AUTOMATIC PARTIAL FACE RECOGNITION

[1.]Mr. Ranjan Kumar Singh,[2]Mr. Mahesh Kumar
[1]PG Student,M.Tech CSE [2]Assistant Professor GITAM.
[1]Computer Science Engineering,
[1]Ganga Institute of Technology and management Kablana, Haryana, India.

Abstract :This proposed a face detection method which is based on feature selection and optimization. In these days, current research trend of biometric security are used as the process of feature optimization for better improvement in face detection technique. Basically, this face consists of three types of features such as color of skin, texture and the shape and size of face. The most important feature of face is the color of skin and texture of face. In this detection methods, its uses texture feature of the face images. Face recognition, which is a longstanding computer vision problem and, a variety of face detection/recognition methods have been discussed over the past years. Among which most methods have achieved best and impressive performance under various controlled conditions where frontal holistic face images are normalized and realigned , there are still a lot of challenges for unconstrained face recognition in many real world applications. Typical face detection applications include smart surveillance systems, various technologies and handheld devices, where faces may be occluded by objects or other faces under many types of crowded scenes. In those conditions, only partial faces can be obtained and which caused face alignment may fail to work with facial landmarks occluded. [1].

***IndexTerms*–Partial face recognition, Biometric, Security, Detection technique, Recognition, Surveillance, Alignment, Images**

I. INTRODUCTION

Face recognition or detection is a longstanding computer vision problem and a variety of face recognition methods have been discussed over past years. Among which most methods have achieved impressive performance under many controlled conditions where frontal holistic face images are normalized and realigned, there are still a lot of changes are needed for unconstrained face recognition in many real-world applications. Typical face recognition or detection applications include smart surveillance systems and many digital handheld devices, where faces may be occluded by many objects or other faces under crowded scenes. In such cases, only partial faces can be obtained and thus face alignment may fail to work with facial landmarks occluded. Most face detection methods including the state-of the art such as CNN approaches utilize the full face images for recognition, which are not applicable for partial face recognition. On the one hand, they assume that every image has the same contents of the aligned full face and describes the holistic facial images for presentation. However, contents of images may be different even of the same person in partial face recognition, e.g. one image without left eye and another without the right, or without mouth , which tends to large intra-class variations. On the other hand, the occluded images or objects are included in the representation, which may cause harm for discriminative power. Thus, it is required to design a partial face recognition method which can directly recognizes partial faces and is robust to various occlusions[1].

II. SYSTEM ENGINEERING

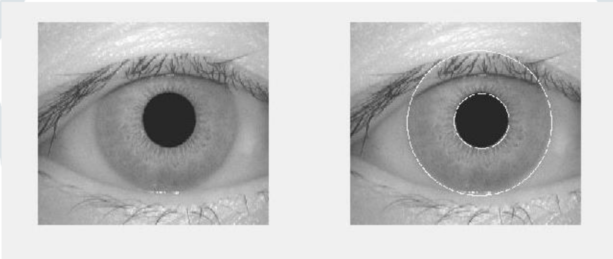
Face registration or detection algorithms performed on-point clouds or range images of faces scans which have been successfully used for automatic 3D image recognition under many expression variations, but have merley been investigated to solve changed poses and occlusions mainly since that the basic landmark or symbols to initialize a coarse alignment which are not always available for check. Recently, local feature based SIFT-like matching proves the competent to handle or solve all such variations without registration. In this concept , towards 3D face recognition for real life in biometric applications, they significantly extends the SIFT-like matching framework which may help to mesh data and discussed a novel and significant approach by using these fine grained matching of 3D key point descriptors. The first, two principal curvature based 3D key point detectors provided, which can repeatedly identify the complementary locations on an image or face scan where local curvatures are high. Then, a robust 3D local coordinate system which is built at each keypoint, which allows extraction of poses-invariant features. The three keypoint descriptors, corresponding to those three surface differential quantities, are designed, and their feature level fusion is employed to comprehensively describe the local shapes of detected keypoints[2].

