Emotion Recognition Face Detection Technique Using Artificial Intelligence

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*Abstract :*This project presents a method to automatically detect emotional duality and mixed emotional experience using Linux based system. Co-ordinates, distance and movement of tracked points were used to create features from visual input that captured facial expressions, head, face gestures and face movement. Spectral features, prosodic features were extracted using the camera. Espeak and Pyttsx and Face API was used for calculation of features. A combined feature vector was created by feature level fusion and cascade classifier was used for emotion detection. Live participants and actions are to be used for recording simultaneous mixed emotional experience. As per calculated result system will play songs and display books list.

Keywords: Smart Emotion, Espeak and Pyttsx and Face API.

I. INTRODUCTION

EMOTION recognition has important applications in the field of medicine, education, marketing, security and surveillance. Machines can enhance the human-computer interaction by accurately recognizing the human emotions and responding to those emotions. Existing research has mainly examined automatic detection of single emotion. But psychology and behavioral science studies have shown that humans can concurrently experience and express mixed emotions. For instance, a person can feel happy and sad at the same time. In this research combinations of six basic emotions (happiness, sadness, surprise, anger, fear, disgust and neutral state) were used. The aim of this study is to develop features that capture data from facial expressions to identify multiple emotions. In case of single-label classification problem each annotated feature-vector instance is only associated with a single class label. However, the multiple concurrent emotion recognition is a

multi-label classification problem. In a multi-label problem, each feature vector instance is associated with multiple labels such as presence or absence of one of each six basic emotions. The multi-label classification is receiving increased attention and is being applied to a many domains such as text, music, images and video based systems, security and bioinformatics. This paper examined recognition of concurrent emotional ambivalence and mixed emotions. Additionally, the study examined two concurrent emotions (emotion duality) to limit the scope of the research based on availability of scenarios. This was done so that the experimental design was realistic. The subjects could express dual emotions with ease and observers could annotate the data without ambiguity. This study implemented a multimodal emotion recognition system with multiple check box input to facilitate the annotation of concurrent emotions in the user interface software.

II. PROBLEM STATEMENT

In the recent years, human-computer interaction got more and more attention from scientists. Today most of the speech processing applications can understand what is said, but often an information about how is necessary. Variety of emotion expression process shows that there are many ways to describe global and local speech properties, and one of the most effective is emotions. There is no common definition of human emotions. In most of the projects a set of states like angry or scared is considered [see, for example, 1]. Each emotion from this set can be demonstrated via voice intonation, gestures, mimic and gaze. Often in spontaneous natural actions their intensity could be different, and the most complex cases contain modalities pointing at different emotions. Main motivation of the system is to automatically identify users' mood and according to that related Music (Happy, Angry, Stressed, Normal) will play through Linux based system. Music mood describes the inherent emotional meaning of a music clip. It is helpful in music understanding, music search and some music-related applications. Nowadays, user expect more semantic metadata to archive music, such as similarity, style and mood.

III. LITERATURE SURVEY

[1] S. Patwardhan, "Augmenting Supervised Emotion Recognition with Rule-Based Decision Model", arXiv, 2016.

Description: In this paper, we investigate the effect of transfer of emotion-rich features between source and target networks on classification accuracy and training time in a multimodal setting for vision based emotion recognition.

[2] M. Liu, R. Wang, S. Li, S. Shan, Z. Huang, and X. Chen. Combining multiple kernel methods on riemannian manifold for emotion recognition in the wild. ICMI, 2014.
Description: Emotional expressions of virtual agents are widely believed to enhance the interaction with the user by utilizing more natural means of communication. However, as a result of the current technology virtual agents are often only able to produce facial expressions to convey emotional meaning.

[3] A. S. Patwardhan, "Augmenting Supervised Emotion Recognition with Rule-Based Decision Model", arXiv, 2016.
Description: This paper presents a method to automatically detect emotional duality and mixed emotional experience using multimodal audio-visual continuous data. Co-ordinates, distance and movement of tracked points were used to create features from visual input that captured facial expressions, head, hand gestures and body movement. Spectral features, prosodic features were extracted from the audio channel.

[4] SE. Kahou, C. Pal, X. Bouthillier, P. Froumenty, C. Glehre,R.Memisevic, P. Vincent, A. Courville, Y. Bengio, RC. Ferrari and M. Mirza. Combining modality specific deep neural networks for emotion recognition in video. Proceedings of the 15th ACM on International conference on multimodal interaction, 2013.
Description: This paper presents the initial implementation of a system of multimodal recognition of emotions using mobile devices and the creation of an affective database through a mobile application. The recognizer works into a mobile educational application to identify user's emotions as they interact with the device.

[5] A. S. Patwardhan and G. M. Knapp, "Multimodal Affect Analysis for Product Feedback Assessment," IIE Annual Conference. Proceedings. Institute of Industrial Engineers-Publisher, 2013.
Description: In this paper, we investigate the effect of transfer of emotion-rich features between source and target networks on classification accuracy and training time in a multimodal setting for vision based emotion recognition.

