Image Processing Using Distributed Environment Approach

Miss. Manisha M. Punse, P.G. Department of Computer Science & Engg, SGBAU, manishapunse@ymail.com

Dr. Mrs. Sujata N. Kale, Assistant Professor, Dept of Applied Electronics SGBAU, sujatankale@rediffmail.com`

Dr. V. M. Thakare HOD of Computer, Dept, SGBAU, Amravati, India, vilthakare@yahoo.co.in

Abstract — Image recognition is an important processing step in many image, video and computer vision applications. Research has been done in creating algorithms for image recognition, but it still faced the problem of complexity, performance, efficiency, reliability and accuracy. In the world of computer security, biometrics is important authentication techniques that authenticate the authorized person based on measurable physiological and individual characteristics. Face detection is the important step among all facial analysis algorithms, including face alignment, face recognition, face verification and face authentication. In the field of face detection, significant progress has been done in the past. The work by Viola and Jones has made face detection practically feasible in real world applications such as digital cameras and photo organization software. The research is based on the fusion of face image and fingerprint image. For detection of face Viola-Jones algorithm is used. This algorithm detects individual's face, nose, eyes, and mouth. For detection of fingerprint image, minutia algorithm is used. The proposed model of Image recognition, recognize an image to further analyze each of these objects present in the image to extract some high level information and compare the face and fingerprint image on the basis of extracted features of images.

Index Terms : Knn algorithm, Minutia extractor

1. INTRODUCTION

A variety of systems require reliable authentication schemes to verify the identity of individuals requesting their services. The purpose of these schemes is to ensure that these services are accessed by an authorized user and not anyone else. Examples of these systems include secure access to mobile phones, office cabins, locker, ATMs, laptops. The proposed model of Image recognition, recognize an face and fingerprint image to further analyze the objects present in the image to extract some high level information and compare the face and fingerprint image on the basis of extracted features of images.

The processing complex images using distributed environment is important and difficult task to analyze. Different tracking and recognition methods are discussed based on different parameters i.e. accuracy, quality, speed, time complexity etc. The Knn algorithm is proposed in this research to provide better recognition accuracy and also achieves better recognition quality with respect to other existing methods.

2. BACKGROUND

Traditionally, knowledge-based securities such as passwords and token-based security such as ID cards have been used to restrict access to systems. The major advantages of this traditional personal identification are that they are very simple. However traditional approaches are

not based on any inherent attributes of an individual to make a personal identification thus it has the number of disadvantages like passwords may be stolen, forgotten or guessed by unauthorized individual. Security can be easily broken down in these systems when a password is divulged to an unauthorized user. The emergence of biometrics has addressed the problems that occur in traditional verification. In computer security approach, biometrics refers to an authentication techniques that verify individual based on individual's characteristics. In other words, every individual has unique personal attributes which may be used for identification purposes, including a fingerprint, the pattern of a retina, and voice characteristics.

3. PREVIOUS WORK DONE

M. Fons et al. [1] proposed a fingerprint matching algorithm that identifies the candidate's common unique minutiae points in the base and the input image using

ratios of relative distances. This algorithm is capable of comparing and producing matching scores between two images obtained from two different kinds of sensors. A. K. Jain [2] proposed a hybrid matching algorithm that uses both minutiae and texture information for matching the fingerprints. In which a hybrid approach to fingerprint matching that combines a minutiae-based representation of the fingerprint with a Gabor-filter representation for matching purposes is described. Josiah Yoder [3] presents a distributed multicamera face tracking system suitable for large wired camera networks. In this an efficient camera clustering protocol is used to dynamically form groups of cameras for in-network tracking of individual faces. M. S. Bartlett [4] presents an evolvable hardware system, fully contained in an FPGA (field-programmable gate array), which is capable of autonomously generating digital processing circuits, implemented on an array of processing elements. R. Cappelli et al. [5] highlights the challenges in applying face-recognition technology to forensics applications. It explains why forensic face recognition differs from typical portrait face recognition and why a human examiner is often needed to carefully interpret. Crookes D. et al. [7] proposed a complete automatic fingerprint-based authentication system (AFAS) application under a dynamically partial self-reconfigurable field-programmable gate array. Anil K. Jain proposed a novel robust secure fingerprint matching technique, which is secure against side channel attacks. An algorithm based on the local structure of the minutiae is presented to match the fingerprints.

