Design and Development of Virtual Medical Home System

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***Abstract*- 'Virtual Medical Home' is a website that provides online medical services to everyone hardly matters whether the people live in metro or a remotely located village. The system helps to automate all the activities of existing manual system. Users can connect through their home internet or approach any nearby kiosk to get these services.**

The system design is motivated by factors like very few doctors or no doctors at remote locations, limited hour services and lack of sophisticated medical equipments and there are no patients' or lab data management. This system can maintain all the previous history and lab data like patients' health reports and lab reports.

It can be used by the patients to take online appointments of doctors, view their previous health records, lab reports etc. The doctors can give online appointments, e-prescriptions and view the patient's history. This system can be entered using a username and password. It is accessible either by admin, doctors or patients/kiosk manager. The data can be retrieved easily. The interface is very user-friendly.

***Index Terms*- VMHS (VIRTUAL MEDICAL HOME SYSTEM), JAVA, JSP, SERVLET, ORACLE.**

INTRODUCTION

Computers have improved the accuracy, speed and reliability of many of the administrative and technical tasks traditionally involved in patient care besides improving the service offered to patients. This has changed the workload of health professionals, allowing them to spend more time on the human aspects of patient care. VIRTUAL MEDICAL HOME SYSTEM (VMHS) are information systems, typically computer based, that are used within an organization. An information system is comprised of all the components that collect, manipulate and disseminate data or information. It usually includes hardware, software, people, communication systems such as telephone lines and the data itself. The activities involved include inputting data, processing of data into information, storage of data and information and the production of outputs such as management reports.

The introduction of computerized systems in hospitals has changed the working practices. Patient data is stored on computer systems, which can then be used to manage patient lists, appointment bookings and issuing of prescriptions. This is usually faster, more reliable and more accu rate than performing these tasks manually. Therefore, computerized systems are money saving and reduce the workload of clerical staff. This project has been developed using Java, Jsp,Servlets,Oracle and JavaScript.

OBJECTIVES OF THE RESEARCH

- Provides online medical services to all people whether they are in metro or remotely located areas.
- Users can connect through their home internet or approach any nearby kiosk to get the services.
- Patients can make online appointments; look their previous health records, doctor's prescriptions, lab reports and medical expenses.
- Doctors can give online appointments, e-prescriptions, and view patient's history.
- Kiosk manager can see/adjust appointments, perform day open and close activities.
- In case of any medical error patient can register a complaint. Patient's grievance and feedback goes to admin and he can forward to specific doctor to answer.
- Since all the hospital data management is automated, it reduces the paper work and the users' data can be stored and retrieved at faster speed and accuracy.

- The site has online help manuals for patients.
- This website helps to find the blood donators and eye donators.
- Ensures data accuracy and security.
- Administrator controls the entire system.
- Reduce the damages of the machines.
- Minimize manual data entry.
- Greater efficiency.
- User friendly and interactive.

MATERIAL AND METHODS

System Analysis

A detailed study of various operations performed by a system and their relationships within and outside of the system was done. Data was collected from the available files, decision points and transactions handled by the present system.

Present System

Existing system refers to the system that is being followed till now. The sophisticated medical equipment's and services are not available in all the areas. Presently all the hospital functionalities are done manually.

Draw backs of existing system

- Very few or no doctors at remote locations.
- Limited hour services and lack of sophisticated medical equipment's.
- No patients history/lab data management .
- Various changes to information like patient details, medical details are difficult to make as paper work is involved.
- Time consuming.

PROPOSED SYSTEM

The drawback of the existing system is lack of doctor's availability and lack of sophisticated equipments. It is difficult to handle the whole system manually and it is less accurate and to keep the data in case files for future reference because it may get destroyed. Moreover, it is very difficult to retrieve data. Redundancy of data may occur and this may lead to the inconsistency. The manual system is so time-consuming.

The proposed system is very easy to operate. Speed and accuracy are the main advantages of proposed system. The medical services are provided online to everyone. There is no redundancy of data. The user's details are easily stored, retrieved and used at any time. The proposed system will easily handle all the data and the work done by the existing systems. The proposed systems eliminate the drawbacks of the existing system to a great extent and it provides tight security to data.

