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Emotion Analysis from Text: A Survey

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ABSTRACT

Detecting emotion from text is a new approach in the area of textual analysis. Emotion analysis of the text is a modified or a extended version of sentiment analysis. Sentiment analysis and emotion analysis are both related to each other in some or the other way, but they only differ in the psychological classification of the analysis. It can also be said that from sentiment analysis a fine grained method is made to categorize emotions from text. There are various work on emotion detection and many more are yet to be done. This paper survey is based on lexical and machine learning approaches and a comparative study is made on the basis of the literature survey.

Keywords: Sentiment analysis; emotion analysis; lexical; machine learning

I. INTRODUCTION

Emotions are a significant aspect is the communication and interaction between a group of people. Emotions make the work more precise and in result, it makes the blogs and text messages more specific and expressive on the other hand analyzing of a text document and finding emotion from the text is a challenging task. There are different ways through which emotions can be expressed in the form of text, facial expression, person's speech, etc.. Text are analyzed which are written in blogs, messages, emails, social media comments.

Initially, content extraction was made to detect the sentiment of the text and afterwards by making it more specific a step took forward in analysis. While we know that sentiment analysis can be classified into positive, negative and neutral groups, but sometimes due to less precise knowledge completely it is not justified whether it is positive group or a negative group.

There is not any type of standard format of emotion classification as different researchers gave different view on emotions. This paper will follow the research of W.Gerrod.Parrot where in his book "Emotions in social Psychology" he explained the hierarchy of emotion which are classified into six primary classes such as love, joy, anger, sadness, fear, surprise. As different research has been followed up in the face emotion detection and speechdetection but emotion detection from text needs more improvement and emphasis of researchers.

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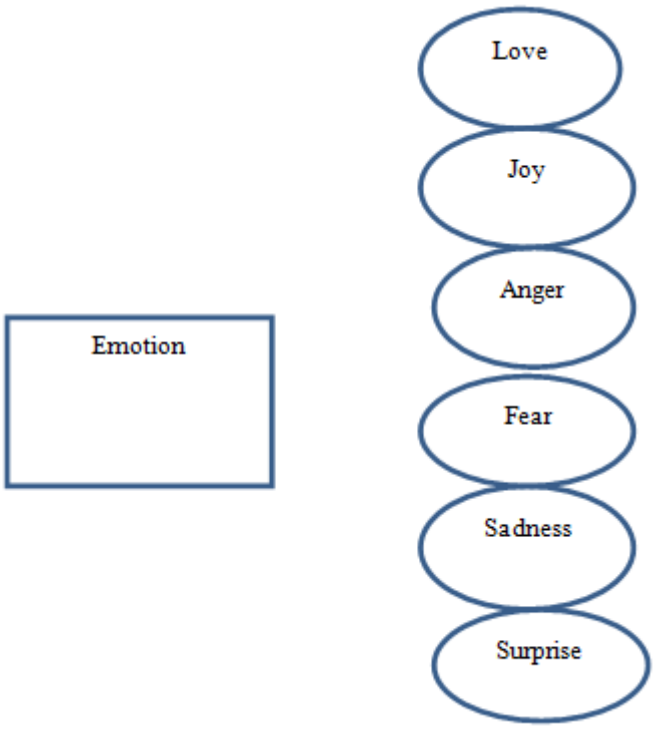

Fig:1 Emotion classification

The approaches which were initially used to detect the sentiment of the text by checking the polarity of the sentences and then categorizing it into positive or negative. Emotion analysis of the text can give a better knowledge about the content but as it is a brief process so analyzing an emotion from a text is a difficult challenge for humans as well as machines as humans are not very sure about their changing emotions whereas machines needs an accurate decision for emotion modeling.

Emotion recognition has different application where it is used such as Stock market analysis, Brand tweets analysis, Emails correction by analyzing any inappropriate words or harsh words, suicide prevention by which a person's written text can go through an e-learning environment whereemotions related to that text can be depicted and some helpline can be directly connected to that IP.

This paper describes various approaches used in emotion analysis and a comparative survey of the existing work has been made.

- **EMOTION RECOGNITION APPROACHES**

There are different approaches used for text based emotion recognition that are keyword splitting, lexicon based approach which depend on lexical resources such as bags of words, lexicons ,learning approach ,hybrid approach.

