Extraction of Patient's Medical History on Emergency by Aadhaar Card from Cloud IoT

S. Jothi[#1], Ms. M. Radha[*2], Ms. P. Alagu Meena[@3]

[#1]*Assistant Professor, Department of Computer Science, J. A. College for Women, Periyakulam, Tamil Nadu, India*
[*2, @3]*PG Students, Department of Computer Science, J. A. College for Women, Periyakulam, Tamil Nadu, India*
[1]sister.jothi@gmail.com
[2]radhamuruganbca@gmail.com
[3]meenarakshitha123@gmail.com

Abstract— **Biometric characteristics are unique features of an individual such as Iris scan, Finger Prints Impression that are fed in Aadhaar. This could be utilized for medical purpose too to treat a person fatally injured in an accident or became unconscious or to a person in a critical stage if doctors can have access to the person's past medical report and the collection of such report involves great difficulty. This can be made easy if the Biometric Authentication Device (BMAD) is linked with Aadhaar with the help of common website through web services. This helps doctors to have entry to those reports to render better treatment to the patient. The main objective of this idea is to highlight the need of automated identity in health care that everyone can have that will serve anywhere in the globe to get fitting medical assistance following one's past reports at the earliest. This helps to make emergency alerts (SMS services or Phone call) to people related to the patient.**

Keywords— **Centralized Aadhaar Database Server, finger print, Biometric Authentication Device, reports, and medical assistance.**

I. Introduction

Biometric features are of greater help in all spheres of life especially in health care and social services. Explorations are piling up high to make use of biometric characteristics as the best means of reaching a person and his/her identity. This evades the risk of remembering the complicated combinations of random numbers and characters. Fingerprint, face, gait, iris and such unique attributes become traits to identify any person. Biometrics technology, besides security purpose, has been in use in the field of forensic science, data sharing over networks and decreasing identification faults in hospitals.

A. Biometrics: Authentication and Identification

Biometrics is the fascinating field of science analysing physical / behavioural individualities specific to each human being in order to be able to confirm their identity.

Biometric authentication is the method of comparing data for the individual's characteristics to that individual's biometric "pattern" in order to conclude similarity. The reference model is first stored in a database or a protected portable element like a smart card. These data are authenticated as compared to the biometric data of the person. In this way the identity of the person is verified.

Biometric identification involves in determining a person's identity. Here the photo of the person's face or recoding of voice or registering the fingerprint is taken to the biometric data of the person. Such data will be compared with that of others to get it distinguished. This is done with the help of two categories of biometric technologies:

1) Physiological Measurements: They can be either morphological or biological. For the purpose of morphological analyses fingerprints, the shape of the hand, vein pattern, the eye (iris and retina), and the shape of the face are taken into consideration. Whereas DNA, blood, saliva or urine are taken for biological analyses; and this is much used by medical groups and police forensics.

2) Behavioral Measurements: This involves mostly of voice recognition, signature dynamics (such as pressure exerted, speed of movement of pen, accelerations, inclination), keystroke dynamics, and the way objects are used; gait, the sound of steps, and gestures, etc. [10].

Fig. 1 Biometrics Technologies

B. Cloud Computing

Cloud computing is a technique for delivering information technology (IT) services wherein information get collected from Internet by means of web-based tools and applications. This does not have any direct connection to a server. Cloud computing stores them in a remote database lest to be done in hard drive or any local device. This data could be sought out from the web and the programs get run based on the software [11].

C. Cloud Computing in Healthcare

Cloud computing is evolving to be a new computing paradigm in medical field too. It stores clinical history of everyone in the country and across the world. This facilitates doctors to have easy access to the medical history of the patient from the database to assure a better and fitting treatment. It is mandatory that the hospitals should be registered to have licence number as specific code to make use of such resource and update recent information about the treatment to the person [8].

D. Implementation of Aadhaar Card Based Biometric Individual Identity in Healthcare using Fingerprint Recognition

The health reports of the patients including diagnostics information and medical prescriptions are provided in the form of test based case notes (papers). This causes the risk that doctors could seldom know the previous health conditions and the medicines used by the person when the patient visits the hospital later. But storing all the health information of a person in the cloud as the soft copy reduces this problem [7]. Hospitals issue a UHID (Unique Health Identification) to their patients at the first entry and all medical details of a particular patient such as the treatments and other medical details started on the first day until now, are easily accessed by the doctor in the same hospital during the subsequent visits of the patient. If the UHID is linked to patient's Aadhaar which is a countrywide unique identification for multiple purposes, then it has the potential to create a universal health record for the patient. With Aadhaar, patients can request the hospital to shift their medical records to their digital locker which they can access from anywhere at any time. This will lead to democratization of healthcare delivery [12].