Advantages of proposed system

- Provides online medical services to all people whether they are in metro or remotely located areas.
- Users can connect through their home internet or approach any nearby kiosk to get the services.
- Patients can make online appointments; look their previous health records, doctor's prescriptions, lab reports and medical expenses.
- Doctor's can give online appointments, e-prescriptions, and view patient's history.
- Kiosk manager can see/adjust appointments, perform day open and close activities.
- In case of any medical error patient can register a complaint. Patient's grievance and feedback goes to admin and he can forward to specific doctor to answer.
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SYSTEM SPECIFIC MODULES

There are four modules in our project. They are:

Admin

The admin will have control over the entire system. There is no registration for him but he should have

username and password to login into the system to provide security. He can view everyone's profiles associated with the hospital. He can interact with the doctors and also patients through chats, mails, discussion forums etc. In case of any medical errors like wrong medication and lab reports, the patients can register complaint. The patients' grievances and feedback goes to admin and then he forwards them to specific doctors to answer. He takes backup of every data; view logs and generate reports according to them.

Doctors

All the doctors associated to the hospital should register. Only registered people can have access to the site. The doctors can vies and update their profiles. The entire patient's database is accessible to them. They can give online appointments, e-prescriptions .They can view patient's history to know their health status and suggest new medication. He can set online appointment request enable or disable. He can communicate with admin, patients and other users through mails, chat and discussion forums.

Patients

The patients should get registered to get online medical services. They can connect through home internets or approach any nearby kiosk manager to get these services. The patients can view and update their profiles. They can also view the doctor's profiles only to know their specialization, their success stories so that they can approach those specific doctors to get treatment. The patients' can take online appointments; look their previous health records, doctor's prescriptions, lab reports and medical expenses. They can also send online payment for their medical expenses. Incase of any errors they can register a complaint to the hospital admin. They can also give feedback and suggestions which goes to admin.The patients' can communicate with the admin, doctors or other patients through mails, chats or discussion forums etc..

Kiosk Manager

The kiosk manager associated to a small area should get registered. He acts as communication link between the patients and hospital. The patients can approach him to get those online medical services. He maintains the patient's database associated with a small area. He can see/adjust appointments, perform day open and close activities. He gets commission for acting as a communication link and helping the patients to get these online medical services. He can also interact with the admin, doctors and others through chats, mails and discussion forums.