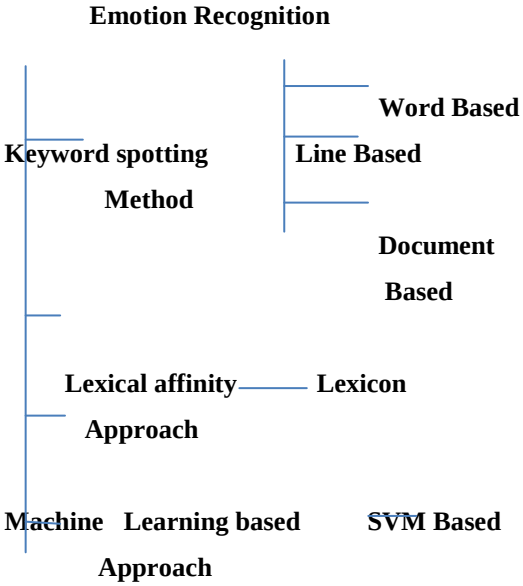

Fig:2 Text based emotion recognition technique

1.1Keyword spotting method

Keyword spotting method is one of the easiest and intuitive approaches which is used for detecting emotions from text. It is a method in which keyword matching problem that is finding occurrence of keywords from a give set of words. Earlier different algorithms were used to analyze emotions and sentiments were given but emotion detection is related to the predefined keywords. The keywords used are love, joy, anger, sadness, fear, surprise. This keyword occurrence can be found on the basis of some algorithm and an emotion class is assigned to that text document. Today was an amazing day||is a positive considered text, it will be assigned same classification for a sentence like –Today wasn't an amazing day|| therefore keyword spotting method is shown in fig:3

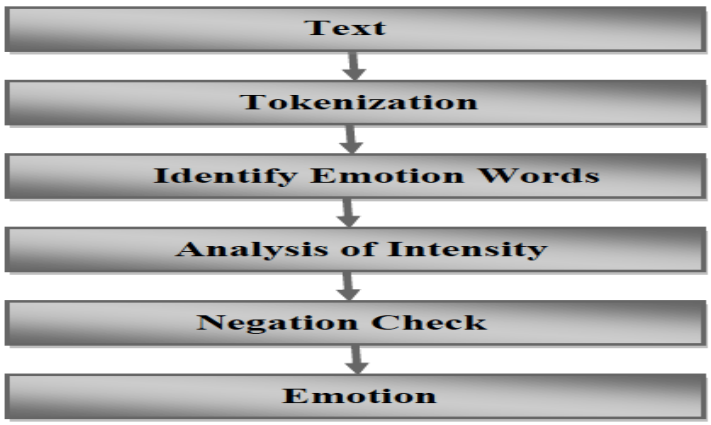

Fig:3 Keyword spotting method[1]

In this technique text document are considered as input and input is generated on the basis input text into its emotion classes. It is a five step procedure. Initially text document is changed initially text document is changed into token form then from these tokens emotion keywords are searched afterwards the intensity of the emotion keywords are analyzed. Negation presence is checked whether it is there or not and at last emotion classes are given as output[1].

1.2 Lexical Affinity Method

Lexical affinity method is an extended version of keyword spotting method .In this method emotion detection on related keywords are used .probabilistic affinity is assigned to a particular emotion to an arbitrary words rather than picking up predefined emotional keywords but this method has some disadvantage as depending on corpus specific text it does not recognize he emotion at word level. For e.g.

"I met my Childhood friend by accident" Here the word accident is inclined with high probability towards negative emotion but here it is not showing negative emotion.

1.3 Machine Learning Based Approach

Various limitations related to theshortcomings of lexicon approach and problem with incomplete Situationgave a new approach to overcome these limitations which is machine learning approach. There are basically two methods in machine learning which is supervised and unsupervised machine learning which has different classifiers, for best result in emotion recognition supervised learning based classifiers are used by training data set. There are various classification algorithms related to supervised learning which are naivebayes, support vector machine (SVM) , decision tree but among these SVM is highly rated and more accurate approach than other approaches given.

