

# Measuring Emotional Intelligence – An Approach to a Modified Text Based Model

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**Abstract-** This paper presents a comparative analysis of Emotional Intelligence Models. Emotional intelligence is the ability to identify, understand, and manage emotions intelligently so as to overcome challenges with ease. Over the years, many models on EI have been proposed and numerous definitions of EI have come up. This sometimes leads to conflicting claims about what EI predicts. This paper analyses popular EI models and determines their features and liabilities. An EI text-based system has been implemented to calculate the emotional quotient of the users. This model if implemented in schools and colleges will help to identify students with negative emotional intelligence. Hence it will help in curtailing misdeeds like ragging and suicide attempts.

**Index Term-** Emotional Intelligence (EI), Emotional Quotient (EQ), EI Models, Sentence Modifiers, Text-Based Model

## 1 INTRODUCTION

Emotional intelligence (EI) has recently attracted significance in the academic literature and applied settings. Emotional intelligence is the ability to identify, understand, and manage emotions intelligently so as to overcome challenges with ease. It impacts many different aspects of our daily life, such as the way we behave and the way we interact with others. EI is everything from recognizing emotion in faces to understanding how emotions might combine to form other emotional experiences.

Various models have been proposed till date for Emotional Intelligence which in turn gave rise to a variety of definitions of EI. This lead to confusion regarding what EI predicts. The study of emotional intelligence has resulted in a number of models and measurements being proposed (e.g. Bar-On, 1997; Goleman, 1995; Petrides & Furnham, 2003, 2006; Mayer & Salovey, 1997; Salovey & Mayer, 1990; Schutte et al., 1998). As a result, ambiguity has arisen regarding the most effective way of measuring emotional intelligence. Each model proposes a new way to develop emotional intelligence. Though most of these models were based on manual measurement of EI through direct interaction between the respondent and the person who is responsible for administering the questions to the respondents, developments in e-based techniques for gauging EI have become the need of the hour. In this context it is felt that developing an e-based model which would be user-friendly could be developed based on the basket of attributes in vogue in the models built up by earlier researchers. It is therefore imperative that a comparison between the popular models be made so as to identify their essential attributes and defects.

## 2 OBJECTIVES OF THE STUDY

On the basis of the discussions made above the main purpose of this research is to arrive at a user friendly e-based EI model by

identifying the principal attributes and shortcomings of the earlier models. Specifically the objectives of the paper are:

- (i) To make a comparative analysis of the attributes and shortcomings of the contemporary EI models in use based on their domain and domain parameters.
- (ii) To develop a user-friendly text based model for measurement of EI.

## 3 A COMPARTITIVE ANALYSIS OF VARIOUS EI MODELS

A huge number of models on EI have been proposed by different researchers in different domains and domain parameters. Researchers have applied emotional intelligent tests on humans based on speech, voice, text, handwriting, face, behavior, sports, mood, music etc. EI has been identified in all spears of influence.

In this paper various EI models of different domains have been briefly described and a comparative study of them is presented. The first model deals with the production and recognition of emotions in speech<sup>[11]</sup> There is an increasing trend of building personal robots. The basic function of such robots is to understand the emotions of human beings and also express their own emotions. A simple algorithm has been provided to demonstrate the working of this model. This algorithm consists in generating a meaningless sentence and specifying the pitch contour and the duration of phonemes (the rhythm of the sentence. For this we require learning algorithms. The second model is based on emotion detection in task-oriented spoken dialog<sup>[12]</sup>. The aim of this model was to define appropriate emotions for call-center services, to annotate the dialogs and to validate the presence of emotions via perceptual tests and to find robust cues for emotion detection. Two types of emotion annotations were carried out.

1) For the first type, two annotators independently listened to the 100 dialogs, labeling each sentence (agent and customer) with one of the five emotions (anger, fear, satisfaction, excuse, neutral attitude).

2) The second type of annotation, based only on lexical information.