III. KEYPOINT DETECTION

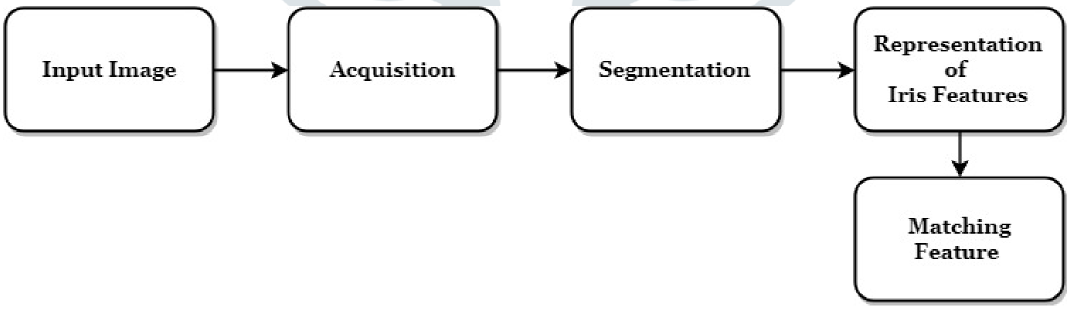
The local keypoint detection and description are the two essential steps for image matching, where keypoint detection finds the repeatable image regions in-spite of changes and keypoint description captures distinctive and robust information of the interest regions. Early keypoint detector which can be traced back to the work of Moravec. Harris and Stephens improved the Moravec detector, by making it more repeatable with a small image transformation and near edges, becomes the well-known Harris corner detector. Mikolajczyk et al. summarized it and evaluated competitive detectors at the time. As Harris corner detector which is scale-variant, Rosten and Drummond discussed features from FAST criterion for keypoint detection, which was further more improved by AGAST. After detecting regions of interest, a descriptor which is needed to describe each local keypoint. SIFT is one of the most famous keypoint descriptor in the literature, as it provides high distinctiveness and robustness. In order to improve the efficiency of the SIFT, Ke and Sukthankar discussed PCA-SIFT to reduce the dimension of the descriptor from range 128 to 36. Bay et al. also presented SURF to obtain the faster detection and description [3].

IV. IRIS SEGMENTATION

Considering that various techniques for segmenting iris are based on Hough-transform parameterization, Junli et al. (2013) developed a robust ellipse fitting technique, robust to noisy edge maps that likely results of degraded data. Their algorithms start by selecting the subset of the edge points which are deemed to be more accurate. Then, considering that squaring the fitting residuals magnifies the contributions of those extreme data which points, their algorithms replaces it with the absolute residuals to reduce this influence. The resulting mixed l1- l2 optimization problem is derived as the second order cone programming one , solved by the computationally efficient interior-point methods. Specifically concerned with the segmentation of iris images acquired at pretty large distances, Tan and Kumar (2012) were based in the concept of Grow cut algorithm which is able to discriminate between the foreground (iris) and background (non-iris) data. The result from this phase is refined by post-processing operations: which is, iris center estimation, boundary refinement, pupil-masking and refinement, the eyelashes and shadow removal and eyelid localization. Experiments were performed in well known datasets (UBIRIS.v2, FRGC and CASIA. v4 Distance) and confirmed the effectiveness of the approach. Moreover, the computational burden of the method which appears to be substantially lower than the similar strategies [6].



Irisrecognition which is the most reliable and accurate biometric identification system. Iris recognition system which captures an image of any individual's eye, the iris in the image mentioned above is segmented and normalized for extracting its feature. The performance of iris recognition systems depends on the process of segmentation of iris form the eye image. Segmentation, which is the most important part in iris recognition systems , process because areas which are wrongly segmented out as iris regions will corrupt biometric data and templates resulting in very poor recognition. There are various methods employs for segmenting iris from image of eyewhich gives the best segmented result. In this, Daugman's method which is used to find out the pupil and the boundaries of iris. Here the Iris images are taken from the CASIA Database, which is then , iris and pupil boundaries are detected. By using Daughman's method the iris boundaries are segmented out. The computational time of segmentation by Daughman's method is less as it take very less time to segment the iris and pupilary boundaries of eye image and give appropriate value. Hence this method gives fast segmented output.



