International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 SJIF 2023: 8.176 ISSN: 2582-3930

Patient Health Management System using Cloud Platform

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ABSTRACT

In the past few years the portability of accessing medical needs is not very easy. The medical industry faces major issues in providing all-in-one medical record holder. The patients are provided with complicated mediums to contact doctors anywhere. They need a compact resource for accessing the doctors and medical records comfortably. Patients need a place where they can gather everything at one place and track properly with the ease of their own house or simple workplace. Cloud platforms provide on-demand availability of computer system resources. Cloud can also be used for data storage and providing computing power, without using the local management provided by the user. It can be used to store structured and unstructured data for better performance of a website. Cloud can also have functions distributed over multiple locations. Each of these locations can be named as data centers. It provides better productivity, reduces cost, enhances security, provides scalability and can give stronger focus on Front-End development. In today's world every service is being transferred to cloud due its many advantages as stated earlier. For Front-End HTML, CSS, Bootstrap and JavaScript is being used. The Back-End is being used as a cloud platform. Node.JS, Express.JS, MongoDB and Mongoose library is being used for providing a cloud platform to the website. This gives an all-in-one touch required to provide efficient accessing of medical records.

Keywords: - Cloud computing, patient health, MongoDB, HTML, CSS

1. INTRODUCTION

The recent pandemic due to COVID-19 has led to a fear amongst people about the medical needs which are necessary to the common people of the world. People have to access different hardcopies or various websites to access their reports. The Cloud storage makes it very easily accessible and safer to use. The online documentation of files secures it from any human or non-human damages caused to the hard copy of the file. The all-in-one platform may come in handy when different doctors are to be consulted and a record of it must be kept for future references. Every patient's information can be stored at a single place. Keeping track of patient history is a major issue in the current world. The ease of access for patient is not available with current scenario. The patient has to run to different departments to have the advisory of a proper doctor. Also with current system there is a lack of immediate retrieval of patient's history which might lead to delayed treatment.

The patient health management system will solve these problems with ease. This aims to provide an interface between patients and doctors. It will provide an immediate store of patient's information. The reports will be uploaded to the portal with a precise and prompt effect. This platform will provide recording patient's activating with ease. The

medical history of the patient will also save time in diagnosis. The patient does not have to fill a form for every doctor's visit instead the doctor will have patient's information at his/her fingertips.

Cloud platforms will be used provide the database of the website. This project falls under the category of Platform as a Service (PaaS) in cloud computing. In this cloud computing model, it provides a platform and environment for developers to build, deploy and manage applications. Cloud platforms can be seen as a virtual machine to provide services without consuming the resources locally.

2. LITERATURE SURVEY

Rasha Talal Hameed, Omar A. Mohamad, Omar T. Hamid and Nicolae Tapus designed an e-Healthcare management system based on cloud and service oriented architecture in Iraq. In this system all the patient information was archived in a single central database. They proposed the system based on Service Oriented Architecture (SOA) and cloud computing. SOA demonstrates important gratification by presenting free conjugation, stage impartiality; standard-based execution and solid deals for variant statehood.

G.N. Vivekananda, Abdul Rahman H Ali, S. Arun, Praveen Mishra, Rupal Sengar and R. Krishnamoorthy developed cloud based effective healthcare management with artificial intelligence. They formulated a complete healthcare system which incorporated wearable technology and multi-sensor data fusion. They provided a cloud-based cyber localization algorithm to examine patients using smart phones and smart watches to gather ECG and heart rate monitoring data in an efficient, real-time and scalable manner.

Inderpreet Singh, Deepak Kumar and Sunil Kumar Khatri improved the efficiency of e-Healthcare system based on cloud. They enhanced the efficiency by connecting to current trend technology. They made use of distributed computing give it an improved efficiency, giving it a drastic improvement.

Bill Joel D J, S Sibi Rajan, R Vibinanth, D Pamela and P Manimegalai formulated the research paper on cloud based data management for health care. They provided a cloud-based data management system for the healthcare professionals. They used this system to get rid of manual records of patients and use cloud platforms for managing patient data. Their main goal behind this paper was to develop an application that helped to minimize productivity and efficiency of hospitals by managing use amount of unstructured data in the cloud.

Sihem Souiki, Mourad Hadjila, Djillali Moussaoui and Soria Ferdi developed a mobile health application to manage patient's medical records using cloud. They developed a system stored a softcopy of an already existing hardcopy of a patient's medical reports. They created a mobile application which ensured the security of the patient's medical record. At the time it was a fairly new concept based on cloud.

