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Partial Face Recognition by Using MKD And Compare It With Other Algorithms

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Abstract- Face Recognition is the technique to verify whether the entire image or input is e xactly similar to the avialable images present in the databases.Face recognition has received a great deals of attentyion of scientific and industrial communities over the past several decades its wide range of applicatons in information security, *access* control, *law* enforce *and surveillance*. Different types of face recognition are finding faces in images with controlled background.Finding faces by color, finding faces by motion and finding faces in un controlled scenerio etc .Each & every approach has its different technique .There are variou algorithm e *x*ist which gives us result based as per expectation.

we are implementing face recognition by using MKD algorithm .The advantages of this algorithm is that we can

it apply on partial faces or incomplete faces. if the given input is partial . *We can* compare the left pat of the given image with the aviable righ t one to determine whether they belongs to same object or not**.**

KeyWords: MKD-SRC Algorithm, Partial Face Recognition, alignment free, Key point descriptor, Sparse Representation.

1. INTRODUCTION

FACE recognition (FR) is the problem of verifying or identifying a face from its image. It has received is substantial attention over the last three decades due to its value both in understanding how FR process works in humans as well as in addressing many challenging real-world applications, including deduplication of identity documents (e.g. passport, driver license), access,control and video surveillance. While face recognition in controlled conditions has already achieved impressive performance over large scale galleries. But there still exist many challenges for face recognition in uncontrolled environments, such as partial occlusions large pose Variations and extreme ambient illumination.

A general approach of partial face recognition method based on Multi-Key point Descriptors which is the method that does not require face alignment by eye coordinates or any other fiducial points. The invariant shape

Adaptation makes image matching more robust to viewpoint changes which are desired in face recognition with pose variations. In Multi-Keypoints Descriptor (MKD), the descriptor size of a image is determine based on actual content of the image. The MKD-SRC framework that **works** for both holistic faces and partial faces can be sparsely represented by a large dictionary of gallery descriptors.

1.2 Literature Survey

In Yang et al. [1] and Yi et al. [2] has proposed automatic partial face alignment and matching approach, for partial faces resulting from a limited view. But, their approach requires high-resolution images (with an interruptible distance of more than 128 pixels) with good skin texture, but it is not applied to pose variations. Some FR approaches only require face sub images as input, such as eye [3], nose [3], one half (left or right portion) of the face [4], or the particular region. Again, these methods require the presence of certain facial components and pre-alignment.

Darwin [5] and Galton [6] has proposed a new technique for face recognition. His work includes analysis of the different facial expressions due to different emotional states, where as Galton studied facial profiles. However, the first real attempts to develop semi-automated facial recognition systems began in the late 1960's and early 1970's, and were based on geometrical information. Here, landmarks were placed on photographs locating the major facial features, such as eyes, ears, noses, and mouth corners. Relative distances and angles were computed from these landmarks to a common reference point and compared to reference data.

Fischler et al.[7] and later by Yuille et al. [8] has proposed a new technique for face recognition
This approach measured the facial features using templates of single facial features and mapped these onto a global template.
Shishir Shah and J. K. Aggarwal, [9][10][11] has proposed a technique for f ace recognition This recognition technique is based on using Radial Basis Function (RBF) networks. Very few researches have applied the RBF networks to person recognition.As compared with the recognition results using a standard back-propagation (BP) learning algorithm, it was found that the RBF networks were discovered to be a stronger tool for face recognition. The RBF networks are far superior for the face recognition task.

1.3 proposed Method

In this paper , we present a general formulation of partial facr recognition problem. we neither require face alignment nor the presence of the eyes and other facial components in th image . our approach is based on Multi Keypoints Descriptors ..A MKD representation for both the gallery dictionary and the probe images a Multi sparse representation is learn for each probe images.and the Sparse rep[resentation based of classification approach is applied fo r face recognition.A new keypoint descriptor is called the Gabor Ternary Pattern(GTP) which outperforms the Scale invariant Feature Transform descriptor and a fast atom filtering method for MKD- SRc to address large scale face recognition(with 13,233 gallery images).The proposed method as shown in figure 1.

