Emotion Detection from Tweets

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Problem Description

Tweet	Emotion
Enjoy the little things in life!	Happy
In the end you have to be your own hero because everyone else is too busy trying to save themselves.	Sad
Tomorrow will be a better day!	Hopeful
Bought 5 things from whole foods and it cost $230…	Complainable
Can't wait to work again!	Complainable

Table 1: Examples of emotions in tweets

Motivation

- Market researchers and companies
- Political campaigns
- People's reactions in a crisis
- Keeping track of the emotional state of a patient with a certain disease
- Define certain psychological disorders
- Sociologist can infer the life quality of a population.

Selected Emotions Based on Ekman's Model

- Happy
- Sad
- Angry
- Afraid
- Hopeful
- Complainable

Methodology

1. Classify the tweets into three main groups; 'positive', 'negative' and 'neutral'.
    - 'Natural Language Toolkit' of Python (Bayesian classifier)

2. Process tweets.
    - Change hashtags into normal words.
    - Apply stemming and filter out stop words.

3. Use keyword lists to assign a more specific emotion to the as 'neutral', 'positive' or 'negative' pre-labeled tweets.
    - The keyword list with the most matches within the tweet will determine the emotional label.

Methodology

- After labeling:
  - Use different machine learning algorithms to train and test our dataset
    - SVM (Support Vector Machine)
    - Naive Bayes
    - KNN (K-Nearest Neighbor)
  - Compute the recall and precision rates to measure the accuracy of the algorithms.
  - Compare these algorithms to decide which works most efficiently.

Data

Datasets	Number of tweets
positive labeled tweets	2.949
negative labeled tweets	3.293
neutral labeled tweets	6.353
total	12.595

Table 2: Dataset size

First Results - pre-labeled Tweets

Tweet	Label
Enjoy the little things in life!	positive
In the end you have to be your own hero because everyone else is too busy trying to save themselves	negative
Tomorrow will be a better day	positive
Bought 5 things from whole foods and it cost $230…	negative
Can't wait to work again!	negative

Table 3: Some examples of pre-labeled tweets

Expected Results

- Aim: to group the tweets according to their emotion with high efficiency and accuracy.
- Obtain statistical data about which method is efficient for detecting emotions in tweets.
- Decide whether using hashtags, emoticons, keyword lists or a combination of them is more precise in terms of detecting emotions.

References

[1] M. Hasan, E. Rundensteiner, and E. Agu. Emotex: Detecting emotions in twitter messages. In *ASE BIGDATA/SOCIALCOM/CYBERSECURITY Conference*, pages 27–31, May 2014.

[2] P. Ekman. Basic emotions. Handbook of Cognition and Emotion, 98:45-60, 1999.