



Relational analysis of Emotion and Performance

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Abstract:

A number of factors are important in daily life for consideration of 'Stress of Study'. Main factors giving Stress is an increase in competition. In research, we are imposing a new approach of stress detection and classification for students during the examination period. We used MFCC (Mel-frequency cepstral coefficients) for feature extraction and SVM (Support vector Machine) classifier for better performance. In this system three types of corpus have been tested and classified. Support Vector Machine combines with the Rule base approach with Energy and Fundamental Frequency rules. Indian Dataset is created by 50 students, including male and female both. Testing of corpus proved that Native area, Nationality and living place effects on speech frequencies. At the end of result analysis, we can see that Indians normal speech frequency is nearby equal to the Mongolian angry frequency. Accuracy of system achieved more than 90% for depressive stress and aggressive stress. The result proved that in the examination period performance of students increases in exited and decreases in a depressive state. This research addresses the impact of stress on the student performance during the examination period.

Keywords: Emotion analysis, Signal processing, performance analyzer, SVM classifier, Detection, Classification

I. INTRODUCTION:

From the past decade, researcher communities working in the area of signal processing introduced various approaches related with emotion detection and classification and on the other hand, some Communities bi-forget the emotion and gives the various methods for the problem of stress detection and classification. Those methods were based on facial expression, i.e. Image processing based, some were based on brain signal simulation and some was based on voice i.e. signal processing.

In the words of Daniel Goleman "Most of the problem in our life, whether childhood problems, adolescent problems, home and family problems, work situation problems or political, regional or international problems are the result of misinterpretation of the involved sentiments, feelings and emotions of the concerned individuals, group of individuals, society and the nations." If proper efforts are made help in bringing mutual emotional understanding, empathy accompanied with right actions and behavior on the part of the individuals and groups, to lead a better life in peace and co-operation.

This research addresses the impact of stress on the student performance during the examination period. When considering the interpretation of this study, certain limitations should consider however, there is a lot of scope for research in the same area which could address some of the challenges discussed in the literature review section. According to some research Mental stress can change the physiological balance. This is to contribute in Human Machine Interaction by enhancing the power efficiency with the help of introducing new approaches motivate for conducting research on Impact of Emotion on the performance of students. The aim of the research is to develop a system for the students and exploring dependencies the nature of utterance at the level of negative emotion for classification as depressive stress and aggressive stress.

II. LITERATURE SURVEY

Research in emotional speech has a long tradition. In recent years, the interest for automatic detection and interpretation of emotions in speech has grown. Concurrently, generation of certain emotions in speech synthesis is also a rising research field. Recently, the Google Deep Mind group shows that it is possible to use raw audio signal to generate speech and more than that this algorithm greatly surpasses all other advances in this field. The study presents the

results of cross-linguistic differences in speaking fundamental frequency and these differences are consistent across female bilinguals.

Emotions are intense feelings that are directed at someone or something. Moods are feelings that tend to be less intense than emotions and that often (though not always) lack a contextual stimulus. [1] Voice quality, pitch and pitch range are the important dimensions on which listeners could base their judgments About speaker age.

Research in emotional speech has a long tradition. In recent years, the interest for automatic detection and interpretation of emotions in speech has grown. Concurrently, generation of certain emotions in speech synthesis is also a rising research field. It is not quite clear why all language pairs have different pitch profiles for the languages, and this issue needs further investigation [2].

Bhalla and Nauriyal (2004) [3] reported in their study that emotional intelligence is a factor that is potentially useful in understanding and predicting individual performance at work. They further reported that emotional intelligence is extremely important in Indians as they have high affiliation need and emotional intelligence can lead to significant gains in productivity.

If voice stress can be automatically detected and analyzed, it could be probably used as a viable diagnostic tool for security services as well as a means of improving speech/speaker recognition capabilities [8, 9]. Certain emotional states which can be controlled by the speaker to some extent are often correlated with physiological states which in turn have quite mechanical, and thus predictable, effects on speech, especially on its prosodic structure [4]. The degree of stress perceived will vary from person to person depending on the persons experience and arousability. Apart from these individual differences, some studies show an increase in intensity, increased fundamental frequency [5,6].

Nyaga Mbitiru [7] gives the contribution for the Analysis of Stress in Speech Using Empirical Mode Decomposition with the algorithm EMD. Speech samples from the Speech under simulated and Actual Stress (SUSAS) database were used to isolate and identify features unique to stressed voice. EMD provides magnitudes on a time-frequency plane. This allows for specific fluctuations to be identified in time further improving the detection of stress.

