

# UNIVERSAL ACCESS OF ELECTRONIC HEALTH RECORD MANAGEMENT SYSTEM

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## **Abstract**

*Many people suffer in keeping their hospital records and since they are recorded in paper format, there may be a chance that it will get lost. The solution is to minimize stress by using the Electronic Health Record (EHR) in handling the records and maintaining them. This model uses a centralized server such as SQL servers to store individual demographic data such as their medications, appointments, major surgeries, diagnosis, scans, and patient reports of the individuals that would be frequently used by the doctors for medications and general check-ups by JEEVAN ITIHAAS. A person's AADHAR number is used as User ID in this proposed system to access and manage individual health databases. To provide greater security these medical records are encrypted using the hashing algorithm. Through a web application, universal coverage to Electronic Health Record Management Systems (UA - HRMS) can be easily obtained anywhere throughout the globe. For security enhancement and confirmation to access the UHRMS, One Time Password (OTP) must be created to further improve.*

**Keywords:** *Electronic Health Record, Hashing Algorithm, SQL Server.*

## **I. INTRODUCTION**

Exposure to electronic health information for patients has the potential for an enhanced health record system. Multiple access to information about patients can increase awareness and comprehension, foster autonomy and informed choice and strengthen interactions between doctor and patient.

Patient's access to online health records has the potential to have an improved health records system. Multiple access to patient's information can increase knowledge and understanding, promote autonomy and informed choice and improve physician-patient interactions.

Contrary to the general public's belief that medical records are personal, the legal control of health records lies with the NHS trust or the paper-holding entity or archive where the record is stored. It means NHS medical records are essentially the property of the Secretary of State, NHS trusts that it or the organisation derives the authority from it. In principle, this involves the restricted intellectual property rights contained in the documents, especially because they are NHS practitioners or NHS contract doctors generating material.

However, since 1984 patients have the legal right to request access to their records, and probably this right to access and monitor the use of their personal data, which is very valuable to patients. At present, access is provided for under the Data Protection Act (1998). The legislation also offers statutory

protections representing physicians' ethical responsibilities to their patients: physicians should not reveal sensitive information about a third party knowingly or without fair permission to reveal that information to a patient or other third party. MPS research shows that, despite long-term access to their records, 72% of people never have one and one in ten GPs never received a request from a patient to see a copy of their records.

More than one in five people (22 percent) actually knew they could ask for access to their data. These effects can result in people feeling no need to look at their medical records. Instead, these findings may mean that patients are less familiar with the definition and advantages of their health management in tandem with health care providers, rather than simply consenting to treatment or recommending recommended treatment.

A patient-centered physician management program would support doctors in their practice and help book physician appointments for patients and monitor medical advances. Doctors can manage their bookings online through the program. Patients are allowed to book online, and reserved on their behalf. The system handles appointment data for several different doctors and times. This program achieves major goals such as developing an Internet-based doctor management network, and handling all knowledge relevant to patients. This software is used to render user experience easier. It's really quick to access the software. Furthermore, the development of real-time communication, using the latest and greatest technologies. The user will now see the change without having to restart or refresh. A consumer interface such as a desktop, laptop, browser and mobile must be compatible with the system. The user can thus easily access the program anytime, anywhere. The program is very simple and user friendly, any user can easily use the program.

Teresa C. Pilioras et.al[1] discussed the electronic acquisition of patient records and digital imaging that facilitates: (i) coordination and collaboration between clinicians and patient care organizations; (ii) collection of patient-life records more accessible to physicians; and (iii) integration of evidence-based population data and development of decision-making support to resources

Nida Butt et.al [2] Computer science is a area driven by creativity that departs from traditional ways of conducting these tasks. Mining has experienced major improvements in the data from the last few decades. While once paper reports were the only way to maintain and store patient records, electronic databases were introduced in the medical sector as a tool for a better healthcare style. Hao Zhu et.al[3] explained that the medical records are records of the patient's onset, growth, assessment, diagnosis and treatment. Bernhard G. Humm et.al[4] explained in EHR's Versatile and Efficient Management which offers a flexible approach to EHR data management. The data model is based on the HL7 Reference Mode of Information. When clinical guidelines alter, the data model can be expanded by editing a table of schemas.

