Biometric Identification System Based On Iris , Palm And Fingerprints For Security Enhancement

1ST AUTHOR RITU JINDAL ,2ND CO-AUTHOR GAGANDEEP KAUR

1ST MTECH STUDENT , 2ND ASST. PROF. IN YADAVINDRA COLLEGE OF ENGINEERING TALWANDI SABO (BATHINDA),PUNJABI UNIVERSITY CAMPUS,

Abstract

Biometric is the science of measuring physical properties of living beings. There are two operating modes of biometric system that are identification mode and verification mode. The term "biometrics" is derived from Greek words bio means life and metric means to measure. BIOMETRIC IDENTIFICATION SYSTEMS includes Finger print, Iris ,Retina, Finger Geometry ,Signature/Handwriting ,Voice ,Facial Proportions ,Hand Geometry detections. Basically now a days we use the multiple biometrics and to make use of multiple biometrics at a time, helps to minimize the system error rates but iris recognition is considered as one of the best Biometric method used for human identification because of its unique feature that differ from one person to another .Even two identical twins has different iris. No two irises are same. This paper describes the method to identify and verify different persons using images of their iris , fingerprints etc by using software that is NI Vision Assistant.

Keywords: Biometrics, Pre-processing, Pattern matching , NI Vision Assistant ,security.

1. Introduction In order to identify an individual , humans differentiate between physical characteristics such as facial structure. Therefore Biometrics as science of measuring and compiling different physical characters now recognizes features such as iris, fingerprint. There are basically four steps involved that are following:

1.1 Image acquisition

1.2 Pre-processing

1.3 Pattern matching

1.4 Authentication

2. Unique Properties Of Iris Iris has many properties that make it an ideal biometric recognition component: i) very little variation over a life's period .ii) genetic independence . Irises not only differ between identical twins, but also between the left and right eye. No two irises are same. The ability to accurately measure the iris patterns, the false acceptance rate is 1 . Iris pattern is formed during the first year of life, and pigmentation of the stroma takes place for the first few years. Formation of the unique patterns of the iris is random and not related to any genetic factors . The only characteristic that is dependent on genetics is the pigmentation of the iris, which determines its colour . Epigenetic nature of iris patterns results in completely independent iris patterns. Even identical twins possess uncorrelated iris patterns .[1]

3. Different Modes Of Biometric Identification System

3.1 There are basically two modes of the biometric identification system .

3.1.1 In verification mode , the system performs a one-to-one comparison of a captured biometric with a specific template stored in a biometric database in order to verify the individual is the person they claim to be.

3.1.2 In identification mode, the system performs a one-to-many comparison against a biometric database in attempt to establish the identity of an unknown individual.[2]

4. Literature Survey In order to implement the biometric system different authors used different methods such as following:

