# THREE-DIMENSION (3D) ASSITED FACE RECOGNITION: DEALING WITH EXPRESSION VARIATION

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## ABSTRACT

*One of the most critical sources of variation in face recognition is facial expressions, especially in the frequent case where only a single sample per person is available for enrollment. The face recognition framework is proposed in which the widely-encountered single sample problem for identification of faces with expressions is targeted by augmenting the dataset with synthesized images. Several expressions are simulated for each enrolled person on an anima table model which is specifically generated based on the 3D face scan of that subject. Methods that improve the accuracy in the presence of such variations are still required for a reliable authentication system. In this paper, we address this problem with an analysis by- synthesis-based scheme, in which a number of synthetic face images with different expressions are produced. For this purpose, an anima table 3D model is generated for each user based on 17 automatically located landmark points. The contribution of these additional images in terms the recognition performance is evaluated with three different techniques (principal component analysis, linear discriminate analysis, and local binary patterns) on face recognition grand challenge and Bosporus 3D face databases. Significant improvements are achieved in face recognition accuracies, for each database and algorithm*

## I.INTRODUCTION

The main advantage of this three dimensional authentication process is used for identification of a human. This provides the security of the user device and helps to secure the stored information. This application mainly designed for user authentication becomes easily when authorized the persons enter with different levels of expression. This application has analyzed the human mentality using the facial expression. This will help to authentication when the person in any mindset. This application continuously analyzes the expression of the human which mainly used for alert the person about their current mentality. This 3D face Detection is an Android application which is helpful to analyze the human f. This application used for detect the human face for authentication purpose. This application has analyzed the human mentality using the facial expression. This will help to authentication when the person in any mindset. This application continuously analyzes the expression of the human which mainly used for alert the person about their current mentality. This application gave the information continuously and gave the alert message while the user in abnormal condition**.**

# System Architecture

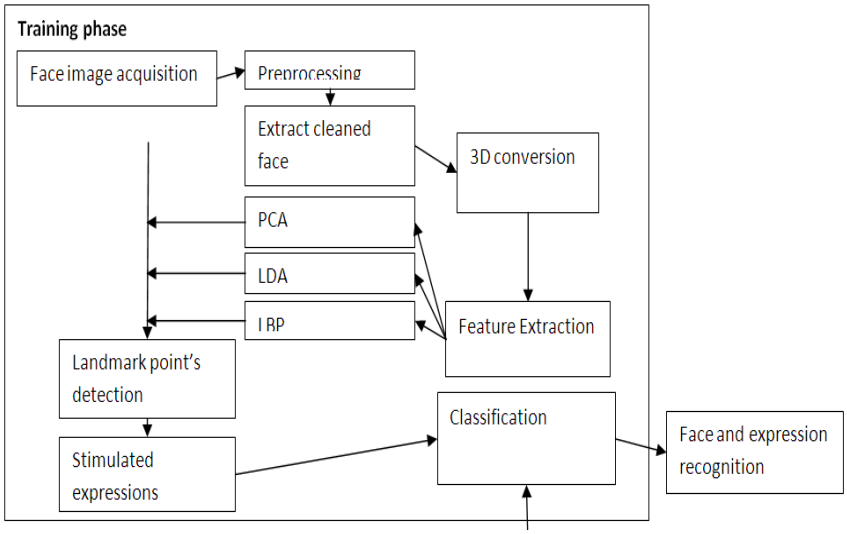


**Fig .1: System architecture**

## II. LITERATURE SURVEY

### 2.1 Novel System for Face Recognition to Identify Occlusions and Restoration of Image

The acquisition of a large number of occluded faces and their annotation with a ground truth are costly A practical face recognition system needs to work under different imaging conditions, such as different face poses and illumination conditions. Hence before the face is subjected to any face recognition system preprocessing steps such as normalization, feature extraction has to be carried out in order obtain efficient face recognition results. This paper involves obtaining a 3D facial image and the occluding object separately. A patch of the occluding object is applied over the face to generate the occlusion. We generate and time intensive operations. Moreover, several in-depth analyses may not be possible because information about the regions covered by the occlusions is not available..

### Disadvantages:

Registered regions are irregularly resample

The recognition method used is dependent of restoration

### 2.2 Three-Dimensional Occlusion Detection and Restoration of Partially Occluded Faces

An innovative three dimensional detection and restoration strategy for the recognition of three dimensional faces which may be partially occluded by unforeseen, extraneous objects. No apriority knowledge about the occluding objects is required. These may be glasses, hats, scarves and the like, and differ greatly in shape or size, introducing a high level of variability in appearance. The restoration strategy is independent of the method used to detect occlusions and can also be applied to restore faces in the presence of noise and missing pixels due to acquisition inaccuracies. They first detect the regions occluded by the glasses and then generate a natural looking facial image without glasses using Principal Component Analysis (PCA) reconstruction.