With the latest information technology, Rasha Talal Hameed et.al[5] can be greatly enhanced within the e-Healthcare system. Nevertheless, the traditional sheet has set up a framework which has been extended to healthcare in absent and developed countries. Aside from other market areas, cloud computing is emerging as a modern computing paradigm in the healthcare field. Vishesh Ved et.al[6] clarified that the Personal Health Record System and Techniques of compatibility with different EMR Systems addresses the importance for patients of a central health record system. All services are structured to help patients improve the quality of healthcare

Maithilee Joshi, et.al[7] found that medical organizations find it difficult to incorporate cloud-based EMR systems because of the risk of data breaches and the possible abuse of patient data. Fei Tang et.al[8] clarified that, in modern EHRs, the medical information is typically treated separately by different hospitals, thereby adding to the complexity of exchanging information. Ayesha shahnaz et.al[9] explained that the block chain was an important research area, and the benefits it offers were used by a variety of different industries. Similarly, the healthcare sector is bound to benefit tremendously from block chain technology because of stability, privacy, congeniality and decentralization

B.NarendraKumar Rao et.al[10] described the square measure taken by EMR in helping critical, sensitive personal data, and wishing to be shared frequently among peers. Blockchain Technology enables a growing, permanent and history of all the development tools for trust, accountability and transparency transactions. Martin T. De Oliveira et.al[11] clarified that, in order to keep medical records up to date, the EMRs are highly sensitive details shared between colleagues. Providing confidentiality , privacy and accessibility to these sensitive data is a challenge, as the patient typically loses control over them after the data is released. Block chain-based Secure EMR for healthcare applications propose a block chain-based solution for the security of EMR in healthcare applications where patient-centered access control. Mohamad Kassab et.al[12] stated that technology has allowed the healthcare sector to further enhance patient interaction with the entire healthcare system. Nevertheless, some operational issues remain, in particular those related to the centralized control of HER's, which would require several physicians to have access to the full background of their patients.

## II. DEVELOPMENT OF PROPOSED SYSTEM

### A. Architecture of Proposed System

This application is coded and controlled with server in PHP language, so that it has an index page where all the users can have a respective login. It redirects the individual user at this part of the application and they will then have their respective activities. After those logins, data will be stored and retrieved in the database. After those logins, data will be stored and retrieved in the database. This application can be used in any device with the same credentials, as it is handled with an external server. Three portals are listed from Fig.1, namely the patient, the doctor and the receptionist. Such three portals are connected to the Web portal using a single username and unique credentials. Many of the relevant records and other data are stored in an external database server.

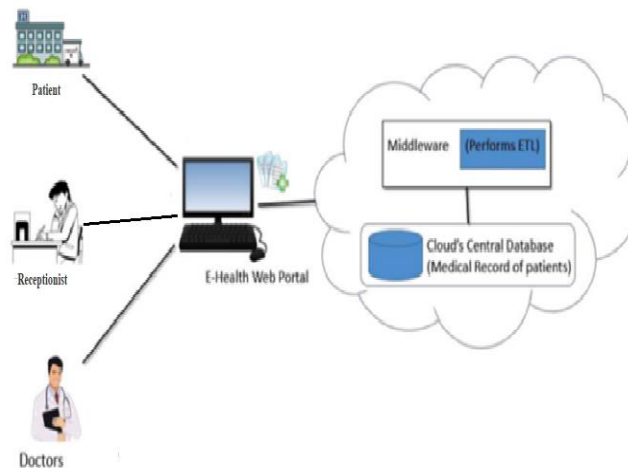


Fig .1 Block diagram of proposed work

The service of this application begins with the first page consisting of a standard patient login and three special logins. The three login given will be the login of admin, physician and receptionist. The administrator will have full rights for a doctor, receptionist, to create an Identity (ID). Such people are given the option to change the prescription and add reports etc. If a new patient first uses this app, they will register for a new ID so that the doctor can update their medication on their ID. Once the patient goes to a laboratory technician, they can get details from their ID and change their scan details in the respective. When they go to the pharmacy, the shop owner will get user ID information about their prescription, and issue the medicine they need. The clinic will also be registered in an application with a login ID for which a manager is assigned. The digitized medical records thus help patient relationships with doctors and improve their healthcare.

### *C. Implementation*

Implementation of this proposed model, where a functional system embeds the structure. Therefore, in achieving a successful new system and providing the user with the confidence that the new system will work and work, it is sometimes considered critical. The implementation process involves preparation, analyzing the current framework and its implementation limitations, developing methods for change detection and evaluating the mechanisms for change.

