A Survey Paper on Facial Expression Recognition System

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Abstract

Facial expression recognition has many potential applications which have attracted the attention of researchers in the last decade. Feature extraction is one important step in expression analysis which contributes toward fast and accurate expression recognition. Happy, surprise, disgust, sad, anger and fear facial expressions Emotion are of facial recognition. Facial expressions are most commonly used for interpretation of human emotion. There is a range of different emotions in two categories: positive emotion and non-positive emotion. There are four types of generally using system: Face detection, extraction, Classification and recognition. In Existing system it is not so much identify exact emotion of a person . In this proposed taking the large scale image, hybrid extraction feature and ANN classification of frame based expression recognition try to detect facial expression detection and emotion detection for positive and non-positive images also design robust.

Keywords: Face detection, Facial expression extraction, Expression recognition.

I. INTRODUCTION

Today Facial Expression Recognition Most Important Research Topics in Image Processing. Facial expression in human refers to the facial changes of a person. Such changes might be the result of the person's state of emotion, deliberation or social interaction. A facial expression recognition system is a computer system. Which can be analyze the facial features from either still image or video dataset and classify the facial expression into defined classes [1]. Facial Expression convey non-verbal communication cues in face to face inter action[7].Paul Ekman and Freisen have produced FACS-Facial Action Coding System for describing visually distinguishable facial movement[7].The Facial Expressions Two Types of Emotion: Positive Emotion And non-positive Emotion, positive emotions, we have included happiness, anticipation, interest, and acceptance and in non-positive emotions, we have considered anger, disgust, sad, fear, shame, contempt [1].
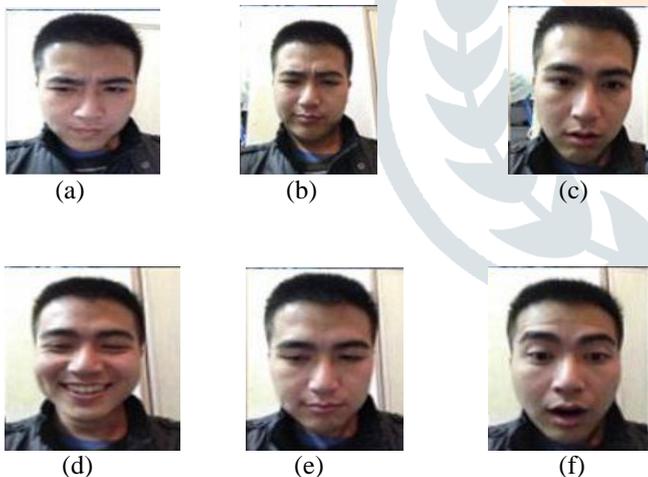

| (a) | (b) | (c) |
| (d) | (e) | (f) |

Fig1. Six Facial Expressions: (A) Anger (B) Disgust(C) Fear (D) Happy (E) Sad (F) Surprise [6].
Facial expression analysis find application in different interesting area, mostly used in human computer interaction interface .expression recognition acts as an intelligent system
in identifying the genuine pain and posed pain, hence there by find its place in medical field, crime and security division. The expression system is used in many domain like telecommunications, behavioral science, video games, Animation, Automobile safety, television, educational software etc [7].

II. BACKGROUND THEORY & LITERATURE SURVEY

Facial Expressions:
Fear: Eyebrows are raised and pulled together, with the inner eyebrows being bent upward. The eyes are tense and alert.
Disgust: Eyebrows and eyelids are relaxed. Also, there is raised and curled upper lip, frequently asymmetrically.
Happiness: Eyebrows are relaxed, with the mouth being open and its corners pulled back toward the ears.
Surprise: Eyebrows are raised. The upper eyelids are wide open, the lower one is relaxed. Also, the jaw is opened.
Sadness: Inner eyebrows are bent upward. Also, the eyes are slightly closed & the mouth is relaxed.

Anger: Inner eyebrows are pulled together downwards, with the eyes wide open. Also, the lips are pressed against each other or opened to expose the teeth.

Neutral: Relaxed face muscles. Eyelids are tangent to the iris. The mouth is closed and lips are in contact.

