© 2018 IJSRST | Volume 4 | Issue 7 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X
Themed Section: Science and Technology

A Novel Approach for Facial Emotion Recognition Based On Kernel Extreme Sparse Learning with CSMP

B. Sriharika[1], B. Anuradha[2]
[1]M.Tech Student, Department of ECE, Svuce, Tirupati, Andhra Pradesh, India
[2]Professor, Department Ofece, SVUCE, Tirupati, Andhra Pradesh, India

ABSTRACT

Camera motion during light exposure causes image blur and disturbs them. The nonuniform blur occurring due to camera inclination and rotations cannot be handled efficiently .The traditional methods depending on the convolution model are failed in case non-uniform blur. Here we recommend a procedure for face recognition with space-varying motion blur. To deal with it NU-MOB algorithm is used. A set of determined gallery image is blurred and the input probe image is compared with each image to find closest match. Our future work is based on the emotion identification where considering the different emotion based videos and the emotion recognition performed using the ESL-CSMP technique. And improve performance by using kernels in ESL method. Experimental results prove to be better and yields better performance when compared to the other state of art methods.

Keywords : Face recognition, Illumination, Non Uniform Blurring, Convolution Model, ESL-CSMP Technique

I. INTRODUCTION

A facial recognition system is a computer application able to identify a particular person from a digital image or a video source. This is done by comparison of selected image facial features with a database containing faces. It is commonly used in safety systems which is similar to biometrics such as Thumb-print or Ocular recognition systems. Lately, it find wide spread use in industrial and commercial applications.

Since facial expression analysis is useful in different applications in real-life and is main topic interest in pattern recognition/classification areas. For example, some researchers consider the whole face into account without segmenting as sub regions or sub units for processing while some others consider sub-sections for carrying out their methods. Different parameterization techniques, all aiming to solve the classification problem in the most efficient way possible, have been introduced and used together with the above expressed methods. One of the examples to the facial features is computer simulations and animations that are applicable in movies and in computer games. Recognition of the expression on face can further be used in various other aspects, such as in projects where a driver's expression is examined to check whether he is tired and therefore an alert should be displayed to fulfill the requirements of a safe drive. Different practical uses of Automatic facial expression identification are safety systems, computer graphics, interactive computer simulations and computer vision. In this project, the aim is to implement binary and multi-class face expression analysis algorithms based on 'Facial Action Coding System' by evaluating features such as HAAR wavelet coefficients, Gabor and using classifiers like Error Correcting Output Codes and Support Vector Machines together with feature selection methods such as Adaboost is useful in automated systems in

real-life applications depending on learning from examples.

Few algorithms standardize a set of images containing face and then abridge the face data, saving the data in the image which is useful for face comparison. This compressed data is used for comparison with a probe image.

Two types of algorithms exist for face recognition1.Geometric (consider distinguishing features) 2.Photometric (a statistical approach which imparts an image into values and the values are compared with templates to exclude variances).

II. RELATED WORK

The elementary non-uniform movement face recognition algorithm depends on PSF Model. Every selected image from gallery is subjected to all the existing transformations in the 6 D Space (3 for translations and 3 for rotations) and the resulted transformed images are arranged as columns of a matrix and the convexity result is extended to the PSF Model which is proved for simple convolution. And the elementary framework is extended to handle differences in blur. The Face is approximated to convexity property of a face under blur variances in the settlement of PSF Model. The scheme wherein the first step is to solve PSF weights for the probe image and use the estimated PSF to solve for the blurred gallery image coefficients and repeated till it is converged. At last every gallery image is undergone transformation (re blur and relight) to find similarity with the probe in the LBP Space. Here we recommend a face identification algorithm for non uniform motion blurring that is caused by relative motion b/w the camera and person.

