Emotion Detection And Analysing Emotion Using Text

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Abstract- *Emotion can be expressed in many ways that can be seen such as facial expression and gestures, speech and by written text. Emotion Detection in text documents is essentially a content – based classification problem involving concepts from the domains of Natural Language Processing as well as Machine Learning. In this paper emotion recognition based on textual data and the techniques used in emotion detection are discussed.*

I. INTRODUCTION

Detecting emotional state of a person by analyzing a text document written by him/her appear challenging but also essential many times due to the fact that most of the times textual expressions are not only direct using emotion words but also result from the interpretation of the meaning of concepts and interaction of concepts which are described in the text document. Recognizing the emotion of the text plays a key role in the human-computer interaction [1]. Emotions may be expressed by a person‟s speech, face expression and written text known as speech, facial and text based emotion respectively. Sufficient amount of work has been done regarding to speech and facial emotion recognition but text based emotion recognition system still needs attraction of researchers [14]. In computational linguistics, the detection of human emotions in text is becoming increasingly important from an applicative point of view. Emotion is expressed as joy, sadness, anger, surprise, hate, fear and so on. Since there is not any standard emotion word hierarchy, focus is on the related research about emotion in cognitive psychology domain. In 2001, W. Gerrod Parrot[2], wrote a book named "Emotions In Social Psychology", in which he explained the emotion system and formally classified the human emotions through an emotion hierarchy in six classes at primary level which are Love, Joy, Anger, Sadness, Fear and Surprise. Certain other words also fall in secondary and tertiary levels. Directions to improve the capabilities of current methods of text-based emotion detection are proposed in this paper.

II. RELATEDWORK

The concept of affective computing in 1997 by Since Picard [3] proposed that the role of emotions in human computer interaction. This domain attracted many researchers from computer science, biotechnology, psychology, and cognitive science and so on. Following the trend, the research in the field of emotion detection from textual data emerged to determine human emotions from another point of view. Problem of emotion recognition from text can be formulated as follows: Let E be the set of all emotions, A be the set of all authors, and let T be the set of all possible representations of emotion-expressing texts. Let r be a function to reflect emotion e of author a from text t, i.e., r: A x T □E, then the function r would be the answer to the problem [4]. The main problem of emotion recognition systems lies in fact that, although the definitions of E and T may be straightforward, the definitions of individual element, even subsets in both sets of E and T would be rather confusing. On one side, for the set T, new elements may add in as the languages are constantly emerging. Whereas on the other side, currently there are no standard classifications of "all human emotions" due to the complex nature of human minds, and any emotion classifications can only be seen as "labels" annotated afterwards for different purposes. Methods used for text based emotion recognition system [4], [5] are:

2.1. Keyword Spotting Technique

The keyword pattern matching problem can be described as the problem of finding occurrences of keywords from a given set as substrings in a given string [4]. This problem has been studied in the past and algorithms have been suggested for solving it. In the context of emotion detection this method is based on certain predefined keywords. These words are classified into categories such as disgusted, sad, happy, angry, fearful, surprised etc. Process of Keyword spotting method is shown in the figure 1.

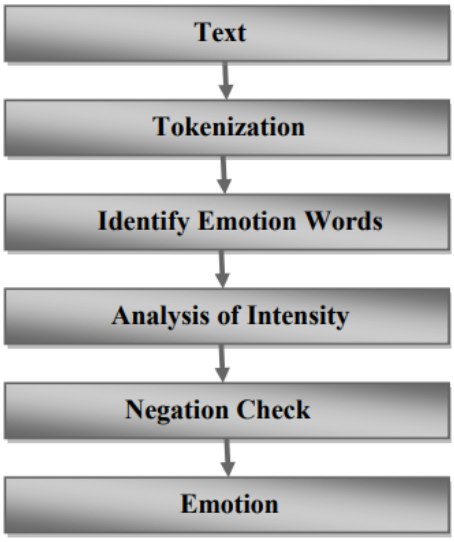

Figure-1

Keyword spotting technique for emotion recognition consists of five steps shown in fig.1 where a text document is taken as input and output is generated as an emotion class. At the very first step text data is converted into tokens, from these tokens emotion words are identified and detected. Initially this technique will take some text as input and in next step we perform tokenization to the input text. Words related to emotions will be identified in the next step afterwards analysis of the intensity of emotion words will be performed. Sentence is checked Tokenization Identify Emotion Words Analysis of Intensity Negation Check Emotion Text whether negation is involved in it or not then finally an emotion class will be found as the required output.

2.2. Lexical Affinity Method

Detecting emotions based on related keywords is an easy to use and straightforward method. Lexical Affinity approach is an extension of keyword spotting technique; it assigns a probabilistic „affinity" for a particular emotion to arbitrary words apart from picking up emotional keywords. These probabilities are often part of linguistic corpora, but have disadvantages; firstly the assigned probabilities are biased toward corpus-specific genre of texts, secondly it misses out emotional content that resides deeper than the word-level on which this technique operates. For example the word „accident", having been assigned a high probability of indicating a negative emotion, would not contribute correctly to the emotional assessment of phrases like „I avoided an accident" or „I met my girlfriend by accident".

2.3. Learning-based Methods

Learning-based methods are being used to formulate the problem differently. Originally the problem was to determine emotions from input texts but now the problem is to classify the input texts into different emotions. Unlike keyword-based detection methods, learning-based methods try to detect emotions based on a previously trained classifier, which apply various theories of machine learning such as support vector machines [8] and conditional random fields [9], to determine which emotion category should the input text belongs.