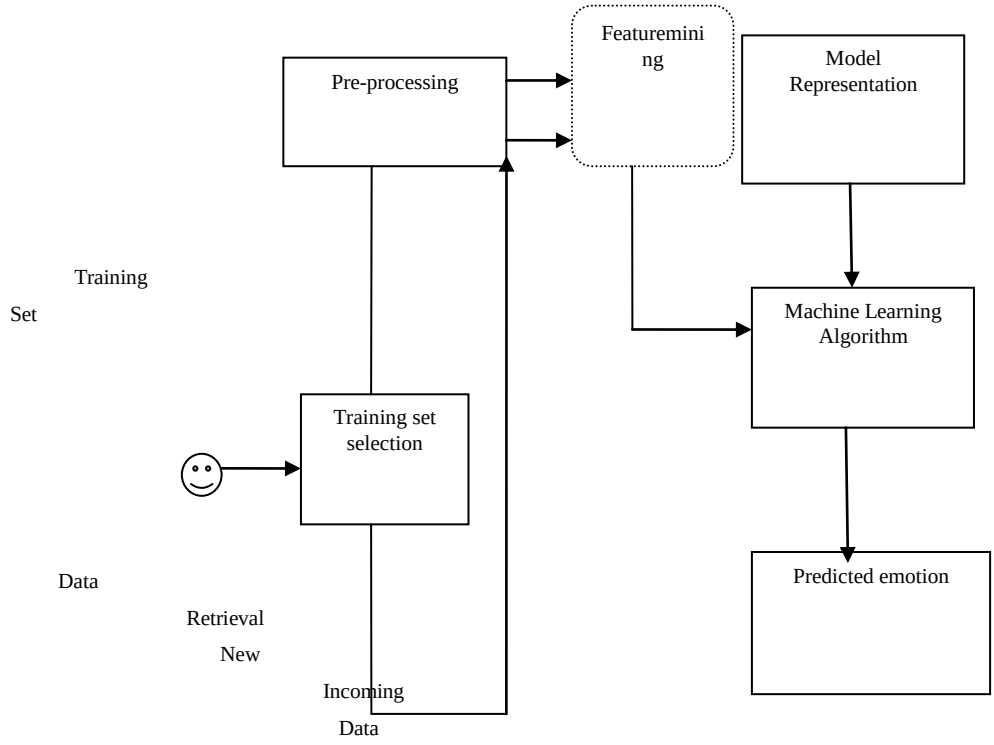

Fig:4 Machine learning approach[2]

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1.4 Hybrid Approach

A hybrid based approach is a combination of Machine learning approach and lexical based approach. By adding machine learning concept has overcome some of the limitation of the lexical approach and thus this approach gives a higher accuracy result by adding some linguistic information from dictionary and training them.

MACHINE LEARNING PROCESS

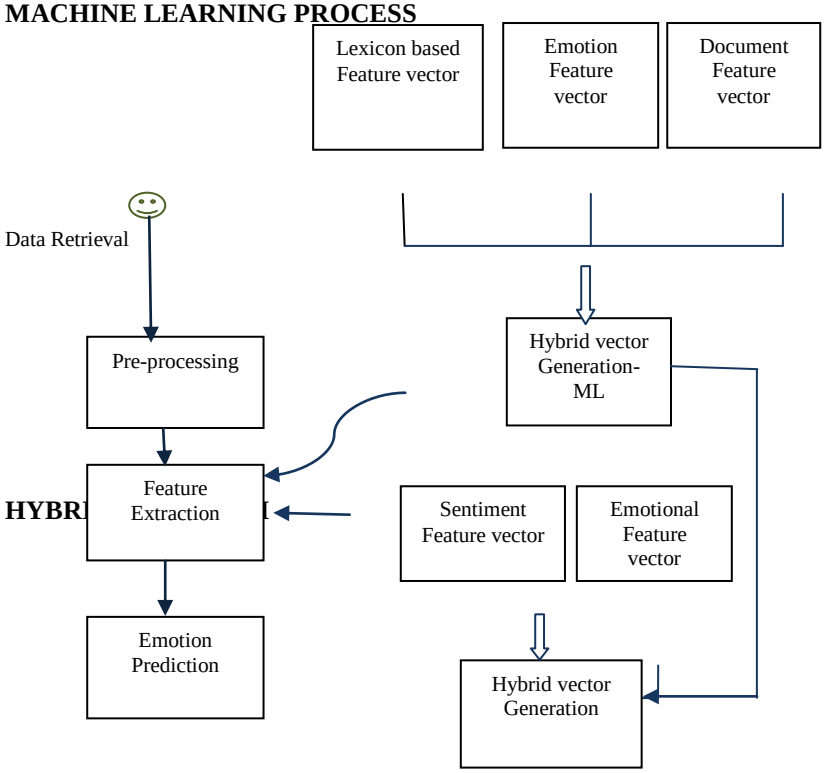

Fig:5 Hybrid Approach[2]

II. LITERATURE SURVEY

Obdal et al.[3] approach was a learning based approach which is used for detection of emotion from chinese language. This novel approach was supported by an algorithm which was segment based fine grained .A hidden variable represent the emotion label dependency of each short textof asub tree. Calculation of the value of hidden variable is with respect to the relation between variables having nodes with head modifier relation in dependency tree.

