REVIEW ON COMPARATIVE EMOTION RECOGNITION SYSTEM FROM TEXT USING CLASSIFIER TECHNIQUES

Er.Vibha Dutta
Research Scholar(MTech)
BCET, Gurdaspur

Dr. R. C Gangwar
H.O.D(Associate Professor)
BCET, Gurdaspur

Er. Mohit Marwaha
Assistant Professor
BCET, Gurdaspur

ABSTRACT

The emotion recognition system is a generic model based on text and real-world knowledge. Recognition of Emotion from Text has noticeable and big problem in the Text-Processing Systems. In this paper, we proposed a review on emotion recognition from text with different types of classifier like Fuzzy Logic, Artificial Neural Network, and Support Vector Machine classifier. Most important methodology such as fuzzy logic towards Emotion Recognition from text using neural network has been discussed in this paper. Emotions are indescribable things; however, there are lot of factors which can be used to recognized emotion from the text. In order to simplify the model by reducing the amount of data required to evaluate the propose model, we make use of fuzzy logic with neural network. Emotions and opinions have enormous impact on customers to make their choices regarding online -shopping, choosing-events, products and entities. These opinions also help the banks to propose plans and schemes for insurance zone. Application of the proposed work has high utility in detecting email spams by using the emotion recognition from the text data and artificial neural network enhanced the recognition efficiency of proposed module. By using the comparative study to recognize emotion from text we can achieve more accuracy as compare to previous work.

KEYWORDS – Accuracy, Artificial Neural Network, Emotion Recognition System, Fuzzy Logic Text Data, , Support Vector Machine, Rule Sets.

1. NTRODUCTION

To detect an emotional state of human being through text document is a challenging task [1]. However, this concept is essential number of times because most of the times, the expressions of texts not only direct by emotion words , even through the concept interpretation with the interaction meaning given in the text document.   Recognize the text emotion has a major role in

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

16 | P a g e

'human computer' interaction. The basic architecture [2] of emotion recognition is shown in figure 1   that is categorized into two parts namely, Emotion Word Ontology with Emotion Ontology. Ontology is a term that describes the concepts with the relationships for some entity or number of entities. Basically, an understanding of particular domain is described in this. Emotion hierarchy is a conversion of emotion word ontology. The algorithm for emotion detection is used for recognizing the textual data emotions.   The algorithm gives weights for every emotion through the addition of weights at every level of hierarchy that is shown in figure 2.

Emotions are expressed as happiness, joy, fear, anger, sadness, hate, surprise and so on. Still standard emotion word hierarchy is not created yet. In 2001, W. GerrodParrot [3], composed a new book "Emotions in Social Psychology", that clear the feeling framework and arranged the feelings of human via feeling chain of six classes which are Joy, Love, Anger, Surprise, Fear and Sadness. Some additional words also added in this hierarchy. Numbers of scientists have concentrated in this area . An attempt to get sentiment data for examining and to shorten the opinions communicated directly via PCs. Sentiment analysis (SA) [4] is also known as sentiment mining of huge information. SA is the computational investigation of Opinions [5], conclusions, subjectivity toward an element. The element represents the people, occasions or points.
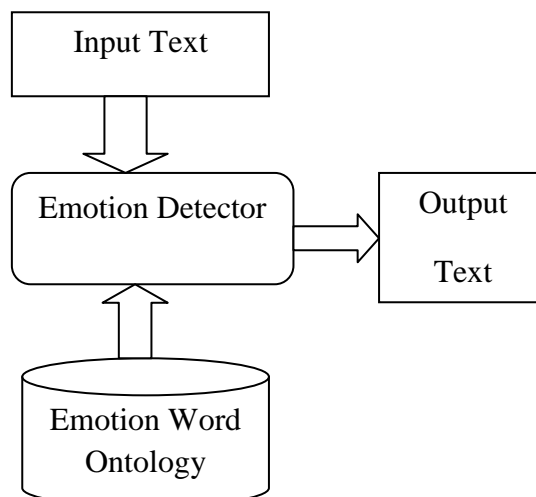

Figure 1: Emotion Recognition Architecture

Emotional analysis is a text classification problem [6] which deals with extracting information present within the text. This extracted information can be then further classified according to its polarity as positive, negative or neutral. It can be defined as a computational task of extracting sentiments from the opinion.

