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Social Spam Detection in Microblog

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Abstract: ***Microbloging sites are the most popular and commonly used social networking sites. Examples for micro blogs are Sina web, Face book, twitter etc. Since the importance of these sites attracts spammers widely, spammers are the person or an information hub, which copy a pieces of information or tweets from others and modify it. An improved LSH (locality sensitive hashing) technique is used to identify duplicate tweets, and also for identifying emotions of this duplicated tweets.***

Keywords: microblog, LSH, social spam

1. Introduction

Social Spam detection in Microblogs mainly aims to identify social spammers in microblogging sites. Social spammers are common users; they post false or irrelevant information in microblogging sites within seconds. The very importance of microblogging sites attracts these kinds of spammers widely.. The proposed system helps to detect these spammers to an extent. An improved Locality Sensitive Hashing (LSH using Minhash) based method is used for finding social spam. In micro blogs tweets are updated within seconds. Hadoop framework is used for handling these tweets. Input to Hadoop is a file that contains tweets. Emotions of the tweets are analyzed using minhash algorithm. The system makes use of mysql database, which contains a total of 8000 tweets in which 5000 tweets are positive and 3000 tweets are negative. The input tweets are stored in master set, 5000 positive tweets set as positive dataset and 3000 negative tweets are taken as negative dataset. From the given input file, system has to find the duplicate tweets using LSH and stored in master set itself. During the time of minhashing, master set data is compared with positive and negative datasets and finding the similarity. If it finds that the data is more similar to positive dataset then the tweet will be declared as positive otherwise it will be taken as social spam. [1] [2] [3] [4] [5] [6].

2. Background

Social networking has become a very popular tool to communicate on-line for Internetusers. Social networking sites such as twitter, sina weibo etc are used a lot by internet users for reading news, discussing events etc. Unfortunately their popularity attract spammers who continuously expose malicious behavior leading to greater inconvenience for internet user's social activities.. According to statistical reports, until 2013, there are around 1.61 billion social networking users. It is expected that the users will reach 2.33 billion at the end of 2017. Social network platforms while providing technical and commercial success, unfortunately provides large opportunities for spammer broadcasting by spreading malicious message and behaviour. According to Nexgate report, during the first half of 2013, social spamming has grown to about 35.5%, which is faster than growth rate of accounts on most branded social networks. However, along with great technical and commercial success, social network platform also provides a large amount of opportunities for broadcasting spammers, which spreads malicious messages and behavior. According to Nexgate's report, during the first half of 2013, the growth of social spam has been 35.5 percentages, much faster than the growth rate of accounts and messages on most branded social networks. Thus detection of social spammer is very important for the existence of social networking site. The existing system uses LSH algorithm for finding duplicate tweets. The proposed system not only finding the duplicate but also finding emotions of the duplicated tweets using LSH.

3. Implementation

3.1 Tweet Analysis

Input:-input tweet file as master set, positive tweets in the database as positive dataset, negative tweets in the database as negative dataset

Output:-Tweets labeled with positive, negative and neutral

1. Split the input tweet in to words and stored in master set.
2. Separate positive and negative tweets.
3. Calculate the tweet rank (no of positive and negative words) for tweets using LSHMinHash algorithm.
4. a) If number of positive tweet rank is greater than negative tweet rank.
5. b) If number of positive tweet rank is less than negative tweet rank then tweet is negative.
6. Output tweets with its label (positive and social spam).

3.2 LSHMinGHash

Input:-The tweet, positive and negative dataset
Output:-The number of positive and negative words in the tweet (rank)

1. Create bands/buckets for positive and negative dataset using random functions (Algorithm 1[4])

2. Compare each word in the tweet with each shingles in positive bands and negative bands.
2a) Initialize positive tweet rank variable and negative tweet rank variable to zero.
2b) Increase the positive tweet rank variable for the tweet word if that word is in the shingles of the positive bucket/band

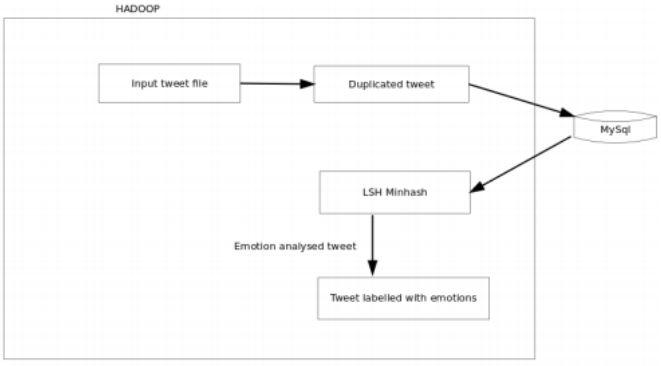
2c) else increase the negative tweet rank variable for the tweet word if that word is in the shingles of the negative bucket/band
2d)If positive tweet rank ¿negative tweet rank variable then declare word as positive else negative
3. Output the number of positive and negative tweet rank in the tweet

