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Global Centralized Medical Report Repository for Medical Emergency

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Abstract— *Obtaining medical records is not a simple task but it is next to impossible, during a medical emergency case like accidents, cardiac arrest, suicides attempts, seizures, riots etc. The main goal of this project is to provide the medical records/history of a patient to the doctors during an emergency when the patient isn't able to respond using Global Centralized Medical Report Repository (GCMR). Doctors use QR code or OTP or Fingerprint of the patient to retrieve the data from the "Reports" database and display it on the doctor's portal. The Global Centralized Medical Report Repository (GCMR) is updated solely by the doctor, along with the discharge summary incase of hospitalization. During this upload, the system automatically records the doctor's details also. When the patient avails treatment next time or during an emergency where the patient is unable to respond, the doctor can use the QR code or OTP or Fingerprint of the patient to get his earlier medical reports and provide his/her treatment consequently thereby saving time and expenditure for generating scan reports and other details. Security of the application is maintained in such a way that, each and every doctor is granted with the doctor authorization after formal verification. This makes the report precise and ensures that no forged records are entered. As the doctor's information is also recorded along with the medical report upload, this enables the future treatment providing doctor to know who treated the patient and when he was treated and where he was hospitalized. The client/patient can view his medical report/history by logging into the patient's portal. The doctors can login through the doctor's portal to view/update patient's records.*

Keywords— *Global Centralized Medical Report Repository (GCMR): QR code: OTP: Fingerprint.*

I. INTRODUCTION

All hospitals maintain an adequate medical report/history for each and every individual who is evaluated or treated as an inpatient, outpatient, or emergency patient. This medical report/history is documented correctly with all significant clinical information in a timely manner along with treatment and course of medication given to the patient. This report should be readily accessible for providing continuous patient care by medical and paramedical staffs in Centralized fashion that keep the hospital running smoothly and successfully. The ultimate aim is to provide patient details along with the previous medical history to the doctor which will help doctor to treat the patient in short span of time.

The Global Centralized Medical Report Repository (GCMR) uses various authentication methods to retrieve the reports that include fingerprint scanner of the patient, QR (Quick Response) code scanner of the patient's security login code and one time security login password (OTP) that changes and patient gets notified of the security authentication after completion of every treatment.

Since the Global Centralized Medical Report Repository (GCMR) is updated and accessed solely by authenticated and authorized doctors. In consequence it eradicates the bogus doctors in the society.

II. RELATED WORK

The Cloud Based Shopping Guide System Using QR code [8] is based on an easy optimizing technique to design a shopping guide system that runs on any smart phones, with the assist of QR code generation and recognition technology. For competent shopping organization, exclusive QR codes are fashioned to record the article name, number, location of goods placed. Phone recognizes the QR Code through the camera. Subsequent to being recognized and transformed, the code will be compared with the data in the server that is placed in the cloud.

Fingerprint identification [9] is one of the most conventional biometric technologies and is suitable for a large number of identification applications. Live scan fingerprint scanners can effortlessly capture high quality fingerprint images. Fingerprints are inimitable and don't change during a person's existence. Most of the automatic fingerprint detection systems are based on local ridge features identified as minutiae [4]. For this reason it is significant to mark these minutiae precisely and discard the fake ones. [12]

One Time Random Password (OTP) [1] the concepts of secure transactions are essential for almost all online transaction. OTP is generated by the server and send to the user for their personal authentication access. This works on all platforms and applications that may be online processed through system or electronic gadgets. This also adds further protection in spite of the security poised by the one-time password (OTP).

A Quick Response (QR) code [11] is a two-dimensional barcode, generated by means of worldwide free available software. The requirement is a smart phone with high-resolution camera and software that enable to interpret the QR code. The QR code consists of black color module arranged in a square pattern on a white background. The information that is encoded must be in any one of the four standardized modes viz. Numeric, Alphanumeric, Byte/Binary, and Kanji.

III. SYSTEM ANALYSIS

A. Problem Definition

In existing automated system [6], the patient's medical

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record has always been a discrete entity. This data is spread between numerous documentation (computerized and paper based) in diverse locations, often under different patient's identifier numbers. A large amount of these records is outdated, redundant, duplicated, or illegible to the extent that it does not aid the patient at the point of an emergency. This leads to spending extra time in collecting patient's medical details before starting treatment.

