



Cloud Based Health Monitoring System

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Abstract: Health issues and health problem concerns are growing these days. Also the number of patients getting admitted in the hospitals got increased. So to maintain the details of inpatients in a hospital is a tedious task. Hospitals have to save the details of each and every inpatient details. In some cases patients may even have to wait a long time to meet the doctor. Also in the existing scenario if the main doctor is not available then nurse or duty doctors have to call him and ask the queries about the inpatient. Our proposed system is a web based health monitoring system with the help of cloud computing. In our proposed system, nurses or duty doctors will send the details about the inpatient in each hour and doctor will check the details. If any emergency situation occurs a mail will be send to main doctor. Since we are using cloud computing it is not necessary for the hospitals to own large databases. Also nurses can upload inpatient details in each hour and update into the website and concerned doctor will be able to view this.

Keywords: Cloud Computing, Health Monitoring System, IaaS, PaaS, SaaS

I. INTRODUCTION

Now a day, people are getting affected by serious health issues. Numbers of patients getting admitted in the hospital are increasing day by day. In a hospital there will be many doctors handling the same department. Each and every doctor will be available in their allotted time slot. When a patient is admitted, he can be monitored by any doctor. The details about the inpatients are stored in hospital's computer system. Through this system, other doctors and nurses who are in charge of the patient will get to know patient details. If any emergency situations occur, nurse has to call the doctor in-charge and report the condition of the inpatient. If the same information has to be told to too many doctors it will be a difficult task. If any system failure occurs it will be very difficult to retrieve data. To overcome the above difficulty we are using a centralized cloud server for storing and retrieving of huge amount of data.

Cloud computing is delivering computing as a service than as a product, by which the shared resources, softwares, and the informations are provided to the computers and other devices as a utility over a particular network. For maintain data and application in central remote servers we are using cloud computing with the help of internet. Without installation consumers and businesses to use application in cloud computing. By using this we can provide a centralized storage of data, easy maintenance of data, security etc to our data. Information sharing in cloud servers which is based on the

levels of website traffic through the entire network. The Cloud computing is frequently provided as a service across the internet in the form of IaaS, PaaS, SaaS. Cloud computing customers have to pay for what they are using. Through mobile app or light weight desktop or web browser an end user can access cloud computing services from a remote place. Some cloud computing providers are Microsoft, Amazon web services, VMware, Rockspace, IBM etc. We can provide security measures to data stored in the cloud. So data will be secure and access data fast. Since we are using cloud computing the entire data is stored in cloud which leads to low system maintenance cost and high performance.

II. RELATED WORKS

Authors [1] have proposed smart card file system design for the user health care as well as the health care profile management system. In this system personalization is given profound attention and care. By personalization they introduced user profiles that store the user preferences, context of use and additional data related to user interests. Healthcare profile management systems that are used for health care systems are incorporated using cloud computing environments. Smart cards are developed for the profile management system which helps in creation and management of profiles. The patient-centric approach which is maintained throughout this system is quite thought provoking.

Authors [2] have proposed a privacy-preserving system for public auditing used for storage of data in cloud computing.

This ensures the data security and integrity in the cloud. The third party auditing system is designed in such a way that no local copy of the data is needed. Also, it does not cause any difficulties for the users who handle the data in the cloud. They use the homomorphic authenticator and random masking to guarantee Third Party Auditor cannot be able to learn what data stored in the cloud server. By using this data security can be assured and multiple users can store and retrieve the data at same time.

Authors [3] have proposed a system hospital information system based on cloud computing that recognizes the flexible, extensible and practicable framework by regarding the hardware and software and data of hospitals as resources acquirable from the cloud. This is proposed to replace the existing Health Information System (HIS) in the hospitals. By using this we can reduce construction plan as well as easy sharing of data. It reduces hospital operating system cost and improves operating efficiency. By making more and more hospitals getting added to resource sharing using cloud the problems of small health centers and hospitals for data storage can be solved.

Authors [4] have proposed a system to enable the Security and Patient centric Access Control for E-Health in cloud computing, used to achieve the patient access control by providing security to data. It is a system which helps patients in accessing the data from the cloud remotely at any time with security. It also helps as to reduce data size of the system since all the data are stored in the cloud. Other accesses to the patient data are controlled by privilege rights and authorizations.