There are various modules that are been used in the application namely;

- Entity Creation & Allocation Module,
- Patient module,
- Appointment module,
- Prescription module,

### *D. Entity creation and Allocation module:*

Administrator can log in to their portal and create a separate doctor ID from his / her basic details. He'll also create the clinic along with the location. Admin will assign the clinic to the doctors and managers depending on their locations.

### *E. Patient module:*

Patient can register with the basic details of him / her and create a login access using biological information. Patients should log into their access later and verify the availability of the doctor.

### *F. Appointment module:*

The doctors may use the username and password to log in to their portal. He / she can get the appointment checked and change the status.

### *G. Prescription module:*

The medical prescription can be written on the site itself using the patient ID doctors. Doctors will review from the list the list of patients, and show his chart.

## **III. RESULTS AND DISCUSSIONS**

This section provides a brief discussion regarding the results obtained from the Electronic Health Record. As said earlier in this project a web application and a mobile application are been provided in which an individual can access the software from anywhere and anytime. Thus, the EHR has three portals namely

- Patient
- Doctor
- Receptionist

All three portals provide different access for each person they are needed to login to using a unique credential that they have created. In fact, the patient can access only the patient account in these systems, the doctor can access only the doctors account, likewise the technician can only access his assigned account.

### **A. User Registration Page**

The user's UA-EHRMS first page is the registration page, which serves as the user's initial step, which can be observed in Fig. 2.

