Functional Description of Online Medical Management System Using Modern Technology

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Abstract— Today's web based technology offers many online services in almost every field. Almost everything can be done online reducing the amount of tasks, cost, and efforts to a greater extent using cloud computing online storage also can be managed. The paper describes about an idea of such a web based platform that make many medical/hospital procedures online using Web, networking, Cloud and android programming technology that can be very important in implementing the functionality of online medical management. This will help in management of patients, managing the schedules of the doctors, maintaining the records of patients which can be accessed throughout hospital. Storing, managing, communicating, analysing and updating the patient details online. Also each doctor can be provided with a tablet with the customized version of this application specific to their speciality using android programming. Thus by implementing this web based application using cloud computing and creating customized application using android application programming we can manage many tasks that are usually time consuming and inconvenient.

Keywords— web based medical management, patient database on cloud, patient management and customized applications on tablets, android programming.

I. INTRODUCTION

As many web services are made available online, Almost every field is made online, web based applications can provide a boon to hospital management. The system should incorporate many things online that include the following Most importantly maintaining the patient's records in details including his disease, history, reports etc. which the doctor can access from anywhere using his login. The online storage can be implemented using cloud computing which provides a shared and secured access to all the resources shared. If a patient is currently admitted then that patient's current status (whether he is undertaking tests or in OPD etc.). Doctors can have this customized version of application on their tablets based on their speciality that can give them all the patient details in hand which can help manage their schedule by prioritizing each patient. Doctor can also send pictures and videos of a patient's condition to other doctors for expert opinion if required; doctors can give online prescriptions to pharmacy directly specific to particular patient with their patient id. We can develop this application using android programming, android programming being open source the entire OS is open for usage and extension. Every person can view the website and should be able to register him/her providing all the necessary details required , the system will provide a Patient's ID to the patient and further actions can be taken based on the this patient ID .A patient can take the appointments online and know the availability of the doctor. Notifications about regular health check-ups and vaccinations can be sent to the patients and doctors. Website also contains page for online journals which include all the latest medical advances and also medical breakthroughs, unique cases for study and videos featuring several surgeries and research. The user can also check for tips. Using web technology it can be easy to provide all the above functionalities and making the management of patients efficient.

System functionality
The Functionality of the online patient management system
Includes 2 parts
1)   The complete website that includes all the functions required
2)   The customized application for every doctor as per their speciality on their respective tablets.
This System offers implementation of following functionalities online
1)   Online registration of the patient
Anybody can register online filling all the details required and the system will generate a Patient Id. This patient ID should be maintained by the person and the system. This patient ID will be used for patient records management and all further actions. This will eliminate the need for form filling procedures at last moment in many emergency cases.

2) *Record storage*

All the records of each and every patient is maintained in the System data base. This includes the patient's personal details, cases history, diseases, tests results, MRI scans, CT scans, X-rays, visit number , patient is admitted or not , details of doctor allocated, prescriptions, further actions and treatments this will eliminate the need of maintaining the records on papers and scans on films also all the record will be accessible by knowing the patient's ID .

3) *Patient status*

The current status of each patient can be maintained. The flow of the patient status is shown below in fig 1.
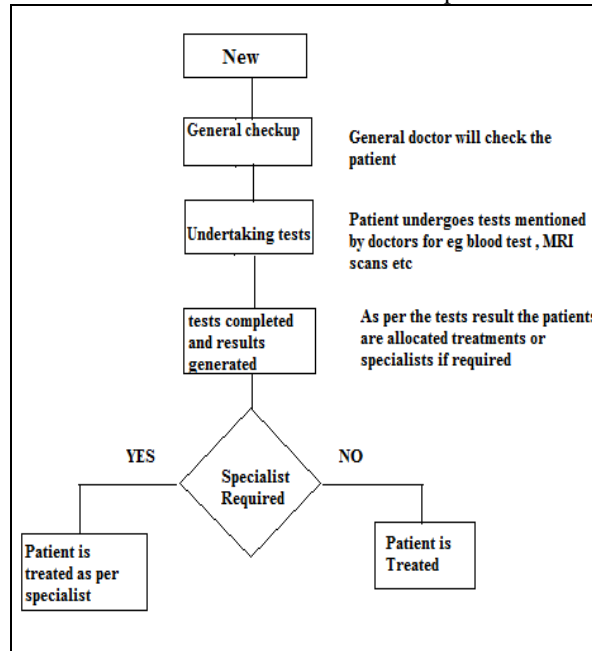

FIG 1 PATIENT STATUS FLOW

4) *Customized application for each doctor as per their speciality on their tablets*

Every doctor can have a tablet with a customized application based on their speciality. Each doctor can check the patient list assigned to him/her . can get every details about any patient on click . notifications on patients reports , test results can will be generated on the application. When the results are generated the lab technician updates the result in the system and the notification is generated at the assigned doctors end and result, reports are also sent at doctors end.Doctor can check the details on tablet and maintain his/her schedule , prioritizing the patients, doctors can update the treatments for patients , doctors can check if any operating rooms available currrently and book accordingly and can release the OR after his work is done.doctors can also update prescribtion to the patient in system which is then notified to the pharmacist through the system.Doctors can also send videos, pictures to other doctors for second opinion etc.

5) *Online appointments*

The person who is registered can also schedule his/her appointment online . he can check the availability of the doctors .

6) *Notifications*

The patient can get notifications of regular checkups on mail or phone. As well as the doctors can also get the notifications about their appointments.

Notifications can be made about several vaccinations ,
Health check ups conducted etc

7) *Research*

Every doctors can publish their research online , several medical journals can be published. Articles and details on unique cases can be maintained online.Videos of surgeries, differenct techniques , can be shared . latest breakthroughs , researches , can be maintained. This will give everyone a very good platform for research and studying different cases making the doctors aware of new techniques used to cure any disease   as well publishing the same. Doctors can use this for investigation on cases and it can help them in decision making process decreasing the time in diagnosis and treatment.