The third model experimented with mood classification in blog posts<sup>[13]</sup>. This experiment consisted of a large collection of blog posts— online diary entries – which included an indication of the writer’s mood. In the fourth model, emotions were identified by human and machine recognition of face<sup>[14]</sup>. Machine recognition of faces from stills and videos are used widely in image processing, pattern recognition, computer vision and neural networks. FACE RECOGNITION TECHNOLOGY (FRT) has numeral commercial and law enforcement application such as, credit cards, photo id, and drivers’ license. Human recognition system generates stimuli obtained from their sense organs. These stimuli are collected for storing and retrieval of faces for the purpose detecting emotions. The fifth model employs textual and facial emotion recognition to design an affective tutoring system<sup>[15]</sup>. In this model the author introduced us with Employing Textual And Facial Emotion Recognition to Design An Affective Tutoring System in which Construction of ITS based on consistent emotional state representation and control including uncertainty model (affect-awareness framework) allows to reduce the risk of unnecessary and disturbing

application intervention .In the sixth model, the author interprets emotion in metaphorical and simile phenomena and multithreading dialogue<sup>[16]</sup>. A Software has been created with the following parts:

1. Control the automated actor (EMMA) that operates a character in the improvisation. i.e. the detected affective states enable the AI agent to make appropriate responses to stimulate the improvisation.
2. Additionally, drive the animations of the avatars in the user interface so that they react bodily in ways that is consistent with the affect that they are expressing, for instance by changing posture or facial expressions.

The last model is handwriting analysis based on segmentation method for prediction of human personality using support vector machine<sup>[17]</sup>. Handwriting is brain writing, representing the mental status of the person. And handwriting analysis is a projection technique as the body language that profiles the human behavior in areas of the social skills, achievements, thinking styles, or work habits.

Model No. <sup>[Ref]</sup>	Domains For Measuring EI					Attributes of the Models					Defects Of the Models	
	Voice	Speech	Text	Facial Detection	Hand-writing	Location Dependent	Affective Aware	Complete (always finds solution)	User Dependent	Time Dependent	Confused	Incomplete Database /Corpus
1. <sup>[11]</sup>		Y				Y	Y		Y	Y	Y	Y
2. <sup>[12]</sup>	Y						Y		Y	Y	Y	
3. <sup>[13]</sup>			Y			Y		Y	Y	Y		Y
4. <sup>[14]</sup>				Y			Y		Y	Y	Y	Y
5. <sup>[15]</sup>			Y			Y	Y	Y	Y	Y	Y	
6. <sup>[16]</sup>			Y						Y			Y
7. <sup>[17]</sup>			Y		Y		Y		Y			

Table 1: Comparative study of seven EI models based on their domains, attributes and defects

#### 4 A USER-FRIENDLY TEXT BASED MODEL FOR MEASUREMENT OF EI

This is a text-based emotional intelligence test which has been developed to estimate the emotional intelligence quotient of any person. It has human-level accuracy for short English sentences. The sentences must have proper construction, must be grammatically correct and should have proper spelling. This test reports two EI strengths: Positive emotion (+ve) and negative

emotions (-ve). The EQ is calculated from the sentence and shown in the screen. The front end of this test has been developed using ASP.Net using C# and the backend is been made with SQL server 2008. The user needs to text some English sentence into the text box provided in the EI test page and the EQ will be calculated. The database has been attached to the frontend. The database has two attributes: emotion and value. In the emotion column, the English words which can signify some emotions have been written. More than 6 thousand such words have been committed to the database. Each such word has been assigned a value, either positive or negative (-4 very negative to very positive +4). For example, good is a positive word and +1 has been assigned to it. Similarly, bad being a negative word has been given +1 value. Based on relative and superlative degrees, the words have been assigned values. For example,

Emotion	Value
Happy	+1
Happier	+2
Happiest	+3

Some modifiers have been also used in the text based analysis. These are linguistic hedges which modify the meaning of the sentence.

Sentence Modifiers used: not, not very, almost, very, slightly, and very very.

