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# Patient Biometric Analysis Database Hospital Management System

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**ABSTRACT:** The poor efficiency of the present manual management system in hospitals today results from the inordinate length of time it takes to search for and locate patient folders and the ineffective filing system adopted. The purpose of this study is to develop a computerized Health Centre Management System that will upgrade the quality of information management and efficiency of the hospital employees by adopting two – way authentication system involving the use of fingerprints. As every cooperate organization, institution or government agency requires data and good quality information to function effectively, It is however not an over statement to say that many organizations, institutions or government agencies have become critically dependent on the use of database system for their successes especially in the hospital.

## I. INTRODUCTION

The poor efficiency of the present manual management system in hospitals today results from the inordinate length of time it takes to search for and locate patient folders and the ineffective filing system adopted. The purpose of this study is to develop a computerized Health Centre Management System that will upgrade the quality of information management and efficiency of the hospital employees by adopting two – way authentication system involving the use of fingerprints. As every cooperate organization, institution or government agency requires data and good quality information to function effectively, It is however not an over statement to say that many organizations, institutions or government agencies have become critically dependent on the use of database system for their successes especially in the hospital. This research paper uses the Waterfall methodology model that followed a linear structure starting from preliminary investigation, requirement analysis, design phase, implementation, and maintenance. This study produced the module that would administer patient registration and admission details, a module that could monitor medicine inventory of the Health Centre Pharmacy, etc.; thereby resulting to a better improvement of the hospital transactions. However, it has been recommended in this research need to enhance the front end design of the system; add modules for the laboratory and billing module, generate hospital reports that could help the users to provide an overview of the hospital transaction within specific date.

Advancements in healthcare industry with new technology and population growth has given rise to security threat to our most personal data. The healthcare data management system consists of records in different formats such as text, numeric, pictures and videos leading to data which is big and unstructured. Also, hospitals have several branches at different locations throughout a country and overseas. In view of these requirements a cloud based healthcare management system can be an effective solution for efficient health care data management. One of the major concerns of a cloud based healthcare system is the security aspect. It includes theft to identity, tax fraudulence, insurance frauds, medical frauds and defamation of high profile patients. Hence, a secure data access and retrieval is needed in order to provide security of critical medical records in health care management system. Biometric authentication mechanism is suitable in this scenario since it overcomes the limitations of token theft and forgetting passwords in conventional token id-password mechanism used for providing security. It also has high accuracy rate for secure data access and retrieval. In this paper we propose BAMHealthCloud which is a cloud based system for management of healthcare data, it ensures security of data through biometric authentication. It has been developed after performing a detailed case study on healthcare sector in a developing country. Training of the signature samples for authentication purpose has been performed in parallel on hadoopMapReduce framework using Resilient Backpropagation neural network.

## II. LITERATURE SURVEY

Modern technologies are being integrated to already existing medical services. For example EMR (electronic medical records) and EHR (electronic health records) are those two technologies that have been adopted by some of the medical healthcare centers to maintain health records. But these technologies are susceptible to security threats by

hackers and employees of the center. Biometrics based data authentication provides an apt solution for providing security of health data stored in cloud. Biometric security can be obtained from different methods such as confidentiality, integrity, non-repudiation and authentication.

Amongst which, authentication is a prime concern so that any illegal access can be prohibited, thus we have focused on biometric authentication in this paper. There are many different biometric authentication mechanisms in practice but biometric signatures are becoming more and more popular because of its social acceptability. Biometric signatures are different from conventional static signatures as static signature verification is based on just the structural properties but biometric signature authentication takes into account the dynamic features of a signature such as velocity, acceleration, total time, pen tilt angles, pen-ups and pen-downs which assures maximum security to the user. Therefore, an amalgamation of biometrics and cloud can be thought of as an elixir for management of e-health records.

In order to speedup processing of data and ensure a secure, scalable storage and management of data cloud computing has been used in combination with biometric authentication mechanism for storage and processing purpose in BAMHealthCloud. It makes use of parallel computing frameworks such as apache hadoop[3] for carrying out the authentication of data and artificial neural network for training and processing of dynamic signature data. Furthermore, priority has also been taken into consideration for defining various levels of data access in order to safeguard high profile clients against data theft which can set grounds for crimes such as defamation of high profile patients through rumors, baseless allegations and falsehood [4]. Thus, this paper proposes BAMHealthCloud and discusses various existing approaches for e- health data and presents a case study about management of health data in a developing country. It suggests BAMHealthCloud as a solution for secure data access, retrieval and management. It has two modules namely health data management system and biometric authentication agent. Following are the contributions of this paper.