Srijani Mukherjee, Koustabh Dolui and Soumya Kanti Datta formed a patient health management system using e-health monitoring architecture. They embellished design and implementation of an electronic-health monitoring network. They used architecture based on the smart devices and WSN for a real-time analysis of various bounds of patients. It also provided a continuous examination of patients for any sort of emergency services required which is looked over by attendees and caregivers.

3. SYSTEM DESIGN

The system is designed to gather patient's medical information and store it on a cloud platform. It will also store any new prescriptions or reports uploaded by doctor's side. There are three layers in this namely client layer, cloud layer and logic layer. The client layer will include Admin, patients and doctors. The admin will approve the accounts and

monitor the usage and detect any misuse of the platform and retaliate accordingly. The patient will be able to upload its medical history and book any appointments with necessary doctors. They will also be able to view their reports and prescriptions uploaded by doctor. The doctor will be able to accept or decline the appointments based on its availability. After the consultation the doctor will be able upload the prescription and any required reports too. On the logic side resides the higher authorities that will monitor the ongoing records and keep an eye on any misuse of any sensitive information. There will also be a pharmaceutical access for any pharmacy to provide fast and effective medicines to the patients. They can keep an eye on the allergies provided by the patients.

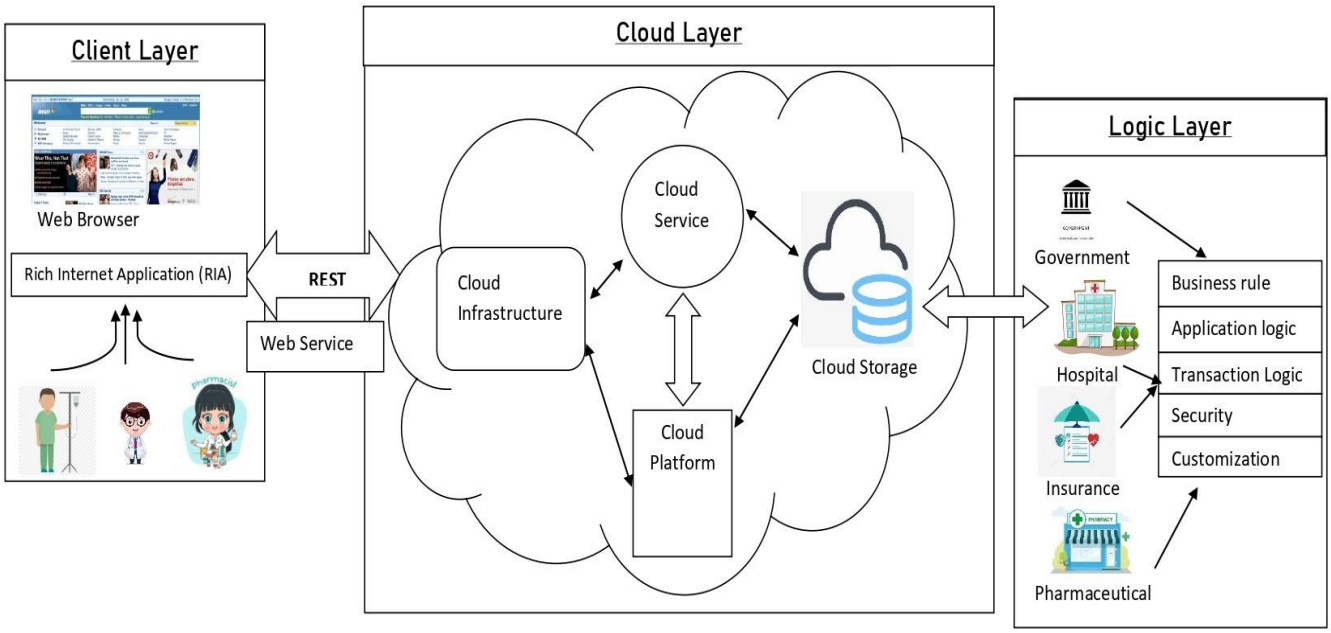

Figure 1: System Architecture

It makes use of a basic data flow. It starts with user login and adding any necessary information and personal details. The patient then goes on add medical history and book an appointmnet with the doctor. The on the other hand will coose to accept or decline the apointment based on its availability. Once the appointment is fixed the patient visits the doctor on the scheduled time. After the consultation the doctor uploads the the prescriptions any reorts produced. Then the patient will visit a pharmacist to get the medicines. The user might choose to logout of the system after the completion of the peocedure. The image below will provide with basic understanding of this project.