Emotional analysis is a natural language processing and information extraction task. This technique aims to extract writer's feelings expressed in comments or reviews. Emotional analysis does not only deal with extracting polarity but also deals with extracting features from the text [7].
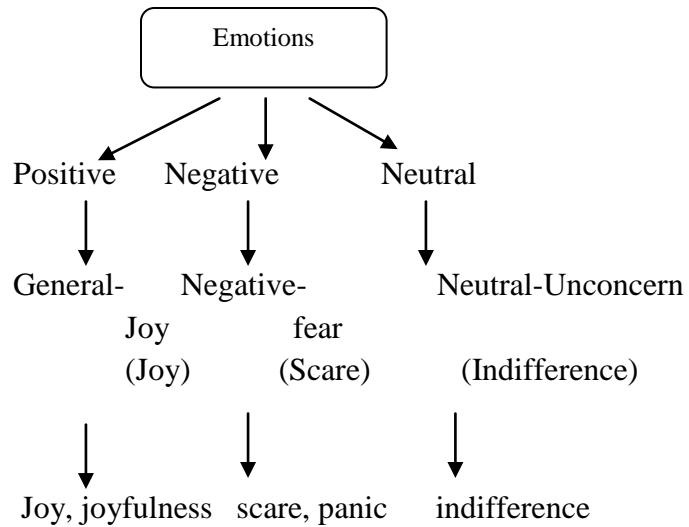
A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

17 | P a g e

Figure 2: Emotional Hierarchy

Some opinions represent sentiments and some opinions do not represent any sentiment.

i. Sentiments: Opinions or in other sense can be recognized as someone's linguistic expressions of emotions, beliefs, evaluations etc.

ii. Analysis: To capture the opinions from a pool of users whether the opinion is positive, negative or neutral.

iii. Benefit: Provide efficient information in decision making

Some of the definitions given by different authors with respect to emotion detection are:

i. Opinion mining of big data as a computational task: Given a set of evaluative text documents D that contains opinions or sentiments about an object (person, organization, product etc.), opinion mining of big data aims to extract attributes and components of the object that have been commented on each document d in the set D and to determine whether the comments are positive, negative or neutral [8].

ii. Another definition of the opinion proposed by the author Bing Liu who defined "feature based Emotional analysis". According to the author: an opinion on a feature f is a positive or negative view, attitude, emotion or appraisal on f from an opinion holder.

2. A GLANCE OF EXISTING TECHNIQUES

A lot of work exists in emotion recognition field. The work includes: to find the sentiment orientation, to determine fine-grained distinctions, to differentiate the texts from subjective portions and so on.

P. Ekman [9] has explained the emotions as mental states that are accompanied with the physiological changes. The author has identified six emotions that are: Happiness, anger,

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

18 | P a g e

surprise, sadness, fear and disgust. Mohamed Yassine[10] et al have proposed emotional interactions from social networks by using the characteristics for differentiating the friends from the acquaintances. Main objective was the emotional content extraction of texts from the social networks. Text mining techniques are used for retrieving the comments from the social networks. David Garcia [11] et al have proposed a model for the analysis of statistical analysis for the review of the product. The research has only extracted the emotional matrices like unhelpfulness, helpfulness as well as rating. The main objective of this work is the customer satisfaction by giving the guidelines for manufacturing. Esuli Baccianella [12] Stefano et al have focused on the study of challenges proposed by the sentiment analysis with the aim of enabling new applications for the procedure of subjective language. Turney Mohammad [13] et al have explained the lexico-based methods for computing sentiment score by mean of texts. The estimation of the customer's sentiment orientation by using sentiment orientation score for constituent adjective is proposed and the orientation is calculated by the frequency on Web by number of positive as well as negative adjectives. Isa Maks [14] et al has defined lexicon model. The model has described the detail of relations which are existed among the participants of verbs with their attitudes. A framework that provides a definition of Dutch verbs that should develop the sentiment analysis with the applications of the opinion mining on the basis of deep syntactic semantic technique. The validation is given by the annotation research that clarifies that the subtle subjectively relations came out to be more reliable.

3. STATISTICAL AND MACHINE CLASSIFIER TECHNIQUES FOR EMOTION DETECTION

Number of statistical and machine classifier techniques for affective computing has been developed like SVM (Support Vector machine), NN (Neural Network), and Fuzzy logic and so on.