**Advantages:**

The reliability with respect to occlusions of any 3D recognition system, even when low computational resources are available

The non-occluded regions correspond to nearest neighbor classifiers, which are then combined using fusion methods such as the sum of the scores, the product, Borda count

**Disadvantages:**

- This method is not expected to provide high accuracy in the case of emphasized facial expressions

## 2.2 Regional Registration for Expression Resistant 3-D Face Recognition

The novelty of the approach is that it requires a single registration for a given test face. The probe is registered in a two-pass algorithm: First, rigid registration to an average model, followed by registration to individual avrms. The algorithm is preceded by a novel automatic Landmark localization module, which provides the initialization. The registration of facial parts to a generic model significantly speeds up the identification time because it is sufficient to perform only a single alignment to a generic model per facial region. Since all the gallery/training samples are previously registered offline to the same generic model, single alignment provides the dense correspondence information to every gallery image by default. Lastly, and most importantly, since dense correspondence is established and 3-D features are represented as an ordered feature vector, it is possible to utilize advanced pattern recognition tools either at the level of feature extraction or at the level of pattern classification. Traditional approaches like pair wise matching of two 3-D point sets are limited in that sense, since the 3-D point sets are unordered and the similarity can only be computed by means of geometrical measures.

**Advantages:**

- Better registration under local facial surface deformations,
- Fast search in identification mode,
- The applicability of statistical feature extraction methods for unordered 3-D point data.

**Disadvantages:**

- High sensitivity sensor that has a high capture time.

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## 2.4 A Survey of 3D Face Recognition Methods

The main purpose of this overview is to describe the recent 3D face recognition algorithms. The last few years more and more 2D face recognition algorithms are improved and tested on less than perfect images. However, 3D models hold more information of the face, like surface information, that can be used for face recognition or subject discrimination. Another major advantage is that 3D face recognition is pose invariant. A disadvantage of most presented 3D face recognition methods is that they still treat the human face as a rigid object. This means that the methods aren't capable of handling facial expressions. Therefore, some face recognition methods originally developed for 2D face recognition have been extended for 3-dimensional purposes. Using 3D models one can deal with one main problem in 2D face recognition: the influence of the pose of the head. Also the surface curvature of the head can now be used to describe a face.

**Advantages:**

- Major advantage is that 3D face recognition is pose invariant.

- Calculation times could become prohibitive for practical applications

**Disadvantages:**

- Aren't capable of handling facial expressions
- Head poses and other poses leads high error rate.

## III METHODOLOGY

### 3.1 Face image Acquisition

This module used to capture the face image or upload the datasets. The uploaded datasets contains 3D face images. In face registration we can identify the faces which are captured by web camera.

### 3.2 Preprocessing

In perform the preprocessing steps such as gray scale conversion, invert, and border analysis, detect edges and region identification. The edge detection is used to analyze the connected curves that indicate the boundaries of objects.

### 3.3 Facial points description

This module used to divide the examined image into cells. For each pixel in a cell, compare the pixel to each of its 8 neighbors. This can be used for face recognition or texture analysis.

### 3.4 Expression Recognition

Classifications are supervised learning models with associated learning algorithms that analyze data and recognize patterns, used for classification and regression analysis

## IV CONCLUSION

Automatic emotion recognition from facial expression and face recognition are one of the most intensively researched topics in affective computing and human–computer interaction. However, it is well known that due to the lack of 3-D feature and dynamic analysis the functional aspect of affective computing is insufficient for natural interaction. In this project, we present automatic face recognition with expression variations approach from real time datasets based on a landmark point's controlled 3-D facial model. The facial region is first detected with local normalization in the input dataset. The 17 landmark points are then located on the facial region and tracked through algorithms such as PCA, LDA and LBP. Depending on the displacement of the lank mark points may be used to synthesize the input expressions. So we easily recognize faces under various expressions. In our future work, we plan to develop alternative initial alignment techniques. Furthermore, the automatic occlusion detection stage can also be improved: As a future direction, we plan to model occlusions better, so that the overall performance of the system can be increased.

## V. FUTURE ENHACEMENT

We extend our work to less limited registration approach and Independent of nose visibility. Then Occlusion invariant recognition system has following aspects,

- Automatic occlusion detection and removal
- Discriminative features other than depth information

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## BIOGRAPHY NOTES

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