4. PROPOSED METHODOLOGY

The proposed methodology is used to detect the face and fingerprint image and extract the features of images and saved in database. In the evaluation stage, the features of selected images are extracted and compare the face and fingerprint image and gives the appropriate output. In this, for detection of face Viola-Jones algorithm is used. This algorithm detects people's faces, noses, eyes, mouth, or upper body. However if noise occurred during image acquisition, this might affect the processing results and reduces speed. For detection of fingerprint image minutia algorithm is used. After detection of images the features of face and fingerprint are extracts, then images are stored in database. The saved features of image compared with the new image. If selected images are matched with database images then message will pop up that matching images are found else it gives message that fingerprint is matched with other image in database. The purpose of this algorithm is to combine face and fingerprint image features.

Automatic and reliable extraction of minutiae from fingerprint images is a critical step in fingerprint matching. The quality of input fingerprint images plays an important role in the performance of automatic identification and verification algorithms. In this paper, we presents a fast fingerprint enhancement and minutiae extraction algorithm which improves the clarity of the ridge and valley structures of the input fingerprint images based on the frequency and orientation of the local ridges and thereby extracting correct minutiae.

A fingerprint is the pattern of ridges and valleys on the finger tip. A fingerprint is thus defined by the uniqueness of the local ridge characteristics and their relationships. Minutiae points are these local ridge characteristics that occur either at a ridge ending or a ridge bifurcation. A ridge ending is defined as the point where the ridge ends abruptly and the ridge bifurcation is the point where the ridge splits into two or more branches. Automatic minutiae detection becomes a difficult task in low quality fingerprint images where noise and contrast deficiency result in pixel configurations similar to the minutiae. This is an important aspect that has been taken into consideration in this presentation for extraction of the minutiae with a minimum error in a particular location. The proposed algorithm combines features of face and fingerprint image and compare the features of face and fingerprint, then gives appropriate output.

Minutiae also refer to any small or otherwise incidental details. But the focus when matching is only on the two main minutiae; ridge ending and ridge bifurcation. For the detection of fingerprint image minutia extractor is used, it is widely used three-stage approach. Figure 1 shows the stages of minutia extraction process. They are

preprocessing, minutia extraction and post-processing stage.

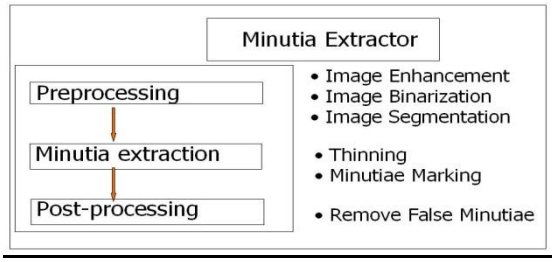

Figure 1. Minutia Extractor

5. ANALYSIS & DISCUSSION

The global ridge and valley configuration of fingerprint images presents a certain degree of regularity. A model of the ridges and valleys that can be constructed from partial valid regions can be used to correct the errors in the estimated orientation images, which in turn, will help the enhancement. In evaluation phase, if the face image is selected which is not in database, then it checks extracted features of face with all the face images saved in database. After evaluating it gives appropriate message that face image does not match with database image. If the fingerprint image of one person is selected and face image of other person is selected then it checks whether the images selected are of same person or not. If they are of different persons then it checks fingerprint image and face image to which it belongs in the database. This is the combined approach of face and fingerprint recognition.