3.1 Fuzzy Logic

Fuzzy logic is the difficult mathematical model for understanding and gives the uncertainty in reasoning [15]. In the fuzzy logic, the knowledge of experts is used by F-THEN rules. A fuzzy logic is a sub- set with the membership functions as subsets. Fuzzy logic mainly depends on the three features, namely, fuzzy values, linguistic variables and probability distribution [16]. The mathematical methods for fuzzy reasoning are simple and precise. Fuzzy reasoning builds the common understanding for process rather appending it to the end [17]. Fuzzy is a natural language logic model. The fuzzy logic is easy like human communication. The main features of fuzzy logic are as follows:

- It contains matter of degree.
- Fuzzy logic is flexible
- Any system can be fuzzified
- Information is decomposed into collection of variables.

There are five attributes associated with fuzzy expert systems:

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

19 | P a g e

i.   Variables for Input
ii.   Variables of Output
iii.   Subset of input and the output. Also the membership functions that correspond to the different subsets leading to fuzzy set
iv.   Rules that connect the input and output fuzzy subset
v.   Procedure for the defuzzification of Output

3.2 Support Vector Machines (SVM)

SVM is developed by VAPNIK to describe the classification algorithms. Some features of the SVM include that it is easy to implement, it consumes less training time, robust with high accuracy [18]
SVM classifies the various variables as shown below.
Equation of hyperplane is described below [19]

$$x \cdot y + a = 0 \tag{1}$$

Proposed method for hyperplane introduce the function

$$g(b) = sign(f \cdot d1 + m1) \tag{2}$$

It classifies the training of data and the hyper canonical plane described as:

$$bi \cdot f + m \geq +1 \; when \; vi = +1 \tag{3}$$
$$bi \cdot f + m \leq -1 \; when \; vi = -1 \tag{4}$$

or more compactly:

$$vi \, (bi \cdot f + m) \geq 1 \; \forall i \tag{5}$$

Basic operations that utilize the SVM
Multiplication by scalar
Consider vector $b = \{ b_1, b_2 \ldots \ldots \ldots \ldots b \}$ and a scalar d is described below.

$$\{ db_1, db_2 \ldots \ldots \ldots \ldots db_n \} \tag{6}$$

Addition of Vectors
Consider a vector $b = \{ b_1, a_2 \ldots \ldots \ldots \ldots b_n \}$ and $c = \{ c_1, c_2 \ldots \ldots \ldots \ldots c \}$, then addition ca be shown as below:

$$\{b_1 + c_1, b_2 + c_2 \ldots \ldots \ldots b_n + c_n\} \tag{7}$$

Subtraction of Vectors

Consider a vector $b = \{ b_1, b_2 \ldots \ldots \ldots \ldots b_n \}$ and $c = \{ c_1, c_2 \ldots \ldots \ldots \ldots c \}$, then subtraction ca be shown as below:

$$\{b_1 - c_1, b_2 - c_2 \ldots \ldots \ldots b_n - c_n\} \tag{8}$$

Euclidean Distance
Consider a vector $b = \{ b_1, b_2 \ldots \ldots \ldots \ldots b_n \}$
Then it can be written as:

$$\|b\| = \sqrt{b_1{}^2 + b_n{}^2} \tag{9}$$

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

20 | P a g e

Dot Product

Consider vector $b = \{ b_1, b_2 \ldots\ldots\ldots\ldots b_n \}$ and $c = \{ c_1, c_2 \ldots\ldots\ldots\ldots c \}$, then dot product can be shown as below:

$$\{ b_1.c_1, b_2.c_2 \ldots\ldots\ldots b_n.c_n\} \tag{10}$$

3.3 Neural Network

Neural network is composed of simple elements which operate in parallel [20]. A neural network can be trained to perform a particular function by adjusting the values of the weights between elements. Network function is determined by the connections between elements. There is an activation functions used to produce relevant output. Input processes with a neural network that including weights produced output. The output is compared with the target, if the produced output compatible with output, then the input is correct otherwise that output adjust with weight. Neural network basically worked with weights [21].
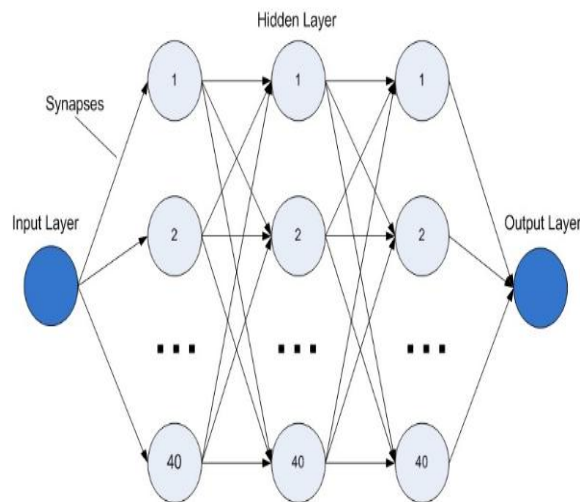

Figure 3: Neural Network

As per in their nature, the connections amongst numerous components, mostly define the specific network function. An individual could easily train a NN to accomplish a particular function by means of amending the values of the weights (connections) amongst several components [22].

