Twitter Sentiment Analysis

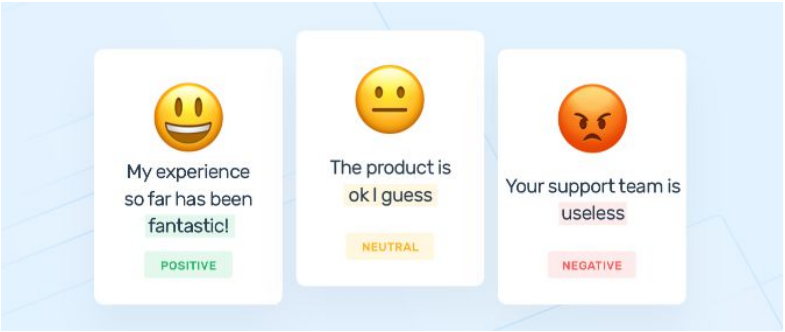
William Gast

About Me

- William Gast
- Carthage College Class of 2020
  - Marketing
- Big Star Wars fan
- Hobbies include
  - Any type of sport
  - Travel

Motivation

- Sentiment analysis or opinion mining is an NLP technique that lets you determine the attitude (positive, negative, or neutral) of text.
- Given the model I am creating, an airline company could take result and understand how their customers are reacting to them and their services from their twitter data.
- This can be used to improve a company's decision making, customer satisfaction and more



Data

- Source: Kaggle
- Name : Twitter US Airline Sentiment
- Columns in use:
  - Text
  - Airline Sentiment
  - Airline

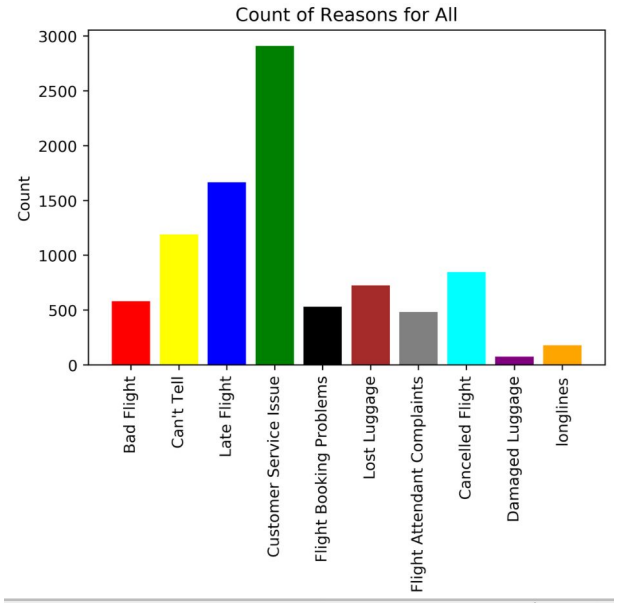
```
Data columns (total 15 columns):
tweet_id                      14640 non-null int64
airline_sentiment             14640 non-null object
airline_sentiment_confidence  14640 non-null float64
negativereason                9178 non-null object
negativereason_confidence     10522 non-null float64
airline                       14640 non-null object
airline_sentiment_gold        40 non-null object
name                          14640 non-null object
negativereason_gold           32 non-null object
retweet_count                 14640 non-null int64
text                          14640 non-null object
tweet_coord                   1019 non-null object
tweet_created                 14640 non-null object
tweet_location                9907 non-null object
user_timezone                 9820 non-null object
dtypes: float64(2), int64(2), object(11)
memory usage: 1.7+ MB
```

