Twitter Sentiment Analysis

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Tweets can't Hurt right...?

Elon Musk ✔
@elonmusk

Tesla stock price is too high imo

8:11 AM · May 1, 2020 · Twitter for iPhone

37.2K Retweets and comments   **200.3K** Likes

Tesla shares tank after Elon Musk tweets the stock price is 'too high'

TESLA (TSLA)
695.24   -86.64   [-11.08%]

INTRA DAY

810

781.88
CLOSE

750

720

690

9:30A   12P   2P   4P

Negative Sentiment

- Tesla stock price fell 11%.
- Loss of investors capital.
- Raises concerns if Musk is mentally fit to run the company.

Elon Musk ✔ @elonmusk · 1h
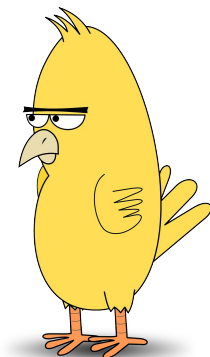Tesla stock price is too high imo

💬 6.2K   🔁 8.7K   ♡ 59K

Elvis
@TradeLikeElvis

Replying to @elonmusk

Dude...I just lost $10k because of this tweet. Wtf is wrong with u

Carter Wilkerson @carterjwm · 1m
Yo @Wendys how many retweets for a year of free chicken nuggets?

Wendy's ✓
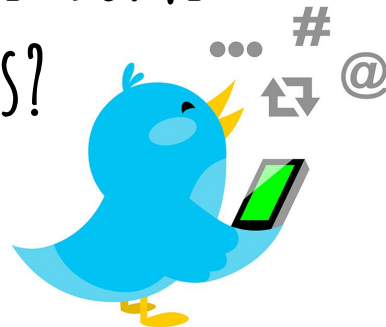@Wendys

Replying to @carterjwm

18 Million

4/5/17, 7:32 PM

1 LIKE

Carter Wilkerson @carterjwm · 11s
Replying to @Wendys
Consider it done

Can I get some retweets?

- Retweeted over 3.4 millions times, 3rd place all time.

- Free marketing for Wendy's Restaurant.

- Great publicity for the brand.

- Created an entire movement with over a million people in order to get free nuggets for a year.

Carter Wilkerson ✔ @carterjwm · Apr 5, 2017

HELP ME PLEASE. A MAN NEEDS HIS NUGGS

Replying to @carterjwm

18 Million

4/5/17, 7:32 PM

1 LIKE

💬 35.3K   ♻ 3.4M   ♡ 960.7K

Is there a way to interpret tweets?

- Twitter is a platform where individuals are allowed to post their thoughts and opinions as they see fit.

- But for some it can do more damage than good, such as having the ability to drop a company's stock price.

- On the other hand Wendy's tweet went viral with a total of 3.4million retweets.This tweet generated massive amounts of free marketing and good publicity for Wendy's.

The Goal
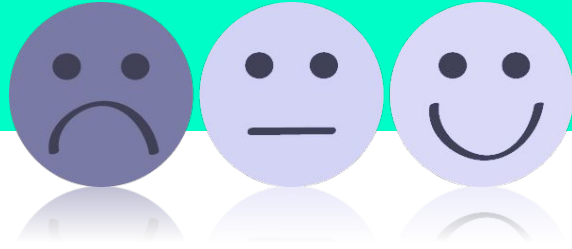
In this project I plan to build a model that can classify a tweet as containing positive, negative or neutral sentiments.

This model can help companies understand the public's perception of them, both good and bad. As well as help brands who would like the benefits of free marketing from going viral on Twitter.

Methodology

- Tweets are limited to 280 characters, which means users are more likely to use acronyms.

- In order to provide as much info to my machine learning algorithms I iterated through each tweet and replaced any acronyms with their full meaning.

- Continued with basic NLP preprocessing removing numbers, special characters, and links.

Data Preprocessing Sample

text	sentiment	clean_tweets
few grilled mushrooms and olives, feta cheese ...	neutral	few grilled mushrooms and olives feta cheese a...
94 more days till bh comes back to la	neutral	more days till bh comes back to laughing aloud
lol i know and haha..did you fall asleep?? o...	negative	laughing out loud i know and hahadid you fall ...
http://twitpic.com/663vr - wanted to visit the...	negative	wanted to visit the animals but whatever wer...
in spoke to you yesterday and u didnt respond...	neutral	in spoke to you yesterday and you didnt respon...
so i get up early and i feel good about the da...	positive	so i get up early and i feel good about the da...
enjoy ur night	positive	enjoy you are night
wish we could come see u on denver husband l...	negative	wish whatever could come see you on denver hus...
i`ve wondered about rake to. the client has ...	negative	ive wondered about rake to the client has made...
yay good for both of you. enjoy the break - y...	positive	yay good for both of you enjoy the break you ...
but it was worth it ****.	positive	but it was worth it

Model Selection + Performance

	Models	CountVectorizer	TFIDFVectorizer	Accuracy	F1 Score ▾	Difference
1	Convolutional NN*			0.70	0.70	94% ▲
2	Support Vector Classifier	✓	✕	0.70	0.69	92% ▲
3	Basic NN*			0.69	0.69	92% ▲
4	Random Forest Classifier	✓	✕	0.68	0.68	89% ▲
5	Naive Bayes Multinominal	✓	✕	0.65	0.64	78% ▲
6	DummyClassifier	✓	✕	0.35	0.36	0% ▬

*Neural Network

The best performing classification model was the Convolutional Neural Network with a accuracy and F1 score of **.70%**.

The differences in accuracy between our baseline model and the Convolutional Neural Network was **94%**.

Final Conclusions

- After looking at the performances of all the models it's no surprise that most of them struggled with predicting the 'neutral' class. It's easier to predict 'positive' or 'negative' sentiments because they'll usually have a couple of words that lean towards one sentiment or another.
- In regards to using either CountVectorizer or TFIDF for data transformation there wasn't a significant difference in overall accuracy.
- For future iterations I plan on collecting more data , this will especially help in determining 'neutral' sentiments. We could also implement pretrained embedding layers such as word2vec or glove.