The healthcare data is growing at an exponential rate, the sources being patient's individual records, data from clinical trials, radiology images and genomics sequences data. It is estimated that this data will escalate to a value of 25,000 petabyte by 2020 [6]. Virtualization and cloud computing are technologies that are gaining popularity for capturing, manipulation and storage of data of large volume. Some of the data management and processing platforms are Hadoop framework and Amazon Corporation EC2. Storing health information in cloud involves its access by a remote desktop, PDAs and mobile devices, but the access through such devices lead to a security issue. The work done in this paper focuses on health care data management through cloud and hadoop distributed programming framework. Furthermore, biometric authentication is used for securing access to this data.

According to NIST [7] Cloud computing is defined as a model of ubiquitous computing which provides an on demand access to a set of resources such as network, services and storage in a flexible manner. Some of its benefits include resource pooling, rapid elasticity and on demand services. These are the features that have facilitated the use of cloud computing in various domains including healthcare. Thrust areas of healthcare where cloud computing is becoming popular include DNA sequencing using hadoop for parallel execution of large DNA sequences without any compromise on the accuracy [8].

### III. EXISTING SYSTEM

In a developing country like India with the population mark reaching second highest in the world. Health is an issue of prime concern as the individuals are the nations building forces. The capital city itself has a population of approximately 1780 lakh [14]. Lakhs of patients visit healthcare centers and corresponding to each patient a record is maintained. According to department of health and family welfare, the department has to cater to the needs of approximately 160 lakh [15] people plus migratory and floating population from neighboring states. With the evolution of digital era a digital copy is kept and since the numbers of patients escalate on a daily basis therefore this has lead to huge volumes of healthcare records. Therefore, it's the need of the hour to handle such voluminous records.

#### DISADVATAGES

Proposal of BAMHealthCloud which is a novel framework for biometric authentication of data in a healthcare cloud.

- Development of a priority based parallel algorithm ALGOHealthSecurityCheck for providing a secure access to data. Results showed that a speedup of 9x was achieved with the proposed distributed approach as compared to the other approaches existing in literature.



- Validation of BAMHealthCloud through experiments which showed a better performance in terms of EER of 0.12, sensitivity of 0.98 and specificity of 0.95 which is less than the values existing in literature.

#### IV. PROPOSED SYSTEM

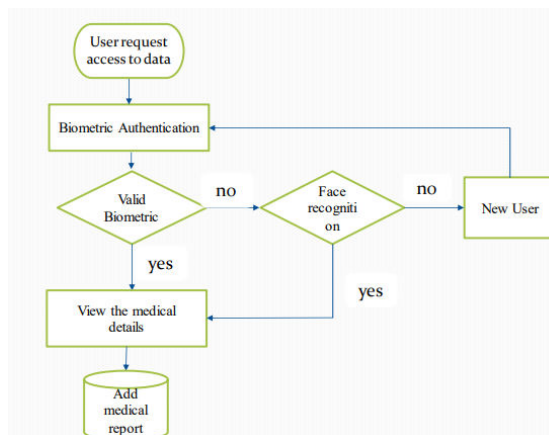
This proposed system enables the patients to register their information at the registration counter only by using their fingerprint and the patient’s brief medical record is accessible to the users, doctors, nurses, and paramedics. The patients need to go to the government hospital to register their fingerprints for the first time using the web application. All the information will be saved in the centralized database including their full name, address, emergency contact, blood type, disease and so on. When an emergency happens, paramedic or any people who installed the MedCo mobile application can identify them by scanning their fingerprint. The process will be faster as there will be a pop-up for the recent disease recorded and in-alert. The doctors and nurses can enter the patients’ medical information in the database. Whenever the patients go to any hospital or clinic, they no need to register at the counter, they just scan their fingerprint for their information.

#### ADVANTAGES

This system is a cross-platform system.

- To enable the doctors and nurses to access the patient’s personal information.
- Medical record, and medicine prescription before giving a treatment.
- This system aimed to enable the users to register at the counter by scanning their fingerprint.

#### DATA FLOW DIAGRAM



#### MODULE DESCRIPTION

##### FACIAL RECOGNITION SYSTEM

A facial recognition system is a technology capable of matching a human face from a digital image or a video frame against a database of faces. Such a system is typically employed to authenticate users through ID verification services, and works by pinpointing and measuring facial features from a given image. Development began on similar systems in the 1960s, beginning as a form of computer application. Since their inception, facial recognition systems have seen wider uses in recent times on smartphones and in other forms of technology, such as robotics. Because computerized facial recognition involves the measurement of a human's physiological characteristics, facial recognition systems are categorized as biometrics. Although the accuracy of facial recognition systems as a biometric technology is lower than iris recognition and fingerprint recognition, it is widely adopted due to its contactless process.

##### BIOMETRICS

Biometrics are body measurements and calculations related to human characteristics. Biometric authentication (or realistic authentication) is used in computer science as a form of identification and access control. It is also used to identify individuals in groups that are under surveillance. Biometric identifiers are the distinctive, measurable characteristics used to label and describe individuals. Biometric identifiers are often categorized as physiological characteristics which are related to the shape of the body.