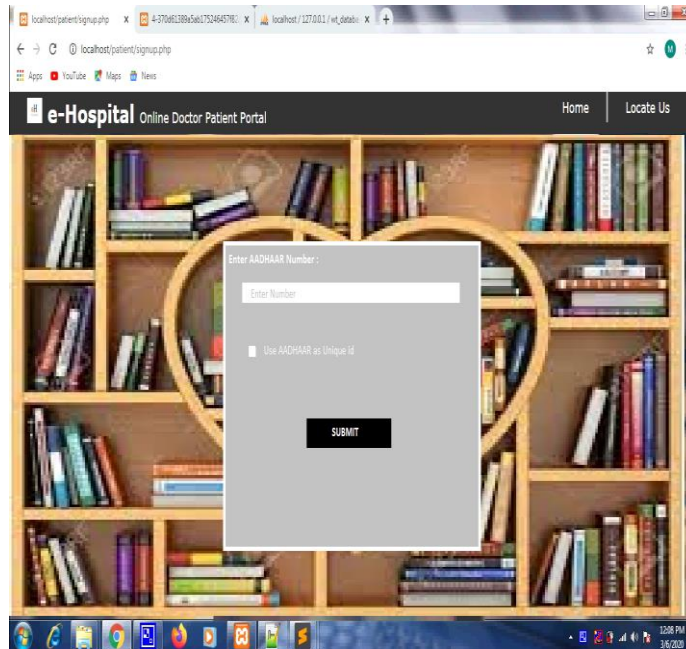


Fig 2. AADHAAR Registration Page

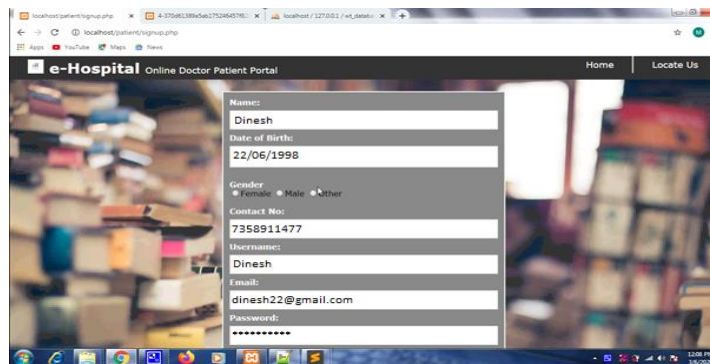


Fig. 3 User registration page View -1

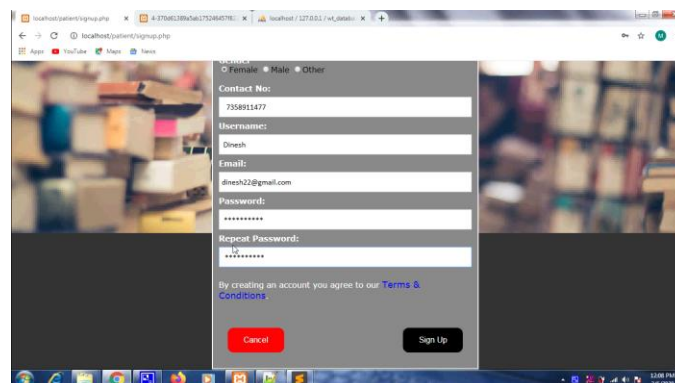


Fig. 4 User registration page View -2

Following the registration of the AADHAAR number, it takes to the second page where the user's personal details have to be filled out as shown in Figures 3 and 4. After registration is successful, the user is redirected to the Login Page. Meanwhile, in the servers, a separate state is created for that specific user.

## B. User Login Page

Login credentials are checked by communicating with all the Network states. To validate the data entered with the registered login credentials, a mapping method is allocated. Successful verification leads to the user's application dashboard. Figure 5 Shows a login page for users.

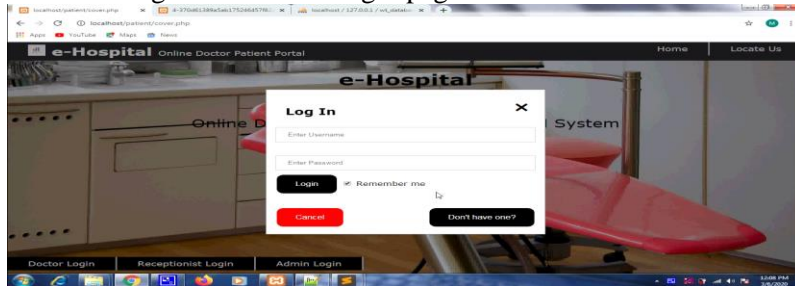


Fig. 5 User login web page

## C. Doctor's dashboard

Figure 6 and 7 displays the screenshot of the login page for the doctor, usually referred to as the dashboard for the doctor. This is the section of the platform where the doctor can monitor and access the patient information recorded and can include the prescription form to the patients he / she has been attending. It helps the doctors to provide a record of the success of the works of the day.

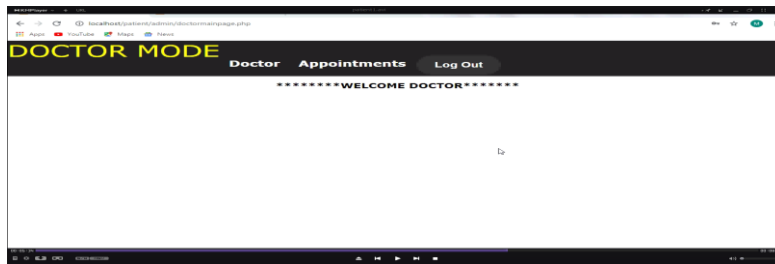
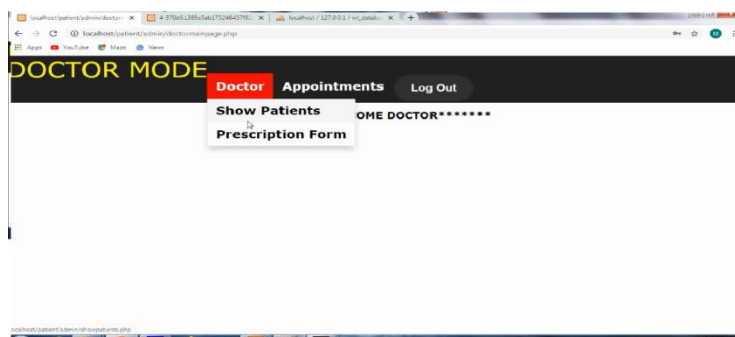


Fig. 7 Options present in Doctor's dashboard

## Show Patient's Page

Fig. 6 Doctor's dashboard





The screenshot shows a web application titled "DOCTOR MODE" with a navigation bar containing "Doctor", "Appointments", and "Log Out". Below the navigation bar, there is a "SHOW PATIENTS" button and a message "TOTAL PATIENTS IN DATABASE=6". A table displays the patient database with columns: Patient Name, Gender, DOB, Contact, Email, and Age. Each row includes a "View Report" link.

