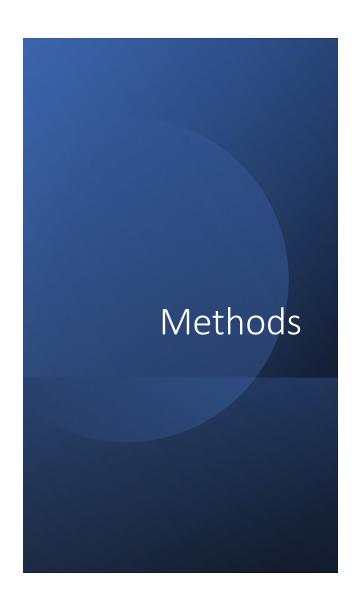
- We are a marketing company, contracted to evaluate these customers tweets based on sentiment.
- Identify what customers are saying about the new phones and company.



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



- 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



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

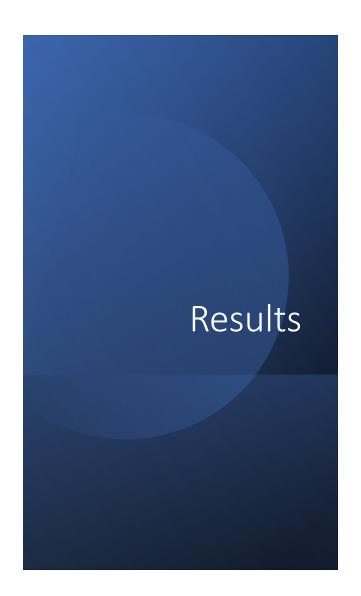
- Precision correct predictions vs total predictions
- Recall Correct predictions vs actual positive predictions
- F1 score harmonic mean of Precision and Recall
- Accuracy



A Little bit about the Vectorizer models...

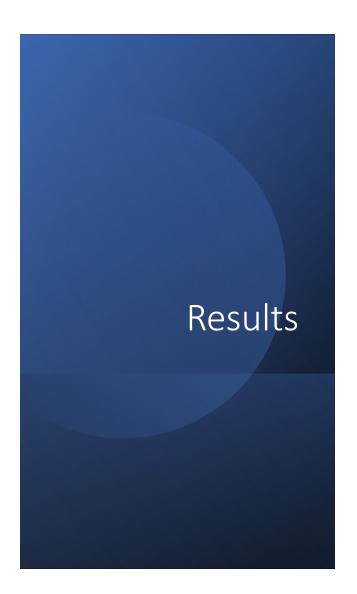
CountVectorizer counts number of times a word appears.

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



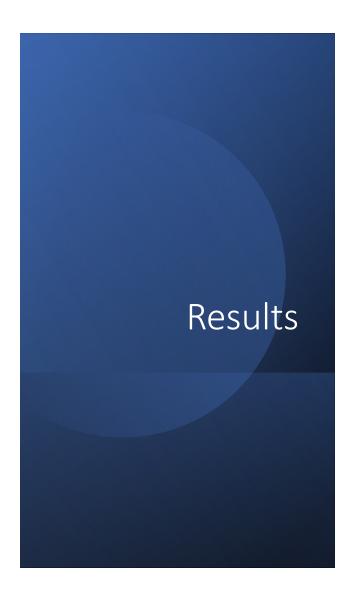
WordCloud for positive Emotion Sentiment (Apple)

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without read open population application a
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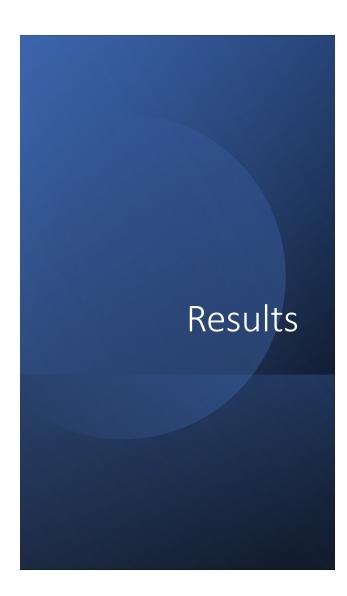
WordCloud for positive Emotion Sentiment (Google / Android)

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product erson parti gsdm detail mobil link launch major sker search search search share and sold application physic world updat time best best back by physic world updat time best best back by physic world updat time best back back back by physic world updat time best back back by physic world updat time back by physic world updat time back by physic world updat time back back back and the physic world updat time back by physic world updat time back by physic world updat time back back and the physic world updat time back by physic world
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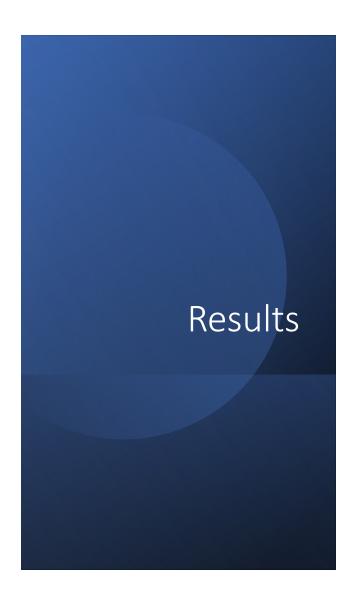
WordCloud for Negative Emotion Sentiment (Apple)