The modules used in the system is as shown in figure 1

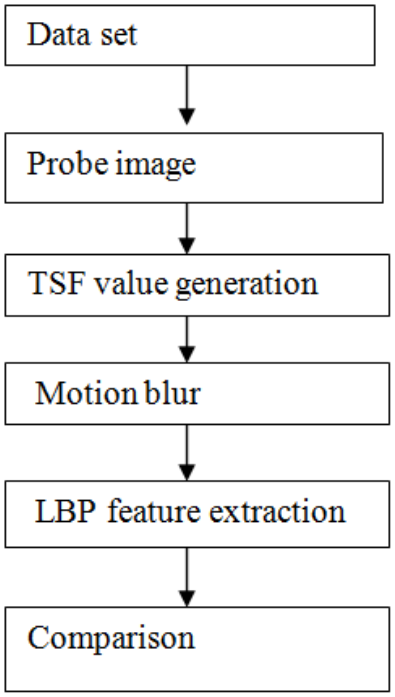

Figure 1. Modules used in system

Dataset

Face data set image is stored in the system. 400 images of 40 persons are comprised in gray level frontal view. These may be of females and males with different expressions.

Probe Image

The probe image in the module represents an image from the testing data set and blur is applied on image by using “imfilter” function and type blur is Gaussian blurring.

TSF Value Generation

Blurring is a method which compresses an ideal image’s bandwidth resulting an imperfect image. In image analysation uses like face identification, number plate detection etc, it causes a crucial problem. The two kinds of blur used in this project are:

Motion Blur

A rapid movement of objects occurs in a sequence of images such as movie or still image cause motion blur. It occurs due to long exposure and rapid movement.

Gaussian Blur

Gaussian blur occurs when the image is blurred using a Gaussian function. Gaussian blur means convolution of Gaussian function with required image. A Gaussian blur has LPF action. It is due to the fact that the FT of a Gaussian function is also a Gaussian and hence the effect of high frequency components in an image is reduced on the application of Gaussian blurring.

The ideal PSF is the 3D diffraction arrangement of light emerged from a small point source in the sample and transferred to the image plane through a high NA objective. The gallery image is blurred by using produced PSF value of the probe image.

Different types of blur kernels can be generated by using MATLAB command special. The command IMFILTER function which is equal to 2 D convolution is used to blur the image with the kernel.

The gallery image represents an image in the training dataset. Here training dataset contains facial images. The TSF value generated using the probe image is used to blur the total data set.

LBP Feature Extraction

For both the image and every blurred image in the training dataset LBP feature is to be extracted. This can be achieved by using LBP texture descriptors to make totally different local descriptions of the face and fix them into a global description. These methods based on local features are more violent to variances in holistic strategies.

Illumination and pose

The quality of stored images, when implementing the solution of an image processing Illumination level is a crucial factor. It causes a large effect on the image assessment. The most troublesome task in image processing is the selection of suitable light source for applications but is often lacked care due to damage of the overall system. The assessment is additionally littered with the angle of striking of light on the article. Here the illumination source is focused at different parts of the picture to obtain varying illumination images. Additionally the probe set contains pictures of persons in numerous poses that embody numerous facial expressions, student positions etc.

Comparison

Similarity between any two images can be find by using computed LBP value. Individual comparison is done between LBP value of the probe image and the entire image's LBP value present in blurred training dataset. For similarity matching the nearest value is considered and the similar 10 images are displayed in the descending order.

III. METHODOLOGY

The step by step procedure for the proposed method is as shown in figure 2

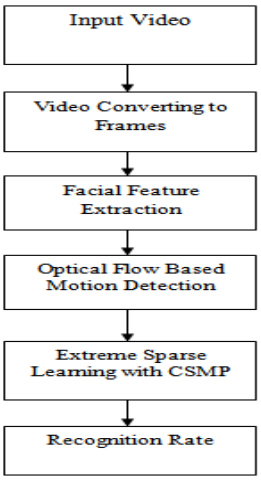

Figure 2. Flow Chart For The Proposed Method

Frame Conversion

Pre-processing consists of computing track-lets and computing frames are occurred by the single input

video. Frame conversion is the process of converting the single video into number of images. By the frame conversion method, the video is not to be processed directly in to the process. So that the process is done by the image processing.

