iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** IV **Month of publication:** April 2018

DOI: http://doi.org/10.22214/ijraset.2018.4289

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

Eye Vein based Locker Security System

Dhanashri Sawant[1], Jignesh Singh[2], Foram Modi[3], Vighnesh Humane[4], Satish Manje[5]
[1, 2, 3, 4]*UG Student,* [5]*Assistant Professor, Computer Engineering Department of Computer Science*

Abstract: ***Biometrics has been used for identification and recognition purposes. The physical, behavioral, biological traits of an individual can verify a person's identity. Physical traits include face, fingerprint, iris, and sclera. Behavioral traits are like gait, voice and biological include DNA. Some traits could change over a period of time, cannot be used for recognition from a distance or can cause hygiene issues. A biometric may be more applicable in a particular scenario than the rest. The implementation of this system is to use multiple levels of authentication for a locker security System. The first stage is password based authentication. Next is the OTP based authentication in which user gets the password to be entered for final verification. The final stage is Biometric Scanning of eye vein which is a novel way of authentication. The veins in the sclera the white part of the eyes can be imaged when a person glances to either side, providing four regions of patterns: one on each side of each eye. Verification employs digital templates from these patterns, and the templates are then encoded with mathematical and statistical algorithms. These allow confirmation of the identity of the proper user and the rejection of anyone else. Advocates of eye vein verification note that one of the technology's strengths is the stability of the pattern of eye blood vessels, the patterns do not change with age, alcohol consumption, allergies, or redness. Eye veins are clear enough that they can be reliably imaged by the cameras on most Smartphone's. The technology works through contacts and glasses, though not through sunglasses. At least one version of eye vein detection uses infrared illumination as part of the imaging, allowing imaging even in low-light conditions. The proposed system will be implemented on a locker.***

I. INTRODUCTION

Biometrics offers automated techniques of verifying the identity of an individual. Biometric technologies can be divided into two major categories physiological and behavioral characteristics. Systems that come under physiological category include traits such as fingerprint, face and eye based authentication. The other category of behavioral system includes traits like signature, voice and postures. Some traits could change over a period of time, cannot be used for recognition from a distance. A biometric may be more applicable in a particular scenario than the rest. We are to make striking balance for making our system foolproof biometric systems compared with traditional authentication schemes are more reliable and it is difficult to copy, share or distribute the biometric feature. The biometric characteristics have universality and distinctiveness due to which they can be used in authentication schemes. The physical, behavioral, biological traits of an individual can verify a person's identity. Each of these has its own advantages and disadvantages.

Authentication systems based on eye can be further classified based on the factors of eyes used for identification purpose. These factors include retinal identification and scanning of pupil region both the methods are effective but there are some drawbacks about them such as retinas are difficult to scan if the person is suffering from eye infection also these factors get affected as person grows old but in proposed system eye veins are used as major factor of authentication these are unaffected by any of the above shortcomings.

II. EXISTING SYSTEM

There are many ways of authentication based on physical attributes of human and one of those method uses eye as an authentication medium. The existing systems are based on scanning of retina or iris of the eyes. These systems are used for biometric purpose in offices as well as they are used for security purpose in various places. Drawback of these systems is that they are not foolproof. There are chances of breaching these systems by forging the attributes. The Structure of retina changes over time and also it gets affected in certain circumstances such as sore eyes and alcohol consumption. Because of these issues the existing systems are not that reliable. To overcome these drawbacks we have proposed a system where eye veins are used as a medium of authentication.

III. PROPOSED SYSTEM

The vein structure of the eye of every person is unique and it can be obtained non-intrusively in the visible wavelengths. The structure of veins is visible and stable over time in eye. With increasing age collation and elastic fibers deteriorates, clera dehydration occurs and calcium and liquid Salts accumulate but the veins do not deteriorate Therefore, it is well suited for human

©IJRASET (UGC Approved Journal): All Rights are Reserved

identification. The vein structure in the sclera is multilayered and has complex nonlinear deformations. The proposed eye vein detection system is hybrid system which includes multiple authentication methods in a single system.

