6. Chapter 6

RESULTS AND DISCUSSIONS

In this chapter, the proposed work and the results are discussed in detail.

i. Recognising a pose variant face image

Face recognition is an important biometric gaining popularity as surveillance cameras are being installed everywhere as a security measure. As the subjects need not interact with the camera, identifying faces from video sequence is a tedious task as there may be occlusion and pose variation in faces. The proposed method is a step in resolving occlusion and pose variation with respect to face images from video. In the proposed method, a training set is created with multi facet images. Descrete Curvelet Transform is used to extract features as this method is proved to be one of the best known algorithms for feature extraction from faces as face includes curved edges and curvelets are good at identifying and retrieving curved edges.

Features are extracted from the face that is stored in the training set upon in-painting for occluded face and inclined faces using Descrete Curvelet Transform. The extracted features from the input are matched against the training set using minimum distance matching. It is found that when YouTube dataset is used in identifying faces, the accuracy rate of recognising faces is comparatively high with respect to other existing methods. Chapter 3 includes a comparative study on the accuracy at which faces are recognised when compared with existing algorithms. It is also seen that the time required to recognise faces is comparatively less when compared with existing methods. In this work we have considered Patch-based method and S-LNMF methods for face recognition.

The proposed method is tested using videos from YouTube database and Honda/UCSD datasets. In the video sequence, both full faces and partly visible faces of each of the subjects are present with pose variation.

Table 6.1: Comparative Analysis of Recognition Rate from You Tube dataset

Video sequences	**Proposed approach**	**Patch based**	**S-LNMF**
1	96	95	92
2	95	94	90
3	95	93	88
4	95	93	86
5	94	92	85
6	94	92	84
7	93	91	82
8	93	87	81
9	92	86	80
10	92	84	80

Table 6.2: Comparative Analysis of Recognition rate from Honda/UCSD Dataset

Video sequences	Proposed approach	Patch-based	SLNMF
1	97	95	92
2	96	94	90
3	95	94	90
4	92	93	89
5	91	92	89
6	91	92	85
7	90	90	84
8	89	88	82
9	89	87	82
10	88	87	81

ii. Modified Exemplar Inpainting

This work modifies the existing exemplar-based inpainting. Exemplar inpainting is a texture synthesis approach to fill in the missing region of an image. Exemplar-based inpainting is considered to be one of the best inpainting techniques. It prioritises the pixels on the contour to decide on the most important patch. Prioritisation is based on the confidence term

and the data term. For the data term Criminisi used gradient computation to detect edge. In this work, Sobel edge detector is used to find the change in pixel values on the edge to prioritise the pixels. The following output does a comparative study on existing Criminisi approach using exemplar and the modified work.

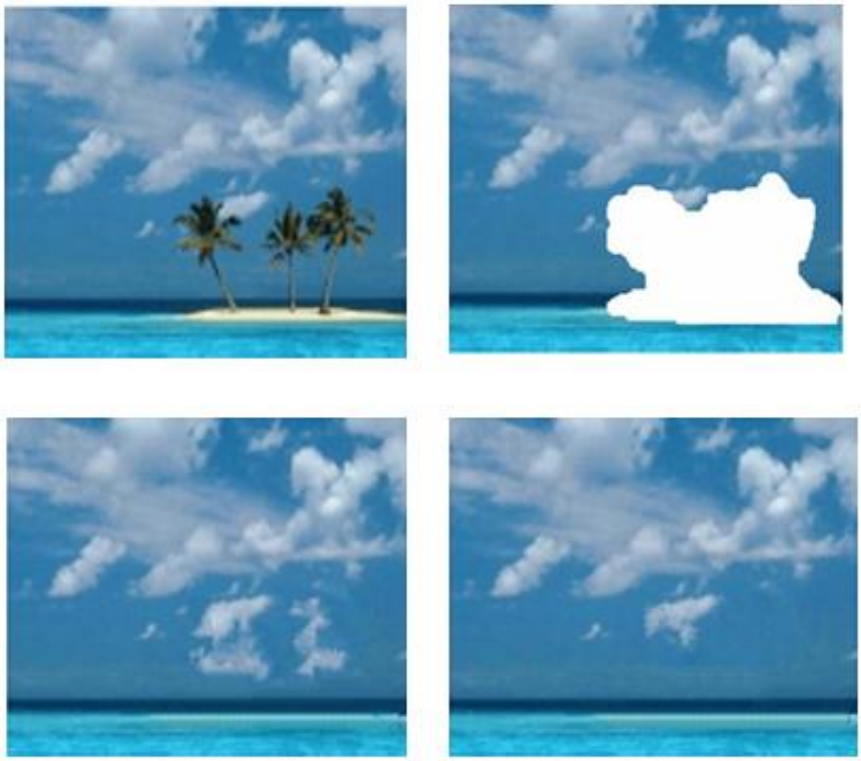

Figure 6.1: Comparative study on region filling on image1.