II. REVIEW OF THE LITERATURE

Number of researchers have proposed various models for IoT in Healthcare and the patients past history using various techniques. This part focuses on the works done in this regard.

Almotiri et al. proposed a system of m-health that uses mobile devices to gather real-time data from patients and store it on network servers linked to internet enabling access only to some certain specific clients. This data can be used for the medical diagnosis of patients and is achieved by using a number of devices and body sensor network.

Sahoo et al. studied the healthcare management system and about the large amount of patient's data that is generated from various reports. They further analyzed the health parameters to predict the future health conditions of the patient. They use a cloud based big data analytic platform to achieve the same using the means of probability.

Tyagi et al. explored the role of IoT in healthcare and studied its technical aspects to make it a reality and to identify the opportunities they proposed a cloud based conceptual framework in which the patients' medical data and information can be securely transferred, with the permission of patient and their family by building a network among patient, hospital, doctors, Labs etc. The primary reason behind this is to relieve patient from the high-priced clinical aid, yet providing improved care and service to patients.

Xu et al. gave a data model to record and use the IoT data. They designed and developed a resource-based Ubiquitous Data accessing method to collect and publish IoT data worldwide so that it can be accessed anywhere, anytime. They also presented an emergency medical facility based on IoT and how to collect and use the IoT data on different platforms.

III. PROPOSED SYSTEM

Biometric measurements have the potential to improve both security and convenience in many areas of our daily lives, including in health care and social services. The objective of this system is to improve the security and health care performance in the Medical Report machine as well as to provide easy access to cast Medical Report by using finger print. Fingerprint is one of the distinctive identities of a human being which is being used in the Aadhaar system. By using Arduino software and by using IOT we capture the finger print of every individual is being captured. The Medical of the Case Sheet is transmitted to PC through Arduino communication. Finger print of the person captured is compared to Aadhaar details using IOT. Doctors can know about individual patient's full details and past medical history from UIDAI and Medical Report Linked Database.

The proposed system comes to real time existence, and its utility is accessible within a short span of time in healthcare centres; the accuracy of identification of an individual and past medical information regarding the person are beyond ambiguity even in the cases of great emergency. Thus authentic and accurate details of person give greater hope in rendering medical treatment anywhere to the cases met with grave accidents, death and so like.

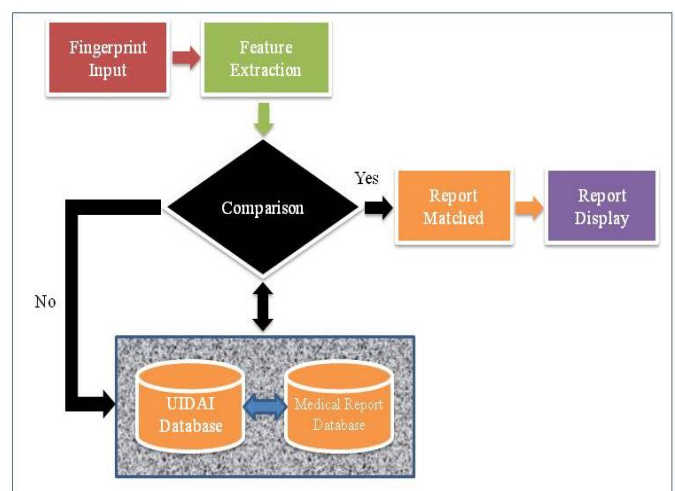### A. Methodology of the Proposed System