Sander Koelstra, et.al [8]-“ DEAP: A Database for Emotion Analysis using Physiological Signals , presented a database for the analysis of

spontaneous emotions .He also presented a novel semi-automatic stimuli selection method using affective tags, which was validated by an analysis of the ratings participants gave during the experiment.

Stefan Scherer et al. [9] introduce architecture to automatically detect the amount of stress in the speech signal close to real time. In this an experimental setup to record speech rich in vocabulary and containing different stress levels is presented. The goal of this work is to recognize stress from the speech signal close to real-time, as in a recently published work (Scherer et al., 2008), which is of great advantage in time sensitive applications.

In [10], Luca Surace et author wrote about the nature of the different stages in the education system and their relation with the emotional state of students. He observed that an academic or professional circumstance affects on the health of the person and hence performance can affect with emotional intelligence.

Although researchers have given the issue of job stress a great deal of attention and practitioners have attempted to reduce the influences of the sources of job stress, to date job stress continues to be problematic. For FSSP, job stress has increased substantially for more than 20 years (Princeton Survey Research Association, 1997).

III. SYSTEM DESIGN

Literature surey raise questions as to whether or not the impact of emotion on the performance of students in the educational environment and analyzing the impacting student outcomes and help them target growth areas.

To understand emotions, it is important to know that emotions have both universal features and individual uniqueness. For example, when students enjoy a lesson, this is a pleasant experience for students around the world. However, the contents, intensity, duration and frequency of classroom enjoyment can differ between students and may even be unique to an individual student.

Fundamental frequency and other features are used as input features for the classifiers to distinguish the emotion state. The vibration rate of vocal is called the fundamental frequency F0 or pitch frequency. Algorithm steps are shown in figure 1.

Research area concerning verbal communication in relation to person psychological state is the search for objective, quantifiable correlates of the stress. In the past these search focused primarily

on the psychological measurement but over the last decade the changes with addition to behavior are examined.

These implementation steps are delicate tasks, The terminology which we use in our presentation of stress calculator focus towards the stress management.

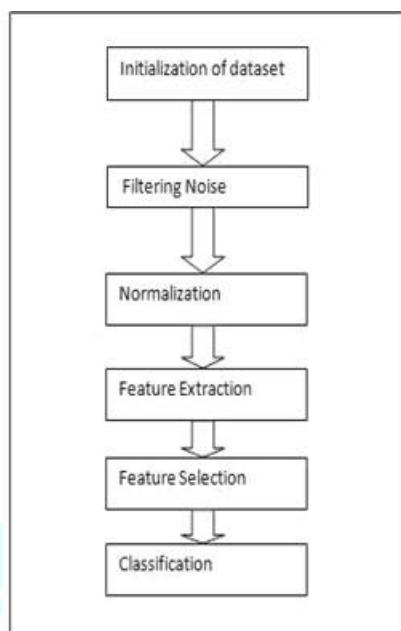


Figure 1: Proposed Algorithm

From the survey of the available literature on stress related to human being, following open issues are identified that need further investigations. Stresses are closely related to circumstances like examination. Stress key related to emotions.

Emotional key closely related to psychological condition.

Table 1: Internal and External type of Emotions

Internal emotions	External emotions
Shame	Anger
Contentment	Fear
Surprise	Liking

Pride	Disgust

Table 2 : Positive and Negative Emotions

How many emotions are there? In what ways do they vary? There are dozens of emotions. They include anger, contempt, enthusiasm, envy, fear, frustration, disappointment, embarrassment, disgust, happiness, hate, hope, jealousy, joy, love, pride, surprise, and sadness.

Positive emotions	Negative emotions
Happiness,	Sadness
Liking	Anger
Respect,	Fear
Hope	Shame
Contentment	Disgust

As shown in table 1 and table 2 Internal, external emotions have a primary focus inside us or outside us, for example being about ourselves or about the outer world. Sometimes these are very much about one or the other and at other times they may be a bit of both. A highly outward emotion is anger, as we project bad feelings toward others. A highly inward one is contentment, for example, in the way a meditating person feels.

Studies that have looked at different acoustic parameters (fundamental frequency, formant values) .

The proposed research has different objectives to fulfil the aim of research work. Objectives are following:

Study and collection of databases of emotional signal at various stages and Examining the stress percentage of the student.

Determine the signals properties with different genders and emotional values and Developing a ANN tool for the psychological measurement for the same.

Design and implementation user-friendly embedded tool with emotion analyzer for the students .

Speech Database

In this research different speech database are utilized to validate the proposed methods in speech emotion recognition. Among all dataset Berlin is most

common used in German language. The place of record was Department of Technical Acoustics of Technical University.

