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A Review on Plastic Surgical Face Recognition Using Multimode Approach

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Abstract- Face provides information about identity, gender, age and expression. And again face recognition is possible with available resources. It is easier to get a photograph of a person (especially in case of suspected criminals) rather than his finger print or iris pattern information. However, even after decades of research, face is still an active topic because of some kind of changes observed in face due to illumination, pose, expression and occlusion. Now a days a new challenge to face recognition is facial plastic surgery. These surgeries alters facial features to such an extent that even human beings often struggle to identify a person face after surgery. Day by day there is increasing the number of people undergoing these plastic surgeries. These surgeries can be used by evaders to mask their identity and mooch without any fear for face recognition systems. we do the different approach survey for image recognition.

Index Terms- Plastic surgery; Face recognition; Face representation; Matlab

1. INTRODUCTION

From past three decades face recognition has been an active research area. The much attention given to face recognition within the research and commercial community can be associated with its real-world application potentials in areas such as forensics, surveillance, and home land security. Among the most challenging tasks for face recognition in these application scenarios is the development of robust face recognition systems. This implies that apart from recognizing faces under normal scenario, such systems should also be able to successfully handle issues arising from unconstrained conditions. The face recognition under unconstrained conditions results in faces, which are termed the unconstrained faces. Typically, unconstrained faces include faces that are subject to factors such as changes in expression, pose, illumination and recently introduced variations due to plastic surgery. The problem of pose, expressions and illumination in face recognition has been addressed in a good number of literatures.

However, there has been insufficient literature on the recognition of surgically altered faces. Like the effect of changes in illumination direction, plastic surgery procedures induce intra-face (face image versions of the same person) dissimilarity, which are obstruction to robust face recognition. The main focus of this paper is to address the recognition problem that arises when there will be plastically surgical face. In the meantime, emphasis will be laid on the intricacies of plastic surgery procedures and its impact on face recognition.

2. LITERATURE SURVEY

Face recognition after plastic surgery can lead to rejection of genuine users or acceptance of impostors. While face recognition is a well studied problem in which several approaches have been proposed to address the challenges of illumination, pose, expression, aging and disguise, the use of plastic surgery introduces a new challenge to designing future face recognition systems.

[1] Becker and Ortiz established algorithms and which are very much popular(principle component analysis (PCA), LDA,ICA,SVMs) for face recognition assess the feasibility of real world face recognition in uncontrolled setting using data drawn from Face book. The face recognition performance for real application is significantly lacking because the cited work reports that none of the algorithms evaluated is robust enough to cope with the variations occurring during the data capture stage.

[2] Rudovicet presented the approach which includes a training phase where the system estimates a mapping among frontal pose and each single pose through a suitable Gaussian process regression(GPR). On the time of testing, the pose is first estimated, and then the appropriate GPR is applied. One limitation of this approach is that only anticipated poses, i.e., those from a predetermined discrete set, can be reliably mapped to a frontal one.

[3] Singh analyzed the different types of local and global plastic surgery procedures and their effect on different face recognition algorithms. They have experimentally shown that the nonlinear variations

introduced by surgical procedures are difficult to address with current face recognition algorithms.

[4] For face recognition Campbellet reported that outer and inner facial regions represent different information that is useful. Against partial occlusion and change in viewpoints researchers from cognitive science also suggested that local facial fragments can provide robustness. To inclose these observation, for facial feature extraction and matching this research proposes granular approach [10],[11]. In the granular approach at different granular levels non disjoint features are extracted. Using multi objective evolutionary learning to obtained the assimilated information These features are then synergistically combined. more flexibility is achieved in analyzing underlying information such as forehead, ears, nose, cheeks, and combination of two or more features with these granules information. The face granulation scheme proposed in this research helps in analyzing multiple features simultaneously.

[5] De Marsico developed an approach to combine information derived from local regions to match pre- and post-surgery face images. For commercial entities (FACE) this method of face analysis was adopted. The face utilizes correlation index obtained from defined sub-region between two images. By correcting for illumination problem an improve performance was obtained using the FACE method.

[6] Based on the face recognition capabilities of human mind Sinha established 19 results. It is suggested that humans can efficiently recognize faces even with low resolution and noise. Moreover, both holistically and locally high and low frequency facial information is processed. On other hand, it is observed that humans solve problems using perception and knowledge represented at different level of information granularity. They recognize faces using a combination of holistic

[7] To match surgically altered face image Aggrawal proposed cellular representation approach on local facial fragments. Though recent results suggest that the algorithms are improving towards addressing the challenge, there is a significant scope for further improvement. . Part-wise sparse representation approach for matching plastic surgery alerted face. From each face image they employed the intensity characteristics of the PCA based representation of the six feature cropped. The features were then fused to determine the sparse representation error. If the probe samples produces smallest representation error to a test sample then match is found.

[8] Parket consider occlusions caused only by eyeglasses and propose a method to compensate for the missing data. Firstly, using colour and edge information the glasses region is extracted. The offline-generated eigen faces from a set of non occluded images are then used together with the extracted glasses region for missing data compensation.