Authors [5] have proposed a system in cloud computing environment for health care institutions which reduces operating system cost and improve the efficiency of medical resources present between the medical institutions. The proposed system is built with the help of the sensors that are attached to the current medical equipments. So real time data is available and can be analyzed by the expert systems or distributed among the medical staff.

Authors [6] have proposed a system which monitors the human activities, health and shares information between doctors, clinics, and pharmacies in the Cloud, so that users can acquire better care in low cost. It merges various technologies Cloud computing security, sensor networks and activities recognition. This is very helpful for the patients who need regular health monitoring. The fluctuations of the health parameters can be recorded fastly.

Authors [7] have proposed a system that an efficient VOIP enabled health monitoring system using cloud computing. In this various sensor nodes are used to monitor human health and the monitored result can be accessed by doctors, caretakers, clinics, pharmacies through cloud. The proposed system implements voice enhanced service using voice over IP to provide immediate aid to patients. Through the VOIP system the communication with the patient can be done in an effective manner. As the cloud computing system is used the cost involved in setting up huge databases can be avoided.

III. MATERIALS AND METHODS

A. *Software specification:*

The proposed system is to develop a web based health monitoring system with the help of cloud computing. In this technology used is ASP.NET as front end and data are stored in the SQL server in cloud. Microsoft Azure is an open platform that helps us to build, deploy and manage web applications throughout the global network.
Front End: Microsoft Visual Studio 2010
Back End: SQL Azure Database
Operating System: Windows 7

B. *Modules:*

The system mainly contains 4 modules: Registration module, Doctor module, Nurse module and Administrator module.

a. *Registration Module:*

This module contains registration forms for new inpatients and doctors. When the Doctor and staff are approved by the Administrator he or she becomes a valid user of the site so that they will be given an ID and password to access the data. After login the user can be given an option to change the user name and password. Only through their ID's both doctor and nurse can access the data stored on cloud.

b. *Doctor Module:*

Doctor details can be edited or updated in this module. The doctors can view inpatient data and do analysis based on this. They will be able to access the inpatient's health history and the type of medicines which are already prescribed to a particular Patient. Only a specific doctor who has the verification for the specific inpatient can view his results from the database and can suggest medicines to nurses. Doctor has to view the patient status in a specified time interval and prescribe medicine if needed. Doctor can access his account from anywhere. It is not necessary he should be there in the hospital.

c. *Nurse Module:*

In every one hour they have to update inpatient details such as temperature, pressure, pulse rate etc and have to send to doctor. According to doctors consult they have to give medicines to inpatient. If any emergency situations occur they have to mail and inform the doctors.

d. *Administrator Module:*

The administrator will have a unique username and password by which he/she may login and add or modify certain things such as doctor selection, nurse selection, add new departments, view feedback from doctors, nurses and send alerts. The new system is developed to enhance the efficiency of the existing system. The system allows users to create their own accounts. It will be verified by administrator and administrator will provide ID to doctors and nurses. Only through their ID's both doctor and nurses can access the data stored on cloud.

The proposed system contains details of inpatient, doctor, nurses. The system is user friendly and also very interactive and up-to-date.

C. Database Design:

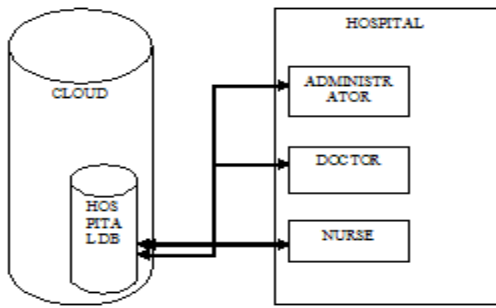


Figure 1 shows how our data will be retrieved from the SQL Azure database

In SQL azure database we will create our hospital database. Administrator, doctor, nurse and inpatients of the hospital can view, update, access the details by providing there username and password.

D. Deployment process in Azure:

- a. Create an account in Windows Azure.
- b. Create an ASP.NET web project to be implemented
- c. Select Windows azure deployment project and add it to the web project
- d. Deploy the web project into the new hosted service present in windows Azure. This will be in staging state
- e. Azure SQL database is created and the application to use the database is configured when it is running in the cloud
- f. The Application from staging environment is promoted to the production.

IV. RESULTS AND DISCUSSION

A. Administrator Login:

Administrator can view patient details, doctor details, nurse details, doctor time management, nurse time management etc. Administrator will provide a unique ID's for doctor and nurse. The new registration by the Doctor and the nurse are also approved by the administrator. So administrator can be rightly called as the prime user of the system.