Emotional styles definition -To study only the influence of emotions on speech, the same speakers are asked to utter the same speech material in different emotional styles. Basic specifications concern neutral style and the 6 MPEG4 emotions proposed for video analysis: anger, sadness, joy, surprise, disgust and fear.

IV. ANALYSIS:

Then, preprocessing is performed to improve the quality of input speech by using filters. In the filtering process background noise is eliminated to extract the original speech because The collected emotional data usually get degraded due to external noise (background and “hiss” of the recording machine). This filtered signal may contain a sort of hiss which will may affect the process of feature extraction and classification in terms of accuracy.

Table 3: features used in analysis

Input	Features	Label
Speech in wav format	Energy	E
Speech in wav format	Fundamental Frequency	fo
Speech in wav format	Standard Deviation	Sd
Speech in wav format	Mean	Mo
Speech in wav format	Minimum speech frequency	Fmin
Speech in wav format	Maximum frequency in speech	Fmax
Speech in wav format	Cepstrum	C0

Hence normalization process necessary in the signal processing. Normally two type's technique of Normalization is preferred in case of speech signal processing they are pitch normalization and energy normalization.

Our analysis is guided by the following research questions. First, what is the relationship between academic self-efficacy and stress? We expect to find a negative correlation, when high academic self-efficacy success- fully mediates the college demands and results in lower perceived stress. Second, how are grades, credits, and persistence related?

The analysis of the recorded speech signals was done in a MATLAB environment which provides several graphical visualizations for analyzing a signal.

Table 4: real time indian testing output for happy Emotional stage.

Sr. No	File No	Energy	F0	Original Mood	Detected Mood
	H1	206.44	4.84	H A P P Y	Happy
	H2	289.30	3.45		Happy
	H3	150.00	6.66		Happy
	H4	254.0	3.93		Happy
	H5	112.55	8.88		Happy
	H6	218.02	4.58		Happy
	H7	321.81	3.10		Happy
	H8	213.00	4.69		Happy
	H9	194.58	5.13		Happy
	H10	278.62	3.58		Happy

Table 4 contain the real time testing of the emotional test of students. And figure 2 to figure 5 shows the frequency level at the different emotion stages. This outcome shows the clear difference at range of spectrum. This is enough difference to describe the state of emotion. In this analysis testing have been done on 100 samples .