Patient Name	Gender	DOB	Contact	Email	Age	
Mithesh	Male	04/04/1999	9897561420	mithesh04@gmail.com	21	<a href="#">View Report</a>
Dinesh	Male	21/05/1999	7820149453	dinesh21@gmail.com	21	<a href="#">View Report</a>
Abhilash	Male	22/05/1999	7358911477	abhilash22@gmail.com	21	<a href="#">View Report</a>

Fig. 8 Patient's database

The doctor should be able to monitor the number of patients he will attend on the specific day. However, as regards time management, the doctor may also consider the patients he needs to treat in different clinics. Figure 8 indicates the number of patients the doctor has to attend database.

#### *Prescription form page*

From Fig 9, the doctor can add the patient's prescription information that the specific doctor has checked and this medication can be sent directly to the patient's portal using the patient's username.



The screenshot shows a web application titled "DOCTOR MODE" with a navigation bar containing "Doctor", "Appointments", and "Log Out". Below the navigation bar, there is a "PREDICT PATIENT DISEASE" section with an "ID:" dropdown menu showing "4". Below this is a "Write Prescription:" text area with a "Submit" button. At the bottom, there is a "Patients Uploaded Report" section.

Fig. 9 Prescription Form

#### *Doctor's appointment details*

The doctors will see the list of patients he will have to treat on that day as shown in Fig 10. The doctors can also count on the number of patients he saw on that day, and the number of patients still awaiting his appointment.



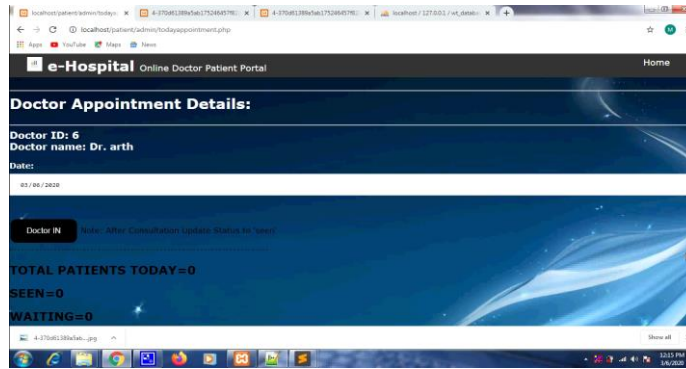


Fig. 10 Doctor's appointment details

#### D. Patient's dashboard

The patient will book an appointment with the doctor he likes from the list of doctors previously kept in the database by the customer. Figure 11 shows the list of physicians saved in the database.

The screenshot shows the 'ADMIN MODE' interface. At the top, there are tabs for 'Doctor', 'Clinic', 'Manager', and 'Log Out'. Below the tabs, there is a 'SHOW DOCTOR' button. A message states 'TOTAL DOCTORS IN DATABASE=4'. Below this is a table with the following data:

DID	Doctor Name	Age	Experience	Specialization	Address	Contact	Region
1	Dr. Bharathi	45	14	Cardiologists	Clinic Nallam	0413-6842371	Pondy
2	Dr. Prasana	52	23	Gastroenterologists	Clinic Ashoka	0413-2841789	Pondy
3	Dr. Ramya	29	4	Dermatologists	Vasan Hospital	0413-2145698	Pondy
4	Dr. Subash	31	6	General	GH	0413-2987412	Pondy

Fig. 11 Database of No. of Doctors

#### Booking an appointment

The screenshot shows a web browser displaying a form for booking an appointment. The form has the following fields:

- Name: Mithesh
- Gender: ☒ Female ☐ Male ☐ Other
- City: Pondicherry
- Town: Pondicherry
- Clinic: Clinic Nallam
- Doctor: Dr. Prakash
- Date of Visit: 02/04/2020

