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Human Expression Identification using Different Classification and RLBP

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Abstract: — Facial emotion or expression detection has wide variety of application such as, machine-person communication, Medical field, Biometric studies, Biometric based person authentication ,Bio based treatment, Audio-video- conferencing, Countrywide security system, robotics and technical games and many more. Hence facial expression detection is an important and complex problem. This paper proposed a algortihm for facial expression recognition based on extraction of Robust Local binary Pattern (RLBP) features in curvelet domain.The curvelet transform saves the edges and unique features occurred on the face during expression and the RLBP eliminates mixed noisy pixels using medianfiletring features from the face images.Face detection is done to reduce compelexity and redundancy.The Euclidean distance classifier classifies the facial expressions as angry, disgust, fear, happy, neutral, sad and surprise.

Keyword: Median Filtering,RLBP (Robust Local Binary Pattern),Eulidian Distance

I .INTORDUCTION

Nowadays, the safety measures for the systems is becoming more and more important and useful. The authentication plays a major role in the line of defense, identity card and passport verification. There are three main types of authentication such as password, card or token, biometric. Biometrics is used for recognizing person physical or behavioral characteristics. There are different types of biometrics are used like finger print, retina, face recognition, voice pattern analysis etc. Among all biometrics face is one of the best biometrics. The security is not well in many of the system such as banking, finance transaction, sales and law enforcement. So confidentiality should be provided. characteristics include keystroke dynamics, signature, voice pattern and physical characteristics include iris, Palm print, face A **facial expression** is one or more motions or positions of the muscles beneath the skin of the face. According to one set of controversial theories, these movements convey the emotional state of an individual to observers

II. PROPOSED SYSTEM

Biometrics refers to automatic identification of a person on a basis of his or her unique physiological or behavioral characteristics. Behavioral biometrics include signatures, voice recognition, gait measurement, and even keystroke recognition. Physiological biometrics include facial recognition, fingerprinting, hand profiling, iris recognition, retinal scanning, and DNA testing. Behavioral methods tend to be less reliable because they are easier to duplicate.However, one issue of LBP is that it is not so robust to the noise present in images when the gray-level changes resulting from the noise are not monotonic, even if the changes are not significant [2]. To this end, we propose a new descriptor based on LBP, i.e., robust local binary pattern (RLBP). The idea is to locate the possible bit in LBP pattern changed by the noise and then revise the changed bit of the LBP pattern. The idea is very simple, but it works very well. For example, the performance of LBP decreases significantly when we add white Gauss noise in the Brodatz texture dataset [1]. However, the performance of RLBP almost does not change.

A]

Face Img->Preprocessing->RLBP+Redundant->D/B

B]

Test Img->Preprocessing->RLBP+Redundant->TesT

C]

Test feature <->Database Image--->Expressions

Fig1.Block Diagarm

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A) Face Detection

Face detection can be defined as the computer based process that takes an image as input and produces a set of image coordinates where human faces are located if present. The face detection process is a basic pre-processing stage for any computer based system that processes images or video streams that deal with the human face. Example applications include face recognition, surveillance, face tracking, human computer interaction (HCI), robotic vision and autonomous vehicles, biometric based authentication; content based image retrieval, as well as selective compression.Human face detection plays an important role in applications such as video surveillance, human computer interface, face recognition, and face image database management. We propose a face detection process for color images in the presence of varying lighting conditions as well as complex backgrounds. There are different techniques like lighting compensation technique and a nonlinear color transformation, adaboost algorithm. Our method detects face portion from the entire image based on Haar cascade classifier method using viola jones algortihm.

