

# Facial level of the corresponding face regions

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Facial expression, visual interactions, through which humans shows their inner emotional state, thus it plays an important role in social interaction and interpersonal relations. Facial expression recognition plays a very huge role in terms of human to computer interaction as well as various aspects of behavioral science. There are six known classes of emotional state (Angry, Disgust, Fear, Happy, Sad, Surprise) associated with their respective facial expressions, according to Ekman's studies. Humans recognize facial expressions almost effortlessly and without delay, but this is quite challenging for machines.

This thesis presents Facial Expression Recognition Using Enhanced Local Binary Patterns which uses LBP for feature extraction. The main contribution of the thesis is the enhanced LBPs, in which the high variance LBP pixels are selected to represent facial information and its recognition rates outstandingly improved. The tests was completed on the BU-3DFE database. The experiments show that after applying feature selection to enhanced LBP representations, the recognition rates are improved by 11.67%. Keyword: expression recognition, BU-3DFE, feature extraction, enhanced local binary pattern. 1. INTRODUCTION Facial Expression Recognition FER, a very important aspect of computer vision, is some biometrics that seeks to use computational algorithms to detect expressions of faces from an existing set of images in dataset.

It has become one of the most popular biometric and challenging topic in pattern recognition as much progress has been made in respect to 2D images 12 3. Facial expression on the other hand is a visible exhibition of emotion, intention, cognitive activity and psychopathology of an individual 4; by means <https://assignbuster.com/facial-level-of-the-corresponding-face-regions/>

of adjusting the facial muscles for each level of facial expression. Humans can easily understand each facial expression, whereas it is difficult for machines to recognize faces or face expression. Advancement and research in algorithms have developed methods for identifying faces from given image and most fortunately, identifying, classifying and recognizing emotional expressions from digital image. There are three main steps in facial expression recognition: facial acquisition, facial feature extraction, and facial expression classification. Facial acquisition is a preprocessing stage in which the input image region is detected or located, once a facial image is located, the eye distance and the gray level of the corresponding face regions will be normalized to be the same while the facial feature extraction will concentrate more in finding the appropriate representation of the facial images for the recognition and two main approaches in facial feature extraction: appearance features-based systems and geometric features-based systems. Appearance Features-Based Systems: it checks the changes in appearance (facial images) such as wrinkled face, furrows and bulges.

Image filters such as Gabor wavelet analysis [35, 36] and local binary patterns (LBP) [34] will be applied to either specific face regions or the whole face to extract the facial appearance changes. Gabor wavelet analysis is accurate and its computational memory requirement is very large while local binary patterns (LBP) is more tolerant against illumination changes which is one of its important properties also its simplicity in computation, it also has extensive interest for facial feature expression representation. Geometric features-based systems: detects the shapes and locations of major facial

components such as mouth, nose, eyes, and brows of the image. Moreover, in practice Geometric features-based (GFB) systems require the accurate and more reliable facial feature detection, which in real-time application is difficult. A robust algorithm has to be applied on each stage (image acquisition or registration, normalization, feature extraction, classification and recognition) of the Facial Expression Recognition (FER) system and novel methods used to recognize each emotion with varying level of intensity. Researchers are making effort to extract different facial features from different expression levels, but their recognition performance generally depends upon the reliability of these features 5.

For this reason, this paper made use of the popular algorithm, Local Binary Patterns (LBP) for feature extraction and classified using distance classifier. Since the Local Binary Patterns (LBP) has recently gained attention in the field of facial recognition, so it is worthwhile, using it in facial expression recognition applications 3 6. However, the major aspect this project is most concerned about when dealing with Facial Expression Recognition (FER) is the expression on the face 4. This is due to the challenging fact that the human faces carry a lot more information such as the identity of an individual, and therefore need to find a way to remove the personal identity while working with expression recognition. Facial Expression Recognition (FER) has application in areas such as human computer interaction, computer vision and pattern recognition due to its application in several areas such as customer satisfaction framework, in security system for verification and authentication and some robots have been developed to benefit from the ability to recognize facial expressions 7. Also, the behavioral science or

medicine are key areas that can take advantage of the application of facial expression analysis 4. This paper is organized as follows: the most popular and successful Local Binary Patterns (LBP) operators in section 4. 1.

Section 5 presents extraction of facial feature based on Local Binary Patterns (LBP). Section 5. 1 explains the face recognition scheme used. Simulation result and conclusion are shown in sections 6 and 7 respectively.