Staraparrava et al.[4] system was developed which is used for various distinctions of latent semantic analysis to recognize emotion in text when there is no such presence of emotional words, But this method attain a low precision because this approach is not context sensitive and its drawback is that it lacks semantic analysis of sentence.

Hancock et al.[5]used linguistic enquiry content analysis and word count (LIWC) for the sorting of sentences in positive and negative emotions. They analyze in this approach that positive emotions in text are expressed with

more words and exclamation marks, whereas negative words are expressed by using and adding affective words. Thus this approach is restricted to positive and negative emotions.

Kaur et al.[6]survey was based on opinion mining and sentiment analysis other than english language there are also some algorithms and approaches that can be successfully applied on sentiment analysis and emotion analysis for the detection of public opinion on a particular topic. A country like India has a wide variety of languages spoken as well as written by people, Thus this paper includes in its work that senti word net has successfully fulfilled for languages like Hindi, Bengali, Gujrati, Telgu and so on a sum of total 57 languages for the sentiment detection.

Ho et al. [7] has given the indication that human emotions are linked to their mental states and it depends on some emotional events therefore human mind changes its state at every next event. It is not certain at a time thus this idea was implemented with the help of hidden markova model(HMM) where every sentence comprise of various sub ideas here each and every concept of brain is taken as an event that makes transition to specific state. The most accurate emotion of the text is determined after thearrangement of events in the sentence. By testing ISeAR dataset F score was achieved as 35% where the best one is 57%.The low accuracy is due to the fact that the system ignored semanticandsynaptic analysis of sentence which made it non context sensitive.

Sykora et al.[8] also use an ontology approach to solve the problem of fine-grained emotion detection in text. Their approach detects a range of eight high-level emotions; anger, confusion, disgust,fear,happiness,sadness,shame and surprise.

Wang et al.[9]has given a method that uses an improved LSA algorithm for text emotion classification on ISEAR (International Survey on Emotion Antecedents and Reactions) dataset. The training set according to text sentiment classification random extraction.

Gill et al.[10] approach can give us access to higher-level semantic information that can be used to help classify a set of emotional concepts further, such data-driven techniques are more likely to be generalizable across different areas and inform applications. Thus is paper we examine the applicability of this approach to detecting emotion in text.

III. COMPARITIVE ANALYSIS

This section provides a comparative study of the survey in subsection *A*. Then after analyzing this comparison is shown in which is in table no.1 there are some pros and cons related to all the survey paper discussed above.In [1] a machine learning approach was used for the detection of emotion from the chinese language with the help of segment based algorithm.[2] approach has low accuracy as the approach is not context sensitive.[3] used LIWC for classification of sentences, this approach is limited to positive and negative classification.[4]Senti word net approach is used in this work and is verified with the help of different languages.[5] approach has low accuracy due to the fact that the system ignored synaptic and semantic analysis of sentence which made it non context sensitive.[6] uses ontology approach for detection of emotion.[7] propose a method that uses an improved LSA algorithm for text emotion classification on ISEAR as this approach is lexicon based the accuracy is low.[8] approach can give access to higher-level semantic information

Papers	Categories	Approaches
Obdal et al.	Anger,Guilt,Disgust Fear,Joy,Sadness	Machine learning-based
Staraparrava et al.	Anger,,DisgustFear ,Joy,Sadness,Surprise	Machine learning-based
Hancock et al.	Anger,,DisgustFear, Joy,Sadness	Machine learning-based
Kaur et al.	Anger, Guilt,Disgust Fear,Joy,Sadness	Machine learning-based
Ho et al.	Anger, Guilt,Disgust Fear,Joy,Sadness	Machine learning-based
Sykora et al.	Anger,Confusion, Disgust,Fear ,Happiness,Shame, Sadness,Surprise	Lexical-based
Wang et al.	Anger, Guilt,Disgust Fear,Joy,Sadness	Lexical-based
Gill et al.	Anger,Anticipation, AcceptanceFear,Joy, Sadness,Surprise	Lexical-based

IV. CONCLUSION

In this paper, a survey is based in the field of emotion recognition from text. There are various approaches given by different researchers which are discussed in this work and from the survey it is analyzed that machine learning approach is better and it gives a enhanced result than lexical approach as there are some drawbacks like ambiguity in keyword, determining the content of emotion lexicon is subjective therefore it is not very accurate for large range of domains

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