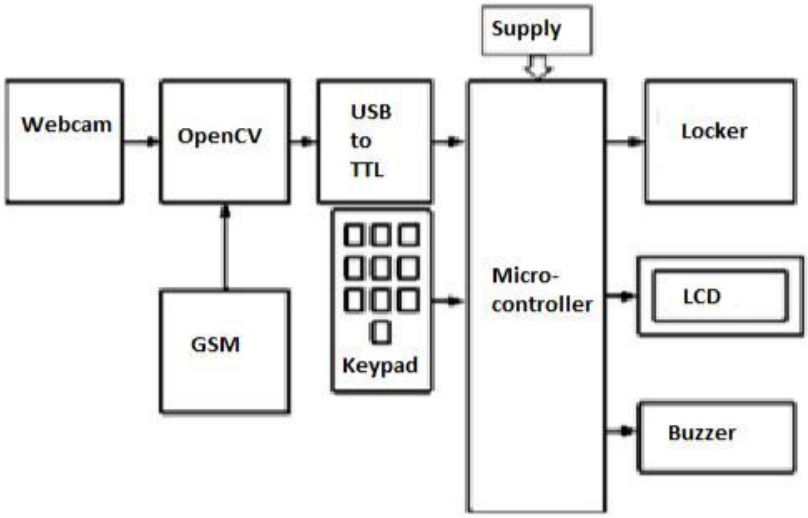


Fig 1. System Architecture

A. User id and password

By using comparison algorithm microcontroller compares the provided input data with the stored data. If the password matches then system will provide user with access to next step of authentication. The device is programmed in such a way that it will operate only with the correct entry of pre-defined digits.

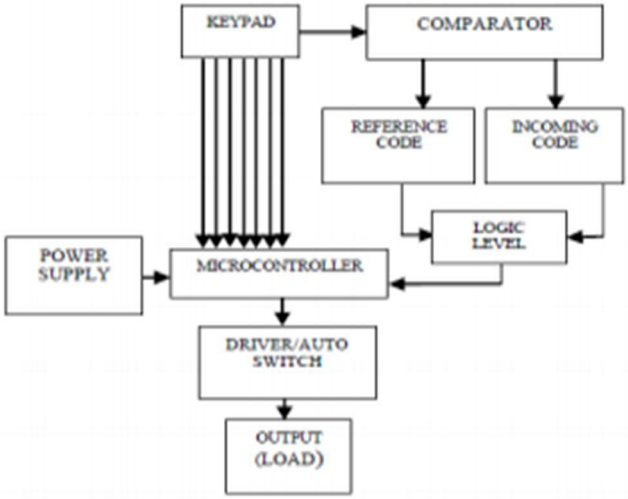


Fig 2: Programmable Electronic Code Lock.

B. One time password (OTP)

OTP is password authentication scheme where a new password is generated for each authentication session. Once the password is used, it is no longer valid and any attempt to reuse the same password for future authentication sessions would fail. Properties of one time passwords ensure the resistance towards various common attacks and the uniqueness of human perception makes it usable. OTP generation algorithms typically make use of pseudo-randomness or true-randomness. This is necessary because future OTP's can be easily predicted by observing previous ones.

C. Eye vein pattern scanning

The system consists of four steps which includes image acquisition, segmentation, normalization and encoding and matching.

©IJRASET (UGC Approved Journal): All Rights are Reserved

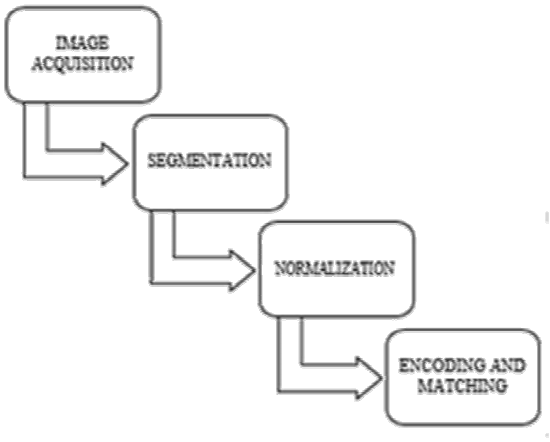


Fig 3. Method flow for vein detection

D. Method flow

Authentication system captures the face in real time and identifies the region. When the region is divided into half from the face image, it divides the image performs iris localization. This output is normalized then undergoes encryption. This result's compared with the iris within the information if match the person is documented else not a licensed person and doesn't demonstrate.

E. Image acquisition

Image is captured using digital camera and is transferred to the file for processing. Image undergoes preprocessing. From the acquired image, region required for processing is identified. K-means clustering algorithm is used to identify the region. The Euclidian distance metric is given by Image where'd' represents the distance and x, y represents the points. This gives the distance between the x and y co-ordinate of points and 'n' represents the number of points. In the algorithm squared Euclidean distance metrics is used. This is same as Euclidean but does not involve the square root. This is summation of the square of the difference between the x and y co-ordinate of the points.

