

*Team name:* JAWs

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## **CS - 410 Project Proposal: Sentiment Analysis of Customer Support Tweets**

### **1. Project objective / Hypotheses to test**

*What is the function of the tool?*

Our tool analyzes customer support tweets generated by both customers and call center personnel and performs several textual analyses:

- Determines the sentiment of the initial tweet, response tweet and subsequent interactions.
- Determines the topics/categories that exist in order to categorize tweets.
  - Relating to complaint, such as bad service, faulty product, etc
  - Relating to industry, such as software, food service, etc
- Searches in the response tweets word unigrams and bigrams that partially characterize the content of the response.
- Mines possible associations of those uni or bi-grams with the change in the sentiment between the initial customer tweet and the tweet after the interaction with the call center employee (to estimate “success” of the customer service)
- Uses non textual variables to control for variations due to company / industry and topic (maybe timeliness of response too).

For further exploration:

- Find correlations between inbound and outbound topic which would be the initial step for predicting the answer from the question the customer asks

*Who will benefit from such a tool?*

The idea behind this project is to find associations between the language used and the effectiveness of the interaction with the customer, that may lead to a focused A/B testing which in turn would be used to establish best practices for the service personnel.

*Does this kind of tools already exist? If similar tools exist, how is your tool different from them?*

We can assume that technology savvy companies already have discovered the best language to approach angry or dissatisfied customers and have clear guidelines for

different types of interactions. But probably smaller companies do not have the resources to perform this type of analysis and rely on common sense and the experience of their employees.

*Would people care about the difference?*

We do not know yet what we will find but this path could be much faster than discovering language patterns only with the experience. Also, this would help to flatten the learning curve of new employees by informing of empirical best practices.

*How are you going to evaluate your work?*

Initially, we will evaluate our work by observing that our tool produces accurate results when analyzing the sentiments of a small amount of data. A larger scale test could be running our tool on a large, similar dataset that has already had a sentiment analysis done to it and compare the results. We will also visualize our output and analyzed input data to better understand it.

## **2. Course topics covered by the project / Tools to be used in analysis and display of results**

*What techniques/algorithms will you use to develop the tool? (It's fine if you just mention some vague idea.)*

We will apply sentiment analysis, topic mining, and general CS techniques like parsing text to remove useless words, database wrangling to put together related tweets and some type of regression analysis.

We intend to do the development work in Python.

## **3. Data description**

*What existing resources can you use?*

Our group has identified a suitable dataset in Kaggle that can be accessed in this site:

<https://www.kaggle.com/thoughtvector/customer-support-on-twitter>

This dataset is a large corpus of over 3 million tweets and replies from big brands like Apple, Amazon, Delta and T-mobile.

This dataset is organized in one row per tweet in 7 fields per row that include the links to previous and next (if applicable) tweets.

## **4. Other**

*How will you demonstrate the usefulness of your tool?*

We will run the analysis using a Jupyter Notebook that can be run by the TA. This notebook will include graphs and tables that show the uncovered relationships (hopefully some with statistical significance)

*A very rough timeline to show when you expect to finish what*

1. Data exploration and data wrangling - 11-05-2020 - 3 hours per person
2. Sentiment analysis and topic mining by type (customer or employee) by 11-15-2020 - 5 hours per person
3. Word unigrams and bigrams in the response and their association with the change in sentiment - 11-25-2020 - 5 hours per person
4. Project Presentation Made - 11-30-2020 - 3 hours person
5. Optional: prediction of response topic from inbound topic by - TBD