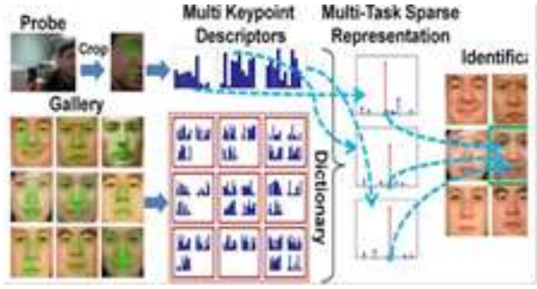

Fig 1 Flowchart of proposed Method

The uniqueness of the proposed approach includes:
1. A general partial face recognition approach without requiring face alignment, the MKD-SRC framework that works both the holistic face as well as partial faces , surpass SRC addressing the one sample per class problem.
2. A new point descriptor called , the GT P which outperforms the scale i nvariant feature transform descriptor.

3 .Finally, a fast atom filtering method for MKD-SRC to address large scale face recognition (with 10,000) gallery images.

2. CannyEdge Detector

The cannyEdge detector is an edge detection operator that ue a multi stage algorithm to detect a wide range of edges in image . Canny aim was to discover the optimal edge detection algorithm .in this situation an optimal detector means:

- Good detection : the algorithm should mark as many real edges in the images as possible.
- Good localization : edges mark should be close as possible to the edge in the real image.
- Minimal response : a given edge in the image should only be marked once ,where possible image should not create false edges.

Fig. 2 canny Edge Detector

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2.2 Sparse Representation based classification

This is robust face recognition method .Sparse representation is recently applied in various field of computer vision and image processing. However,its computational comple xity is very high due to solving comple x minimization problem . To improve the calculation efficiency a novel face recognition method are called sparse representation based classification.

2.3 Scale Invariant Feature Transform

The S IFT descriptor is invariant to translations , rotations and scaling transformation in the image domain and robust to moderate perspective transformations and illuminations.

There are five stages that are worked:

1.Scale-space E xtreme Detection :The first of computation searches over all scales and image locations.

2. Keypoint Localization : At each candidate locations a detailed model is fit to detemine location and scale .The Keypoints are selected based on measures of their stability.

3.Orientation Assignment :One or more orientatioms are assigned to each image gradient directions.All future
operations are performed on image data that can be transformed relative to the assigned orientations scale and
location for an each feature thereby.

4.Keypoints Descriptor **:**The local image gradient are measured at the selected in the region around each Keypoint .The transf ormed into a representationthat allows fo r significant levels of local shape disstortion and change in illumination.
A SIFT descriptor is a 3D spatial histograms of the image gradients in characterizing theapperance of the Keypoint.The gradient at each pi xel is regarded as a sample of the three dimentional elementary features vector formed by the pi क्ष्el locationand the gradient orientations.

2.4 Gabor Ternary pattern Descriptor

Gabor filtered have been successfully used for face recognition.they have been used as a complementary features set to local pattern features as well as the preprocessing stages of local pattern features where local pattern features are applied on the Gabor filter images .However local pattern features are computed over a Gabor filter image . In Gabor a s the name suggests the features are computed from the Gabor filter image obtained by convoling the image with multi scale multi orientation Gabor kernel overall we use 40 different Gabor kernels that span five different scales and eight different orientat ions over the range of 0 to 2p.However all other methods computed local patteren feature and concantenated in to Gabor Ternary pattern and Local binary pattern allows it to capture pattern occcured on the neighbouring scale and orientation cncantenated to computed code on the neighbouring scales and orientation on local pattern level.

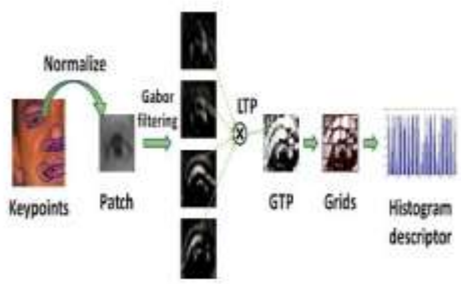

Fig. 3 Major components of GTP

3. PROPOSED ALGORITHM

Algorithm: The MKD Algorithm

1. Take input image c classes ; Probe image i ; Parameter L;
2. Extract Multi-Keypoint Descriptor(GTP).
3. Recognition of image from gallery.
4. Extract MKDs from probe image i
5. For i=1 to n do
6. Compute parameter L & Dictionary end.
7. Detemine the classes of identity c;
8. End.