3.3 Map Reduce programming

Hadoop map reduce software frame work for writing applications easily by processing vast amounts of data in a realistic, fault tolerant manner. A map reduces splits input data into independent chunks which are processed in completely parallel manner by the map task. Both inputs and outputs of the job are stored in the file system. Here, the frame work sorts output of the maps which are then inputs to reduce tasks. Input to mapper is a text file that contains the tweets. From the input text file duplicate tweets are generated. The duplicated tweet is given to Minhash algorithm for finding the emotions of the duplicated tweet. Then the duplicated tweet with corresponding label is displayed as output [7] [8].

4. System Architecture

Input to Hadoop is a file that contains tweets. Duplicated tweets are found using LSH. Then Emotions of the duplicated tweets are analyzed using minhash algorithm. The system makes use of mysql database, which contains a total of 8000 tweets in which 5000 tweets are positive and 3000 tweets are negative. The duplicated tweets are stored in master set, 5000 positive tweets set as positive dataset and 3000 negative tweets are taken as negative dataset. During the time of minhashing, master set data is compared with positive and negative datasets and finding the similarity. If it finds that the data is more similar to positive dataset then the tweet will be declared as positive otherwise it will be taken as social spam.



. **Figure 1:** System Architecture

5. Performance Analysis

The performance of the system is evaluated by Jfree chart, which is an open source library, java based, used to create a wide range of data charts. All Types of 2D and 3D charts (like pie charts, bar charts, line charts, XY charts), can be easily created using Jfree chart.

PRECISION is the ratio of the number of relevant records retrieved to the total number of irrelevant and relevant records retrieved. It is usually expressed as a percentage.

RECALL is the ratio of the number of relevant records retrieved to the total number of relevant records in the database. It is usually expressed as a percentage.

5.1 Precision and recall of duplicated and analyzed tweet

Input file contain 100 tweets among that 30 tweets are duplicated. The retrieved duplicated tweet by algorithm is 29, in these retrieved tweets relevant tweets are 27. Thus precision and recall for duplicated tweet is as follows.

$$\text{precision} = [27 \div 29] \times 100 \quad (5.1)$$
$$\text{recall} = [27 \div 30] \times 100 \quad (5.2)$$

Table 1: Precision and recall of duplicated tweet

P	93	75	62	40
R	90	71	56	33

Table 2: Precision and recall of sentiment analyzed tweet

P	88	72	61	56
R	50	30	25	10

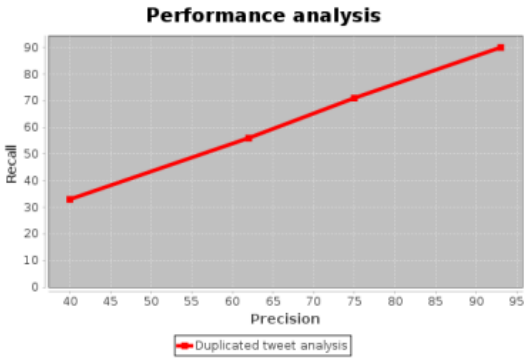


Figure 2: Performance of duplicated tweets

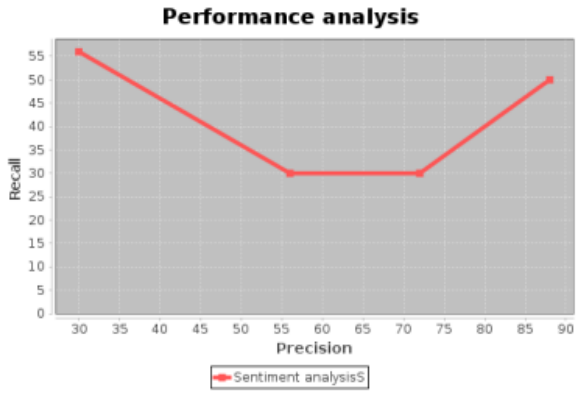


Figure 3: Performance of analysed tweets

6. Conclusions

A duplicate detection based method is proposed for identifying potential social spammers in micro blogs. LSH is used for finding duplicate tweets and analyzing it's emotions. Proposed method is used to effectively find users with different behaviors and social networking characteristics so that in future the site providers can block abnormal users. Our future work includes the in-depth study of users with many duplicated tweets, and new methods for identifying spamming tweets.

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