

Detecting Stance in Tweets

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1 Problem Statement

Stance detection can be defined as the task of automatically determining from text whether the author of the text is in favor of a target idea, against a target idea or neither. For example, consider the tweet: "A fetus has rights too! Make your voice heard". We can easily deduce that this tweet is against the target of "Legalization of abortion".

In this work, we aim to build a system that can determine this stance from tweets. Tweets present an additional challenge in that they are short. To successfully predict the stance, the system would have to identify information that may not be present in the text itself. For example in this case, it has to connect that supporting the rights of fetus means against abortion.

Stance detection has lot of applications and is closely related to tasks like information retrieval, text summarization, textual entailment. It can be seen as an extension of sentiment analysis, where instead of general sentiment, the goal is find the author's opinion on a particular topic.

This task is part of the International Workshop on Semantic Evaluation SemEval-2016. They provide training dataset in the form of tweets labelled with the target and stance.

2 Related Work

There is some existing work which analyzes debates in different scenarios like online forums and essays. However, Twitter data poses a new challenge in terms of length of the document under consideration. Apart from this the language used is different from other structured documents. There is some work which aims to identify the stance of Twitter users using re-tweet based label propagation. The challenge in solving this problem is to do so without relying on the structure of the conversation.

3 Approach

We will investigate the following approaches to solving this task. The idea is to build an ensemble with appropriate weights.

- **Target prediction:** Even though the target is mentioned in testing set, trying to incorporate prediction of the target as a step is useful. It can help us determine whether the tweet talks about the target that we are concerned about or does not.
- **Lexicons:** Use subjectivity and sentiment lexicons to determine corresponding scores, which can be used as features for input to the classifier
- **Adding knowledge:** Since tweets are short-text and may not mention the target directly, we need to be able to relate the target to the subject of the tweet. Additional information could be introduced in the form of semantic relatedness of two topics using a Wikipedia link-based measured, like the one proposed by Milne and Witten (2008).
- **Dependency parsing:** Can be used to accurately determine the subject, opinion, and whether a negator affects a word in the graph.
- **Hashtags:** Leverage the information provided by Hashtags to detect the stance. Since this feature is unique to tweets it would be interesting how we can make use of this feature. This is not available for all the tweets.
- **N-Grams:** Classifier with unigrams, bigrams and trigrams as features trained using the tweets.
- **Baseline:** Classifier trained using a bag of words to predict the stance in the tweet.

4 Data

We will be using the data provided by the SemEval-2016 task.

- **Train Data:** 2900 labeled training data instances for five targets. Additional train data with extra labels like 'target of opinion' and 'sentiment'.
- **Test Data** with and without gold standard labels