Review System using IoT

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Abstract:
Feedback generation is one of the most important phases that helps to determine the requirement of any changes needed in any system. Traditionally, the feedback was generated by using the pen-paper method and later by using online forms that would indicate the actual feedback based on the parameters provided. In this system, we are going to provide the feedback of a particular lecture that is based on real-time facial detection and emotions of students attending that lecture. Faces contain a large portion of our emotionally expressive behaviour that can be captured using various machine learning classification algorithms. We have used facial expressions to display our emotional states and to provide the right feedback for a lecture by reading the facial emotions effortlessly. Student involvement is a key concept in contemporary education, where it is valued as a goal in its own right. Machine learning does play a vital role in the area of image processing where images captured in the form of frames are given as an input to the algorithms where they can classify the similar images based on some user specified requirements. Based on this, the result can be represented in user understandable graphical user interface. To capture live data and then processing it in real time to produce result set is the main aim behind this concept of student face detection. Capturing frames from video gives required input to the application where face detection is done with the help of Haar classifier. Emotions expressed by the students is depicted by detecting the facial expression that can be used as one of the aid for taking overview of lecture those are conducted in educational institutes using SVM(Support Vector Machine) algorithm. Thus, based on the review generated the teaching strategies can be modified and some new teaching techniques can be evolved for further improvement.

Keywords — Facial expressions, Face Detection, Haar classifier, SVM algorithm.

I. INTRODUCTION

Image processing is a method to perform some operations on an image, in order to enhance image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image. Nowadays, image processing is among rapidly growing technologies.

It forms a core research area within engineering and computer science field that has a wide range of useful real-life applications. Usually Image Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them.

II. LITERATURE SURVEY

[1] Context-Aware Local Binary Feature Learning for Face Recognition.

Author: Yueqi Duan, Jiwen Lu, Senior Member, IEEE, Jianjiang Feng, Member, IEEE, and Jie Zhou.

Description:
In this paper, we propose a context-aware local binary feature learning (CA-LBFL) method for face recognition. Unlike existing learning-based local face descriptors such as discriminant face descriptor (DFD) and compact binary face descriptor (CBFD) which learn each feature code individually, our CA-LBFL exploits the contextual information of adjacent bits by constraining the number of shifts from different binary bits, so that more robust information can be exploited for face representation.

[2] Real-time SVM based Emotion Recognition Algorithm

Author: Wout Swinkels1, Luc Claesen1, Feng Xiao2, and Haibin Shen2.

Description:
This algorithm extracts specific facial cues, in the form of displacement ratios, and interprets these cues with a cascade of SVMs. In total there are 4 different steps to achieve the emotion detection. First, the countenance is detected with an adapted Histogram of Oriented Gradients (HoG) algorithm. Subsequently, 19 feature points are derived from the facial region. The next step comprises the calculation of 12 displacement ratios based on the distance between those feature points in successive frames. Finally, the displacement ratios are used as feature vectors for a multi-class SVM in cascade with a binary SVM.

III. PROPOSED SYSTEM

Facial emotion recognition is one of the main application of Image Processing. Emotions can be classified as fear, happiness, joy, sadness, aggressiveness are recognizable facial expressions using computer vision. Emotional expressions at face are related to the movements or positions of the muscles under the skin. In this system, we are going to implement an efficient method to create face and emotion feature database and then this will be used for face and emotion recognition of the person. For detecting face from the input image we are using Haar-Cascade face detection algorithm and to evaluate the face and emotion detection SVM classifier is used.

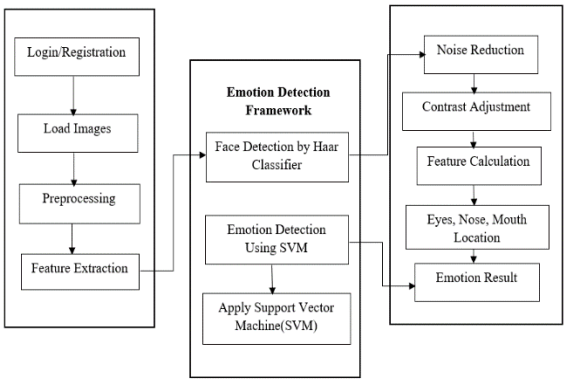

Fig.1: Working of the proposed system

1. Frame Extraction / Live Camera: User grabs images using live camera on the application, the application then extracts frames from the video. These frames are saved on local machine. Frames are usually in 640x480 format.
2. Pre-Processing on images: Once we get the faces, we apply the pre-processing techniques on the images like noise removal, normalization etc.

a. RGB to Gray Scale Image: Convert the image into a Gray scale image by taking the average of each pixel of RGB image.

b. Image Normalization: Normalization is a process that changes the range of pixel intensity values to promote intensity distribution for the given images.

c. Noise Removal: Removing errors in the image acquisition process that result in pixel values that do not reflect the true intensities of the real scene.
3. Face Detection: Apply the Haar-Cascade Classifier for the face detection in images.
4. Feature Extraction: A SVM consists of an input and an output layer. SVM will classify the features on the basis of training dataset. It extracts the features of faces from the image like nose, lips, and eyes in the form of points as follows:

i. Eyebrow rises
ii. Upper eyelid to eyebrow distance
iii. Inter-eyebrow distance
iv. Upper eyelid
v. Top lip thickness
vi. Lower lip thickness
vii. Mouth width
viii. Mouth Open

5. Feature Calculation: In this phase, all the extracted features are calculated and the process of finding out the eyes, mouth and nose location on person face is performed.
6. Emotion Detection and Result generation: By applying SVM classifier on the extracted features, emotions such as happy, neutral, sad can be calculated and result can be generated.

IV. CONCLUSION AND FUTURE SCOPE

Thus, we have developed an application for educational institutes that can be used for feedback generation of a particular lecture by monitoring the students involvement in a lecture and detecting the facial expression of the student.
Future Scope:

- This application can be used for Lecture wise attendance.
- In future this particular application can be used in organizations in a hall where the meeting is being conducted.

V. REFERENCES

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