State of the art in *Sentiment Analysis*

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ABSTRACT

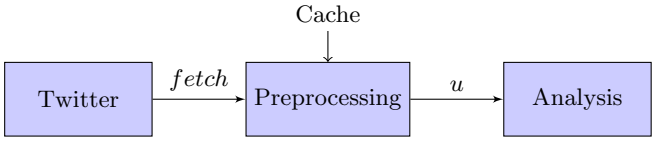
The extensive growth of user-generated content in social networks and the common usage of emoticons and hashtags has introduced new possibilities to classify these information. In this paper, an overview of the state-of-the-art regarding sentiment analysis of Twitter messages is provided. The usefulness of existing lexical ressources and special expressions like smileys or hashtags is evaluated and an general introduction to sentiment analysis is given as part of the introduction.

1. INTRODUCTION

Within the last years Twitter and similar social media platforms grew considerably in terms of user numbers and mainstream fame. Twitter has about 284 Mio. active users, generating approximately 500 Mio. posts[1] on a single day[2]. These impressive numbers show the amout of information generated by the crowd. Furthermore Twitter is able to reach a vast number of potential customers especially for consumer businesses. As a result the named services gain more and more acceptance as opinion platforms and powerful tools for both, opinion leader as well as pollister. This trend influenced various marketing and sales strategies and created a new market for companies specialiced on sentiment analysis of tweets, like tweetfeel[3], Social Mention[4] and Twitratr[5].

The aim of sentiment analysis is to determine and try to measure positive and negative feelings, emotions and opinions written in a text. English as language allows to express the same intent in different ways. The main challenge therefore consists in abstracting the intention of the writer from the grammatic and language specific rules.

In general sentiment analysis can be splitted into 2 steps: a preprocessing and a constitutive sentiment analysis phase. In Twitter sentiment analysis there is another step right bevor preprocessing: fetching the data from the application programming interface (API). This task is not trivial, because the official API is limited regarding the datasets fetched within certain intervals. This leads to the requirement of a caching mechanism to avoid fetching the same tweets multiple times and allow the usage of more datasets.



While sentiment analysis of conventinal ressources like news papers or articles is quite well investigated the special research area of sentiment analysis in terms of social network posts is relatively unexplored. Excpecially the possibility of priorizing keywords[6] and the common usage of emoticons lead to advanced possibilities to categorize feelings of posts.

2. RELATED WORK

Sentiment analysis a growing and well explored part of Natural Langugage Processing (NLP). There are several papers from Pang and Lee regarding sentiment analysis in general and related topics like the effects of various machine learning machines[7][6]. Especially the last topic is a well studied field [5]. Some related research areas are document level classification, sentance-level classification and machine learning. Due the limited number of characters within a single twitter post, this topic is quite similar to sentance-level sentiment analysis. There are several recent papers regarding sentiment analysis in the context of twitter posts. Agarwal et al. published within "Sentiment analysis of Twitter data" general information and techniques which cover this area[1]. In "Twitter Sentiment Analysis : The Good the Bad and the OMG !" the utility of linguistic features for detecting the sentiment of tweets are investigated. Saif, He, and Alani introduce a novel approach of adding semantics as additional features into the training set. For each extracted entity (e.g. Galaxy S) from Twitter Messages, they add a semantic concept (e.g. Samsung product) as an additional feature, and measure the correlation of the representative concept with negative/positive sentiment[8]. In *Twitter Sen-*

[1] posts are also known as tweets
[2] `https://about.twitter.com/company`, Effective 12.11.2014
[3] `www.tweetfeel.com`
[4] `www.socialmention.com`
[5] `www.twitratr.com`
[6] known as hashtags

timent Analysis a algorithm is presented, which accurately classifies tweets as positive or negative, in respect to a query term[2].

3. PREPROCESSING

The Data-Preprocessing-Process is an essential part of sentiment-Analysis. Its goal is to prepare data for the sentiment analysis and remove unnecessary parts.[3] Unnecessary Parts are:[3]

1. Remove URLs, Special Characters
2. Filter Unnecesarry Words
3. Remove Retweets

Besondere an twitter: Hashtags, Mentions, Smileys Tokenizen

4. DATA AND METHODS

5. CONCLUSIONS

APPENDIX

A. HEADINGS IN APPENDICES

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