Fig. 2 Methodology of the Proposed System

- UIDAI and Medical Report Linked Database: A Linked Database is an organized collection of data.
- Finger Print Stage: This system recorded the users that consider as authority to access control in the enrollment model.
- Feature Extraction: The feature extraction is responsible for conveying fingerprint's unique characteristics.
- Feature Matching and Medical Report: The matching function is that the features extracted from the input fingerprint are compared against those in a database. If the person's finger print matches with the name mentioned in the Aadhaar card then their Medical Report will be displayed.
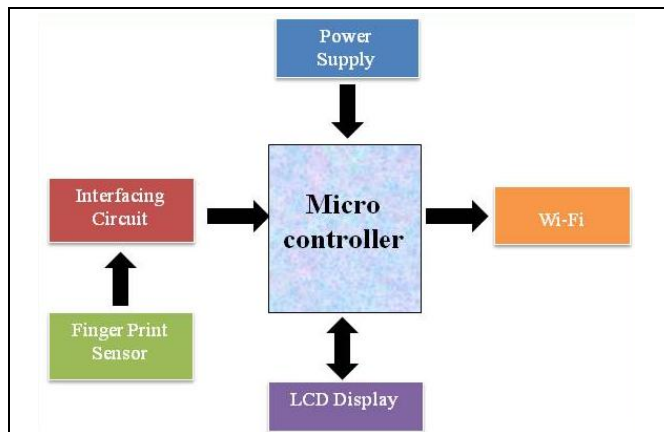
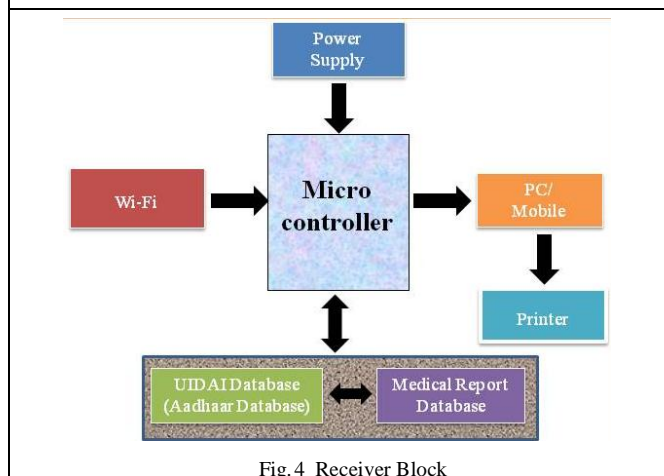### B. Block Diagram

Fig. 3 Transmitter Block

Fig. 4 Receiver Block

The system that is proposed here functions as the finger print sensor is interfaced with the microcontroller. The finger print sensor gets activated by the processor when a person fixes one's finger on it. At once the data related to the finger print will be sent to the microcontroller for comparing the data with the stored data. The microcontroller would send information to PC provided the finger print matches to the details of the Aadhaar and Medical Report of the person asked for. As the details fit well, the information expected are at our disposal to start the treatment at once.

C. Hardware Components and Design

- ARDUINO MEGA 2560
- GT-511C3 FINGERPRINT SCANNER
- PIEZOELECTRIC BUZZER
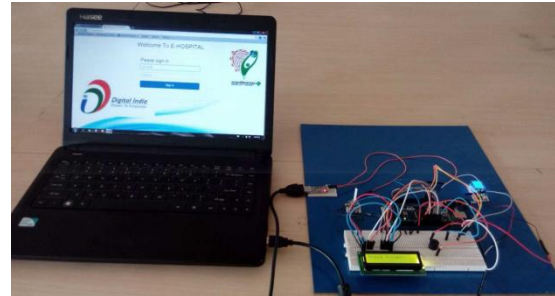- 16x2 LCD DISPLAY
- PL - 2303HX
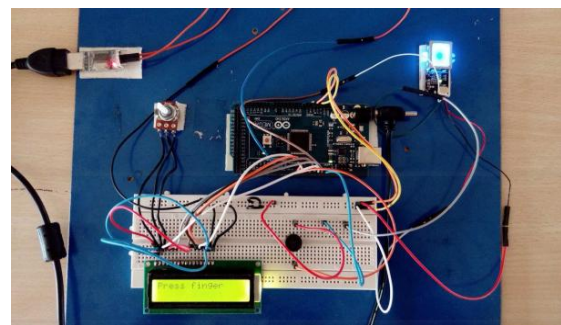

Fig. 5 Interfacing of Laptop and Kit

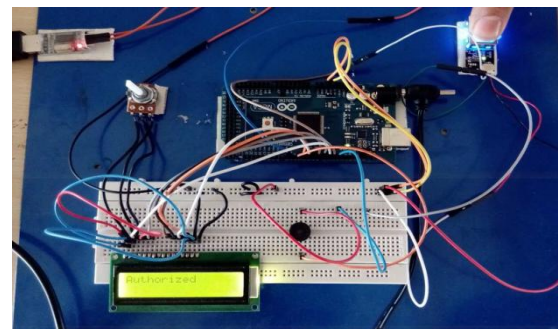Fig. 6 Initilaization of Kit – Press Finger

