

# [Facial level of the corresponding face regions](https://assignbuster.com/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 interpersonalrelations. Facial expression recognition plays a very huge role in terms ofhuman 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, accordingto Ekman’s studies. Humans recognize facial expressions almost effortlessly andwithout delay, but this is quite challenging for machines.

This thesis presentsFacial Expression Recognition Using Enhanced Local Binary Patterns which usesLBP for feature extraction.  The maincontribution of the thesis is the enhanced LBPs, in which the high variance LBPpixels are selected to represent facial information and its recognition ratesoutstandingly improved.  The tests was completedon the BU-3DFE database. The experiments show that after applying featureselection to enhanced LBP representations, the recognition rates are improvedby 11. 67%.  Keyword: expression recognition, BU-3DFE, feature extraction, enhanced local binarypattern. 1.   INTRODUCTIONFacialExpression Recognition FER, a very import aspect of computer vision, is somebiometrics that seeks to use computational algorithms to detect expressions offaces from an existing set of images in dataset.

It has become one of the mostpopular biometric and challenging topic in pattern recognition as much progresshas been made in respect to 2D images 12 3. Facial expression on the otherhand is a visible exhibition of emotion, intention, cognitive activity andpsychopathology of an individual 4; by means of adjusting the facialmuscles for each level of facial expression. Humans can easily understand eachfacial expression, whereas it is difficult for machines to recognize faces orface expression. Advancement and research in algorithms have developed methodsfor identifying faces from given image and most fortunately, identifying, classifying and recognizing emotional expressions from digital image. There are three main steps infacial expression recognition 29: facial acquisition, facial featureextraction, and facial expression classification. Facial acquisition is apreprocessing stage in which the input images region is been detected orlocated, once a facial image is been located, the eye distance and the gray level of the corresponding face regionswill be normalize to be the same while the facial feature extraction willconcentrate more in finding the appropriate representation of the facial imagesfor 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 (facialimages) such as wrinkled face, furrows and bulges.

Image filters such as Gaborwavelet analysis 35, 36 and local binary patterns (LBP) 34 will be appliedto either specific face regions or the whole face to extract the facialappearances changes. Gabor wavelet analysis is actuary high and itscomputational memory requirement is very large while local binary patterns(LBP) is more tolerance against illustration changes which is one of itsimportant properties also its simplicity in computation, it also have extensiveinterest for facial feature expression representation. Geometric features-basedsystems: detects the shapes and locations of major facial components such asmouth, nose, eyes, and brows of the image Moreover, in practice Geometricfeatures-based (GFB) system require the accurate and more reliable facialfeature detection, which in real-time application is difficult.  Robustalgorithm has to be applied on each stage (image acquisition or registration, normalization, feature extraction, classification and recognition) of the FacialExpression Recognition (FER) system and novel methods used to recognize eachemotion with varying level of intensity. Researches are making effort to extract different facial feature fromdifferent expression level, but their recognition performance generally dependupon the reliability of these feature 5.

For this reason, this paper madeuse of the popular algorithm, Local Binary Patterns (LBP) for feature extraction and classified using distanceclassifier. Since the Local Binary Patterns (LBP) has recently gained attentionin the field of facial recognition, so it is worthwhile, using it in facialexpression recognition applications 3 6.  However, the major aspect this project is most concerned about when dealing with FacialExpression Recognition (FER) is the expression on the face 4. This is due of the challengingfact that the human faces carry a lot more information such as the identity ofan individual, wetherefore need to find a way to remove the personal identity while working withexpression recognition.  FacialExpression Recognition (FER) has application in areas such as human computerinteraction, computer vision and pattern recognition due to its application inseveral areas such as customer satisfaction framework, in security system forverification and authentication and some robots have been developed to benefitfrom the ability to recognize facial expressions 7. Also, the behavioral science or medicine are key areas that can take advantage of theapplication of facial expression analysis 4. This paper is organized as follows: the most popular and successful Local Binary Patterns (LBP) operators insection 4. 1.

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