Figure 2: Administrator can login his account using username and password

B. Patient Registration:

Details are stored for future references. All the patients have to fill this form.

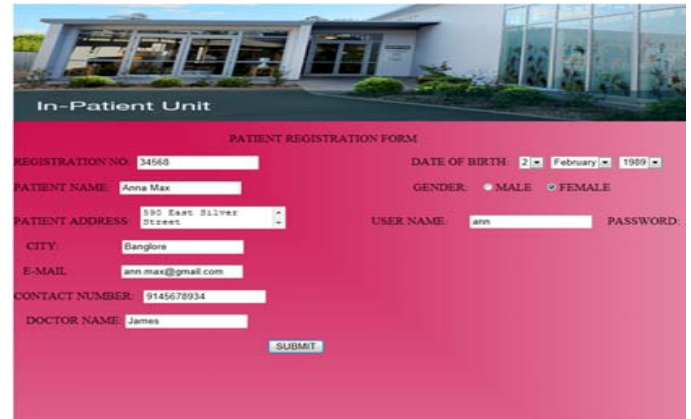


Figure 3: patients who are admitted in the hospital have to register

C. Doctor Registration:

When the submit button is pressed the registration will be redirected to administrator page. Administrator will approve or reject the registration.



Figure 4: Doctors can register to our hospital. Admin will approve the doctor according to their qualification.

D. Nurse Registration:

When the submit button is pressed the registration will be redirected to administrator page. Administrator will approve or reject the registration.



Figure 5: Nurse can register to our hospital. Admin will approve the doctor according to their qualification.

E. Doctor Timing:

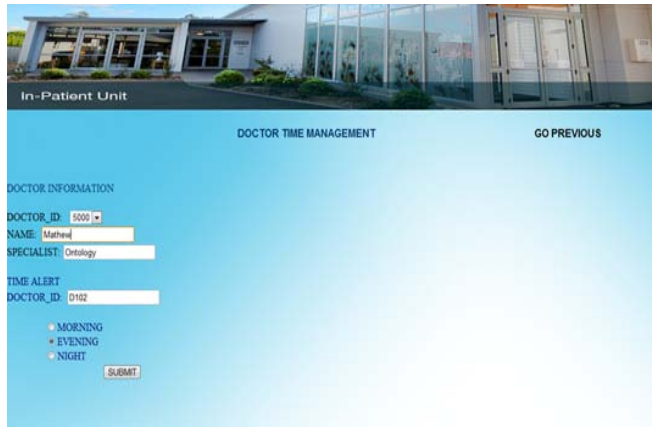


Figure 6: To allot working hour for a doctor

F. Nurse Timing:

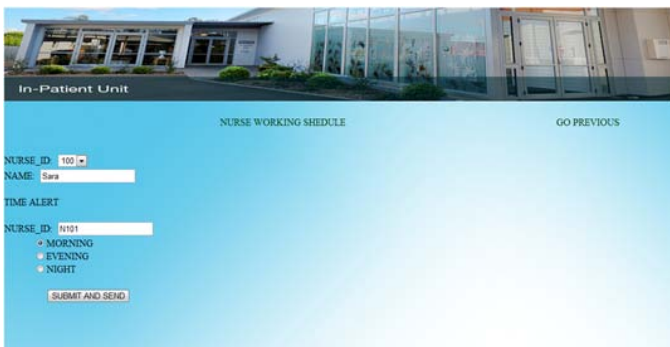


Figure 7: To allot nurse working schedule

G. Patient test detail entry form:



Figure 8: Nurse will enter the details of inpatient and send to doctor

V. CONCLUSION

A web based health monitoring system is developed with the help of cloud computing. In this system inpatients get the fast and good services. Doctor services will be available in 24 hours. Nurses or duty doctors can send the details about the inpatients in each and every hour. The doctors can view this data and do analysis based on this. Nurses and duty doctors will be able to access the inpatient’s health history and the type of medicines which are already prescribed to a particular patient by the main doctor. Also if any emergency situations occur nurses can mail and inform doctor in charge. We can provide security measures to data stored in the cloud. So data will be secure and access data fast. Since we are using cloud computing the entire data is stored in cloud which leads to low system maintenance cost and high performance.

VI. REFERENCES

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