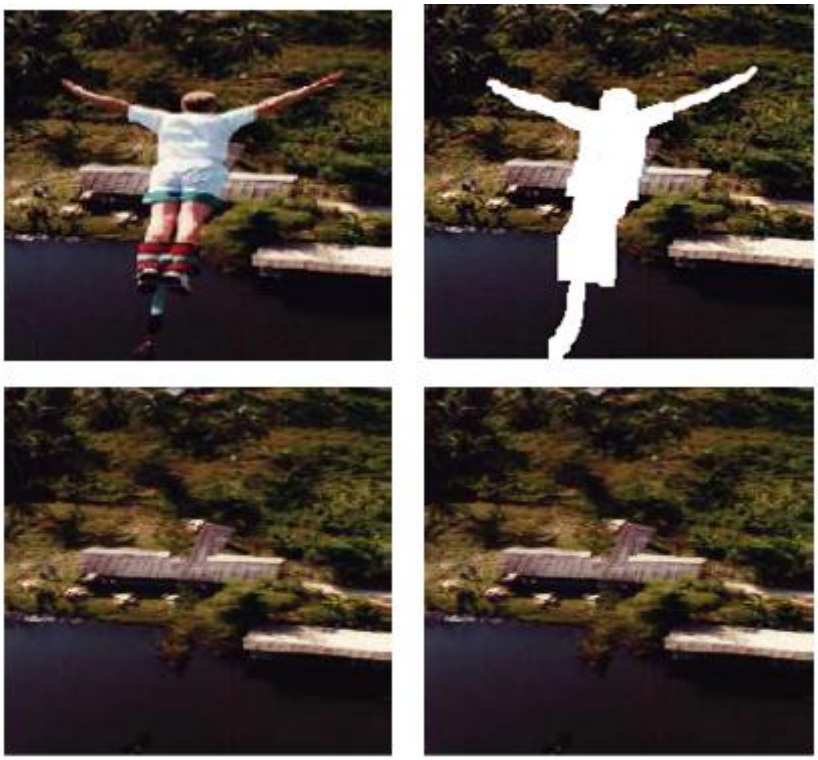

Figure 6.2: Comparative study on region filling on image2.

iii. Recognising partially occluded face using modified exemplar inpainting

The aspect of face recognition from video images is very much in application for constant surveillance and the use of it has been increasing day by day. Face recognition from video faces is beset with major problems like occlusion. Occlusion can result from facial accessories or other objects. The method proposed in this work is a step in solving this problem of occlusion that may appear in a video and in turn is a major cause in reducing the recognition rate.

On processing a video, faces in a frame are detected. Occlusion with respect to a face is detected using SVM classifier. Once an occlusion with

a face is detected, the occluded region is to be recovered. In order to recover the lost region, modified exemplar-based inpainting algorithm is used. Features are extracted using Curvelet transform and matching is done against the faces in the training set using minimum distance matching.

In order to test the efficiency of the proposed method, the algorithm is tested on patches on both sides of the face. Applying the modified exemplar-based approach on the specific patches, the result shows a good recognition rate.

The algorithm is tested using videos from YouTube database. In the video sequence, both full faces and partly visible faces of each of the subjects are present with occlusion. We compare the recognition rates of the reconstructed face images to that of the full face examples from the video. The result of this method shows that our algorithm provides a better recognition rate for partially occluded faces when compared with the existing methods.

Table 6.3: Recognition rate with face occlusion on You Tube Dataset

Video sequences	Proposed approach	Patch Based	SLNMF
1	93	92	90
2	92	91	89
3	92	90	88
4	92	90	88
5	91	89	86
6	90	88	85
7	89	86	83
8	89	86	83
9	86	85	82
10	85	83	80