4.EXPERIMENTAL RESULTS

The performance of alignment free MKD partial face matching algorithm has been evaluated omn public domain LFW database. For LF W

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database,we followed LFW verification benchmark test protocol.

4.1 Process **Description with Snapshots**

Fig 4 shows the generating gallery dictionary and generating multi-key point descriptors of each images that are existing the database.

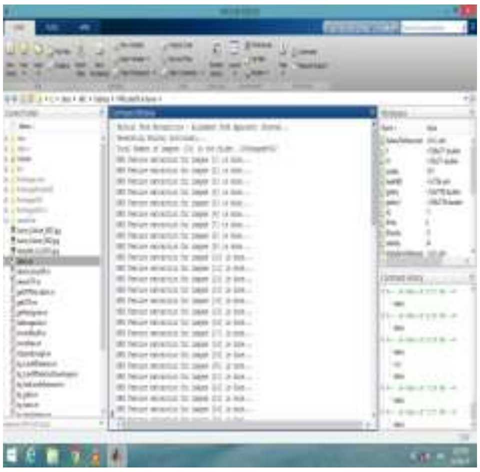

Fig 4 shows reading all images and generates MKD dictionary of the database.

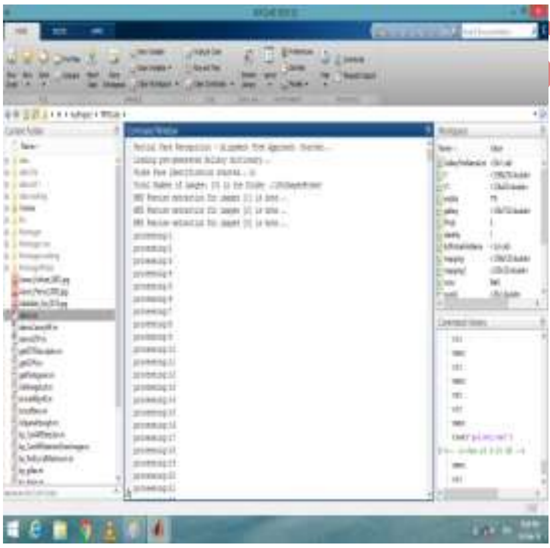

Fig 5 shows pre-generating gallery dictionary of the database

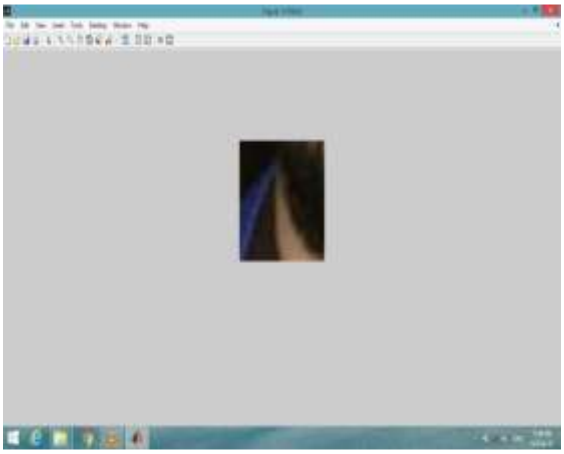

Fig 6 *shows the patch of a particular image.*

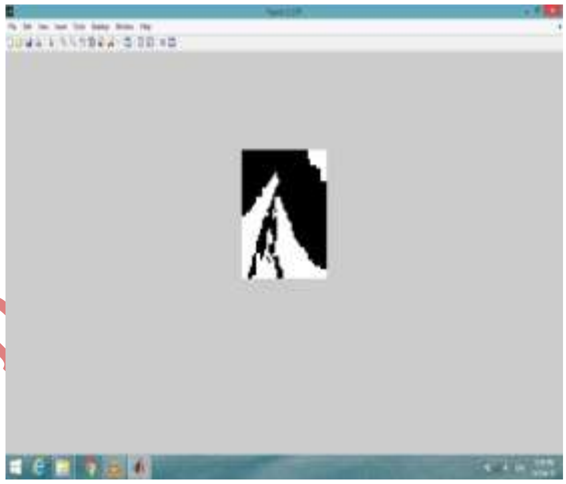

Fig.7 *shows the GTP of the particular image.*

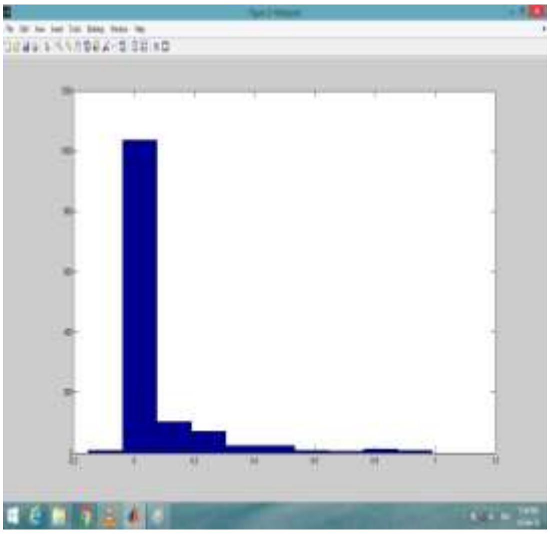

Fig 8 *shows the Histogram of particular image*

Fig. 9 *shows that given probe image is matched with particular image of gallery dictionary of the database.*

Fig. 10 *shows that given probe image is matched with particular image of gallery dictionary* of the *database*.

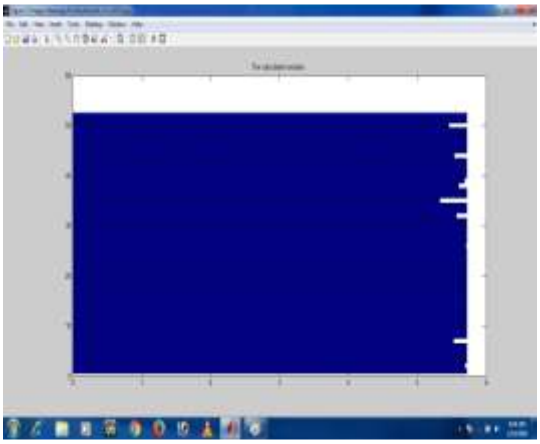

