NOVATEUR PUBLICATIONS
International Journal Of Research Publications In Engineering And Technology [IJRPET]
ISSN: 2454-7875
VOLUME 2, ISSUE 6, June -2016

IDENTIFICATION SYSTEM BASED ON USE OF INFRARED IMAGES BY GETTING BLOOD VEINS OF FACE

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ABSTRACT:

The proposed work is about an approach of face recognition using infrared images. In this project we are going to design algorithm to get the vascular structure of face, then to find the minutiae points and then to compare it with the stored template. The minute points are found on the basis of ridges, bifurcations. The infrared images of 10 people are taken in laboratory. In this way the live database is generated as well as to check performance, of algorithm images from internet were also used. The comparison will be done on the basis of distance as well as alignment based.

KEYWORDS: Identification System, Infrared Images, Blood Veins, etc.

INTRODUCTION:

Mostly authentication and identification systems employ few basic tools for identification viz.

1. personnel information such as educational details postal details etc,
2. Numerical information such as, PIN number or nationality card number etc. [1]
3. Biometric details such as thumb print or face recognition etc. If seen carefully above methods are vulnerable to copy. One can easily hack pin number or nationality card number or even can easily avail personnel information.

In last couple of decades the biometric has come up as good alternative over conventional identification systems but due to some drawbacks mentioned below the effectiveness may get hampered. As the finger prints can be manipulated or duplicated and even face recognition has its own limitations such as it is vulnerable to variations in light. And still scientists are working on this though machine recognition has gone at par. In such situation a nonconventional tool helps us which uses infrared images which are mostly free from light variations.

In medical field some research has been carried out. This research was about the uniqueness of finger print as well as of vascular structure [5]. It was found that the finger print as well as vascular structures of face [1] ND OF Palm Dorsa [2] are unique for a person.

CURRENT PRACTICES AND THEORIES:

i. **Y. Adini, Y. Moses, and S. Ullman, "Face recognition: The problem of compensating for changes in illumination direction,"[3].** The paper discusses facial recognition from volume rendered magnetic resonance imaging data. For a face recognition system, a variation between images of same face is a challenging issue. A common approach is used which is to convolve image with Gabor filter or image intensity derivative etc. The paper discuses the study that evaluates sensitivity of those reorientations to changes in illuminations as well as view point and facial expressions.

ii. **C. L. Lin and K. C. Fan, "Biometric verification using thermal images of palm-dorsa vein patterns,**" **[4**].According to the paper like finger ridge, the vein pattern of human body is also a distinguishing feature for each person. The paper presents an approach to exploit this uniqueness of vein pattern of palm dorsa for personnel identification. Vein pattern is captured using thermal images of palm dorsa.

iii. **P.Buddharaju, I. T. Pavlidis, P. Tsiamyrtzis, and M. Bazakos, "Physiology based face recognition in the thermal infrared spectrum"[5]**. Since blood vessel structure of each human face is unique. This particular fact is used in this paper to propose a novel approach of physiology based face recognition in thermal infrared spectrum. In this paper human face thermal image is captured and is compared against five thermal images of each subject taken at different angles.

iv. **B. F. Jones and P. Plassmann, "Digital infrared thermal imaging of human skin"[6]**. Study of thermograph is done in this paper for medical application for investigating physiological effect using noninvasive techniques. This paper discusses the physics of image formation, development in un cooled camera and use of image processing to interpret 2D maps of temperature.