Facial feature extraction

In order to understand human faces, we have to consider the conspicuous characteristics of the faces. Features like eyes, nose and mouth with their abstraction and geometric distribution and

By exploitation the feature points on person face and applying human visual property within the recognition of faces, people can acknowledge persons from very far distance, even the details are hazy i.e., the symmetry characteristic is sufficient to be recognized. Human face is a set of eyes, nose and mouth etc., and have variations in size and shape of these parts. So one of the ways to recognize face is to consider the shape of the eyes, nose, mouth and chin, and then differentiate by scale and distance of those parts. Another method is by using deformable model to depict the shape of the parts on face in subtle manner.

We should choose important characteristic feature on the face and can be sunder out easily. Sufficient number of the feature points should be taken for enough information. If the database contain different poses of people to be recognized, the angle invariance property of the geometry characteristic is very essential. This paper presented a process to designate the essential feature points of face, which select 9 characteristic points that have the property of angle invariance, including 2 eyeballs, 4 far and near extremes of eyes,2 mouth extremes and the centre point of nostrils. Based on these, we can get alternative feature points by extending them and the characteristics of face elements which are useful and associated with face identification.

Optical Flow Based Motion Detection

Study and estimation of motion is very hard task in computer vision and digital video processing. Optical flow presents a lucid modification in moving object's location or distortion between picture frames. Optical flow estimation produces a 2 D Vector field, i.e., Motion field, representing velocities and directions of every point of an image series. Since it is an ill posing difficulty, assuming image brightness steadiness between video frames is mostly used limitation. Until now various constraints between frames have been recommended in optical-flow modeling. Such constraints depend on image brightness and velocity.

Based on native derivatives optical flow is taken into account as an approximate local picture motion in a given image sequence i.e., in 2-D how much every image pixel moves between adjacent images is specified, while in 3-D how much every volume pixel moves between adjacent volumes is specified. The 2 - D picture series are established under perspective projection through the relative motion of scene objects and camera. With orthographic projection of stationary sensor and object which is moving 3D volume sequences were formed. In both cases, temporal changes in the image brightness are caused by moving patterns. Here all temporal intensity transforms are caused by motion.

The image region where brightness change is observed is considered as a principle for moving object. Optical flow based method is challenging, but it can precisely examine the motion even without considering the background. This approach has good performance, but this requires more images to be stocked, thus resulting in higher memory requirements and expenditure.

Extreme Sparse Learning with CSMP

The features are trained to differentiate the input frame's expression. For this we want to compress the spatial property of training frames feature. At the time

of Training itself we are selecting the Group based Classification labeling is called CSMP. And here kernels are united to give best performance.

IV. QUANTITATIVE ANALYSIS

Recognition Rate

Recognition performance has many measurement principles. The most important and accepted formula of recognition rate is in below equation .

$$\text{Recognitionrate} = \text{RecognizedImages number} / \text{NumberOfTestingImages}$$