V. PROPOSED METHODOLOGY AND ARCHITECTURE.

Now a day’s data and network security is used human biological component such as face, finger, iris and voice. Face is important component of human body. The face is used for the process of security authentication and validation, today various smart phone devices gives the facility of face detection and recognition. This paper proposed the face detection algorithm based on feature extraction and feature reduction methods. For feature extraction used wavelet transform function. The wavelet transform function is well known feature extractor. The extracted features is optimized using glow optimization algorithm. the glow optimization algorithm works based on glow for the collection of similar agent during the process of optimization. In the continuity of chapter discuss the feature extraction process. Wavelet transform, glowworm optimization algorithm, proposed algorithm and finally discuss proposed model.

VI. FEATURE EXTRACTION

The feature extraction is important phase of face detection and recognition. For the extraction of features various methods and transform function are used. In face image, basically three types of features are presents. On is color features, texture feature and dimension of face. The texture features are most dominated features in face detection process. For the extraction of texture feature used wavelet transform function. Some other transform function is also used such as Gabor transform, SIFT transform and many more transform function[7].

VII. WAVELET TRANSFORM

The wavelet transform function is well known texture feature extractor. The wavelet transform function is combination of higher and lower frequency band. The process of frequency bands depends on the dimension of image. Basically the fusion process used two-dimensional image for the fusion. Now used two-dimensional wavelet transform function. The two-dimensional image represents in transform function as set of shift and dilated wavelet function. The decomposition of wavelet function in terms of LL, HH and set of LL and HH. The value of feature extraction given below in diagram.

VIII. RESULT ANALYSIS

To evaluate the result or performance of the proposed method of Face detection we have use MATLAB (Matrix lab) software 7.8.0 with varities of groups image dataset used for this experimental task. In this , we will describe the MATLAB simulation for the proposed face detection method. We will provide the details of the simulation tool, input method& formats, simulation steps, and group image collecting and processing steps, the feature extraction method and finally get result group of images.

IX. MATLAB SIMULATOR

MATLAB is basically a modern programming language environment. The name MATLAB , stands for MATrix Laboratory. It has sophisticated data structures, which contains built-in editing and debugging tools, and supports object-oriented programming(OOP) . These factors make thte MATLAB an excellent tool for teaching and research. MATLAB has a lot of advantages compared to any conventional computer languages (C, FORTRAN) for solving the technical problems. MATLAB is one of the interactive systemswhose basic data element is an array,it does not require dimensioning. The software package has been commercially available since 1984 and is now it is considered as a standard tool at most universities and industries worldwide. It has powerful built-in routines that enable a very wide variety of computations. It also has easy to use graphics commands which make the visualization of results immediately available. Specific applications are collected in various packages referred to as toolbox. There are the toolboxes for signal processing, symbolic computation, control theory, simulation, optimization, and several other fields of applied science and engineering. it is a tool for numeric based calculation and visualization.

X. Future Scope

The proposed algorithm, for face detection is very much efficient in case of individual as well as group face. The proposed algorithm uss partial feature extractor function along with GSO algorithm. The process of feature optimization and the feature selection is very much complex for these two different constraints function of optimization and detection. The optimization and detection increases the time complexity but in-case of the value of hit ratio. In future it reduces the time complexity of proposed algorithm and improved the efficiency of overall system.

XI. Conclusion

This Face Detection System using wavelet transform and features selection process by GSO algorithm. After extraction of feature of face used feature optimizations technique for better selection of feature. The localized face image is transformed from layered form of transform function for extraction of facial feature. The optimized feature selection process gives better result in compression of LBP and support vector machine based detection technique. In the process of feature extraction, we used wavelet transform function, wavelet transform function extract the texture features. The proposed method works in two phases in first phase used feature optimization and second phase used face detection. For the selection of feature and optimization of used two different functions in GSO algorithm, the selection of feature process satisfied the given condition of feature constraints then select feature and passes through matching of the feature for the process of optimization.

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