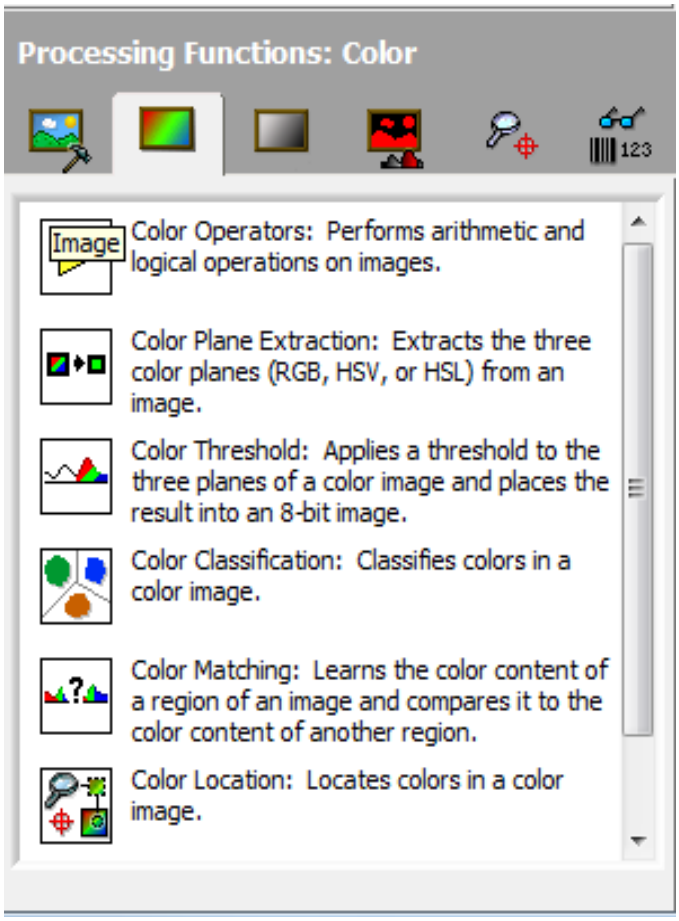
4.1 M.Suganthy,P.Ramamoorthy.R.Krishnamoorthy proposed an algorithm using a system based on Local Binary Pattern and histogram approaches for feature extraction, and Linear Vector Quantization classifier for classification for this iris recognition. This model is designed to distinguish clients from unauthorized users so that only valid users can have access to the security systems.[3]

4.2 S. Akrouf, *Member, IACSIT*, A. Bouziane, A. Hacine. Gharbi, M. Mostefai and Y. The goal of their project is to bring together and integrates the work of the laboratory team members in order to get a practical realization of an Intelligent Multimodal Biometric Identification System. To improve classification performance, the system will have a virtual character module which can exchange information with the person to be identified according to a random survey.[4]

4. Methodology In this paper we have divided the whole process of Biometric identification system into four steps earlier discussed in introduction part of this paper. Database have been taken from the website [5].Different 50 user are to be involved and their images have been taken.

5. Results

STEP5.1 Getting the image or we can say image acquisition. Images used in this taken from database [5]. Original images from database are converted into gray format shown in fig.5(a) and 5(b). We select the color plane setup from different processing functions in Machine vision.



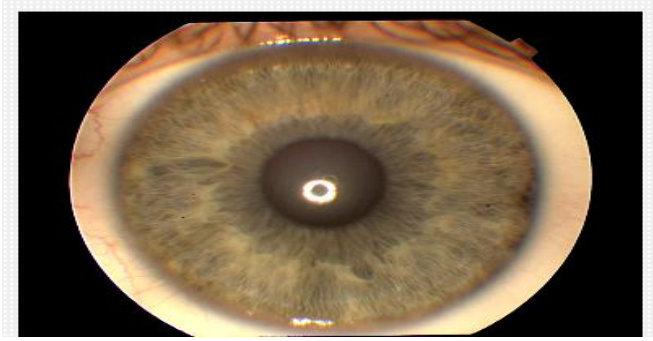


Fig5(a) Orignal image

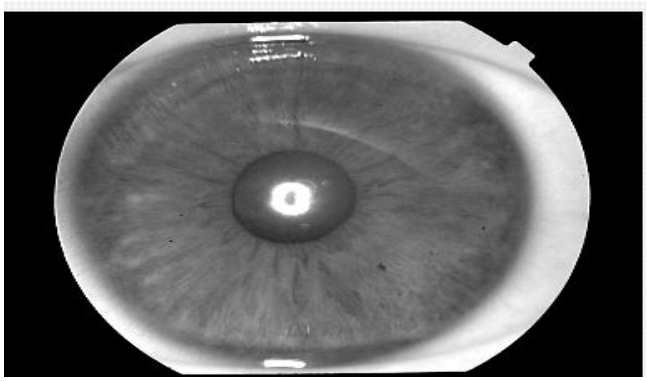


Fig5(b) image in gray format

STEP5.2 Pre-processing of image: Basically it includes all the steps like iris segmentatation in which various steps like histrogram, use filters for better pixels clarity, including filters, circular edge function for detecting the iris – pupil boundary , image mask function that isolates the parts of an image for processing.Processing of color plane extraction shown in fig 5(c)