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glad by phone mobil time work take heard weekend S S Whelpele year work take heard weekend S S Whelpele year work take heard weekend S S Whelpele year take heard weekend S S Whelpele year year work take heard weekend S S Whelpele year year work take heard weekend S S Whelpele year year work take heard weekend S S Whelpele year year year walk sxswipretti talk deleg link day store turn be walk to be with the work tablet call we want to be work to be with the work to work the work to be with the work to work the work to be with the work to work the work to be with the work to be with the work to work the work to be with the work to work the work to be with the work to work the work to work the work to be with the work to work the work the
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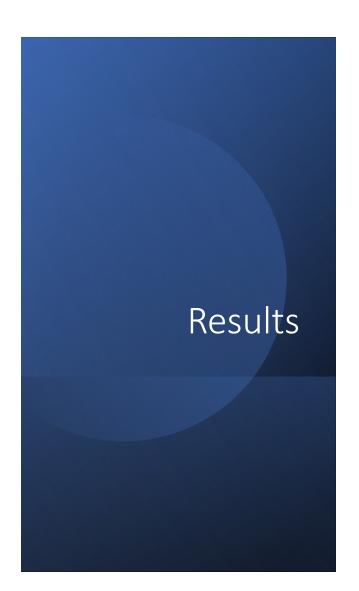
WordCloud for Negative Emotion Sentiment (Google / Android)

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human solut term great Solut term great Solut term great Solut timberlak product Seem possible Solut destroy Seem product S
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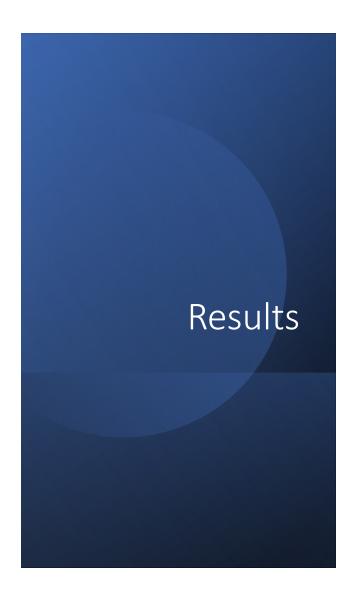
WordCloud for all Apple Sentiments

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app market expert size of the size of the
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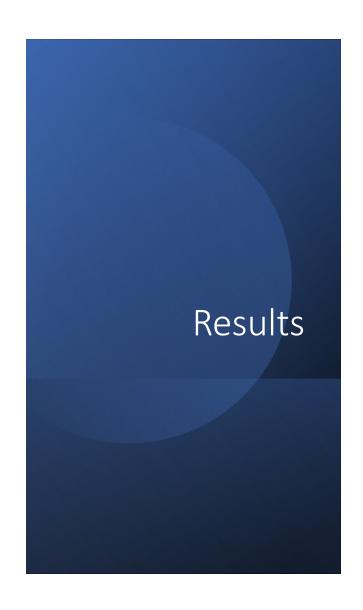
WordCloud for all Google Sentiments

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digit physic instead of develop goog launch quot mark product of the content of t
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Evaluation of the Count Vectorizer and TFIDF Model

	Count Vectorizer	TFIDF
PRECISION (negative Emotion)	42%	<mark>71%</mark>
PRECISION (No Emotion)	69%	<mark>71%</mark>
PRECISION (Positive Emotion)	58%	<mark>72%</mark>
RECALL (Negative Emotion)	22%	<mark>24%</mark>
RECALL (No Emotion)	82%	<mark>92%</mark>
RECALL (Positive Emotion)	<mark>47%</mark>	46%
F1 SCORE (Negative Emotion)	0.29	<mark>0.36</mark>
F1 SCORE (No Emotion)	0.75	<mark>0.80</mark>
F1 SCORE (Positive Emotion)	0.52	<mark>0.56</mark>
ACCURACY	65%	<mark>71%</mark>



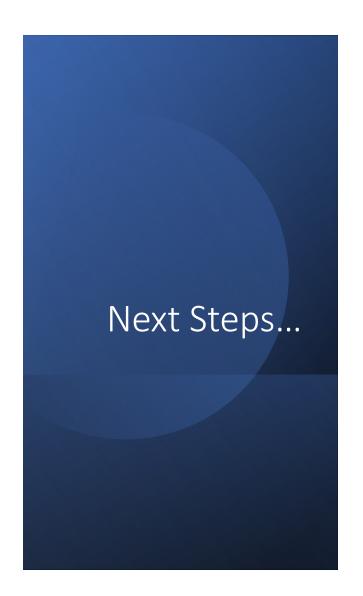
DRUM ROLL!!! AND THE WINNER IS....

TFIDF Vectorizer!

Outperformed in 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...

- 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

