Emotion Analysis of COVID-19 dataset using CNN

Nagashree N . Kaushik K

School of Computer Science and Engineering
Reva University, Bengaluru, Karnataka

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Abstract – COVID-19 pandemic is creating a lot of issues in social media available to the comments by humans in the websites. The proposed work helps to have a survey over relation between the comments and suggests to government. Web crawler technology is used to extract emotion data from the public which is helpful in sentiment analysis. Using the technique of Natural Language processing, we have classified the words using tokenization and lemmatization algorithms. Further level analysis is done by different uses cases comparison of about 30 people. The result of word classification is given with performance parameters.

Index Terms – COVID-19, Sentiment analysis, emotion analysis, CNN

I. INTRODUCTION

The pandemic started in 2019 and it spread all over immediately. Still according to some analysis, the pandemic is slowly increasing in number and many native cases were are reported [1]. Many NLP techniques dates back from the year 1950 existed and recent techniques have been added with machine learning and deep learning technologies [2].

NLP, beginning in the 1950s, NLP has resulted into lot of revolutions and machine learning is added recently [3]. According to researchers many classification of emotions and sentiment analysis is carried out recently [4]. Many web crawlers help to classify the sentiment based on textual data representation [5]. In [6], a vide regression analysis is carried out to classify textual representations to compare the human text recognition and analysis. Many recent works have been aimed to compare public relation with sentiment science and a detailed survey is carried out [7]. Materials and Methods

II. PROPOSED SYSTEM

A. Data

The data collection is very much essential for any work and carried over a cumulative database obtained from sentiment classification and taken from the website: https://news.sina.cn/zt_d/yiqing0121 and the textual and speech data from human voice are obtained from SINA microblog.

B. Natural Language Processing (NLP) crawler

The crawler is an essential software used in the proposed work to collect automatic

web pages generated while browsing the website. that extracts web pages automatically. Through the process of segmentation, speeches or phonemes were extracted from WeChat, blogs etc. For sentiment analysis in the proposed work, an emotion database is constructed. We separate the sentences from the corpus which is called the emotion dictionary [8]. Then emotional words, negative words, and degree adverbs in the document can be found. The weight of emotional and degree adverts is obtained by calculating perplexity algorithm [9]. EMOT represents the weight of emotional words, and ADVB represents the weight of degree adverbs. Six basic emotions, happiness, surprise, fear, sadness, anger, disgust are taken into consideration. Emotion factor analysis from the table is classified based on negative and positive values as in Table 1.

TABLE I. THE EXPLANATION OF A

Negative words' number	The value of A
Even	1
Odd	-1

Thus, different basic emotions are represented. The basic emotions are happy, sad, disgust, fear, surprise, anger. In this way, the score of the 8 types of emotions can be calculated. The process of emotion analysis can be illustrated in Fig. 1.

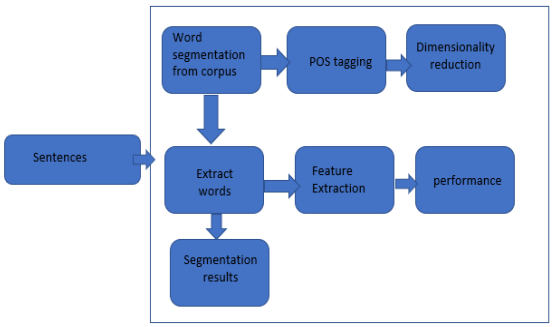

Fig 1: Emotion analysis

III. RESULTS AND DISCUSSIONS

When the sentences are extracted and tagging of parts of speech is done over a given sentence, positive, negative words are resulted which helps in detecting the emotion of various sentences. According to results, there are changes in negative and positive emotions which is resulted in the way as shown in fig 2.

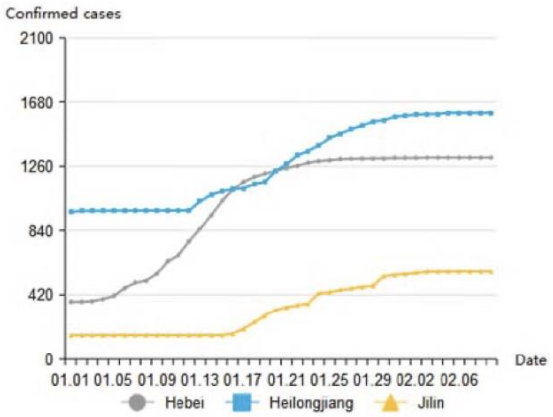

Figure 2. The cumulative number of confirmed cases

The CNN classification method of deep learning is applied to classify the textual data and results of CNN classifier is shown in Fig 3. The logistic curves are obtained to analyse the parts of speech in emotion recognition which is given by the equation below.

$$\begin{cases} \dfrac{dx}{dt} = rx\left(1 - \dfrac{x}{x_m}\right), \\ x(0) = x_0. \end{cases}$$

In this equation, x is the population of an area, t is time, r is the growth rate, xm is the carrying capacity of this area and x0 is the initial population.

The result of sentence segmentations from CNN algorithm is anlysed through NLP toolkit and BERT tool is also used. The result of segmentation is shown in Fig 3.

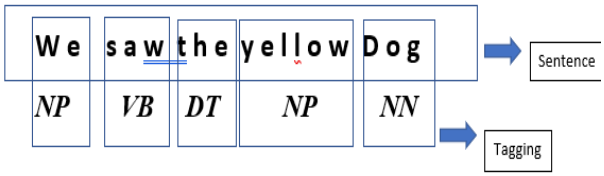

Fig 3: Sentence classification

IV. CONCLUSION

The proposed work has analysed emotions and sentiments from the sentences obtained out of human conversations in the website. An efficient web crawler are used to achieve those and the CNN method of sentence classification has given fairly good results.

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