B. Drawbacks in Existing System

- Information provided by the patient is not confirmed.
- It is not helpful when patient is unconscious.
- Cannot filter bogus doctors.
- Restricted to a specific health organization only.
- Time is exhausted and attempt to gather basis data of patient is high.

C. Proposed System

The Global Centralized Medical Report Repository (GCMR) is centralized repository that contains medical record information about patients. GCMR is far more adaptable than the existing private applications. As GCMR will operate as a global cloud-powered tool, all the medical records at the conclusion of a particular treatment will be under duress have to be uploaded into the application by the treating doctor. Other than the authorized doctor, no other individual will be able to add/modify a patient's records. Hence doctors are provided with a separate authentication data. Patients will have to approach a doctor to add/edit their medication details like blood group, vitals, allergies etc. However their personal details like emergency contacts, address will be modifiable by the patient.

Patient and Healthcare providers like doctors, specialists and hospital staff can access this online portal from anyplace at any moment, like in an accident or emergency, using QR code or OTP or Fingerprint of the patient. It can also be used for supervising day by day health. GCMR also provides the facility to manage your own health by monitoring and storing your health data from different sources hospitals, laboratories and even old medical records.

D. Advantages in Proposed System

- The details provided by the patient are verified.
- Fake Doctors cannot use the application.
- Patient details are obtained even when the patient is unconscious.

IV. System Design and Implementation

A. Proposed Global Centralized Medical Report Repository (GCMR) Architecture

The proposed model of the Global Centralized Medical Report Repository (GCMR) is as shown in the Fig. 1.

There are three users namely the administrator, patient and the Doctor. The patient and the doctor register themselves by providing their personal details which is being verified and entered into the database by Administrator. The patient visits the doctor for treatment and the doctor logs in to doctor's portal and uses patients QR code, OTP or fingerprint to obtain the patients details and uploads the treatment records. Once the reports and treatment details are uploaded by the doctor in his portal, he will submit the details to repository. As soon as the details are uploaded, the patient is immediately receives an OTP and QR code for future reference. Details once uploaded cannot be modified by doctor without the patient's knowledge.

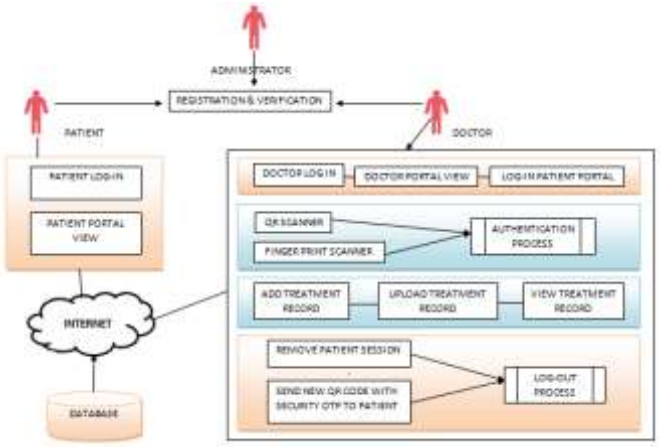

Fig. 1. Architecture of GCMR

There are two separable components namely Patient View Portal [Fig. 2] and Doctor Portal [Fig. 3]. The Patient View Portal deals with providing the patients respective reports after Authentication. In Doctor Portal the doctor gets the access to view his previous treatment report and can upload patients' treatment report after patient's login authentication. The report uploaded by the doctor is available in both doctors and the patients' respective portal.

The patient view portal [Fig. 2] is where patients can view their necessary personal information and their most up-to-date and complete medical treatment records sorted by date. The login process involves entering the verifier OTP, QR code or fingerprint of the patient. Invalid entry will disable system for certain limited period of time.

