

Irony Detection in English Tweets

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1 Introduction and Motivation

Irony is a frequent phenomenon in human communication and user-generated content such as blogs, forums, and micro posts, especially in English. Although different definitions of irony co-exist, it is often identified as a figurative language use whose actual meaning differs from what is literally enunciated. Irony detection is considered a difficult task considering that it requires world knowledge and understanding of the conversational context and also the cultural background of the participants. The detection of irony in the written text becomes more challenging when compared to the spoken conversation due to the fact the information that is contained in the tone of the voice or facial expressions are lost.

The past decades have seen an increase in the research interest in the field of sentiment analysis, which extracts the positive and negative opinions automatically. The accuracy of such analysis is obviously affected by the presence of an irony.

eg: *Great. Another rainy day. How wonderful.*

Regular Sentiment analysis will probably classify it as a positive statement. But the irony is noticeable because of our real world knowledge, where rainy day is considered to be an unpleasant day. This clearly contrast with the positive expression “How Wonderful”. If we want to improve the accuracy of tasks like sentiment analysis, opinion mining, automatic interpretation of text-based chats etc. it is important to build a computational model that can automatically detect the irony behind a positive statement.

One of the strongest driving force for me to take up the project is the desire to gain the most out of this project, being a beginner in this field. Also, the previous research work in Detection of figurative language like Sarcasm, Irony etc. is very limited when compared to the well-known tasks in NLP like Sentiment Analysis, Opinion mining etc. which makes it an ideal topic for me to become proficient in this field.

2 Deliverables

The following are the results that can be expected from the project

- A model which is capable of analyzing the data collected from Twitter and classify it into two classes: ironical or non-ironical.
- A comparison of the results with a baseline model which is nothing but a bag-of-words approach to model the system, each tweet is represented as a set of word features.
- An analysis of the feature groups as to which features are better for the task of Irony detection

3 Methodology and Related Research

I have been doing a literature survey, studying the current research and trends in the selection of the different set of features used and the classifier algorithms to model the system.

Following are some of the research papers that I have been going through

- *A multidimensional approach for detecting irony in twitter.* - A Reyes (2013)

They have attempted to classify the tweets into four categories, humor, irony, education and politics. They used Decision tree and Naive Bayes as their classifier and used a rich set of features which included style, emotional scenario, signature, and unexpectedness.

- *Modelling Irony in Twitter* - Barbieri and Saggion (2014)

They used the same corpus as that of the previous paper and used Random Forest and Decision Tree as their classifier. The features included frequency, written-spoken, intensity, structure, sentiments etc.

- *Fracking Sarcasm using Neural Network* - Ghosh and Veale. (2016)

They have employed a neural network for their classification. The model is composed of Convolutional Neural Network(CNN) and Long Short Term Memory network(LSTM) and finally Deep Learning. They have compared the results with an another model with SVM classifier.

- *Monday mornings are my fave :) #not Exploring the Automatic Recognition of Irony in English tweets* - Cynthia Van Hee (2016)

They have used LIBSVM with the standard RBF kernel as their classifier and features sets like lexical ,syntactic, sentiment lexicons and semantic features. They conducted the experiments considering each of the features and the combination of them and found out that the combination features model performed well.

In this Project,I am going to approach the problem as a classification problem and would like to perform the following experiments which might help in improving the detection of irony.

Analysis of different types of Irony: According to the previous papers, the main approach to solve the irony detection task is to identify the polarity contrast in the tweets.i.e a negative sentiment followed by a positive one in the same tweet. As per the paper by Cynthia Van Hee, these type of tweets accounts to only 20% of all the different types of tweets. I am going to research the linguistic papers in order to find some other approach to model the other types of irony computationally.I believe that this might substantially increase the prediction accuracy since it takes into account the other types of irony also.

Analysis of different features: To Understand the impact of a specific feature on the detection, I would like to perform experiments with and without including the specific feature and also with only that particular feature. This will help to analyze the set of features and select the appropriate ones for our task.