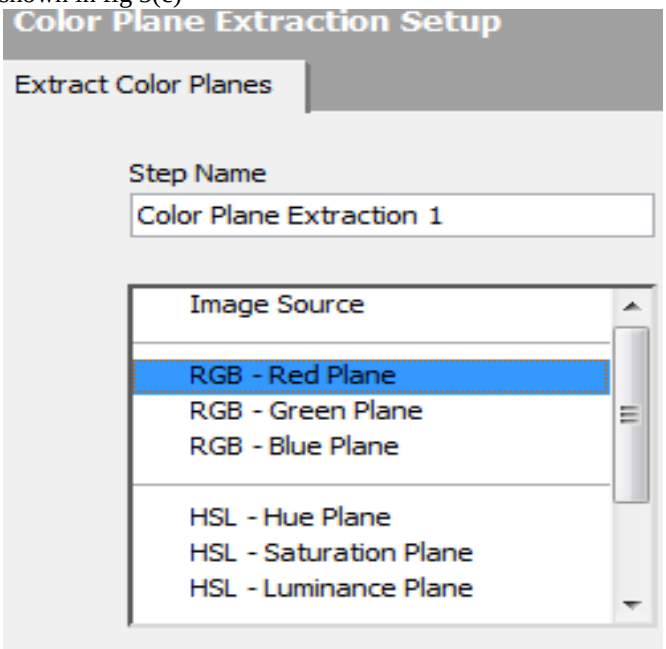


Fig5(c) color plane extraction

STEP5.3 Templates Matching: Pattern matching of the iris image with the stored templates of all the 50 users stored in database. Patterns are used to create templates for iris recognition.Just like iris we can also do the fingerprint and palm recoognition by following some steps. In that portion we make a different script in machine vision for fingerprint and palm recognition .Instead of iris images fingerprint and palm images taken for recognition of different users. Four different templates are to be made from all different 50 users.

STEP5.4 In verification or authentication ,we can match the image with stored templates that are made by us in step5.3 of different 50 users. If result of all the templates should be equal to threshold(score) or greater than that value , then person is recognized as an correct user and if result of all four templates should be very less than score value then its fraud user.

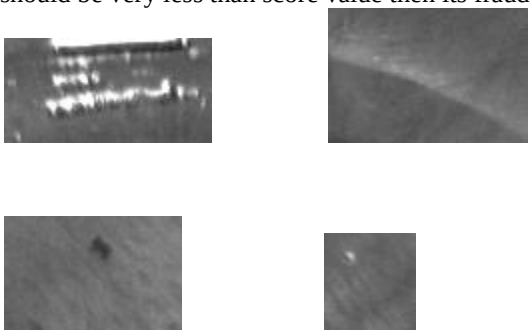


Fig 5(d) Templates of iris images.

Results ...	1
X Position	327.50000
Y Position	67.50000
Angle	0.000000
Score	1000.00000

Results ...	1
X Position	405.50000
Y Position	185.00000
Angle	0.000000
Score	1000.00000

Results ...	1
X Position	214.88982
Y Position	124.91965
Angle	0.000000
Score	928.66235

Results ...	1
X Position	451.00000
Y Position	409.00000
Angle	0.000000
Score	1000.00000

Fig 6 Results of all four templates.