V. RESULTS

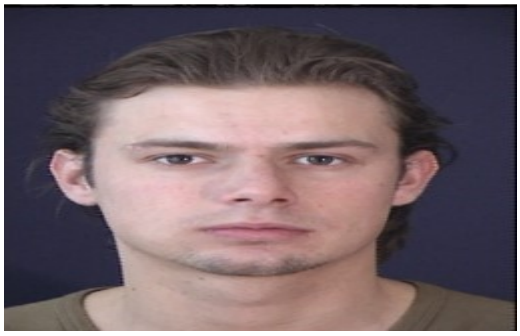

Figure 3 . Input Video Converting To Frames

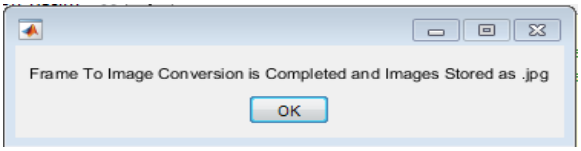

Figure 4. Frame To Image Conversion And The Images Stored as .jpg

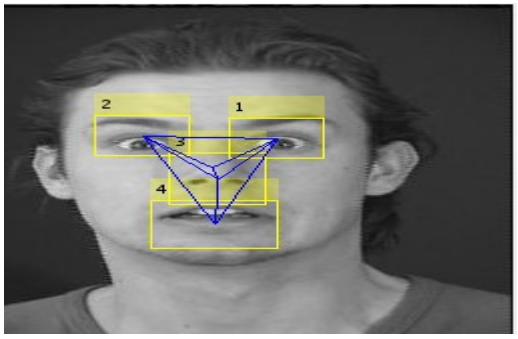

Figure 5. Facial Point Feature Extraction

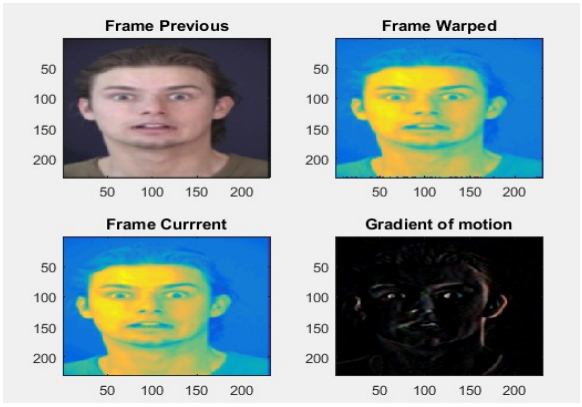

Figure 6. Frame Wrapped and Gradient Of Motion

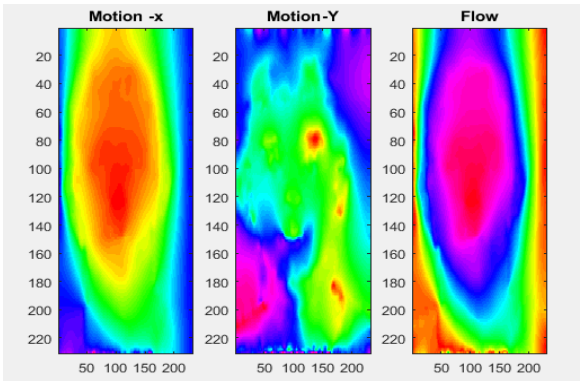

Figure 7. Graphs Of X and Y

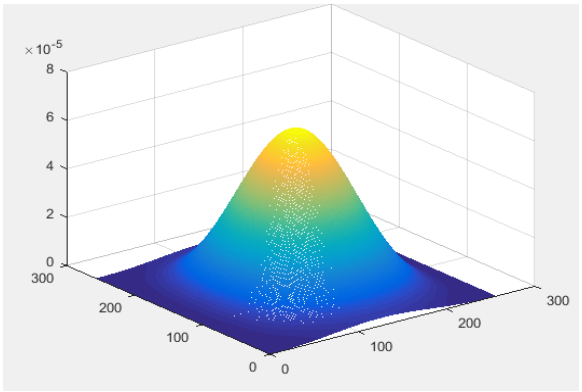

Figure 8. Weight Function

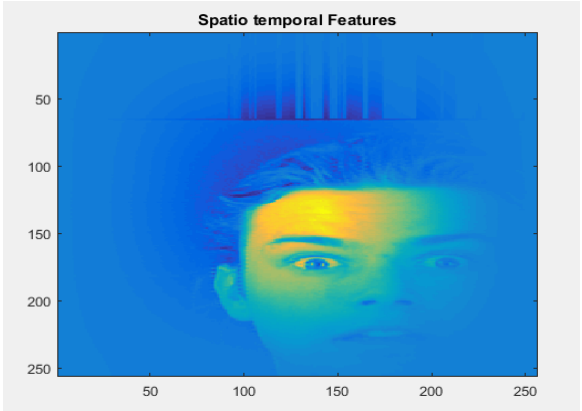

Figure 9. Spatio Temporal Features

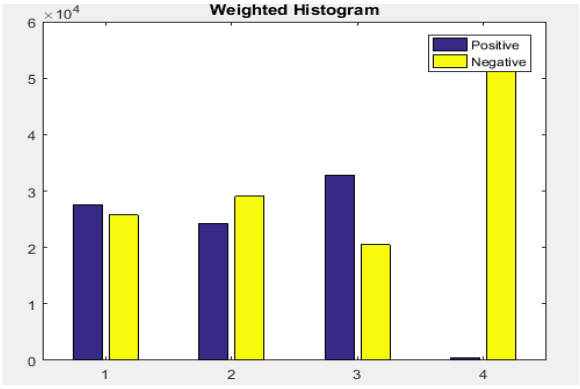

Figure 10. Weighted Histogram

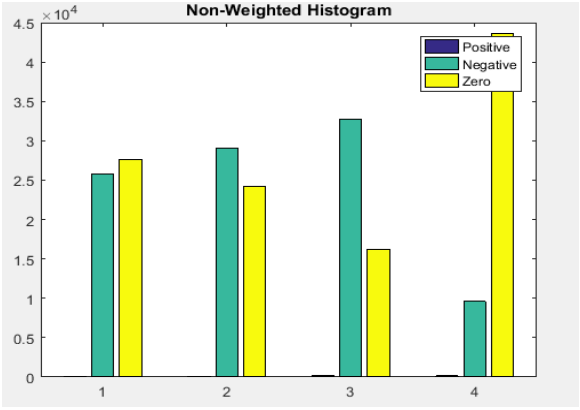

Figure 11. Non –Weighted Histogram

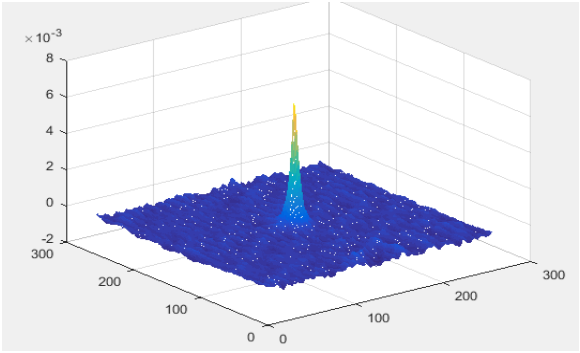

Figure 10. Confidence Map

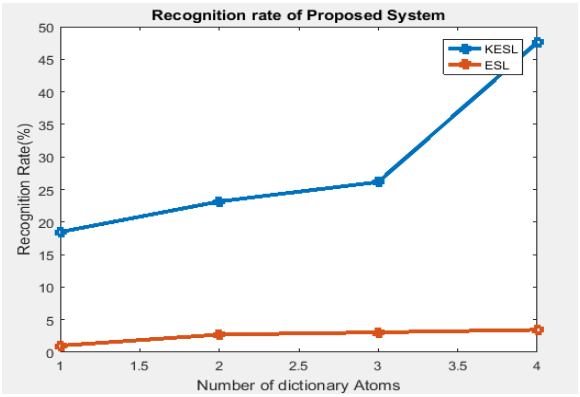

Figure 11. Recognition Rate

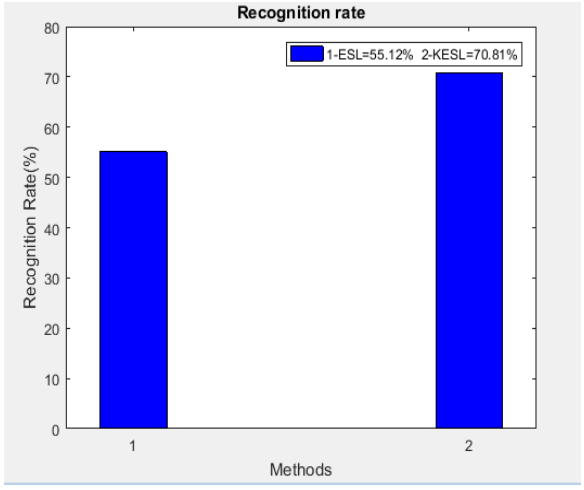

Figure 12. Recognition Rate

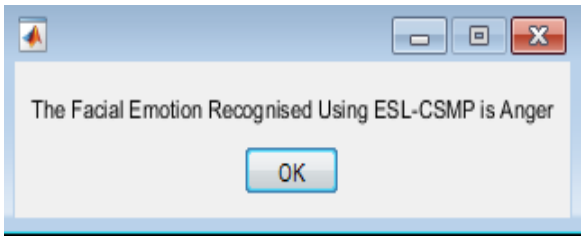

Figure 13. Facial Recognition Using ESL-CSMP is Anger.

```