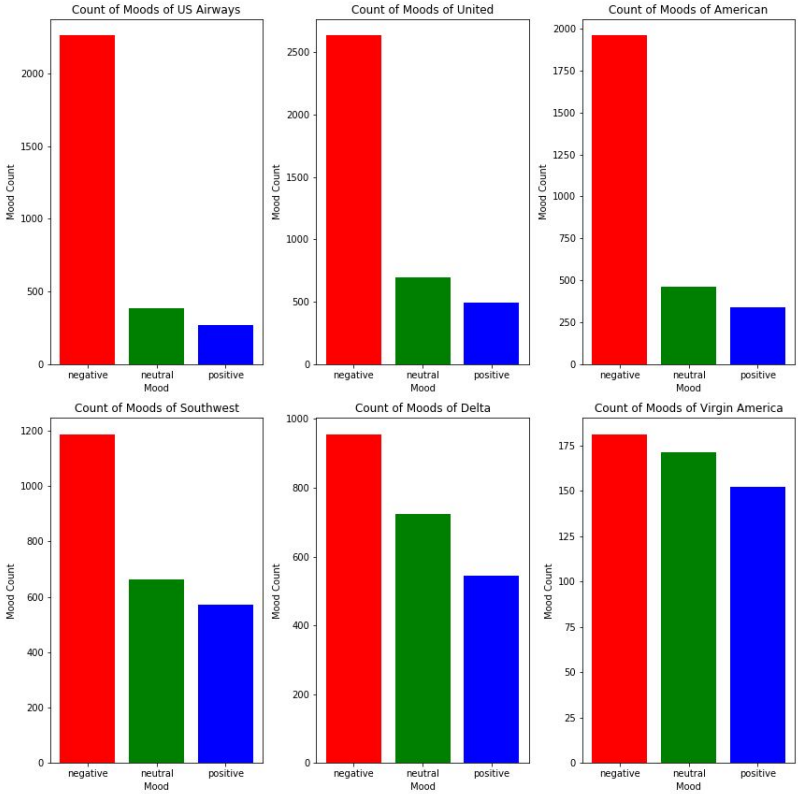
column_name	percent_missing
tweet_id	0.000000
airline_sentiment	0.000000
airline_sentiment_confidence	0.000000
negativereason	37.308743
negativereason_confidence	28.128415
airline	0.000000
airline_sentiment_gold	99.726776
name	0.000000
negativereason_gold	99.781421
retweet_count	0.000000
text	0.000000
tweet_coord	93.039617
tweet_created	0.000000
tweet_location	32.329235
user_timezone	32.923497

Cleaning and Preprocessing

1. Cleaning
    a. Taking out the @ and # signs while also removing the RT tags
2. Tokenization
3. Lower casing
4. Stop words removal
5. Stemming
6. Lemmatization
7. Vectorizing
    a. Convert a collection of text documents to a matrix of token counts

EDA


Count of Reasons for All
Count
3000
2500
2000
1500
1000
500
0
Bad Flight
Can't Tell
Late Flight
Customer Service Issue
Flight Booking Problems
Lost Luggage
Flight Attendant Complaints
Cancelled Flight
Damaged Luggage
longlines


Count of Moods of US Airways
Count of Moods of United
Count of Moods of American
Count of Moods of Southwest
Count of Moods of Delta
Count of Moods of Virgin America
Mood Count
negative
neutral
positive
Mood

Modeling

Sentiment Metric	Score
Positive	0.674
Neutral	0.326
Negative	0.0
Compound	0.735

- VADER sentiment
  - lexicon and rule-based sentiment analysis tool specifically tuned to be used for social media.
- Naive Bayes
  - The intuition behind Naive Bayes is to find the probability of classes assigned to given text by using the joint probabilities of words and classes.
  - It is easy and fast to predict class of test data set. It also perform well in multi class prediction
  - It perform well in case of categorical input variables compared to numerical variable(s).
- Random Forest
  - Ability to handle large data sets with higher dimensionality.
  - With more trees, it won't allow-overfitting trees in a model.

Choosing an evaluation metric

- I used the weighted F1-score for my evaluation metric
- A weighted F-1 score was a good choice because I care about the precision and recall of all the classes.
- Gives a good measure of the incorrectly classified cases.
- Does a good job of combating class imbalance

Results

	Precision	Recall	f1-score
VADER	.70	.55	.58
Textblob	.67	.46	.48
Naive Bayes	.84	.77	.79
Random Forest	.77	.75	.76

Questions?

Github : https://github.com/WilliamGast

Linkedin: https://www.linkedin.com/in/william-gast-2b6b45127/