Normally, neural networks are trained, or adjusted, so in a particular input directs to a precise target output. The subsequent figure demonstrates such a circumstance. At this point, the network is adjusted, depends on a comparison of the Output in addition to the target, unless the network Output matches the actual target. Typically, much such type of input/target pairs is required to train a network.

4. KEYAPPLICATIONS

Numbers of applications are there in emotion detection in different areas that are described below:

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

21 | P a g e

4.1 Online Commerce

The broadest utilization of feeling examination is in ecommerce exercises. A site permits their clients to present their experience about shopping and item qualities. They give rundown to the item and diverse elements of the item by allocating appraisals or scores. Graphical rundown of the general item and its elements is displayed to clients. Prominent trader sites like amazon.com gives audit from editors furthermore from clients with rating data. http://tripadvisor.in is a prominent site that gives audits on lodgings, travel destinations. They contain 75 million feelings and audits around the world. Assumption examination helps such sites by changing over disappointed clients into promoters by examining this gigantic volume of suppositions.

4.2 Voice of the Market (VOM)

Voice of the Market is about figuring out what clients are feeling about items or administrations of contenders. Precise and opportune data from the Voice of the Market helps in increasing aggressive advantage and new item advancement. Identification of such data as right on time as could be expected under the circumstances helps in direct and target key promoting effort. Opinion Analysis helps corporate to get client's feeling progressively. This ongoing data helps them to outline new advertising systems and can anticipate odds of item disappointment. There are business and free assumption examination administrations like Radiant6, Sysomos, Viralheat, Lexalytics, and so on. Some free apparatuses like www.tweettfeel.com, www.socialmention.com are additionally accessible.

4.3 Voice of the Customer (VOC)

It worries about what singular client is saying in regards to items or administrations. It implies investigating the audits and input of the clients. VOC is a key component of Customer Experience Management. VOC helps in distinguishing new open doors for item creations. Removing client feelings likewise recognizes utilitarian necessities of the items and some non-practical necessities like execution and expense.

4.4 Brand Reputation Management

Brand Reputation Management worries about dealing with user's notoriety in business sector. Assessments from clients or some other gatherings can harm or upgrade your notoriety. Brand Reputation Management (BRM) is an item and it is organization concentrated instead of client. Presently, one-to-numerous discussions are occurring online at a high rate. That makes open doors for associations to oversee and fortify brand notoriety. Brand discernment is resolved not just by promoting, advertising and corporate informing.

4.5 Government

Supposition examination helps government in surveying their quality and shortcomings by breaking down sentiments from open. For instance, "In the event that this is the state, how do you anticipate that truth will turn out? The MP who is examining 2g trick himself is profoundly

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

22 | P a g e

degenerate." This case plainly demonstrates negative notion about government. Whether it is following nationals' assessments on another 108 framework, recognizing qualities and shortcomings in an enrollment battle in government work, evaluating achievement of electronic accommodation of assessment forms, or numerous different zones, we can see the potential for conclusion examination [32].

5. CONCLUSION

In this survey paper, the concept of emotion detection is discussed and this can be concluded that this concept plays an important role by means of systems of human computer interaction. Emotion detection as of texts is able to find the suitable emotion by surveying the Input text. This paper has studied the concept of emotion recognition from text using different type of classifier like Fuzzy Logic, Artificial Neural Network, and Support Vector Machine classifier because the efficiency of single classifier does not provide the best solution for emotion recognition system. So we have used a comparative work for the emotion recognition system to achieve more accuracy than the previous work. This comparative method has many advantages like High speed in processing of recognition, high accuracy of text emotion recognition due to the use of different types of classifier and less probability of errors.