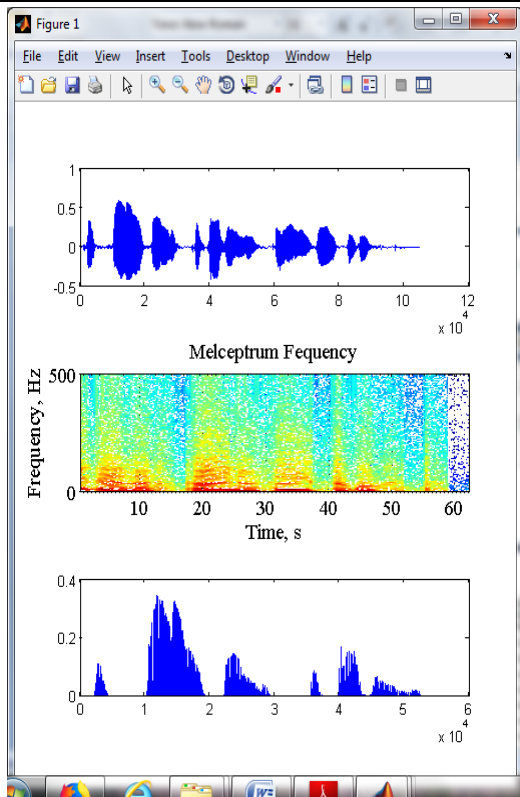


Figure 2: Angry emotion state in Indian DB

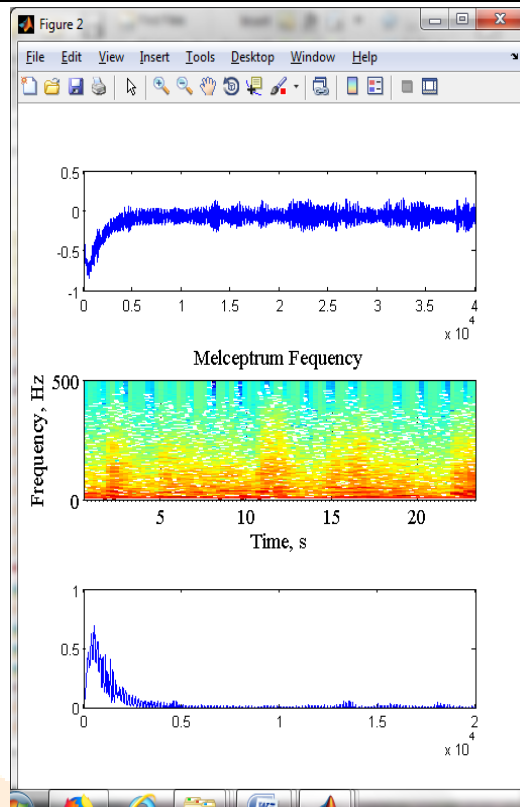


Figure 4 Natural Emotional state in Indian database collection

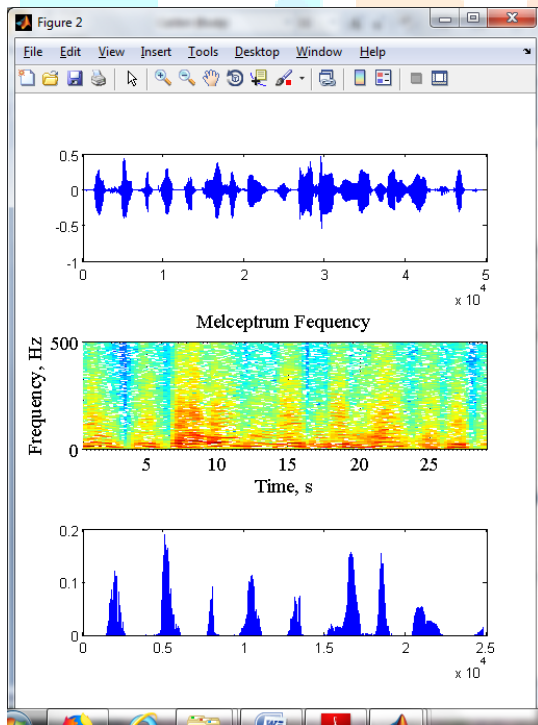


Figure 3:Natural Emotional State with existing database

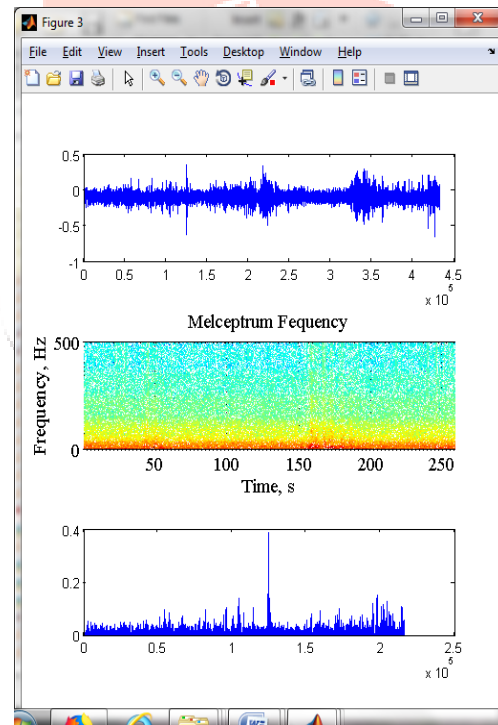


Figure 5: SAD emotinal state with indian DB

V. RESULT AND CONCLUSION:

All the set up and experiment was performed on the same platform of Matlab. Trained and tested database is used for analyzing the performance accuracy of the stress analysis system. Anger again classified as Aggressive anger and Depressive anger. Similarly Sadness also classified as Aggressive sadness and Depressive Sadness. For the final testing of the system subjects were asked to identify the stress during the examination period. Our aim in research is to analysis the impact of emotion on the performance of students. (Age Group 20 to 26)

The research findings imply that positive emotions can have profoundly positive effects on students' learning. However, this need not be true for all positive emotions. Specifically, positive task-related emotions, such as enjoyment of learning, focus students' attention on learning, promote their motivation to learn, and facilitate use of deep learning strategies and self-regulation of learning. Overall, you can expect these emotions to have positive effects on students' achievement. By contrast, positive emotions that do not relate to learning can draw attention away and lower performance, such as a student falling in love reducing his/her academic effort. Similarly, deactivating positive emotions, such as relief and relaxation, do not necessarily have positive effects.

The research evidence implies that negative emotions can strongly obstruct students' learning. Test anxiety, achievement-related hopelessness or boredom during lessons can lead students to withdraw attention, avoid effort, procrastinate in doing assignments, fail exams, and drop out of school. Negative emotions are a major factor explaining why many students do not live up to their potential and fail to pursue the educational career that would correspond to their abilities and interests. Moreover, these emotions also jeopardize students' personal development and health, and contribute to the high numbers of suicides among youth in many countries—both unsuccessful and successful.

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