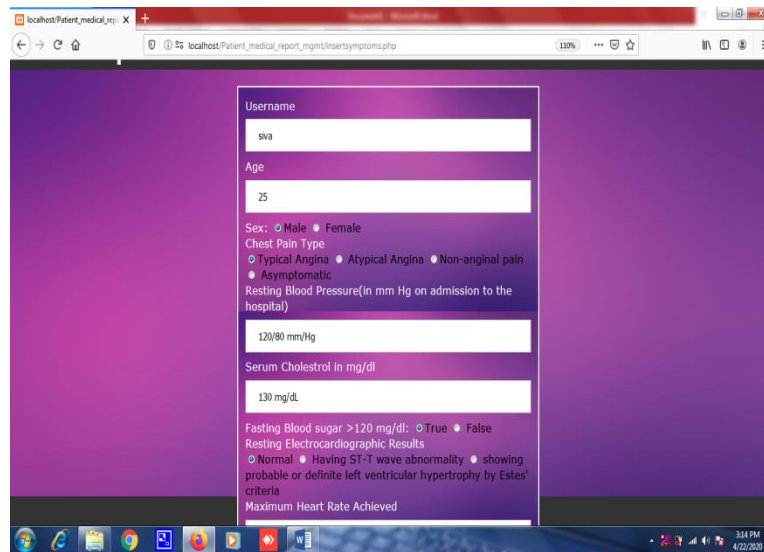
Below the form, there is a message: 'Doctor Available on Friday.' and a 'Submit' button.

Fig. 12 Booking appointment

Using this system, the doctor's appointment can be easily booked where we just have to fill in the necessary details as requested in Fig 12.



## E. Patient's Report



localhost:Patient\_medical\_report\_mgmt/insertsymptoms.php

Username  
siva

Age  
25

Sex: ☐ Male ☒ Female

Chest Pain Type  
☐ Typical Angina ☒ Atypical Angina ☐ Non-anginal pain  
☐ Asymptomatic

Resting Blood Pressure (in mm Hg on admission to the hospital)  
120/80 mm/Hg

Serum Cholesterol in mg/dl  
130 mg/dl

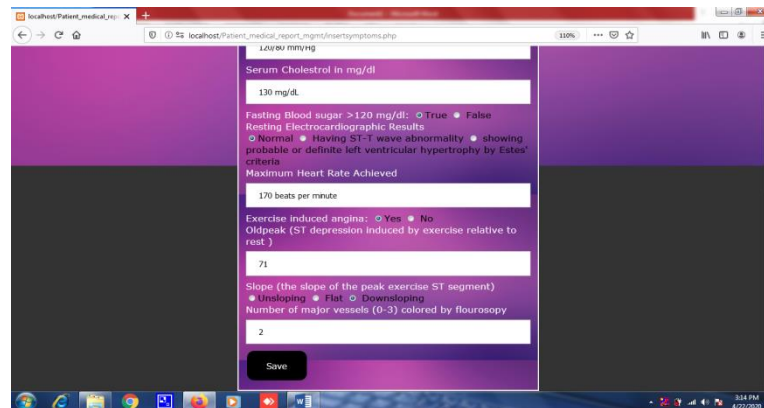
Fasting Blood sugar >120 mg/dl: ☐ True ☒ False

Resting Electrocardiographic Results  
☐ Normal ☒ Having ST-T wave abnormality ☐ showing probable or definite left ventricular hypertrophy by Estes' criteria

Maximum Heart Rate Achieved

Fig. 13 Patient's Report – View 1

Figures 13 and 14 show a summary report being processed when a patient has undergone a general check-up in a hospital suffering from chest pain.



localhost:Patient\_medical\_report\_mgmt/insertsymptoms.php

Serum Cholesterol in mg/dl  
130 mg/dl

Fasting Blood sugar >120 mg/dl: ☐ True ☒ False

Resting Electrocardiographic Results  
☐ Normal ☒ Having ST-T wave abnormality ☐ showing probable or definite left ventricular hypertrophy by Estes' criteria

Maximum Heart Rate Achieved  
170 beats per minute

Exercise induced angina: ☐ Yes ☒ No

Oldpeak (ST depression induced by exercise relative to rest)  
.71

Slope (the slope of the peak exercise ST segment)  
☒ Upsloping ☐ Flat ☐ Downsloping

Number of major vessels (0-3) colored by fluoroscopy  
2

Save

Fig. 14 Patients report – View 2

## F. Manager's Dashboard

Figure 15 displays the dashboard of the manager where the user registers, the managers, deletes the managers and can also see the list of managers saved in the database.