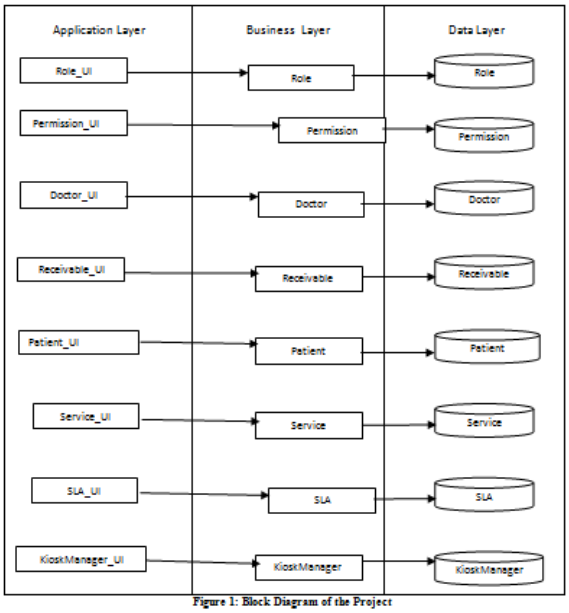

Figure 1: Block Diagram of the Project

Figure 2: Design of Login Screen

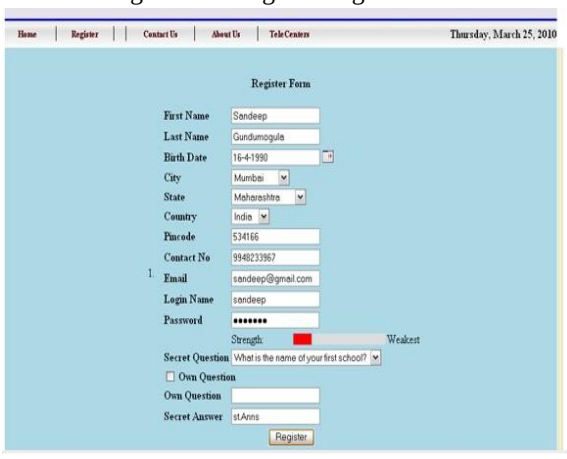

Figure 3: Design of User Onboarding screen

Design and Development of Database

Oracle was used for database support. Fig. 4 represents the entity relationship diagram that is designed to view the required entities & their relationships within the Hospital VMH.

ER DIAGRAM

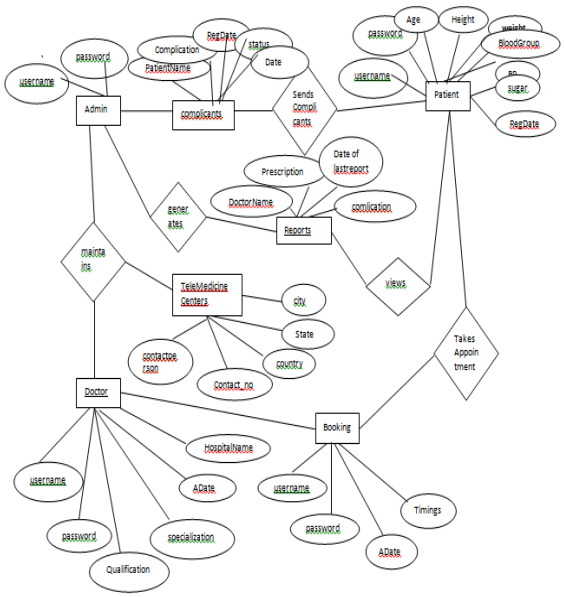

Figure 4: Entity Relationship Diagram

RESULTS AND DISCUSSIONS

Online Hospital VMH provides more security and better performance as compared to manual hospital management. Paper work is reduced to a large extent. Several tasks like registration of patients on the registers of hospital, bill calculation of patients, maintenance of records of employees, etc., which consumed hours previously are now jobs of just a few button clicks.

The flexibility of E-Card allows affiliated hospitals and clinics to retrieve patient information. E-Card is a challenging area, where one needs expertise in domain as well as technical understanding, with hold on language used to implement the application. E-card is being used in western countries but it is yet to be implemented in India. In the coming times, this facility will be available across whole of the country. The interface with user is through forms that are totally graphics oriented and user friendly. Even a layman can handle the whole work after a short-term training.

The database is kept on a central server, which contains the database tables. The forms are kept on individual workstations in different departments and are able to access data from the server. Various departments can access their corresponding modules after proper authentication. Finally, we can say that the software is ready for implementation and it is sure to provide better and in-time healthcare services to patients.

CONCLUSIONS

The objective of research was to automate and computerize whole working of hospitals. Objective has been achieved successfully. The user first adds information into the database regarding various departments, designations, states, districts, patient categories, bed categories, etc., using master forms. Then details of various employees working in the hospital can be added. After that patients can be registered, transferred and discharged. Finally their bills are calculated, including bed charges, doctor charges and other charges. When a patient visits a hospital, he is assigned a card no., which is used to manage his visits to the hospital.

The system is secure as a user can modify the information only after proper authentication. It provides a big leap forward over the existing laborious and inefficient system of hospital management. Chances of errors are also eliminated to a large extent. Computerization and automation of the whole system helps in easy and fast access to the required information. The system is highly user friendly as appropriate messages are provided to guide the user logged in.

Although the project is complete in itself but as there is always a future scope for improvement; the same applies to this software. The provision for getting appointment from the doctor through Internet, i.e., Online Appointment facility can be added. The doctor could view the requests from several patients and accordingly give the appointment if possible. Further, Mobile Application can be implemented to allow the patients to view their previous visit details and get appointment from doctors through mobiles. Posting of employees from one hospital to another can also be managed. Further, doctors can be given the provision to post their articles on the website of hospital.

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