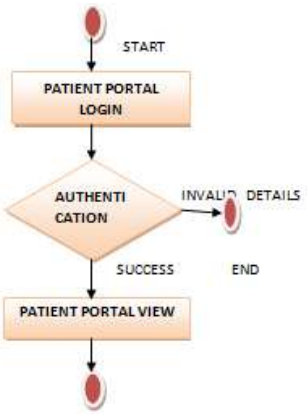

Fig. 2. Patient View Portal of GCMR

The Doctors portal [Fig. 3] is where doctors will enter to view their basic information, their recent treatment records and will be able to update patient record too. Doctor login involves an authentication using email and password

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verification after which the doctor is redirected to dashboard view.

Once the doctor has treated the patient, he will login into the patient portal by obtaining the security OTP or QR code from the patient. At this point doctor can add new records like treatment, case sheet and other medical reports. These medical reports can be multi extension file, which is zipped and uploaded. A doctor is usually locked to patient's portal until he manually logs out. Hence prevent the session timeout and loss of data.

After the successful entry in the patient portal, the doctor should logout from the current patient portal to login into another patient's portal. During this process, the backend process sends an email message to the patient/user with their new security Login OTP and the QR code which they can save in their mobile device for future reference.

Most significant aspect of the Global Centralized Medical Report Repository (GCMR) for Medical Emergency is the use of fingerprint recognition. This mechanism is one of the categories of biometrics used to identify and authenticate the patient's identity and also helps to retrieve the patient's medical history in times of emergency. This helps the doctors' to start immediate treatment without performing any prelude test.

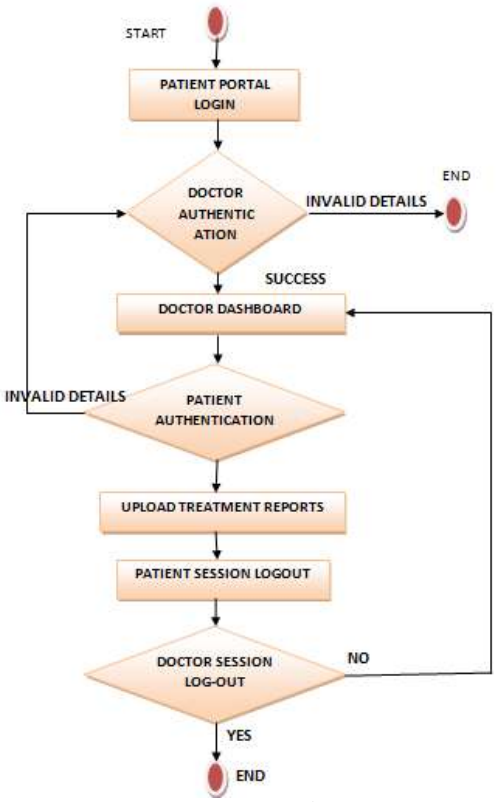

Fig. 3. Doctor Portal of GCMR

B. Modules

- Registration & Verification
- Authentication
- Doctor and Patient Portals
- Session Handling
- Report Uploads
- QR code Generation
- Security OTP Mailing Function

C. Hardware Requirements

The hardware requirements may serve as the basis for a contract for the implementation of the system and should therefore be a complete and consistent specification of the whole system. They are used by software engineers as the starting point for the system design. It shows what the system does and not how it should be implemented.

PROCESSOR	: Intel Core i3.
RAM	: 4 GB DDR2 RAM
MONITOR	: 15" COLOR
HARD DISK	: 80 GB

D. Software Requirements

The software requirements manuscript is the specification of the system. It must contain both a definition and a requirement of requirements. It is of a set what the system should do rather than how it should do it. The software requirements present a foundation for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the team and tracking the team's progress throughout the development activity.

Front End	: JSP, HTML,CSS
Back End	: MySQL
Operating System	: Windows 10
Working Software	:Notepad++, PHPMyAdmin

V. Conclusion

One of the most important impacts of this application is the development of the medical field by enabling doctors to access the medical data of patients at ease during the time of emergency by providing secure authentication methods. This system also minimizes doctor's work by granting automated support.

VI. Future Enchancement

The Global Centralized Medical Report Repository (GCMR) for Medical Emergency can be enhanced in future by integrating iris scanner along with this application. Making use of iris as primary authentication method will improvise the security strength of the application as fingerprint and iris of a person is unique more over this authentication method can be used in emergency cases in quick course of time.

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