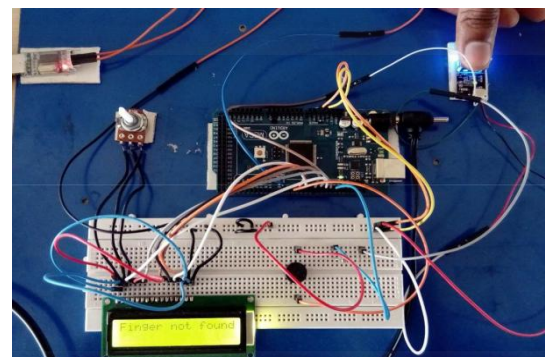Fig. 7 The Sensed Fingerprint is indicated by means of Buzzer and LCD Display
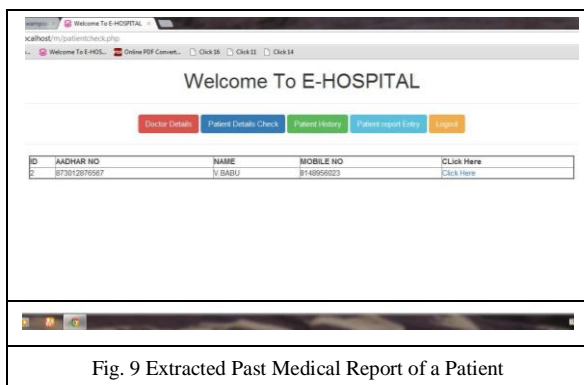

Fig. 8 Mismatch Indication

Fig. 9 Extracted Past Medical Report of a Patient

IV. CONCLUSION

Most of the hospitals today collect and retain the medical history of their patients manually. It is highly impossible to collect medical history of a patient under critical situation. This project replaces this manual work with digitalized one. This digitalized stored medical information of any patient must be safeguarded with utmost care. For this purpose, the patient's fingerprint biometrics is advised to be taken as the password to get access to it. Fingerprint is one of the unique identities of a human being. This medical history of the patient is stored in the Unique Identification Authority of India (UIDAI) and Medical Report is linked to the Database. All these would be linked with patient's AADHAAR ID using Arduino. It makes the history easily available to doctors anywhere to treat the particular patient whenever needed. This serves a great aid to save human life.

REFERENCES

Journals

[1] N.Gopal, dr.R.K.Selvakumar,"Multimodal Biometric Identification System- An Overview" International Journal Of Engineering Trends And Technology ISSN 2231-5381,vol 33, Issue 7, Mar 2016.

[2] Ruchi Parashar, Abid Khan, Neha," A Survey: The Internet Of Things" International Journal of Technical Research and Applications e-ISSN: 2320-8163, Volume 4, Issue 3 (May-June, 2016), PP. 251-257.

[3] S. H. Almotiri, M. A. Khan, and M. A. Alghamdi. Mobile health (m-health) system in the context of iot. In 2016 IEEE 4th International Conference on Future Internet of Things and Cloud Workshops (FiCloudW), pages 39–42, Aug 2016.

[4] P. K. Sahoo, S. K. Mohapatra, and S. L. Wu. Analyzing healthcare big data with prediction for future health condition. IEEE Access, 4:9786–9799, 2016. ISSN 2169-3536.

[5] S. Tyagi, A. Agarwal, and P. Maheshwari. A conceptual framework for iot-based healthcare system using cloud computing. In 2016 6th International Conference - Cloud System and Big Data Engineering (Confluence), pages 503–507, Jan 2016.

[6] B. Xu, L. D. Xu, H. Cai, C. Xie, J. Hu, and F. Bu. Ubiq- uitous data accessing method in iot-based information system for emergency medical services. IEEE Transac- tions on Industrial Informatics, 10(2):1578–1586, May 2014. ISSN 1551-3203.

[7] T. Jayadeep, Sunar Mohammed Farooq, "An E-Health Information System Using Cloud Computing", IJRCS - International Journal of Research in Computer Science Vol. 04 Issue: 01, pp.120-122, Jan. 2017.

[8] B. Sreesaila1, K. Abinaya, M. Swarnalatha, Dr. R. Sugumar, "Aadhaar Card Based Health Records Monitoring System", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 7, Special Issue 2, March 2018.

[9] Arulraj, M.Nithya, A.Parvee "Implementation of Biometric Individual Identity in Healthcare and Fingerprint Recognition" International Journal of Engineering Science and Computing, Volume 8 Issue No.3, March 2018.

Websites

[10] https://www.gemalto.com/govt/inspired/biometrics

[11] https://www.investopedia.com/terms/c/cloud-computing.asp

[12] https://www.ukibc.com/aadhaar-revolution-healthcare-india/

[13] https://www.ideasforindia.in/topics/governance/unique-health-identification-and-aadhaar-a-case-for-mandatory-linkage.html