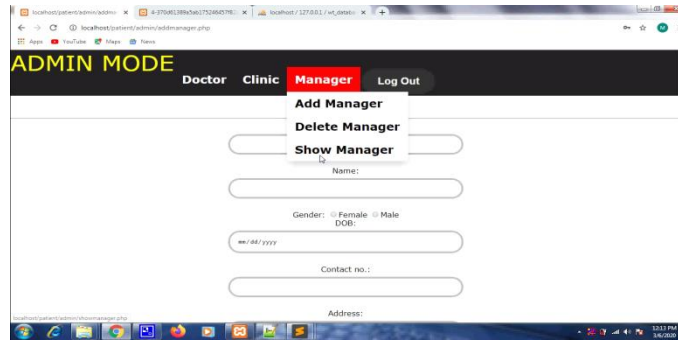


Fig 15 Manager's Dashboard

The user can add any number of managers to the server by filling out the correct information the application asks for. Once the entries have been completed, the data will be stored successfully in servers. The sample image is displayed in Figs 16 and 17

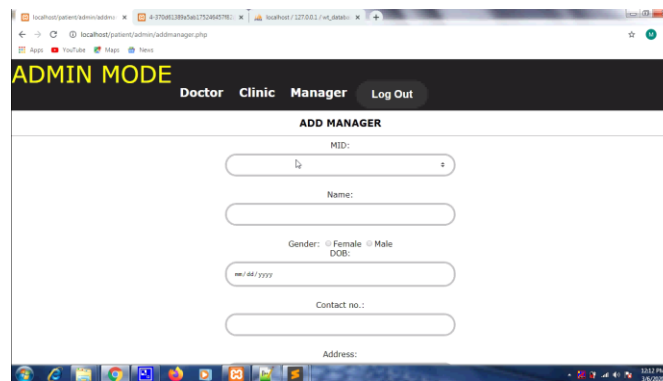


Fig 16 Add Manager View- 1

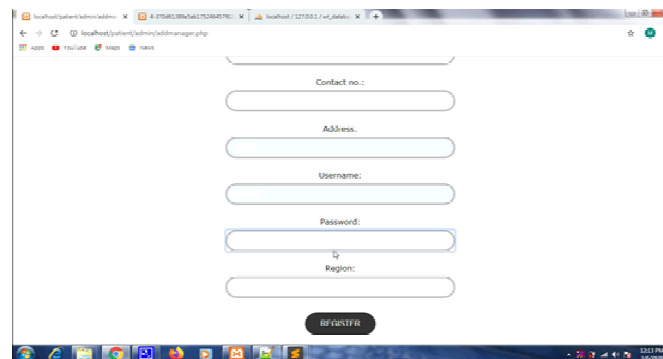


Fig 17 Add Manger View – 2

### *Show Manager*

Fig 18 shows the list of managers from various clinics and hospitals stored in the database by the user.

CID	Name	Address	Town	City	Contact	MID
1	Mari	Clinic Ashoka	Pondy	Pondicherry	9423-2856078	821
2	Priya	Clinic Nallam	Pondy	Pondicherry	9423-2856087	842
3	Bharath	Vasan Hospital	Villupuram	Pondicherry	9894361230	865

Fig 18 Manager Database

### Summary of Process

Input Development is the method of turning a user-oriented input definition into a computer-based program. This design is important in order to avoid errors in the process of data input and to show the management the correct way for getting correct information from the computer system. It is done by designing user-friendly displays to accommodate huge volumes of data for the data entry. The purpose of designing input is to promote data entry and to be error-free. The data entry screen is built in such a way that it is possible to manipulate all the data. It also provides facilities for register viewing. After entering the data it will test its validity. Data may be entered using screens. Correct messages are received as needed so the consumer won't be instantaneously in maize. Therefore the purpose of input design is to build an easy-to-follow input layout.

### Advantages

- The EHR would improve the efficiency and protection of the healthcare.
- Allow better file recording and arrangement.
- Alert patients of arrange appointments to assist them in adhering to prescription regimens.
- Aid physicians follow their treatment guidelines.
- Helps to reduce adverse conditions and medical errors.

## IV. CONCLUSION

This is a web-based application that overcomes the problem of managing and scheduling appointments according to the preference or demands of the customer. Here the user can select good doctors by looking at their info. Therefore this project provides an interactive solution where users can browse various available booking slots and select the desired date and time. The doctor will test his own time schedule with this application. Hospitals can handle their registration and appointment process easily and track patient flow to the doctor and with this application; time can be saved for both the doctor and the patient.

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