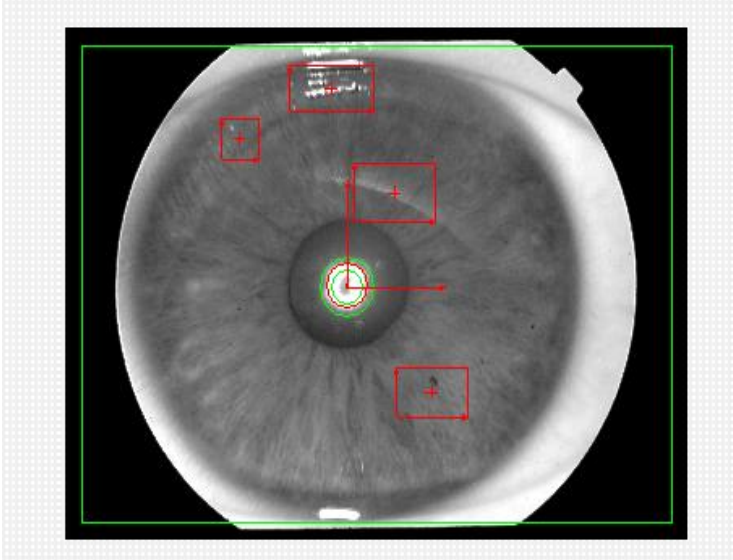


FIG 7 Pattern matching.

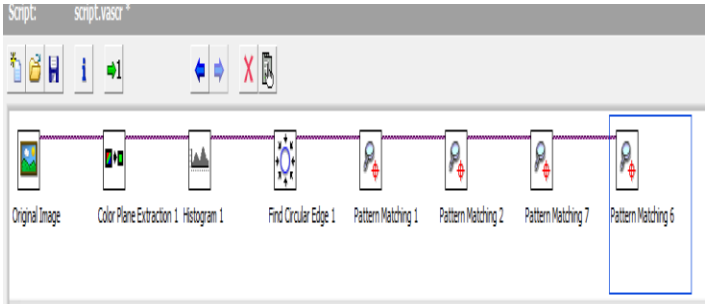


FIG8 Preprocessing of iris patterns.

Similarly in fingerprint, palm all these above steps followed and according to this process very good recognition system has to be developed for security enhancement.

6. Applications of Biometric Identification System

6.1 Resetting Passwords, Processing Payments.
6.2 Access Control, Border Management
6.3 Time and attendance systems, Law Enforcement.[6]

7. Future Scope Finally we conclude that all biometric identification systems are very benefial for us for security applications. There are so many softwares which are used by students like NI VISION ASSITANT AND NI LABVIEW for learning and research activities .There is no doubt that BIOMETRIC will that technology that affect every person in future.

REFRENCES

[1]. Mohinder Pal Joshi*et al. / (IJAEST) INTERNATIONAL JOURNAL OF ADVANCED ENGINEERING SCIENCES AND TECHNOLOGIES Vol No. 6, Issue No. 2, 277 – 281.

[2]. BIOMETRICS : A FURTHER ECHELON SECURITY
Siddhesh Angle, Reema Bhagtani, Hemali Chheda Department of Biomedical Engineering, ThadomaShahan Engineering College, T.P.S III, Bandra, Mumbai50.

[3].M.Suganthy,P.Ramamoorthy,R.Krishnamoorthy / International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 2, Issue 2,Mar-Apr 2012, pp.1016-1019 1016 | P a g e . Effective Iris Recognition For Security Enhancement.

[4]. Towards an Intelligent Multimodal Biometric Identification System. S. Akrouf, *Member, IACSIT*, A. Bouziane, A. Hacine. Gharbi, M. Mostefai and Y. Chahir. International Journal of Computer and Electrical Engineering, Vol.2, No.6, December, 2010, 1793-8163.

[5]. Iris database- http://phoenix.inf.upol.cz/iris/download .

[6]Ritu jindal ,Gagandeep kaur ,BIOMETRICS:A BOONFOR SECURITYPURPOSES,PROCEEDING OF INTERNATIONAL CONFERENCE IN ADVANCED COMPUTINGTECHNOLOGIES(ICACT2012),HELD AT GURUKULVIDYAPEETH,BAHUR,2012.