III.Robust Local Binary Pattern(RLBP)

The LBP feature vector, in its simplest form, is created in the following manner:Local Binary Pattern (LBP) describes a 3x3 image neighborhood by comparing the intensity of the 8 non-center pixels against the center pixel, and encode the comparison result into an 8-bit string. Therefore a 3x3 local region may have 2^8=256 different patterns. In a typical texture recognition task, the LBP feature is extracted at each pixel of the input texture image, and is then accumulated to a 256-bin histogram. The shape of this histogram thus summarizes the properties of the input texture, whose identity is determined by comparing the histogram against precomputed model histograms (usually certain bins are merged)

Among the 256 patterns, those 58 patterns that consists of at most one consecutive block of 0 AND at most one consecutive block of 1, which we call "uniform patterns", dominate the occurences of all patterns, and contribute most to the discriminative power. In contrast, other patterns beside the uniform patterns, which we call "miscellaneous patterns", occur much less frequently and contribute little to the discriminativeness.However, under noisy situation, the number of miscellaneous patterns seriously increase because a lot of uniform (good) patterns get corrupted, therefore hurts the discriminativeness. And that's when RLBP come out. Given an 8-bit miscellaneous pattern (possibly corrupted), RLBP tries to save it by changing it to the most possible uniform pattern(s) before accumulate it/them to the histogram. Intuitively, this process helps retain useful information by reusing the corrupted patterns instead of simply discarding them. Divide the examined window into cells (e.g. 16x16 pixels for each cell).

for each pixel in a cell, compare the pixel to each of its 8 neighbors (on its left-top, left-middle, left-bottom, right-top, etc.). Follow the pixels along a circle, i.e. clockwise or counter-clockwise.Where the center pixel's value is greater than the neighbor's value, write "0". Otherwise, write "1". This gives an 8-digit binary number (which is usually converted to decimal for convenience).Compute the histogram over the cell, of the frequency of each "number" occurring (i.e., each combination of which pixels are smaller and which are greater than the center). This histogram can be seen as a 256-dimensional unique feature vector .Optionally normalize the histogram. Concatenate (normalized) histograms of all cells. This gives a feature vector for the entire window.The feature vector can now be processed using the classifiers, or some other machine-learning algorithm to classify images. Such classifiers can be used for face recognition or texture analysis.The neighbors of the pixel xc would give the LBP pattern string (11010011).

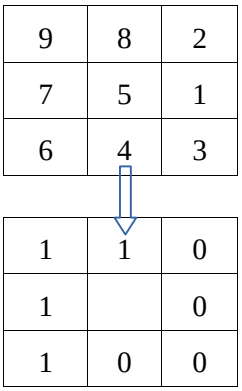

Fig. 2. Robust local binary pattern

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However, the pixel value of x2=124 here is of high probability of being noisy since it results in a (101) substring (see following for details). If we change the corresponding bit of x2 in LBP string from 0 to 1, the new LBP string of this pixel (11110011) would denote a local corner, which is a more meaningful pattern for the texture representation and classification.

IV.Euclidian Distance Classifier

Eulidian distance is finest method to classify depending upon minimum distance between two values.Euclidean distance classifier, for calculating the minimum distance between the test image and image to be recognized from the database. If the distance is small, we say the images are similar and we can decide which the most similar image in the database is .Euclidean distance is one of the simplest and faster classifier as compared to other classifiers. Euclidean distance is defined as the straight-line distance between two points. Minimum Euclidean distance classifier is optimum for normally distributed classes. Euclidean distance or Euclidean metric is the ordinary distance between two points that one would measure with a ruler, and is given by the Pythagorean formula. By using this formula as distance, Euclidean space (or even any inner product space) becomes a metric space.

V RESULTS

In this project given input image as testing image of same person having one of the facial expression and comapred with database of multiple images of same person having different facial expressions. Testing image is matched against each stored database template at each level. An genuine and imposter matching is defined as the matching between iris features of training image and iris features of test image. Here, the parameters for the unique features are calculated. And getting 97.5% efficiency .Total we had used 1 persons facial expression image almost 100 to 150 databse images with different expression .Preporcessing was done on al images like rgb to gray and median filetring and then unique feature calculation done with RLBP with additional redundant pixel reduction method and storage of it to comapre with testing image which gives result ina round 150 seconds.Which accurate and fast