Fig. 11 ***G**raphical **R**epresentation of image 1 (Abdullah Gul).*

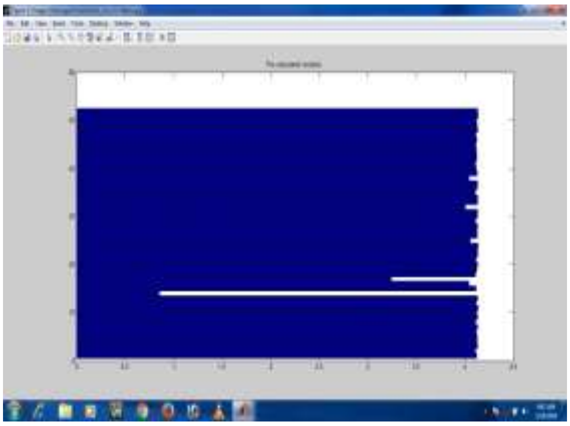

Fig. 12 ***G**raphical **R**epresentation* of image 2 ***(**Abdel_Aziz_Al-Hakim)*

5. CONCLUSION

Our approach represents each face image with a set of keypoint descriptors (GTP and SIFT), and constructs a large dictionary from all the gallery descriptors. In this way descriptors of a partial probe image can be sparsely dictionary, and the identity of the probe can be inferred accordingly. The proposed approach shows promising results on synthesized partial faces (from the LFW database), occluded holistic faces and non-frontal faces collected in unconstrained scenarios(LFW database). A face matchers, LFW database shows that MKD-SRC, particularly with the proposed GTP descriptor, is well suited for general partial face recognition problem. In case a partial face cannot be detected, our approach can still provide a matching score given a manually cropped face region. Given the general framework of MKD-SRC it would be useful to apply MKD-SRC to other image classification areas, such as object categorization.

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