

MIDTERM REPORT

Irony Detection in English Tweets

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1 Progress Schedule

1.1 Baseline system

I have completed the baseline system for the problem with Bag-of-words as the feature set. I formed a sparse matrix with 3834 rows and 11793 features(which represents the number of words in the dictionary that has been created from the corpus available to us) and the number of rows being the number of tweets in the training data set.This matrix along with the labels is passed to the classifier(Support Vector Machine) and I have calculated the predictions using 10-fold cross validation. The F-score was found out to be 0.626.

1.2 Analysis of different features

I have extracted the following feature sets from the training data set to be used along with the Bag of Words.

- ***Frequency Imbalance*** Situational ironies can be found when there is an element of surprise or unexpectedness in the instance. Therefore, in this group of features, I try to model the surprise element with the imbalance in the words being used.The public ANC frequency data set contains the measure of the frequency of the occurrence of any word in English and hence can be used to find out whether the word is a common or a rare word.

I formed three features **averagefreq**, **rareword**, **imbalance**. The *averagefreq* is the average of the frequency of all the words in the tweet, the frequency obtained from the ANC data set. The *rareword* is the frequency value of the rarest word and also it is an important feature, the assumption being usage of rare words can be a sign of irony.The third feature being *imbalance*, the absolute difference between the frequency value of the most common and the most rare word.This will give us a measure

of the unexpectedness, the smaller value imbalance reflects that there are not any surprise elements in the tweet.

- ***Punctuations and Emoticons*** Punctuations and emoticons seem to play an important role in the detection of written form of irony. The ironical tone of the speaker, being a vital cue for detection of irony in speaking, is captured with the Punctuations and Emoticons in the written form.

Therefore I have formed three features in this set namely **Punctuation-count, Emoticoncount, Laughing**. The punctuationcount keeps track of the number of exclamation marks, question marks, ellipses, dots etc. and the emoticoncount keeps count of the number of emoticons. Finally I have added another feature that captures the laughing words like LOL, haha, lmao etc since the internet users use these sequences a lot in place of punctuations.

- ***Structure of the tweet*** his feature set contains features which tells us about the structure of each tweet. I have formed 11 different features in this set. First three features namely **Length , words, wordlengthavg.** captures the number of characters in tweet, number of words in a tweet and the average word length respectively. This is a powerful feature since they capture few patterns in the dataset. For example, the ironic data corpus contains sentences that are longer than the normal tweet in general.

The remaining features are the number of **verbs, nouns, adjectives and adverbs** since they might capture the style of the writer. Also I have formed four more features with the ratio of each of the previously formed numbers with the total number of words in the tweet, namely, **verb ratio ,noun ratio, adverb ratio, adjective ratio**.

2 Things to be done

The following has to be done in the upcoming weeks.

- *19 November 2017* Extraction of more feature sets that measures the polarity imbalance and that captures the world knowledge in ironical tweets.
- *23 November 2017* Analysis of the different feature sets as to find out which features set is better for Irony detection.
- *26 November 2017* Build the final model and compare it with the baseline model.
- *10 December 2017* Finish the final report.

3 Existing Challenges

The polarity imbalance can be incorporated by finding the polarity difference of each word. But to capture the other types of irony I need to find a way to include real world knowledge also. For this, I have been going through several papers on linguistics and have found an interesting insight from an approach called the "The implicit display theory of Verbal Irony by Akira Utzumi(1996)". I am trying to find a way to model this theory in practice so that the model will be able to cover different types of irony also.

4 Conclusion

There is no change in the original proposal. I have completed the extraction of three sets of features and also the Bag of Words baseline system with F-score of 0.626. The remaining works are the extraction of two more sets of features, polarity imbalance, and the feature set that can capture the real-world knowledge and the analysis of different features in the task of irony detection.