For example, the EQ of 'not good' can be calculated as,

$$\text{value}(\text{good})=+1, \text{not} = -(\text{value}(\text{good}))=-1,$$

$$\text{very} = 2 * (\text{value}(\text{good})) = 2 * 1 = 2,$$

Therefore, not good= -1, very good=2, not very good=-2

#### 4.1 A Simple Algorithm:

Step 1: Enter a sentence in the textbox

Step 2: Extract each word from sentence. Let the number of words be n

Step 3: For each word in sentence

Do

Step 4: If word is present in database then read the em\_values

Do

Step 5:  $t = \text{em\_value}$

Step 6: If modifiers present then according calculate sum by modifying t

/\* if(modifier == 'very ')

then sum = sum + (3 \* t)

if(modifier == 'not')

then sum = sum - t \*/

Step 7: sum = sum + t

Step 8: Else if word not found in database, then display msg " Emotion not found or incomplete sentence"

End

End

Step 8 : Display EQ= sum

Step 9: if(sum < 0) display : " Negative Emotion " ,

Step 10: if(sum > 0) display : " Positive Emotion" ,

else " Neural Emotion"

End

#### 4.2 Results

The system has to be checked for errors using unit testing. A number of questions are given to the system and checked for desired solution. The user provides certain sentences in the textbox and the output is recorded.

E.g. 1

Enter a sentence: I am happy

Click

Result: The emotional state is POSITIVE

EQ: EQ is 2

Back

Click To Check Spelling

The sentence "I am happy" is broken into words.

word[0]=I , word[1]=am, word[3]=happy.

value(word[0])=0 , value(word[1])=0, value(word[2])=2.

sum = 0+0+2 =2 > 0 Positive emotional state

E.g. 2: EQ of complex sentences

Enter a sentence: Why are feeling lonely?What is the matter with you?Are you sad

Click

Result: The emotional state is NEGATIVE

EQ: EQ is -4

Back

Click To Check Spelling

E.g. 3 (For incomplete sentences)

Enter a sentence: I am so

Click

EQ: [Empty]

Back

Click To Check Spelling

Message from webpage

Emotion does not exist in the sentence or

### 4.3 Limitations

- 1) System gets confused when presented with both positive and negative emotions.

Enter a sentence: I am sad and happy too

Click

Result: The emotional state is Neutral

EQ: EQ is 0

Back

Click To Check Spelling

- 2) Cannot understand simile or metaphors.

Enter a sentence: I can die for you

Click

Result: The emotional state is NEGATIVE

EQ: EQ is -3

Back

Click To Check Spelling

- 3) Limited numbers of modifiers hence cannot fully detect EQ.

## 5 CONCLUSION

Emotion Modeling has an interesting role in the next generation human-machine interactive systems. It can be realized by modeling both input and output parameters of the interactive system. For example textual expressions in forms of chats, messages, letters, blogs and other forms of textual manifestation can directly be regarded as input to the computers. On the other hand, the emotional expression of the computer can be regarded as the output.

Models of emotional intelligence are currently given much importance for their increasing application in psychotherapy. The behavior of a person can to some extent be visualized from his/her emotional expression in form of texts, speech etc. Sometimes a number of emotions coexist together and various forms of emotional reactions can appear under this circumstance. Detection of antisocial activities among school/college going is possible through these models. Almost all students send texts and chats on social networks. They express their desires, frustration, daily experiences in these sites. If these texts are checked by some emotionally intelligent system then many suicides, antisocial activities like drug intake can be stopped. If negative emotions are detected at an alarming rate of a user of social networks, then the moderators can be alerted. Currently bullying and ragging of younger students by senior students have increased rapidly. Although the authority has taken strict measures to stop ragging in colleges, yet news of severe ragging is common. The college fresher's are regularly ragged. These students express their annoyance and frustration

by leaving posts in their home pages or blogs. The EI text based system developed in this project can be used to handle emotional intelligence of college students .It in its primary form can detect emotions and EQ from sentences. This system however needs to be configured for other languages and contexts by changing the input files.

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