A Survey on Biometric Authentication for Accident Victims during Emergencies

¹SANKURI PRIYANKA, ²DR.S.A.MUZEER

Department of ECE
Megha Institute of Engineering & Technology For women's
Edulabad, Ghatkesar mandal, RangaReddy Dist. Telangana, India

Abstract— This paper aims at developing a biometric device for authenticating an accident victim's identity through his/her fingerprint in case of emergencies wherein the person is found unconscious without any identity proof thereby reducing the time taken for the initial treatment of the person and hence minimizing the risk of death due to delay in the treatment process. Initially, people are required to register themselves with any hospital providing their personal details like their contact no., family/relatives contact details, blood group and a brief medical history. The proposed system makes use of a fingerprinting device which will read the patient's fingerprint and compare it with the previously stored fingerprint templates present in the hospital server. If it is present, then it will retrieve the information. In case, the patient's details are not found in the particular hospital, the fingerprint will be searched in the other hospitals which are connected in a distributive manner. This paper also uses the GSM (Global System for Mobile communications) technology which is one of the most widely used telecommunications standard in the world. It is used to send alert messages to the victims /patient's registered family members or relatives. In emergency cases when the patient is unconscious, using this method, hospital will get the information and using the GSM module they can intimate the patient's family.

Key words: Biometric, fingerprint, hospital, GSM, accident

I. INTRODUCTION

Generally a hospital maintains all the patient's details and assigns one unique ID. In case if a person meets with an accident and is found unconscious without any identity proof, it is hard to identify that person and also to provide information to the family required to start the initial treatment. In the current system, if you go to a hospital, you are generally provided with a card the first time you register yourself with the particular hospital. It takes your general details like phone no., name. On every visit to the hospital, information about the medical diagnosis is updated in the hospital's server. An ID card is a document that is highly susceptible to forgery. Also, a person can easily lose an id card, use a different individual's ID card or even forget to carry it.

This paper entirely aims at reducing the risk of deaths due to delay in the initial treatment process and also to help people as much as possible.

II. BRIEF DESCRIPTION ABOUT BIOMETRICS AND GSM

The field of Biometrics deals with identifying humans with the help of their behavioral and physical characteristics [4].

There are various biometric patterns that include various physical and behavioral patterns like facial pattern, iris [1],

hand geometry, fingerprint, DNA, voice modulation and many more.

Fingerprinting is used over the other biometric features for a number of reasons, for example, palm prints are susceptible to weariness; voice, signature, hand shapes and iris images are easily forged; due to various reasons like varying facial expressions, low resolution images and long hair, facial recognition can prove to be a weak tool for biometric authentication. In addition, iris and face recognition are susceptible to spoofing attacks.

The Fingerprint biometrics is the gifted biometric pattern for personal identification both with respect to security and reliability. Fingerprints have been proven to be difficult to steal or forge. It is accepted worldwide [8].

Minutiae-based matching and pattern matching are the two most commonly used and accepted fingerprint matching techniques [6]. Pattern matching technique compares the similarity between the two fingerprint images. Minutiae matching is dependent on minutiae points i.e. the

like Aware and Safran have provided a lot of biometric solutions.

Global System for Mobile communications, commonly referred to as the GSM technology, is one of the widely accepted and used mobile communications standard in the world. GSM technology offers a wide variety of features like fax, email, voice data, high speed integrated data and the highly used SMS feature. It is also highly secure and protected from frauds and intruders. GSM supports a wide range of frequency levels like 900Mhz, 1800Mhz, 1900Mhz [7].

III. RELATED WORK

Lots of research has been done in this field. By referring various transactions, books, conference papers a lot of information can be obtained from previous works, latest and the advancements that needs to be applied.

1) " Design of Biometric Based Transaction System using Open Source Software Development Environment- Savita Choudhary Assistant Professor, Dept. of CSE, Sir MVIT, Bangalore, India (IJIRCCE) [3]."

This paper presents a biometric based identification system replacing the card based transaction system. The key intention is to map multiple account information using a single fingerprint template. This system minimizes the need to maintain a card for each account.

Proposed system uses fingerprint of the user for authentication. This system works using a scanner, followed by a hashing algorithm and decoding. The key generated from every transaction is verified with the database and only an authenticated user is given access to the system.

2) "A portable electronic system for health monitoring of elderly people- Communications and Computing (COLCOM), 2015 IEEE Colombian Conference [2]."

Using this technology, the problem of high demand that is currently being experienced by the hospitals can be reduced by providing remote monitoring and healthcare services at home. Here, in this paper, an implementation of a prototype has been proposed to monitor the health status of elderly people.

This prototype uses mobile communication (i.e., GSM/GPRS) to send alert messages and also concentrate data at a Web server. In order to assist distant doctors, the server might generate electronic health records.

location and direction of each point is considered. As shown in fig. 1, the fingerprint recognition system mainly consists of the image capturing module, feature extraction module and pattern matching module. The figure below shows a diagrammatic representation of the modules.

The fingerprint recognition system used relies on ultrasonic sensors which are useful in avoiding fake authentication.