REFERENCES

1. Shivhare, Shiv Naresh, and Sri Khetwat Saritha, Emotion Detection from Text Documents, International Journal of Data Mining & Knowledge Management Process 4.6 (2014): 51.
2. Mac Kim, Sunghwan, Recognising Emotions and Sentiments in Text, University of Sydney, 2011.
3. Parrott, W. Gerrod, Emotions in social psychology: Essential readings, Psychology Press, 2001.
4. Nisha JA, Kirubakaran E, A Survey on Sentiment Analysis of (Product) Reviews, International Journal of Computer Applications, 2012, 47(11), pp .1-4.
5. Alexander P, Paroubek P, Twitter as a Corpus for Sentiment Analysis and Opinion mining of big data, LREC. 2010, 10, pp.1-7
6. Vandana K, Mahender C N, Text Classification and Classifiers: A Survey, International Journal of Artificial Intelligence & Applications (IJAIA), 2012, 3(2), pp.85-99.
7. Ortigosa, Alvaro, José M. Martín, and Rosa M. Carro, Sentiment analysis in Facebook and its application to e-learning, Computers in Human Behavior 31 (2014): 527-541.
8. Pak, Alexander, and Patrick Paroubek, Twitter as a Corpus for Sentiment Analysis and Opinion mining of big data, LREC. Vol. 10. 2010.
9. P. Ekman, An Argument for Basic Emotions, International Journal of Cognition and Emotion, Vol. 6(3), published by Lawrence Associates Ltd, US, Jan 1992, pp. 169-200.
10. Mohamed Yassine, Hazem Hajj , A Framework for Emotion Mining from Text in Online Social Networks, IEEE International Conference on Data Mining Workshops, Sydney, NSW, IEEE publications, Dec 2010, pp. 1136-1143.

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

23 | P a g e

11. David Garcia, Frank Schweitzer, Chair of Systems Design, ETH Zurich, Kreuzplatz, Emotions in Product Reviews – Empirics and Models, 2011 IEEE International Conference on Privacy, Security, Risk, and Trust, and IEEE International Conference on Social Computing, Boston, MA, IEEE Publications, Oct 2011, pp. 483-488.

12. Esuli Baccianella Stefano, Esuli Andrea and Sebas-tiani Fabrizio, SentiWordNet 3.0: An Enhanced Lexical Re-source for Sentiment Analysis and Opinion Mining, In Procedings of the 7th Conference on Language Resources and Evaluation, pp. 2200-2204.

13. Turney Mohammad, S. and Turney, P.D, Emotions Evoked by Common Words and Phrases: Using Mechanical Turk to Create an Emotion Lexicon, Proceedings of the NAACL-HLT 2010 Workshop on Computational Approaches to Analysis and Generation of Emotion in Text, Los Angeles, ACM Publications, June 2010, pp. 26-34.

14. Isa Maks, Piek Vossen, A Verb Lexicon Model for Deep Sentiment Analysis and Opinion Mining Applications, Proceedings of the 2nd Workshop on Computational Approaches to Subjectivity and Sentiment Analysis, ACL-HLT 2011, Portland, Oregon, USA, ACM publications, June 2011, pp. 10–18.

15. Zadeh L A, Fuzzy sets, Inf. Control, 1965, 8, pp.338–353.

16. Braunschweig V. Tizhoosh H R., Fuzzy-Bildverarbeitung, Einf ̈uhrung in Theorie und Praxis, Springer, Berlin, 1998.

17. Pedrycz W, editor, Fuzzy Control and Fuzzy Systems, 1989.

18. Takahashi, Kazuhiko, Remarks on SVM-based emotion recognition from multi-modal bio-potential signals, Robot and Human Interactive Communication, 2004. ROMAN 2004. 13th IEEE International Workshop on. IEEE, 2004.

19. Altun, Halis, and Gökhan Polat, Boosting selection of speech related features to improve performance of multi-class SVMs in emotion detection, Expert Systems with Applications 36.4 (2009): 8197-8203.

20. Ali S, Omatu S, Web Emotion Classification Using Neural Networks Based on PCA, Information Sciences, 2004, 158, pp. 69-88.

21. R. Kalaivani, K. Sudhagar, P. Lakshmi, Neural Network based Vibration Control for Vehicle Active Suspension System, Indian Journal of Science and Technology,2016 Jan, 9(1), Doi no:10.17485/ijst/2016/v9i1/83806

22. M. Santhosh shekar, P. Mohan Krishna, M. Venkatesan, Artificial Neural Network based Prediction of Pressure Drop in Heat Exchangers, Indian Journal of Science and Technology,2015 May, 8(S9), Doi no: 10.17485/ijst/2015/v8iS9/65549

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.
International Research Journal of Mathematics, Engineering and IT (IRJMEIT)

24 | P a g e