6. RESULT ANALYSIS

It is clear that this system have come a long way towards delivering high-quality output to end users. In this approach knn classifier algorithm is used for comparison of two images. Even if only 1% matching image is present in database then Knn algorithm gives output as image is matched. The contribution of Knn algorithm feature is significant in improving the quality of matching process at perceptual level. If the image does not match then it checks to which it belongs in database and gives the appropriate result. If face image and fingerprint image of two different persons are selected for matching process then it checks whether they are of same person or not. If it is found that these images of different persons then it checks to which it belongs in database and gives the resulting message that face image found with one person and fingerprint image match with other person in database. Viola and Jones algorithm has made face detection practically feasible in real world applications such as digital cameras and photo organization software. This research is based on the fusion of face and fingerprint image.

7. CONCLUSION

There are image recognition techniques which are used for general purpose and specific classes of images. In this approach Knn classifier algorithm is used for comparison of two images. The Knn Algorithm gives the output even if 1% matching image is found. This approach combines face and fingerprint recognition methods. Viola and Jones algorithm has made face detection practically feasible in real world applications such as digital cameras and photo organization software. This research is based on the fusion of face image and fingerprint image. For detection of face Viola-Jones algorithm is used. This algorithm detects people's faces, noses, eyes, mouth. For detection of fingerprint image minutia algorithm is used.

FUTURE WORK

Image recognition has greater importance in future. The output of this algorithm can be accommodated for a particular application to simplify the integration with other image processing techniques. In environments which have low variations; adaptation could bring very significant improvements to face detection. Adaptation for visual object detection has received relatively little attention and we strongly believe that this is a great direction for future work. This can be run on different operating system using VMware workstation. There is a scope of further improvement in terms of efficiency and accuracy which can be achieved by advanced technique.

REFERENCES

[1] M. Fons, F. Fons, and E. Cantó, "Fingerprint Image Processing Acceleration through Run-Time Reconfigurable Hardware", *IEEE Transactions On Circuits And Systems*, vol. 57, no. 12, pp. 991-995, December 2010.

[2] A. K. Jain, S. Prabhakar and L. Hong, "A Multichannel approach to fingerprint classification," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol.21, no.4, pp. 348-359, 2008.

[3] Josiah Yoder, Henry Medeiros, Johnny Park, and Avinash C. Kak, "Cluster-Based Distributed Face Tracking in Camera Networks", *IEEE Transactions On Circuits And Systems*, vol. 19, no.10, pp. 2551-2563, October 2010.

[4] M.S. Bartlett, H.M. Lades, and T.J. Sejnowski, "Independent component representations for face recognition," in *Proceedings of SPIE*, 2008, vol. 3299, pp. 528–539.

[5] R. Cappelli et al., "Fingerprint Image Reconstruction from Standard Templates," *IEEE Trans. Pattern Analysis and Machine Intelligence*, Sept. 2007, pp. 1489-1503.

[6] H. Medeiros, J. Park, and A. Kak, "Distributed object tracking using a cluster-based kalman filter in wireless camera networks," *IEEE J. Sel. Topics Signal Process*, vol. 2, no. 4, pp. 448–463, Aug. 2011.

[7] Crookes D., "Design and implementation of a high level programming environment for FPGA-based image processing," Vision, Image and Signal Processing, IEEE Proceedings, vol. 147, Issue: 4, Aug, 2000, pp. 377 -384.

[8] Myungjin Cho, Associate Member, IEEE, and Bahram Javidi, Fellow, IEEE **"**Three-Dimensional Photon Counting Axially Distributed Image Sensing", *Journal Of Display Technology*, vol. 9, no. 1, pp. 56-62, January 2013.

[9] T. Wakahara, Y. Kimura, A. Suzuki, A. Shio, and M. Sano, "Fingerprint verification using ridge direction distribution and minutiae correspondence," *Syst. Comput. Jpn.*, vol. 38, no.3, pp.72–82,Mar. 2014.

[10] D. Sherlock, D.M. Monro, and K. Millard, "Fingerprint Enhancement by Directional Fourier Filtering," *IEEE Proc. Visual Image Signal Processing*, vol. 141, no. 2, pp. 87–94, 2007.