2.4. Hybrid Methods

Since keyword-based methods with thesaurus and naïve learning-based methods could not acquire satisfactory results, some systems use hybrid approach by combining both keyword spotting technique and learning based method, which help to improve accuracy. The most significant hybrid system so far is the work of Wu, Chuang and Lin [11], that utilizes a rulebased approach to extract semantics related to specific emotions and Chinese lexicon ontology to extract attributes. These semantics and attributes are associated with emotions in the form of emotion association rules. As a result, these emotion association rules, replacing original emotion keywords, serve as the training features of their learning module based on separable mixture models. This method outperforms previous approaches, but categories of emotions are still limited.

III. PROPOSED ARCHITECTURE

Methods described in section II are modified and integrated to extend their capabilities and to improve the performance for which a simple and easy to understand model is designed shown in fig.2.

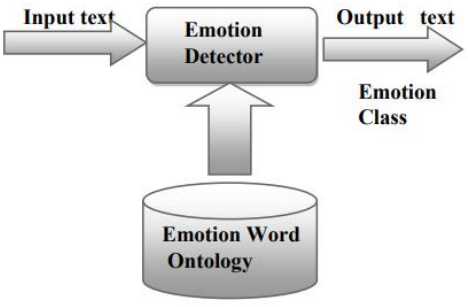

Figure-2

The Framework is divided into two main components: Emotion Ontology, Emotion Detector.

3.1. Emotion Ontology

Ontology is an explicit specification of conceptualization. Ontologies have definitional aspects like high level schemas and aspects like entities and attributes [16]; interrelationship is between entities, domain vocabulary. Ontologies provide an understanding of particular domain. Ontologies allow the domain to be communicated between persons, institutions, and application systems. Emotion word hierarchy is converted into ontology. This emotion word hierarchy is developed by W.G. parrot. Protégé [13], an ontology development tool is used to develop emotion ontology. Proposed ontology has class and subclass relationship format. Emotion classes at the primary level in emotion hierarchy are at the top of emotion ontology and emotion classes at the tertiary level are at the bottom of ontology. High weight age is assigned to the upper level emotion classes and low to the lower level emotion classes.

3.2. Emotion Detector Algorithm

Emotion of the textual data can be recognized with the help of this emotion detection algorithm. The algorithm calculates weight for particular emotion by adding weights assigned at each level of hierarchy and also calculates same for its counter emotion, then compares the both scores and greater one is taken as the detected emotion

1. GOALS and OBJECTIVES

Goals:

Detecting the emotions using text.
System is used for analyze the text to emotions.
System provide high security for input text.
Use secured database for privacy.

Objectives:

This is a Emotion detection that analyze from the text.
It is used to express the emoji from text to emotions.
To makes the chatting systems on social application more easier to share their emotions using text that converts into their emotion emoji's

Various drawbacks such as time consuming, consumes large volume of paper work, no direct role for the higher officials, damage of machines due to lack of attention, mass update doesn't allows users to update and edit many item simultaneously etc.

2. SYSTEMARCHITECTURE

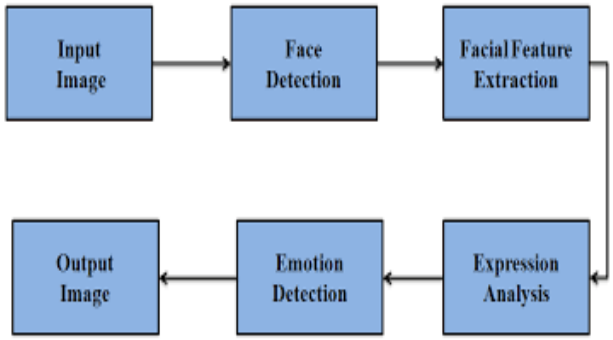

Fig -3: System Architecture

3. MATHEMATICALMODEL

• A set of objects o1, ..., on ∈ O and

• a set of maps A (also called arrows), where each map f ∈ A describes the structure-preserving relationship between two objects of O. In mathematical terms this means, that each f ∈ A has one unique object as domain (dom) and one object as codomain (cod), notation: f : o1 → o2, f ∈ A, o1, o2 ∈ O and

• a composition-operator ◦ exists, such that for f, g ∈ A, if cod(f) = dom(g), g ◦ f exists. In other words: If f : o1 → o2 and g : o2 → o3, then there exists g ◦ f : o1 → o3 The identity-axiom and the associativity of morphisms must be fulfilled:

• ∀f ∈ A: f ◦ iddom(f) = idcod(f) ◦ f = f (identity) • f, g, h ∈ A : f ◦ (g ◦h) = (f ◦ g) ◦h, if the composition is defined (associativity)

1. Calculate (x):

for m 1 to No. of Nodes [Ontology]
score (x) freq [root] / depth [root]
for m 1 to No. of parent nodes [Ontology]
score (parent) = score (parent) + score (child) return score (parent)
for m 1 to No. of parent nodes [ontology]
emotion class High score [parent]
return emotion class

Where Nodes [Ontology] denotes classes in the ontology, Parent [j] denotes parent classes in the ontology, Child [j] denotes child classes in the ontology, Freq [m] denotes frequency of occurrence of mth class in text, Depth denotes depth of class into ontology, Score [parent] denotes score of parent in ontology.

By proposed algorithm we can find out the score of primary emotion classes. Emotion class with highest score will be decided as the final emotion class for the blog.

IV. CONCLUSION

Emotion Detection can be seen as an important field of research in human-computer interaction. A sufficient amount of work has been done by researchers to detect emotion from facial and audio information whereas recognizing emotions from textual data is still a fresh and hot research area.

In this paper, methods which are currently being used to detect emotion from text are reviewed along with their limitations and new system architecture is proposed, which would perform efficiently.

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