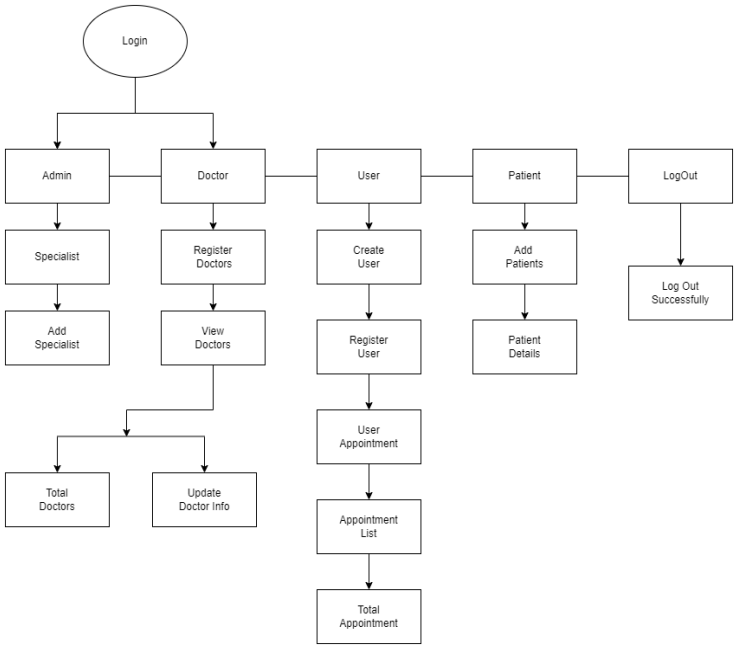

Figure 2: Data flow of the project

4. RESULT AND EVALUATION

The concept is to design a platform for patients to easily access all its medical history at one location. A website is created as a platform this purpose. The Front-End of the website uses HTML, CSS, Bootstrap and JavaScript. These are some of the basic languages and framework which are majorly used in developing a web-page. The idea is to provide a cloud surface for proving the Back-End of this website. For that purpose Node.JS, Express.JS, MongoDB and Mongoose library are being used. Cloud platform will be provided using these services. Using cloud ensures security to the patient's data. The user is required to Sign up first which would generate a unique username and the user has to provide a password too so that that the account remains only to itself. The Admin monitors the movement of every account on the server and can activate or deactivate the account based on feedback. The cloud database will store any data regardless of it being structured on unstructured data. Due to this reason a NoSQL, MongoDB is being used. The reports and prescriptions might be uploaded as an image therefore this property will be very useful.