[9] by eliminating facial parts occlusion variations are handled where occlusions frequently occur. Both in training and test faces several subsets of images are created through masking facial regions. Using masked training images, different face projection spaces are created through Principal Component Analysis(PCA) and majority voting is applied to fuse multiple classifiers.

3. PROPOSED WORK

Main objective of this paper is to recognized the face which are surgically altered. For that in this paper different approaches are use like PCA and LBP. Following diagram shows the image recognition which are surgically altered.

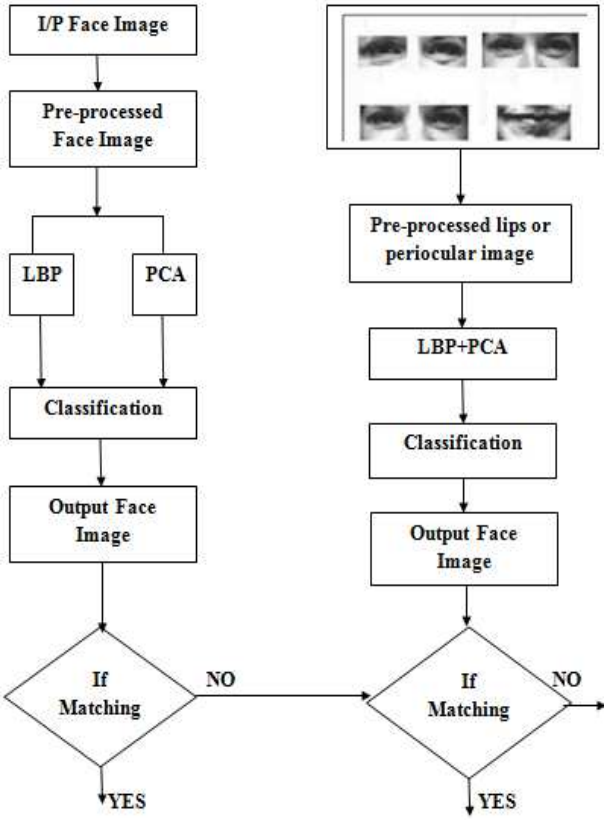

Fig 1. Surgical face recognition

3.1 Source of Data Collection

Data required for face recognition across plastic surgery is collected from plastic surgery database online which contain pre-surgery and post-surgery images of face. For Non-surgical face recognition, any database which is freely available on web is used.

3.2 Preprocessing

In pre-processing, first background is remove and obtained periocular region from the face images. i.e. strip, overlapping, non-overlapping and lips region of face images. In this first normalization of face image is done and then pre-processing is performed on the normalized image.

3.3 Local Binary Pattern

Local binary pattern (LBP) is a non-parametric descriptor, which efficiently use for summarizes the local structures of images. LBP features are in gray scale and rotation invariant texture operator. These features are more widely used for expression recognition. LBP features are also applied for face recognition task. LBP feature extraction is more faster than any other feature extraction method and it provides good performance make this most researched features.

3.4 Principal Component Analysis

In face recognition PCA has been extensively used. Primarily, for reducing the number of variables. Suppose we have an image and wish to compare this with a set of date base image to find the best match. Each pixel can be considered a variable thus we have a very high dimensional problem which can be simplified by PCA. PCA is usually referred to in tandem with eigenvalues, eigenvectors and lots of numbers. Reduced the dimension of data using PCA.

3.5 Periocular Biometrics

There is no database available with periocular region images. Only way to fetch this is using available face image. Periocular biometrics is performed in three different ways such as Non-overlapping, overlapping and Strip. Using four significant points in eye region all this three different types of periocular regions are obtained. Strip is an area below forehead and above nose considered whole region together. This strip region is cropped using outmost corner points of both the eyes. By bisecting strip into left and right region and then Overlapping periocular is obtained. Non-overlapping regions are cropped from the two corner points of each eyes separately. Lips regions are obtained using two corner points. LBP features from periocular and lips region are used in this work. PCA is used for LBP feature dimension reduction (LBP-PCA) and in turn helps in increasing the recognition rate.

3.6 Classification

For given test image Euclidean distance is used as the classifier to identify which training set image belongs. Classification is performed by comparing from each training set image with the test image C_{test} using Euclidean distance, ε_i.

$$\varepsilon_i^2 = (|| C_{test} - C_i ||)^2$$

Where C_i is a shape texture parameter of the i[th] face image in training set. Test image is classified as belonging to image i when minimum of ε_i is below some chosen threshold value θ. Threshold value, $\Theta = 1/2 \max (|| C_{test} - C_i ||)$ where i and j are images from same class.

4. CONCLUSION

In this paper we conduct a multimode approach & statistical study to show that facial plastic surgery operations tend to achieve a divine proportion on the human face, corresponding to the Golden Ratio and useful for proper result we then apply this in conjunction with the notion of considering a face in terms of the sum of its parts, to propose a novel face recognition method. The proposed method 1[st] breaks the input face down into four facial parts, then extracts Gabor and texture features for facial parts recognition from the recognition lists of the four facial parts then finally we refine the result by utilizing the facial geometric proportion information to give a final matching result.

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