The optical sensors just capture the fingerprint images on the surface of the scanner which can be fooled easily. Whereas, In Ultrasonic sensors the minutiae from the epidermal layer of the skin are captured and hence is efficient for likeness detection. The false rejection rate (FRR) is expected to be as low as 0.1% and the false acceptance rate (FAR) is expected to be 0.01% [4].

Biometrics has created a revolution in almost every field ranging from businesses, government organizations, defense, law enforcements and many more. Organizations

3) "Fingerprint Based Temporary Identity Supporting Emergency Actions in Collective Accidents- Astilean, A. ; Autom. Dept, UTCN, Cluj-Napoca; Avram, C. Letia, T. ; Mihele, F (IEEE) [5]."

The paper presents a fingerprint based identification system which is integrated with a communication system used to support and improve the activity of emergency services on large areas and accidents implying to multiple victims. In such situations, due to possible post-accident effects, the victim's identity can be difficult to obtain. Consequently, the occasional patients must be local-identified before to be diagnosed and sent to the appropriate hospital unit. The implemented system allows obtaining the provisional identity of the person, which replaces identity cards along with the whole investigation and treatment period even in the absence of any identity act.

The disadvantages of the existing system are:

–   The person's details are kept with only one particular hospital so the card cannot be used in any other hospital and hence in emergency cases it would be difficult to retrieve any information about the victim.
–   If a person loses the card, then they need to apply for a new one and that's a time consuming process.
–   Hospital issued id cards can be forged, lost or left at home.

IV. PROPOSED SYSTEM

The proposed system is intended to overcome the major drawbacks of the currently existing system. This system is easy to design and implement. This can be done using the biometrics concept.

The features of the system are as follows:

–   This system will make sure that data is accurate.
–   Records will be efficiently and accurately stored, maintained and retrieved effectively from the server.
–   During intimation to the patient's family, alert messages will be sent to them immediately using GSM module.

V. MODULE DESCRIPTION

A. Patient Registration

Hospital maintains all the patient details. During registration, all the patient's details like name, address, emergency contact person's details, contact number, family member's contact number and their previous medical history are taken along with the patient's finger print. All these details are stored in the hospital server.

B. Fingerprint recognizer

During emergency when a patient is taken to a hospital, to get the patient's details and to intimate their family members, finger print is taken by the hospital authorities and is checked in the hospital database.

C. Search Patient's Details

If the details are not found in the server then the finger print is searched in the other hospitals servers, all connected in a distributive manner. If any other hospital is having the details of this patient then that server sends the contact details of the patient's family.

D. Intimate family members

Once the hospital gets the patient's details the GSM module sends an alert message to his/ her family to intimate them about the patient.

VI. CONCLUSION

This is a real time project which aims at helping the people during medical emergencies and also reducing the number of deaths that are caused by the delay in the initial treatment process. This System makes use of the GSM features to send alert messages. The designed and developed system is installed in the hospital. Once the patient's finger print is taken, the information provided by the person will be stored in the hospital server. Generally a hospital maintains all the patient details and assigns one unique ID. But in some emergency cases, wherein the patient is unconscious, we cannot obtain the patient's details. In case of such an emergency, we can take the patient's fingerprint which will

be matched with the stored fingerprint templates in the database. To get the patient's details we make use of this fingerprint.

The proposed paper has the following advantages:

− Just by obtaining the fingerprint of the patient, hospital people can inform the family members.
− No need to maintain the ID card.
− Easy to intimate patient's family during emergencies.
− High level of authentication provided.
− Highly accurate.

REFERENCES

[1] B.Sundar Raj Assistant professor, "A Third Generation Automated Teller Machine Using Universal Subscriber Module with Iris Recognition", IJIRCCE, Vol. 1, Issue 3, May 2013.

[2] Geovanny P. Guano, Darwin Alulema, Enrique V. Carrera, "A portable electronic system for health monitoring of elderly people", Communications and Computing (COLCOM), 2015 IEEE Colombian Conference.

[3] Savita Choudhary, Assistant Professor, "Design of Biometric Based Transaction System using Open Source Software Development Environment", IJIRCCE. Vol.2, Special Issue 2, May 2014.

[4] N. Kiruthiga a, L. latha b, S. Thangasamy c, "Real Time Biometrics based Vehicle Security System with GPS and GSM Technology", Procedia Computer Science 47 (2015) 471 – 479.

[5] Astilean A. Autom Dept, UTCN, Cluj-Napoca ; Avram, C. Letia, T. , Mihele, F., "Fingerprint Based Temporary Identity Supporting Emergency Actions in Collective Accidents", International Conference on eHealth, Telemedicine, and Social Medicine, IEEE 2009.

[6] https://en.wikipedia.org/wiki/Fingerprint_recognition

[7] http://www.wifinotes.com/mobile-communication-technologies/mobile-gsm-technology.html

[8] Naina Kaushik, Mayur Veralkar, Pratik Parab, Kedar Nadkarny, "Anti-Theft Vehicle Security System", IJSRD, Vol. 1, Issue 12, 2014.