

# Emotion Detection from the Text: A Study

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**Abstract:** With the widespread use of computer systems and their interactions with the humans, Natural Language Processing has gained massive attention in the area of Artificial Intelligence. During the recognition of text, capturing the context and detection of emotions are vital elements for effective communication between different cultural languages. The simulation of human behavior compels the computer systems to incorporate the aspect of emotion detection and sentiments analysis. Humans express the emotions and sentimental behavior through text, facial expressions and speech. This paper shed lights on the various methods of detecting human emotions from the text. This is a challenging task as emotions of humans expressed in textual form include an element of ambiguity. This paper emphasizes on various methods of emotion and sentiment detection. The loopholes of various methods have also been presented with intent to improve the current methods and generating opportunity for a new method which efficiently detects emotions for rich simulation of human behavior.

**Keywords:** - Emotion Detection, Sentiments Analysis, Context Identification from Text, Behavior simulation.

## I. INTRODUCTION

Emotions are significant component in the interaction and communication between people of different cultural languages. The exchange of emotions through plain text, messages and tweet posts are the informal style of writing challenge for researches. Extraction of emotions from text can applied for deciding the human behavior [4]. Emotions are expressed by speech, facial expressions and written text. Emotions may be expressed by single word or combination of words. Phrase and Sentence level emotion detection methods play an important role to track emotions or to quest the indications for recognizing such emotions. As a document consists of Sentences which intern consists of combination of words, so for exact simulation of behavior, the detection of emotions from word level, phrase level and document level plays a vital role.

Generally, the emotions are divided into six types which are joy, surprise, love, anger, sadness and fear [3]. Sufficient amount of work has been done related to speech and facial emotion detection but text based emotion recognition system still requires efforts from computational researchers.

The vast growing interest in the emotion recognition from text plugs the motivation for this work [2]. The fast flowing internet services has facilitated increased online communication and written content over the websites and broadens the horizons to detect the emotions from that text data. This has led to flow of large amounts of online content rich in user opinions, emotions, and sentiments which require computational methods to efficiently analyze this online content, recognize, and picture out useful conclusions and detection of emotions. The existing methods judge the polarity of sentiment which maybe

positive or negative. The detection of emotions helps the reader to correctly judge the context of plain text and gives the better insight what the author wants to convey.

## II. APPLICATION AREAS OF EMOTION DETECTION FROM TEXT

Emotion Detection and its precise recognition have vast areas of appliances:

### A. *Sentiment Analysis*

Sentiment Analysis emphasizes on information retrieval and knowledge discovery from text. The aim of sentiment analysis is to empower the computer system to detect and generate emotions. Sentiment analysis traces the opinions of people. Business organizations are interested in capturing opinion about products, services, issues and events for finding their preferring choices. This facilitates various business organizations in their decision making process.

### B. *Computer Assisted Creativity*

The automated generation of evaluative expressions with a prejudice and inclination on certain polarity orientation is a crucial element in automatic personalized advertisement and persuasive communication.

### C. *Text to Speech Generation*

The objective of text to speech generation is to classify the emotional metaphor of sentences in the text, for detecting exact expressive representation of text to speech synthesis. Text documents are collection of sentences with emotional content embedded in it. In order to generate speech from text, detection of emotion is crucial component for representing the exact meaning and context embedded in the text.

### D. *Improves Human Computer Interaction*

The emotion recognition system has applications in different kinds of the Human computer interaction systems, such as dialogue systems, automatic answering systems and human robots etc. which will simulate a rich human behavior.

## III. METHODS OF EMOTION DETECTION FROM TEXT

There are four different text based emotion recognition techniques namely Keyword spotting method, Lexical Affinity Method, learning based method and hybrid methods [6].

### A. *Keyword Spotting Method*

This method is very easy to implement and intuitive since it involves identifying words from the text [5]. The keyword pattern matching problem can be described as the problem of finding occurrences of keywords from a given data set as substrings in a given string. These words are classified into categories such as disgust, sadness, happy, anger, fear, surprise etc. The sentences are tokenized and the individual words are matched with the various categories of emotions by taking into account the intensity and negation of words. The class of emotion is recognized and the behavior is judged.

### B. *Lexical Affinity Method*

This method is an extension of keyword spotting method. This assigns a probabilistic affinity for a particular emotion to arbitrary words rather than detecting predefined emotional keywords from text. The probabilities which are assigned by this method are part of linguistic corpora. This has some limitations as the assigned probabilities are prejudiced toward corpus specific metaphor of texts and does not recognize the emotions from the text that not resides at the word-level on which this method operates.

Consider the sentence, "Your smile kills me". In the above sentence the word "kill" indicates the high probability which having a negative emotion. But exact situation in this sentence does not represent the negative assessment from "kill" word.

### C. *Learning Based Approach*

Learning-based methods attempts to detect emotions based on a previous trained results and classifiers, which are mapped with various machine learning classifiers such as support vector machines, specific statistic learning methods and decision trees, to detect which emotion class does the text belongs. This method has the hurdle of classifying sentences into only two categories which are positive and negative due to insufficient feature gathering.

### D. *Hybrid Based Approach*

This approach is based on a combination of the keyword based method and learning based method which offers the advantage of accurate results and also manages the problem of high cost in information retrieval tasks. Although quite effective this lacks hidden emotional patterns and in depth analysis of context and semantic component.

#### IV. LIMITATIONS OF VARIOUS METHODS OF EMOTION DETECTION

Just like the coin has two sides there are few limitations in the above methods which are explained as follows [9]:

##### A. Ambiguity in Keyword Labels

A single word may convey different meaning when used in different situations. Ambiguity of words can lead to wrong identification of emotion. Using emotion keywords is a straightforward manner to detect associated emotions, the meanings of keywords could be multiple and vague, as most words change their meanings according to different usages and contexts.

##### B. Incapability of Recognizing Text without Emotional Keywords

The keyword based approach is dependent on the set of emotion keywords. Sentences without any emotional keyword would indicate that they do not contain any emotions at all, which is absolutely wrong.

For example, "I got the job" and "Hooray! I got the job" Should denote the same emotion (happy and joy), but the sentence which is without "hooray" could remain undetected if "hooray" is the only keyword to detect the joy and happiness. .

##### C. Lack of Linguistic Information

Syntax structures and semantics also have huge influences on expressed emotions.

For example, "I tease him" and "He teases me" Would signify different emotions from each one's perspective.

##### D. Difficulties in Determining Emotion Indicators [10]

There is a problem of identification of emotion indicators. Learning-based methods can

automatically determine the probabilities between features and emotions but the methods still need keywords and labels which can extract the features from the text.

#### V. CONCLUSION

In this paper, the survey on existing emotion detection methods has been done and pictured out that existing system makes use of plain text only. This paper describes the different text based emotion recognition methods and their limitations. This shed lights on the various areas of improvement in the detection and generation of emotions which can help to simulate human behavior in computer systems. This will help various applications of decision making, data mining, choice making and information retrieval systems.

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