TrainingAccuracy =

     1

ESL(CSMP)     recogniton rate is     0.70809

ans =

The Facial Emotion Recognised Using ESL-CSMP is Anger
```

Figure 14. Recognition Rate

VI. CONCLUSION

We proven a technique to acknowledge face using the effects of illumination, pose and motion blur and to calculate the blur from the given probe image. The facial expression identification estimated using KESL-CSMP technique. Experimental results prove to better and gives better performance when compared to the other state of art methods.

VII. REFERENCES

[1]. W.Zhao, R.Chellappa, Pj.phillips, and A.Rosen Feld, "Face Recognition: A Literature Survey," ACM Comput.Surv., vol.35, no.4, pp.399-458, December 2003.

[2]. R fergus, B.singh, Hertzmann, St.roweis, and W.T.freeman, "Removing Camera Shake From a Single Photograph," ACM trans.graph., vol.25, no.3, pp.787-794, July 2006.

[3]. Q shan, J jia, and A.Agarwal, "High Quality Motion Deblurring from a Single image," ACM trans.graph., vol.27, no.3, pp.73:1-73:10, August.2008.

[4]. A.Levin, Y Weiss, F Durand, and W t Freeman, "Understanding Blind Deconvolution Algorithms," IEEE Trans.Pattern anal.Mach.Intell., vol.33, no.12, pp.2354-2367, December.2011.

[5]. MSorel and F sroubek, "Space Variant Deblurring using One blurred and One underexposed Image," in Proc.16th IEEE Int.Conf.ImageProcess., November.2009, pp.157-160.

[6]. H.Ji and K Wang, "A Two-Stage Approach to blind Spatially-Varying Motion dEblurring," in Proc.IEEE Conf.Comput.Vis.Pattern Recognition., June.2012, pp.73-80.

[7]. S Cho,.Matsushita, and Lee, "Removing Non-Uniform motion blur from images," inProc.Int.Conf.Comput.Vis., October.2007, pp.1-8.

[8]. Y.Tai, Ptan, and MS.brown, "Richardson-Lucy Deblurring for Scenes Under a 'Projective Motion Path," IEEE Trans.Pattern Anal.Mach.Intell., vol.33, no.8, pp.1603-1618, Aug.ust 2011.

[9]. O.whyte, J.Sivic, A.zisserman, and J Ponce, "Non-uniform Deblurring For Shaken images," Int.J.Comput.Vis., vol.98, no.2, pp.168-186, 2012.

[10]. A.gupta, joshi, Zitnick, Cohen, and Curless, "Singleimage Deblurring using Motion Density Functions," in Proc.Eur.Conf.Comput.Vis., 2010, pp.171-184.