F. Segmentation

Once the region is identified the image is to be divided into quadrants to segment eye alone. Then the task consists of localizing the inner and outer boundaries of the iris. Both are circular, but the problem lies in the fact that they are not concentric. The two circles must be evaluated separately. After identifying the pupil with this center concentric circles are drawn till a change in intensity is identified. Now the final circle gives outer boundary that is iris.

G. Normalization

Two images of the same iris might be very different as a result of size of the image and size of the pupil. Orientation of the vein to cope with this, the image is normalized by converting from Cartesian to doubly dimensionless polar reference form.

H. Encoding and matching

It generates a template code along with a mask code, it also compare two iris templates using hamming distances. Gabor filters are used for encoding and Hamming distance for matching. Shifting of Hamming distances takes place to counter rotational inconsistencies and if it is less than threshold value vein match found, if it is greater than the threshold value no match with the vein in the database.

IV. WORKING

In proposed system the end user will initially interact with security person to assemble the system which will include installation of hardware components which includes webcam, LCD panel and keyboard. The security person of the system will set a PIN and mobile number for first step of authentication. Once the basic mechanism is installed the user will store his eye vein pattern in VB excel sheet with the help of professional security person. The GUI of user is simple and includes instructions to be displayed on

©IJRASET (UGC Approved Journal): All Rights are Reserved

LCD panel. The user will get total 3 attempts to insert ID i.e. his registered mobile number and password if he is proved to be legitimate user then only he can go for further level of authentication i.e. eye vein recognition and the last step is he has to provide OTP which will be generated dynamically by GSM module.