Figure 3: Front page of the website

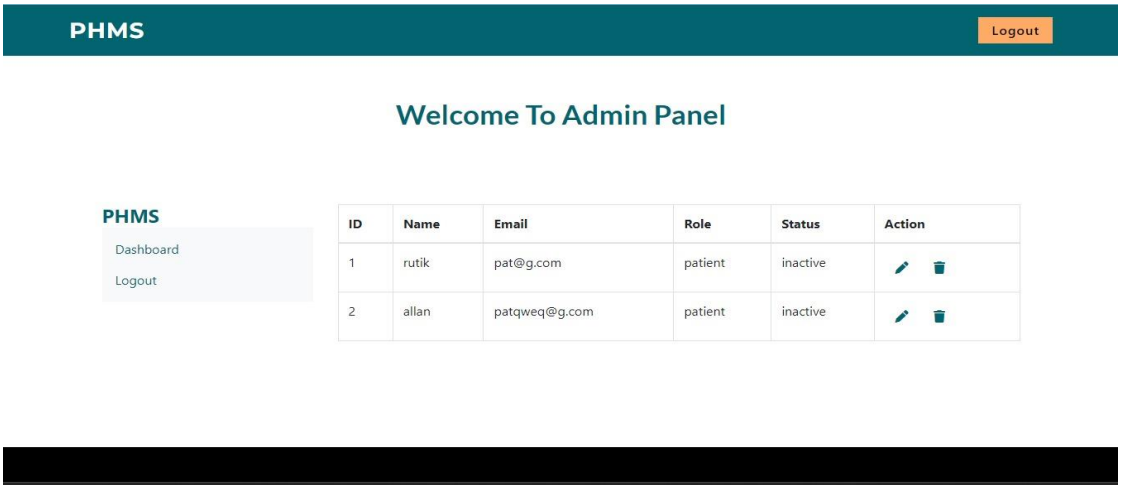

Figure 4: Admin Portal in the website

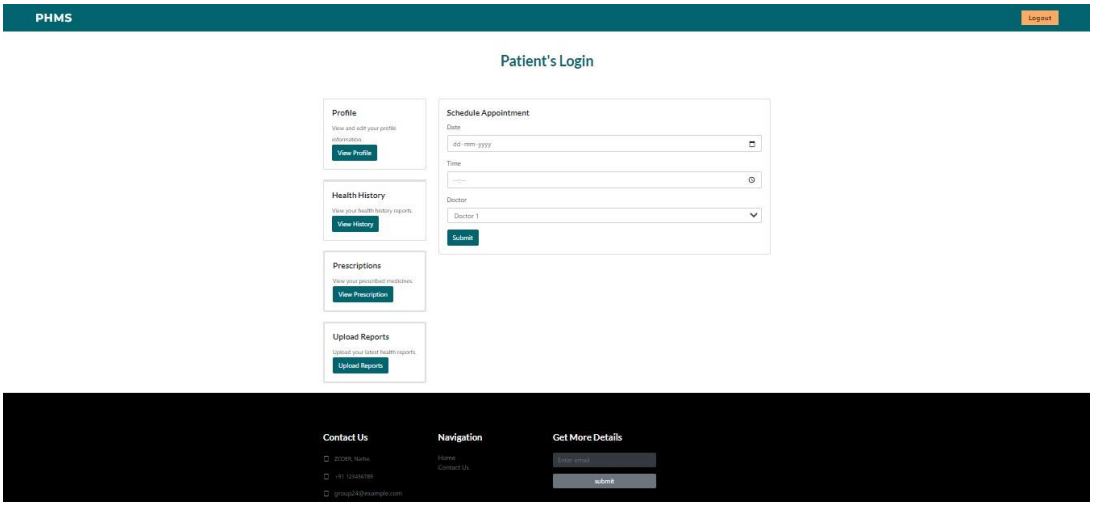

Figure 5: Patient's Portal in the website

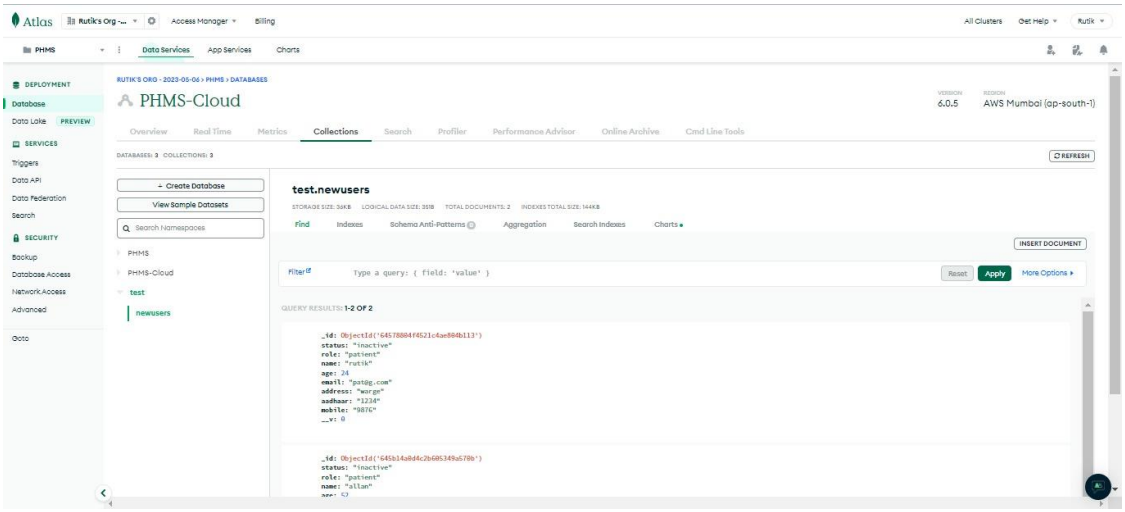

Figure 6: MongoDB Atlas being used as a cloud database

5. CONCLUSION

A website that will manage patient's health is developed. This will store any data on a cloud platform which will as a virtual machine. This project might turn out to be somewhat of an easier route for patients in the near future. The efficiency might be improved in the upcoming future but this project might provide the base for a better handling of patients. It will be useful in accessing patient's medical data faster and easily.

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