



# Image Analysis through Facial recognition: Guidelines

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**Abstract:** Human face detection is a pretty method for a wide range of applications such as face recognition, video tracking applications, and image database management etc. Face recognition is one of the most successful applications of image analysis and understanding, so it has recently received significant attention, especially during the past several years. An attempt has been made to provide basis of facial recognition and guidelines to do analysis of image through facial recognition.

**Keywords:** Face recognition, feature extraction, facial recognition etc.

## I. INTRODUCTION

The past few decades have seen a proliferation of intelligent systems for classification, diagnosis, and related tasks. Intelligent systems plays very important role in a variety of domains: finance, biometrics, human computer interfaces, industrial management, medical diagnosis, software and hardware engineering.

Facial recognition is the thread which makes Human-Computer Interaction (HCI) possible. Facial recognition helps to interpret the emotions of a person. For establishing humans and computers emotional interactions, human emotion identification is of a high priority for an intelligent system. A range of applications are there that use “emotion recognition” such as customer services, intelligent automobile systems, game and entertainment industry, automated systems that provide help to psychologists and neuroscience researchers and the like. These applications are based on automated human facial recognition.

The main role of face recognition (detection) or emotion recognition is to find the location of all human faces in a given image. Although this issue is so simple for a human brain, it still remains a challenging and difficult task for a computer. Tasks such as differences between various facial expressions, image orientation, presence or absence of structural components, imaging conditions such as lighting, camera characteristics can be mentioned. Face Recognition algorithms utilize some particular techniques such as neural networks, support vector machines, hidden Markov model, Hough transform, template matching, principle component

analysis, colour, texture and facial features analysis to get through an acceptable performance [1]

Any method for emotion recognition must settle on three basic choices such as the expressions to recognize, the features to use for recognition of the selected expressions and the classifier system to use for expression recognition.

## II. LITERATURE REVIEW

In [2], a popular set of features for facial expression recognition is the one introduced in facial action coding system (FACS). In this work, author proposed 46 facial action units (FAUs), such that each FAU is associated with the movement of one or more facial muscles. FACS further uses A-E intensity levels for describing intensity of each FAU. Ekman proposed six basic facial expressions, named as anger, disgust, sad, joy, surprise, and *fear* that are universal across all human cultures. He depicted that different people exhibit similar basic facial features while producing any of these basic expressions [3]. Maglogiannis et al. (2009) discussed an integrated system for emotion detection in which they used only eye and mouth expressions for detecting five emotions (Happy, Sad, Neutral, Surprise, and Angry). The main role of their algorithm is the utilization of an edge detection technique to identify the lines of the eyes and mouth, curves and gradients [4]. In [5], a face detection algorithm is proposed by author, which is based on a lighting compensation technique and a non-linear color transformation that can be applied in a wide range of the skin-color. Unfortunately, this algorithm could not identify faces with all kind of poses. However, Jing et al. [6]



proposed a system to detect face under different environment and poses, which concatenate the shape, colour, and lighting distribution information.

### III. STAGES OF FACIAL RECOGNITION SYSTEM

EVERY FACIAL RECOGNITION SYSTEM HAS THREE MAIN STAGES:

1. Face Detection
2. Feature Extraction
3. Classification

In the first stage, Face Detection stage has been performed on the frontal face image and the portion of image that contains the face is passed to the next stage. The next stage after detecting faces is facial feature extraction. Feature

extraction is one of the most complicated stages in emotion recognition system. The final precision of an emotion recognition system mostly depends on precision of this stage. Generally, facial features have two major categories such as:

**The Primary Features:** The primary features include six basic emotions. These features are: Eye Opening, Mouth Opening, Eyebrow constriction and Mouth Corners Displacement.

**The Secondary Features:** Auxiliary attributes for precise recognition of emotions are used as secondary features. These features are: Mouth Length, Nose-Side Wrinkles, and Existence of the Tooth, Eyebrows Slope, and Lips Thickness.

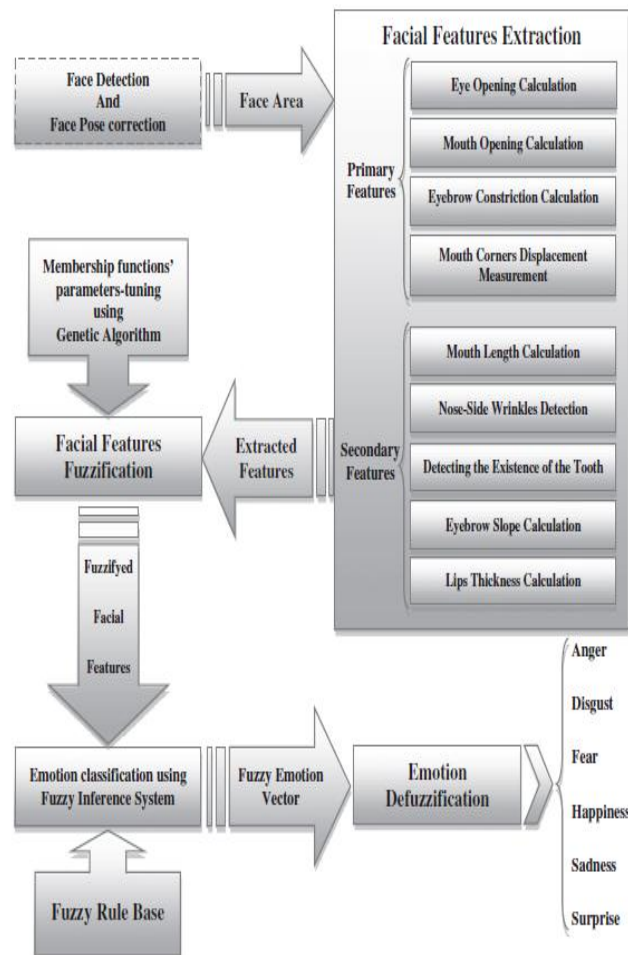


Fig1. Emotion Recognition System Stages [7]

### IV. CONCLUSION

Face recognition is one of the pretty techniques in image analysis applications. In face recognition system, facial features are extracted from a static image. Then these features are fed to the classifier system for recognition of facial expression. Literature reveals that many researchers



implementing facial recognition for image analysis. In this paper basis of Facial recognition has been detected to provide guidelines for further research work.

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