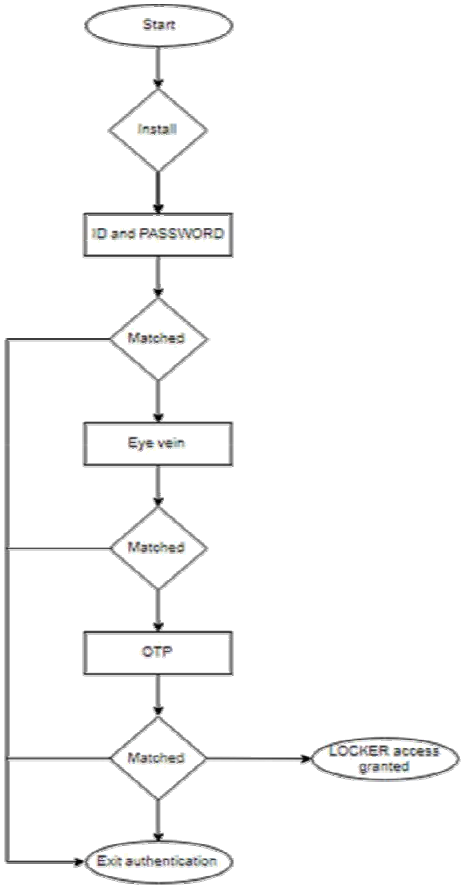


Fig 4: Work Flow

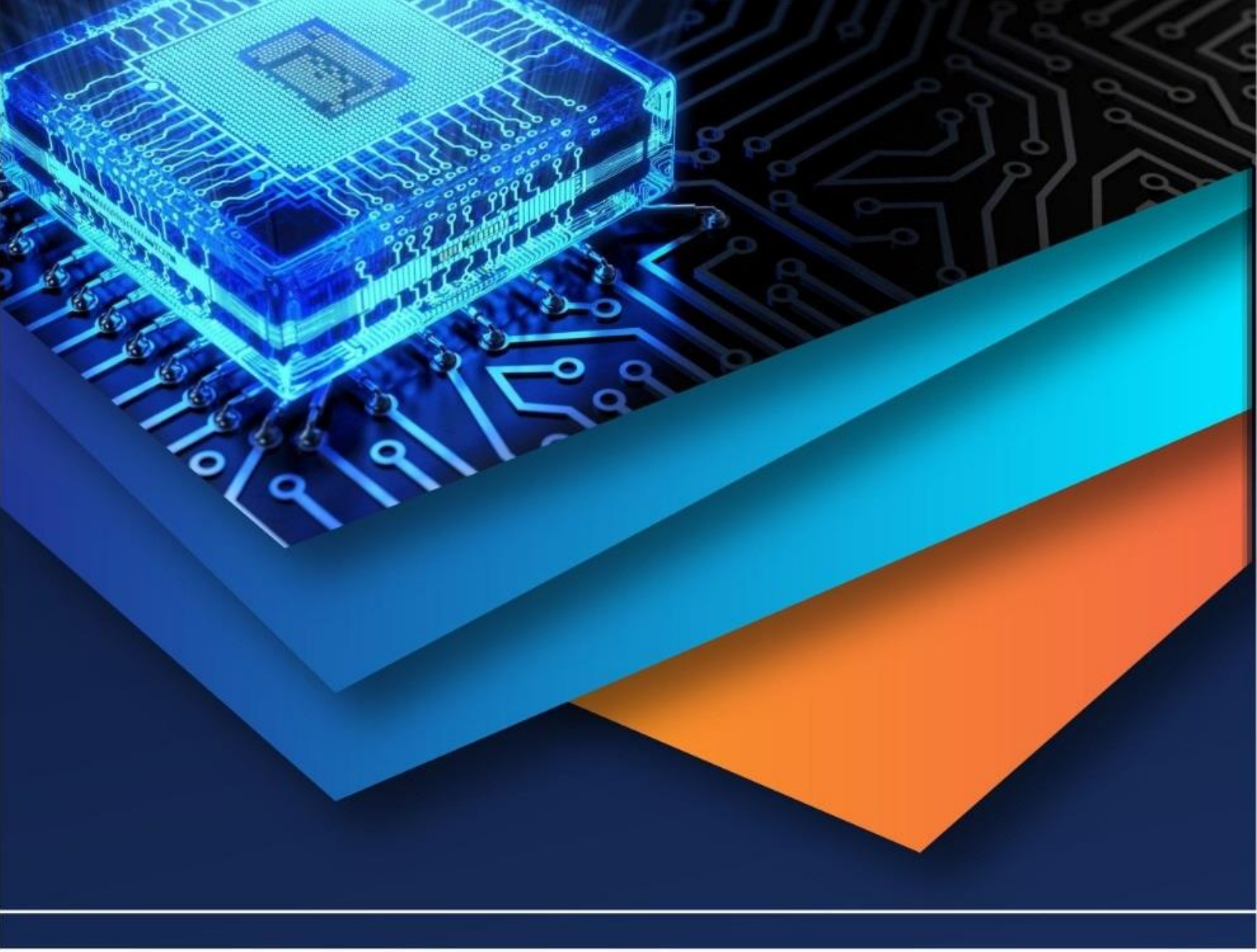
V. CONCLUSION

It can be seen in analysis that the proposed idea will give more effective results than the existing technologies. The existing systems might not be sufficient when the high level of security is required hence the multiple levels used in proposed system will make it hard to crack for illegitimate users. In future though the technology works through contact lenses and spectacles it lacks the ability to scan through sunglasses in future it could be upgraded to overcome this shortcoming. In future the proposed system can also be implemented to be used on mobile devices.

REFERENCES

[1] Himanshu Chaudhary "Electronic code lock with user defined password using 8051 microcontroller (AT89C51)"..
[2] Shweta S.Joshi , Vinayak Ekke, Pankaj Yedurkar , Ajit Lokhande, "Locker Security System using GSM and Random Password" International Journal of Advanced Research in Electronics and Communication Engineering, Vol.- 4, Issue 04, IJARECE, April 2015.
[3] A Agarwal,"A review on vein biometric recognition using geometric pattern matching techniques, "IT in Business, Industry and Government (CSIBIG),IEEE,2014.
[4] R. Derakhshani, A. Ross, and S. Crihalmeanu, "A new biometric modality based on conjunctival vasculature,'' International Journal for Scientific Research & Development| Vol. 3, Issue 12,| ISSN (online): 2321-0613,IJSRD,2016.
[5] Mohammad Hossein Khosravi and Reza Safabakhsh, "Human eye sclera detection and tracking using a modified time-adaptive self-organizingmap,'' International Journal of Computer Science and Network, Volume 6, Issue 1,IJCSN,2017
[6] Maryam Soltanali Khalili1 and Hamed Sadjed "A robust Iris recognition method in an adverse condition"International Journal of Computer Science, Engineering and Information Technology, Vol.3,No.5,IJCSEIT,2013
[7] Yamuna Mahesh and Dr.K.L.Shunmuganathan, "Human Identification Based on the Pattern of Blood Vessels as Viewed on Sclera Using HOG and Interpolation Technique" International journal of advanced research in computer science and management studies,vol-2,issue 9, IJARCSMS,2014.

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)