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v. **B. R. Nhan and T. Chau, "Classifying affective states using thermal infrared imaging of the human face,"[7].** This paper discriminates between self reported affective states in response to visual stimuli drawn from international affective picture system. The result of study suggest that classification of facial thermal infrared imaging data coupled with affective models can be used to provide information about individual affective states from potential use as passive communication pathway.

vi. **The X. Chen, P. J. Flynn, and K. W. Bowyer, "Visible -light and infrared face recognition,"[8]** .This paper discusses PCA algorithm to study comparison and combination of infrared and typical visible light images for face recognition. This paper examines effect of lightning change between gallery image and probe image

SCOPE OF PROPOSED WORK :

If we need to eliminate the disadvantages of face recognition in visible spectrum then we must go for infrared images in Long and mid infrared spectrum. The near infrared spectrum is quite useless because it uses partial reflection with radiation which is not desirable in our case. Our emphasis is completely on radiation only. Here main theme is to extract the vascular structure of human face and compare it with the stored datasets. The main advantage is that no one can mimic this blood vessel structure of human face because it is well beneath the face and very difficult even to alter one facial feature. The proposed system is implemented using MATLAB software.

OBJECTIVES OF PROPOSED WORK:

1. To collect thermal images of each person captured by Medium range Infrared camera.
2. To study the segmentation and morphological operations on thermal images.
3. To find thermal minutiae points from vascular structure.
4. To find match between database images and probed images using alignment based match.
5. To find match between database images and probed images using distance based match.
6. Compare the matching performance.

BLOCK DIAGRAM & DESCRIPTION:

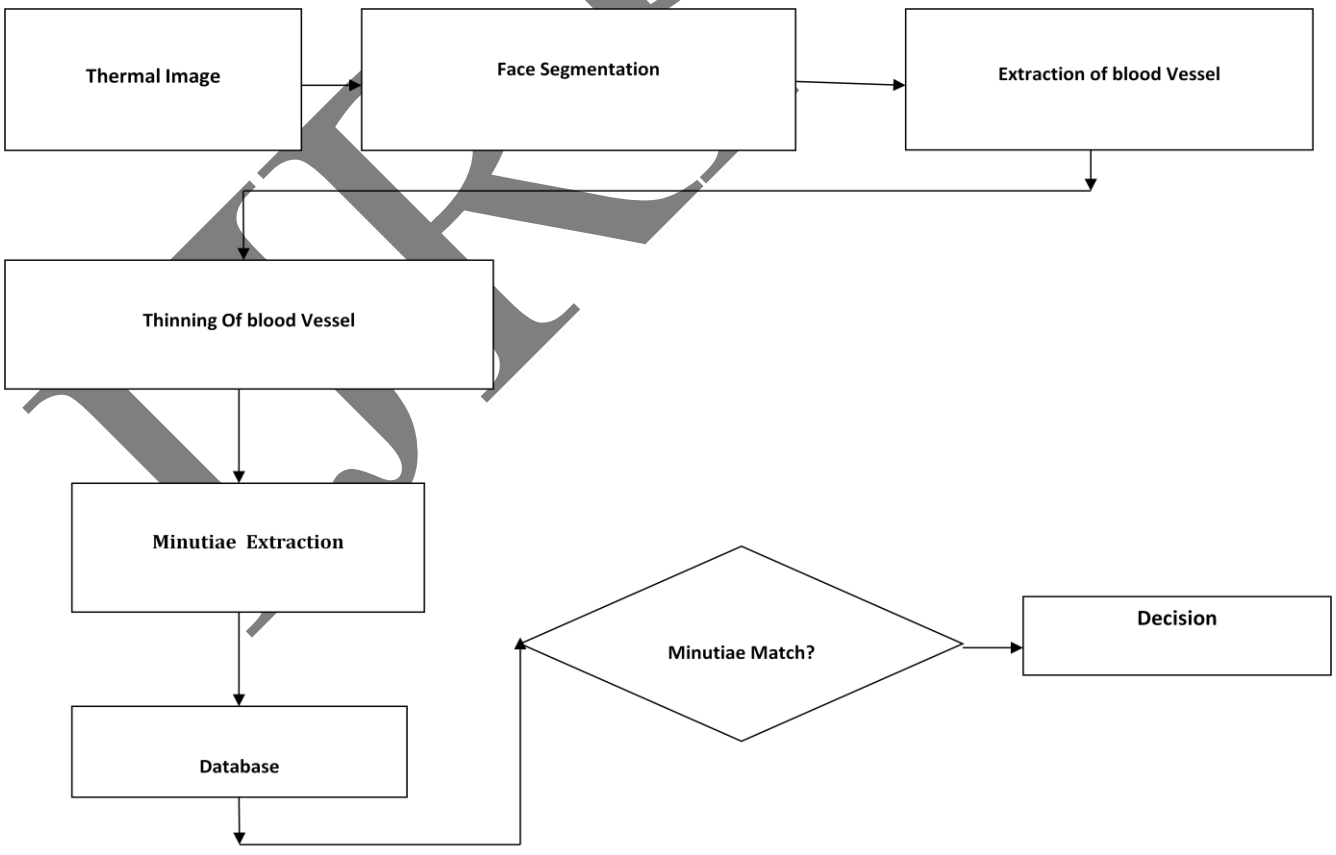

Fig. 1 shows general block diagram of proposed work.

CONCLUSION:

- In this, first the thermal image captured using mid wave infrared camera is taken and is forwarded for segmentation process.
- In the segmentation face is segmented from rest of the image. The Face segmentation is done on the basis of active counter and with energy level of the pixels.
- Face segmented image is transferred to next block where morphological operations are performed to segment the blood vessel structure of face. The blood vessels are extracted using top hat segmentation.
- After this image goes to next block where it is skeletonised using hit or miss operator.
- Then this skeletonised image undergoes thermal minutiae point extraction. Here minutae are extracted. These minutae are actually ridges, valleys and bifurcations of extracted blood vessel.
- The features are stored as gallery dataset.
- Whenever we need to compare the probed image with gallery stored dataset we follow the steps 1 to 5 and then we compare this final with gallery stored dataset.

REFERENCES:

[1]Ana M. Guzman, Mohammed Goryawala, Jin Wang, Armando Barreto, Jean Andrian, Naphtali Rishe,and Malek Adjouadi," Thermal imaging as a biometric approach to facial signature authentication", IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS, VOL. 17, NO. 1, JANUARY 2013"

[2]C. L. Lin and K. C. Fan, "Biometric verification using thermal imagesof palm-dorsa vein patterns," *IEEE Trans. Circuits Syst. Video Technol.*, vol. 14, no. 2, pp. 199–213, Feb. 2004.

[3] Y. Adini, Y. Moses, and S. Ullman, "Face recognition: The problem of compensating for changes in illumination direction," IEEE Trans. Pattern Anal. Mach. Intell., vol. 19, no. 7, pp. 721–732, Jul. 1997

[4] C. L. Lin and K. C. Fan, "Biometric verification using thermal images of palm-dorsa vein patterns," IEEE Trans. Circuits Syst. Video Technol., vol. 14, no. 2, pp. 199–213, Feb. 2004.

[5] P.Buddharaju, I. T. Pavlidis, P. Tsiamyrtzis, and M. Bazakos, "Physiologybased face recognition in the thermal infrared spectrum," IEEE Trans. Pattern Anal., vol. 29, no. 4, pp. 613–626, Apr. 2007.

[6] B. F. Jones and P. Plassmann, "Digital infrared thermal imaging of human skin," *IEEE Eng. Med. Biol. Mag.*, vol. 21, no. 6, pp. 41–48, Nov./Dec. 2002

[7] B. R. Nhan and T. Chau, "Classifying affective states using thermal infrared imaging of the human face," IEEE Trans. Biomed. Eng., vol. 57, no. 4, pp. 979–987, Apr. 2010Biomed., vol. 15, no. 2, pp. 221–232, Mar. 2011

[8] X. Chen, P. J. Flynn, and K. W. Bowyer, "Visible -light and infrared face recognition," in *Proc. ACM Workshop Multimodal User Authentication*,

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