IV. PROPOSED SYSTEM

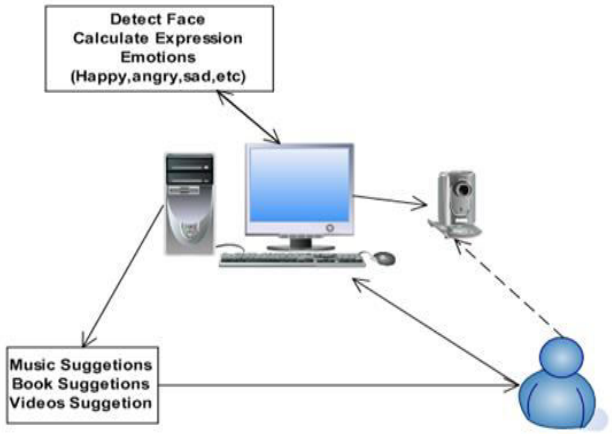


Fig 1. System architecture

A. *Description:*

User: Use this system.
Server: Connection between User and database.

Database: Storage of information related to Facial characteristics, songs and books uploaded.

Our system has mainly three modules, user module, mood detection module and video suggestion module. Various processes involved in these two modules are:

User Module:
User can use system and store songs and books library in the system.

Mood detection Module:
As per the facial expression it will recognize mood of user it will show songs list or books library and it will also give video suggestion.

Video suggestion Module:
According to the users mood it will give the suggestions of videos.

B. *Mathematical Model*:

Input-Output:
U= {I, O, f, S, F}
Where,
I= {I1, I2,I3}
I1= {l1,l2….. ln} where n size of image and n>0
I2= i.e. image capturing using camera
I3= i.e. face images

O= {O1,O2,O3,O4}
O1= Image Preprocess

O2= Image Color Segmentation
O3 = Image Segmentation (gray scale)
O4 = emotion face detect

f= {f1,f2,f3,f4,f5}
f1= preprocess (image,I1, I2, I3)
f2 = color_segmentation (Image,O2)
f3 = image_segmentation(Image,O3)
f4 = face_detection(Image, f2)
f5 = voice_music(sound)

S: Success:
Image process successfully
emotion detected properly

F: Failure:
Algorithm not working properly
Fail to emotion analysis

C. Algorithm:

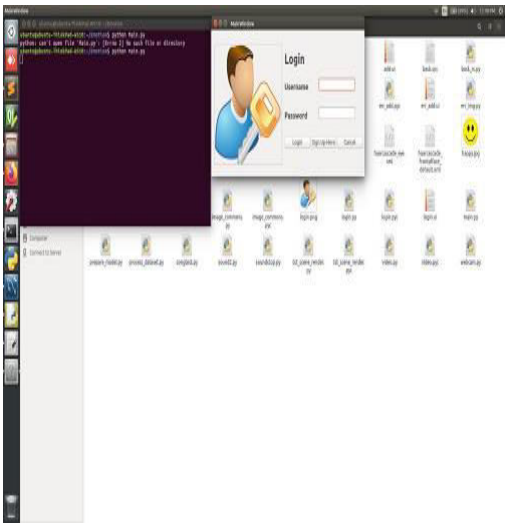
The result of the identification is the image that has the smallest distance with the test image displayed by the system

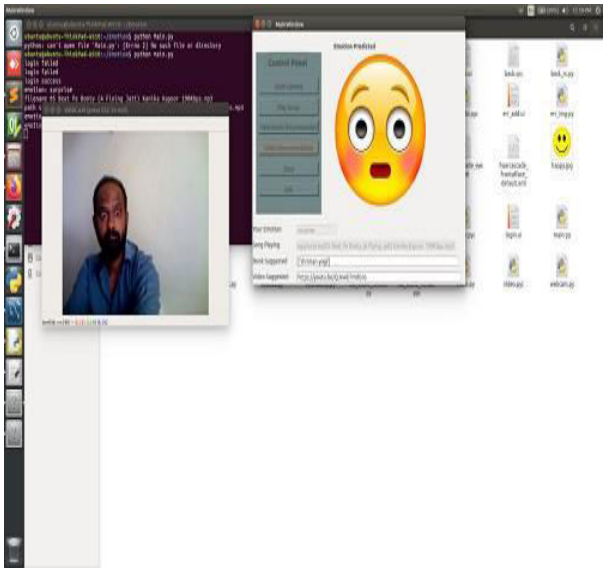
System Testing
To determine whether the system is running well made and properly it is necessary to test.
The following process.

Training Process.
The first stage of system testing is the training stage. This stage aims to generate the weight value of each image of existing training.

Image Recognition Process.
After the training process is successfully done, the next stage is to carry out image recognition process. The goal is how big the system successfully recognize the test image or testing properly.

V. RESULT





VI. CONCLUSION

To conclude, music is an important means of regulating mood in various everyday situations. Proposed system is readily available to everyone and can be listened to almost anywhere. System is directly dependent upon Facial Expressions of user, so it is very effective.

VII. REFERENCES

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[3] A. S. Patwardhan and G. M. Knapp, “Multimodal Affect Analysis for Product Feedback Assessment,” IIE Annual Conference. Proceedings. Institute of Industrial Engineers-Publisher, 2013.

[4] SE.Kahou, C. Pal, X. Bouthillier, P. Froumenty, C. Glehre,R. Memisevic, P. Vincent, A. Courville, Y. Bengio, RC. Ferrari and M. Mirza. Combining modality specific deep neural networks for emotion recognition in video. Proceedings of the 15th ACM on International conference on multimodal interaction, 2013.

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