Analysis of vocabulary used in tweets: I would like to analyze the vocabulary used in tweets in a more deeper fashion.In previous research works, the incongruity in the polarity of the tweets was one of the main features used to find the irony in the phrases. But most of the ironic tweets contains words which are not typical for the context of the tweet. We can find such out-of-domain vocabulary by making use of text-similarity approaches.

4 Resources

4.1 Data

The training and test data required for the project is provided in the CodaLab Website as part of the competition SemEval-2018 Task 3- Irony Detection in Twitter. The task is part of the 12th workshop on semantic evaluation.

4.2 Knowledge

Being a beginner in the field of Natural Language processing, I'd have to start with the fundamentals of NLP.

I am planning to make use of the open access library NLTK in python language.<http://www.nltk.org/book/>.

5 Progress schedule

- *October 6th 2017* : Completion of Literature Survey
- *October 30th 2017* : Formulation of Baseline System with Bag-of-words representation.

- *November 10th 2017* : Selection of Feature sets and the classifier algorithm to be used by analyzing different kinds of features and classifiers.
- *December 13th 2017* : Completion of the whole system for Irony detection.

6 Resources

6.1 Books

- *Natural Language Processing with Python* <http://shop.oreilly.com/product/9780596516499.do>
- *Introduction to information extraction*-Christopher Manning

6.2 Online resources

- *Youtube Lectures on Natural Language Processing* <https://www.youtube.com/playlist?list=PL6397E4B26D00A269>

6.3 Research Papers

- *Gavin Abercrombie and Dirk Hovy. 2016. Putting Sarcasm Detection into Context: The Effects of Class Imbalance and Manual Labelling on Supervised Machine Classification of Twitter Conversations. ACL 2016 (2016), 107.*
- *Francesco Barbieri, Horacio Saggion, and Francesco Ronzano. 2014b. Modelling Sarcasm in Twitter, a Novel Approach. ACL 2014 (2014), 50.*
- *Mondher Bouazizi and Tomoaki Ohtsuki. 2015a. Opinion Mining in Twitter How to Make Use of Sarcasm to Enhance Sentiment Analysis. In Proceedings of the 2015 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining 2015. ACM, 1594–1597.*
- *Konstantin Buschmeier, Philipp Cimiano, and Roman Klinger. 2014. An impact analysis of features in a classification approach to irony detection in product reviews. ACL 2014 (2014), 42.*
- *Dmitry Davidov, Oren Tsur, and Ari Rappoport. 2010. Semi-supervised recognition of sarcastic sentences in twitter and amazon. In Proceedings of the Fourteenth Conference on Computational Natural Language Learning. Association for Computational Linguistics, 107–116.*
- *Elisabetta Fersini, Federico Alberto Pozzi, and Enza Messina. 2015. Detecting Irony and Sarcasm in Microblogs: The Role of Expressive Signals and Ensemble Classifiers. In Data Science and Advanced Analytics (DSAA), 2015. 36678 2015. IEEE International Conference on. IEEE, 1–8.*

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- Irazú Hernández-Farías, José-Miguel Benedí, and Paolo Rosso. 2015. *Applying Basic Features from Sentiment Analysis for Automatic Irony Detection*. In *Pattern Recognition and Image Analysis*. Springer, 337–344.
- Ghosh, A. and Veale, T.: 2016, *Fracking Sarcasm using Neural Network*, *Proceedings of the 7th Workshop on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis*, Association for Computational Linguistics, San Diego, California, pp. 161–169.
- Van Hee, C., Lefever, E. and Hoste, V.: 2016b, *Monday mornings are my fave : not Exploring the Automatic Recognition of Irony in English tweets*, *Proceedings of COLING 2016, 26th International Conference on Computational Linguistics*, Osaka, Japan, pp. 2730–2739.