# SURVEY ON EMOTION RECOGNITION USING FACIAL EXPRESSION FROM VIDEO SEQUENCE

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**Abstract -** *An Emotion recognition using facial expression recognition from a video sequence is an interesting and also a challenging task among the computer vision community. However dynamically identifying the facial emotion can improve the overall efficiency of the system. To identify the facial emotion with minimal complexity, fuzzy approach is considered as an effective technique for detection and recognition using multi-agent modeling. This method contains sequence of steps to detect and classify the six basic emotions of a human being. The steps include detecting the face using skin color, geometry and degree of membership. It uses Support Vector Machine (SVM) and Neural Networks (NN) for classification to improve the accuracy and performance.*

***Key Words*: Videos; Pre-processing; Face recognition; Multi agent; Fuzzy interface**

## 1.INTRODUCTION

In image processing domain emotion recognition is the one of the important topic in recent years. This Emotion Recognition System using facial expression from video sequence has many applications. In computer science emotion recognition system is mainly used for Human Computer Interaction (HCI). This emotion recognition system can improve the overall human computer interaction because here the computer interacts like a human being. Emotion only plays a major rule in human-human interaction and emotions are the fundamental for interaction if the computer can act like a human being then the interaction between the human and computer is an efficient one. Also emotions are the response to particular situation or environment. For example smile for greeting and raising voice means angry. So the computer can understand and act like human. This emotion recognition system also helps machine learning for non-verbal communication.

This emotion recognition system using facial expression from videos sequence also use in security system because this system can identify the person's emotion and every person has a unique face so we can easily identify the person. So the system improves the security by video surveillance system. In video surveillance system, a person can view all the cameras, but now this emotion recognition system can identify the emotion and it helps to monitor the process easily.

Previously they were using speech for identifying the emotion but nowadays many user use video technology and this is very efficient process when compared to the speech recognition. For analyzing persons mental health talking to them and showing some videos then getting the response from them is difficult. Using this system we can easily identify the person's mental health and emotion.

## 2. EXISTING SYSTEM

Fuzzy classification has been used for facial recognition for the past 15 years. This logic favors the partial or relative membership of an object. The membership of an object or vector is not limited to one class but shared with other classes that take into an

account of overlapping partitions and it is the case of fuzzy clustering.

In recent times multi agent systems with fuzzy classification are used for facial analysis from images and videos. These multi agent systems are composed by three agents they are

- Agent of perception
- Tracking agent
- Agent of decision

### 2.1 AGENT OF PERCEPTION

In agent identifies/detects a face from images or videos. However in case of videos it identifies the same face and also identifies the changes happened in the face.

### 2.2 TRACKING AGENT

The tacking agent is used for tracking the face on the scene. The agent follows 3 steps. First it identifies the face in the image frame. In the second step, it eliminates the face which already exists. In third step it identifies the new face from the image frame.

### 2.3 AGENT OF DECISION

The decision agent is an important element in multi-agent architecture. It classifies the face from each image frame. It has a queue which is going to contain faces to be classified. The agent takes the face of the head queue and calculates the degree of membership of that face to every class of face by calculating the similarity between the face and the classes of the face. The knowledge base represents a database which stores all the classes of face.

## 3. PROPOSED METHOD

The system uses BU-4DFE database for extracting and tracking the facial gestures in image frames. The proposed system has 3 steps for identifying the emotion by facial expression. i) Select the image frame and detect the face ii) Mark the facial feature points iii) Classification of emotion.

The system identifies the emotion from the video sequence so we get more number of image frame and we select the frames based on the face detection. Here we extract the image from the video sequence then check whether the image has human face or not. Further we check the quality of face in the image. If it is not clear then we move to next image frame. Process is carried until the face is detected correctly. After this process we have to mark some feature point in detected face for analysing the person emotion. Using this feature points we have to calculate the horizontal and vertical distance between the feature points. Based on the value or ratio we have to compare the value in the BU-4DFE database to identify the emotion of the person by facial expression. After this process we have to implement classification of the expression. In this step we get the actual output of the system.

The BU-4DFE database has 101 subjects for identifying the six emotions (happiness, sadness, fear, disgust, angry, surprise). This database has approximately 60,600 frame models. In the total 101 subjects, 58 subjects for female and remaining 43 subjects for male.

The system identifies the neutral facial expression for identifying the basic six emotions. If we have the neutral expression and other emotion then we have to compare the neutral and emotion image sequence for identifying the human emotion by facial expression then we do the emotion recognition.

## 4. METHODOLOGIES

### 4.1 VIDEO SEGMENTATION

In this videos segmentation we are get the sequence of image frame from the video. In the process of video segmentation the video converted into image frames and all the image frames are stored in a location after this process key frame (detect correct face image frame) only selected for emotion recognition.

### 4.2 PRE-PROCESSING

The process starts with getting selected image frame from the video sequence with good quality. Followed by image pre-processing, it identifies the face in each image frame from the video sequence. If we get the same face in both image frames (next and previous) then we start the facial emotion recognition.

### 4.3 FEATURE EXTRACTION

Feature extraction method is geometric method. In this method we are marking some point (feature point) on the face (exactly nose, eye, eyebrow, lips) which describes the geometric information about the emotion based on the distance between them. BU-4DFE database has 83 feature points marked faces in that database. In previous system they use 39 feature points. Increasing the feature points improves the overall accuracy of the emotion recognition system.

### 4.4 CLASSIFICATION

For classification process we have two classification algorithms which are Support Vector Machine (SVM) and Neural Networks (NN) to classify the specific emotion. In both methods they have some specific formulae and methods to classify the specific emotion.

## 5. CONCLUSION

The emotion recognition system we use simple methodology for identify the emotion using facial expression from video sequence of BU-4DFE database. The database has 101 subjects for identifying the emotion and it also has 83 feature points to recognize the emotion. In the total 101 subjects, 58 subjects are female and remaining 43 subjects are male. 20 feature points system found maximum accuracy 69.88% in NN and 87.88% in SVM. And 39 feature points gives more accuracy than the 20 feature points system. So increasing the feature points increases the accuracy. Using simple method we can get more accuracy.