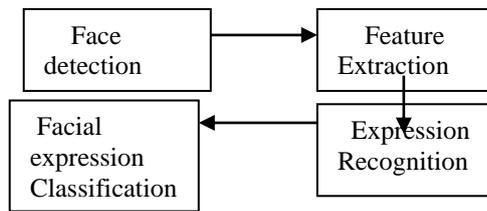## III. BASIC STRUCTURE OF FACIAL EXPRESSION RECOGNITION

Fig2.Basic structure of facial expression recognition [7]

We can show the face recognition in mainly three steps:
1. Face Detection
2. Features Extraction
3. Expression Recognition

Face detection:

Face detection determines the presence and location of a face in an image, by distinguishing the face from all other patterns present in the scene[9]. This requires appropriate face modeling and segmentation. The approach should also take into account the sources of variation of facial appearance like viewing geometry, illumination, the imaging process(Resolution, Noise), and other factors like occlusion[9]. Alternatively face detection can br carried out by using the entire face, making occlusion difficult to handle. Face detection methodologies classified on the basis of the image information used to aid in detection-Color, Geometric shape, motion information [9].

Features Extraction:
Feature Extraction is an extract to the identify face and face recognition. Face recognition is an evolving area, changing and improving constantly. Feature extraction methods can be categorized according to whether they focus on motion or deformation of faces and facial features, respectively, whether they act locally or holistically [8].
Different approaches of face recognition can be categorized in three main groups such as holistic approach, feature-based approach, and hybrid approach [8].
1) Local Feature Method: Local Feature method, Local Feature such as eye, nose , mouth are extracted first and then their local statistic. Local feature method are Geometric feature method and Elastic bunch graph method etc[8].
2) Holistic feature Method: Holistic feature method the whole face region is used a raw input to the expression recognition system. Holistic feature method are PCA, Fisher face, Gabor Feature method etc[8].
3) Hybrid Method: Hybrid method both holistic and local features are used for facial expression recognition [8].

Expression Recognition:
Facial expression analysis systems are to recognize facial expressions based on the extracted features. Two Types of Recognition of first is Frame based: Frame based expression recognition does not use temporal information for the input images.It uses the information of current input image with/without a reference frame. The input image can be static image or frame of a sequence that is treated indepently. And Second sequence based :Sequence based expression uses the temporal information of the sequence to recognize the expression of one or more frames[7].

Facial Expression Classification:
Expression categorization is performed by classifiers, covering parametric as well as non-parametric techniques, has been applied to the automatic expression [8]. Facial expression Recognition approach must be able to Classify efficiently facial expressions in spite of these variation and intensity, we have applied data mining technique [10].

IV. LITERATURE SURVEY

TITLE	Comparison Of Human And Machine Based Facial Expression Classification[1]	Robust Facial Expression Classification Using Shape And Appearance Features[2]	Facial Expression Classification By Temporal Template Features[3]	Facial Expression Recognition Using Anatomy Based Facial Graph[4]	Geometric Approach For Human Emotion Recognition Using Facial Expression[5]
Auther	Murari Mandal , Shashi Poddar ,Amitava Das	S L Happy , Aurobinda Routray	Prarinya Siritanawany , Kazunori Kotani	Sina Mohseni, Niloofar Zarei, Saba Ramazani	S. S. Bavkar , J. S. Rangole , V. U. Deshmukh
Year	IEEE(2015)	IEEE(2015)	2014(SICE)	IEEE(2014)	2015 (IJCA)
Extraction Method	Zernike Moments	PHOG and LBP	MHI , CCF	Modal Based	Anthropometric model
Classification	ANN	SVM	KNN	SVM	SVM ,RBFNN
Recognition Based	Frame	Frame	Sequence	Frame	Sequence
Weakness	The image in training section was not repeated in the testing section. It is not so much required to know the exact emotion of a person but a general description of the state of mind of the person is sufficient.	The eye regions were not selected as the features from these regions . Methods are not evaluated for out-of-plane head rotation due to unavailability of such databases.	Temporal template is that the performance can be corrupted by the head motion and shape deformation of face around the edge of face.	The graph edges ratio instead of measuring displacement, which causes various errors due to head orientations but image scale variation is still a cause of error.	Does Not extract properly if there are hairs on face area.

V. CONCLUSION

According to literature review number of method and technique available for detect facial expression but still some of limitation for detect facial expression and emotion detection using image database. in proposed method try to improve accuracy for detect and identify facial expression and emotion detect using hybrid feature extraction technique . in future try to design for robust system for detect and identify facial expression for positive and non positive emotion.

VI. REFERENCES

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