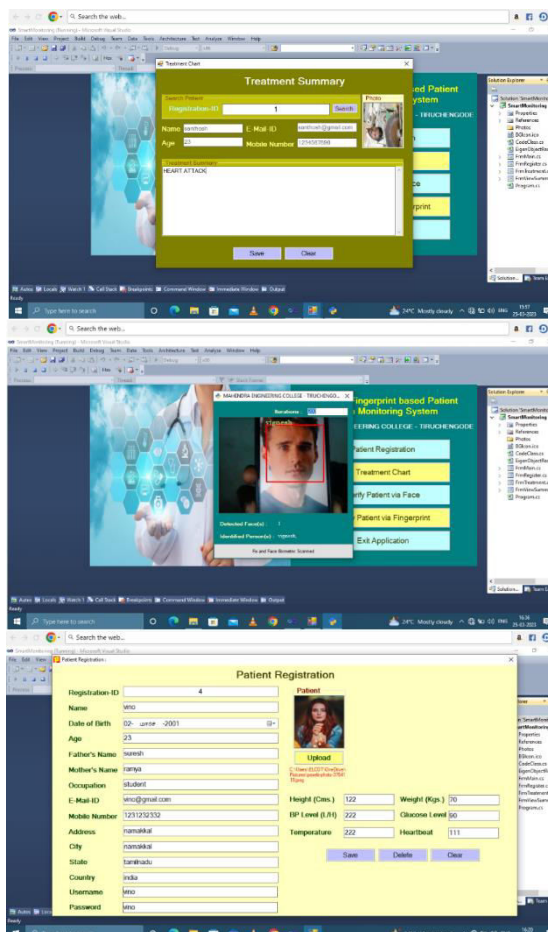
Examples include, but are not limited to fingerprint, palm veins, face recognition, DNA, palm print, hand geometry, iris recognition, retina, odor/scent, voice, shape of ears and gait. Behavioral characteristics are related to the pattern of behavior of a person, including but not limited to mouse movement, typing rhythm, gait, signature, behavioral profiling, and credentials. Some researchers have coined the term behaviometrics to describe the latter class of biometrics.

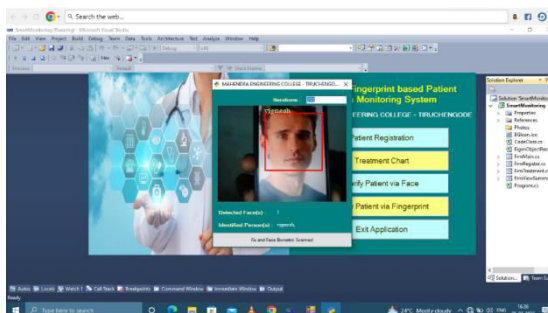
**PATIENT HEALTH MONITORING SYSTEM**

With tons of new healthcare technology start-ups, IoT is rapidly revolutionizing the healthcare industry. In this project, we have designed the IoT Based Patient Health Monitoring System using ESP8266 & Arduino. The IoT platform used in this project is ThingSpeak. ThingSpeak is an open-source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. This IoT device could read the pulse rate and measure the surrounding temperature. It continuously monitors the pulse rate and surrounding temperature and updates them to an IoT platform.

**HOSPITAL MANAGEMENT SYSTEM**

Hospital Management System is a system enabling hospitals to manage information and data related to all aspects of healthcare – processes, providers, patients, and more, which in turn ensures that processes are completed swiftly and effectively. When one thinks of the various aspects and departments of a hospital, it becomes apparent that an HMS is critical. The hospital database management system was introduced in 1960, and has greatly evolved since then – with the ability to integrate with the existing facilities, technologies, software, and systems of a hospital. Today, patients can begin the process of healthcare in the palm of their hand – the mobile devices and apps – make this possible. This process then moves to the healthcare providers and hospitals.





## V. CONCLUSION

There is an anxious race to find the best method of securing healthcare data and ameliorate mistakes which are considered hazardous to the healthcare delivery system all over the world. Despite the financial burden, more healthcare organizations are turning to biometrics as a means to increase security, privacy and improve patient safety. This is however achievable by both adopting and deploying two factor authentications system for its effectiveness which could include a user name (what you know) and fingerprint (what you are) authentication. The computerized Health Centre management System will provide better services for the Nurses and Doctors, Pharmacist, Laboratory, and the Records such as reduction in time taken to find a folder, accuracy and timeliness of record preparation, etc., as well as preventing unauthorized access to available data / information. In this design we have conveniently demonstrated the workability for Lagos State University, Health Center Department and much has been done to eliminate data redundancy, inconsistency, and improve on the integrity of the data stored in the system. The software model used is the iterative waterfall model and the structured design was also employed in the design stage.

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