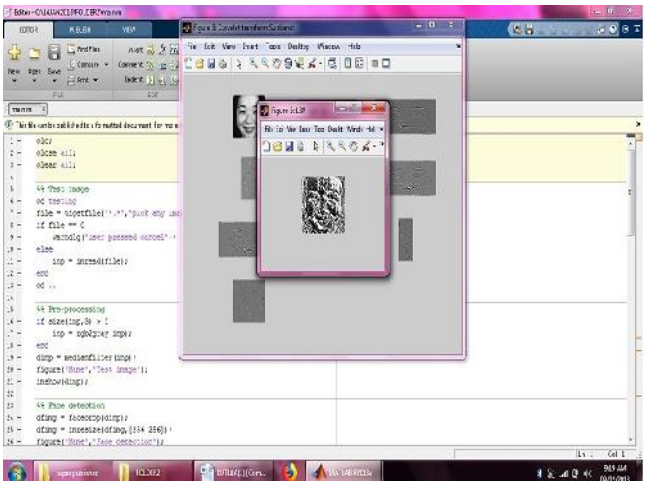

Fig.4 Median filtering

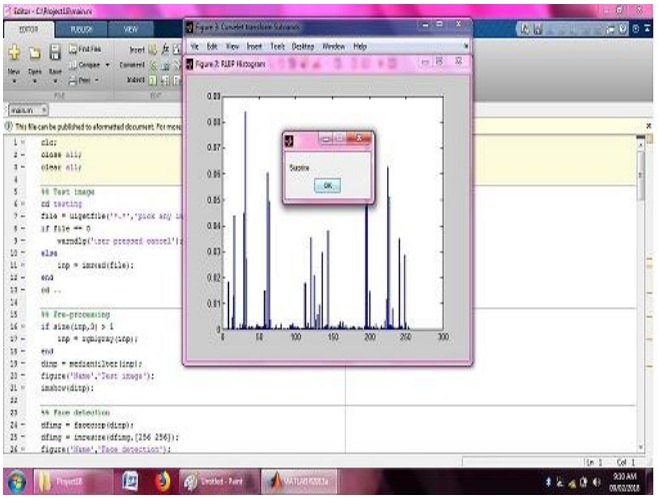

Fig.5 Facial expression recognized:Expression:Surprised

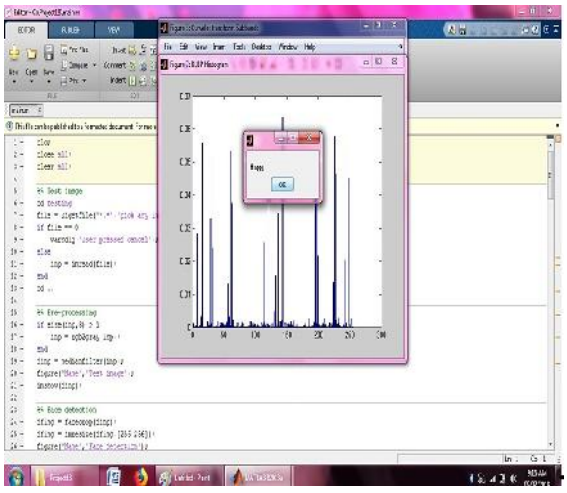

Fig.6 Facial emotion recognize:Emotion:Happy

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VII CONCLUSIONS

We have proposed a new algorithm for facial emotion or expression identification.We did preprocessing of image to convert that image into genral use and then applied median filtering o remove noise from image and then using RLBP with additional redundant pixel reduction method unique fatures from face image is extracted .Database is formed using same approch and testing images are comapred with database images using euclidan distance which is giving more accurate results. This method has been studied using image database. The features are extracted from the still images using curvelet based RLBP. Euclidean distance classifier is used for classification of facial expressions.The mentioned method has better accuracy with consistency. In biometrics, face is one of the user friendly because without the individual contact the characteristics of a person is easily find out and also provide security and authentication in an efficient manner.

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