8) *Online help to he patient*
A person who is registered can get online help by login , he can ask querries about his health conditions online , the doctors can provide suggestions and advice to these patients. The person can also check about various articles on health and diseases. He/she can also check his own details , medical records, reports and ask for advice and suggestions. As the records are maintained online the patient don't have carry all the hardcopys like reports, xray films , mri films with him/her.

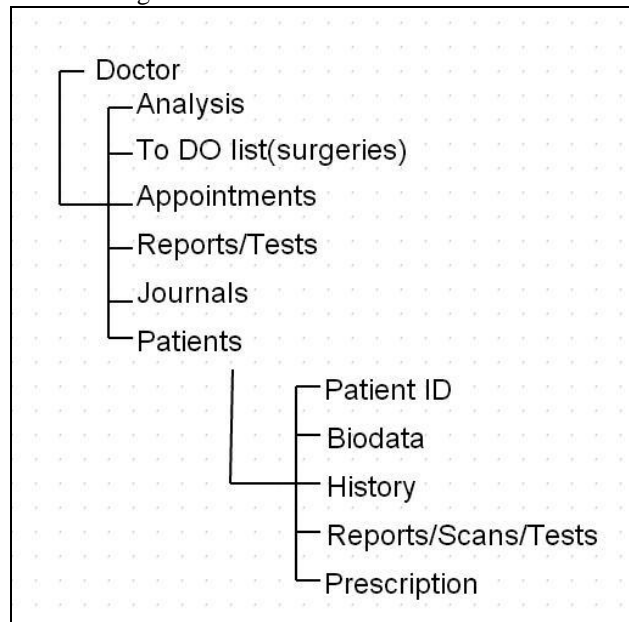## II. SYSTEM MODULES

1)   Doctor module as shown in fig 2

FIG 2 DOCTOR MODULE

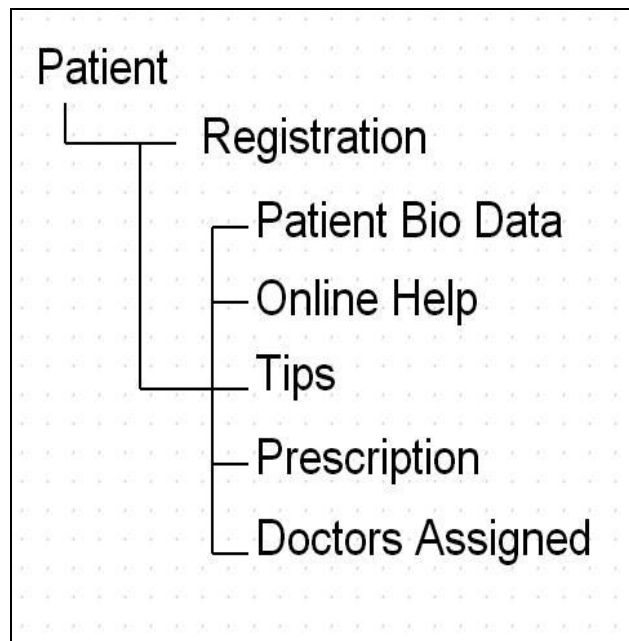2)   Patient module as shown in fig 3
3)

FIG 3 PATIENT MODULE

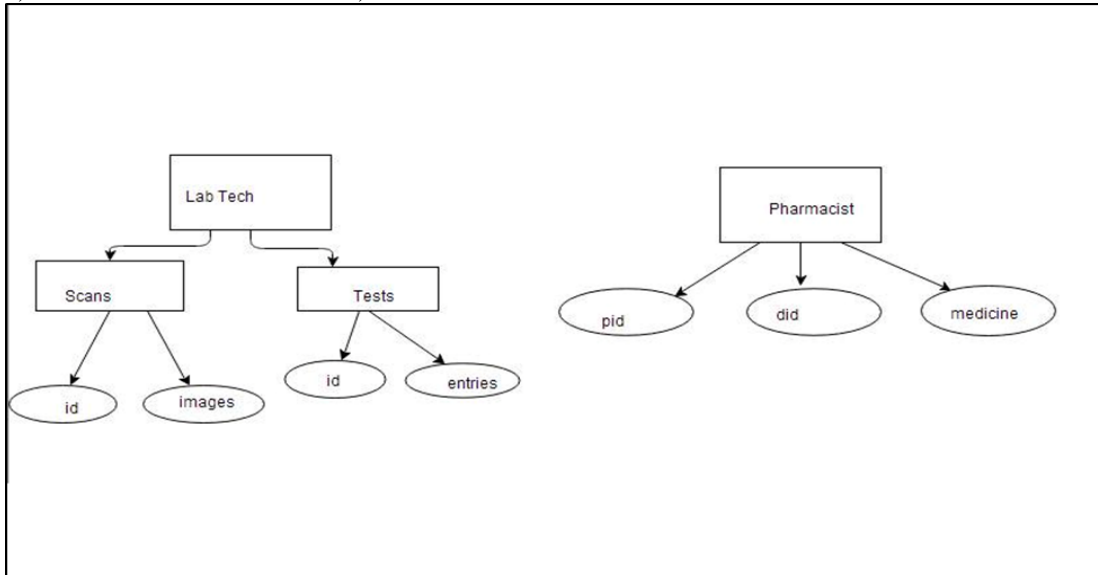4)   LAB TECHNICIAN AND 4) PHARMACIST MODULE SHOWN IN FIG 4

FIG 4 LAB TECHNICIAN MODULE AND PHARMACIST MODULE

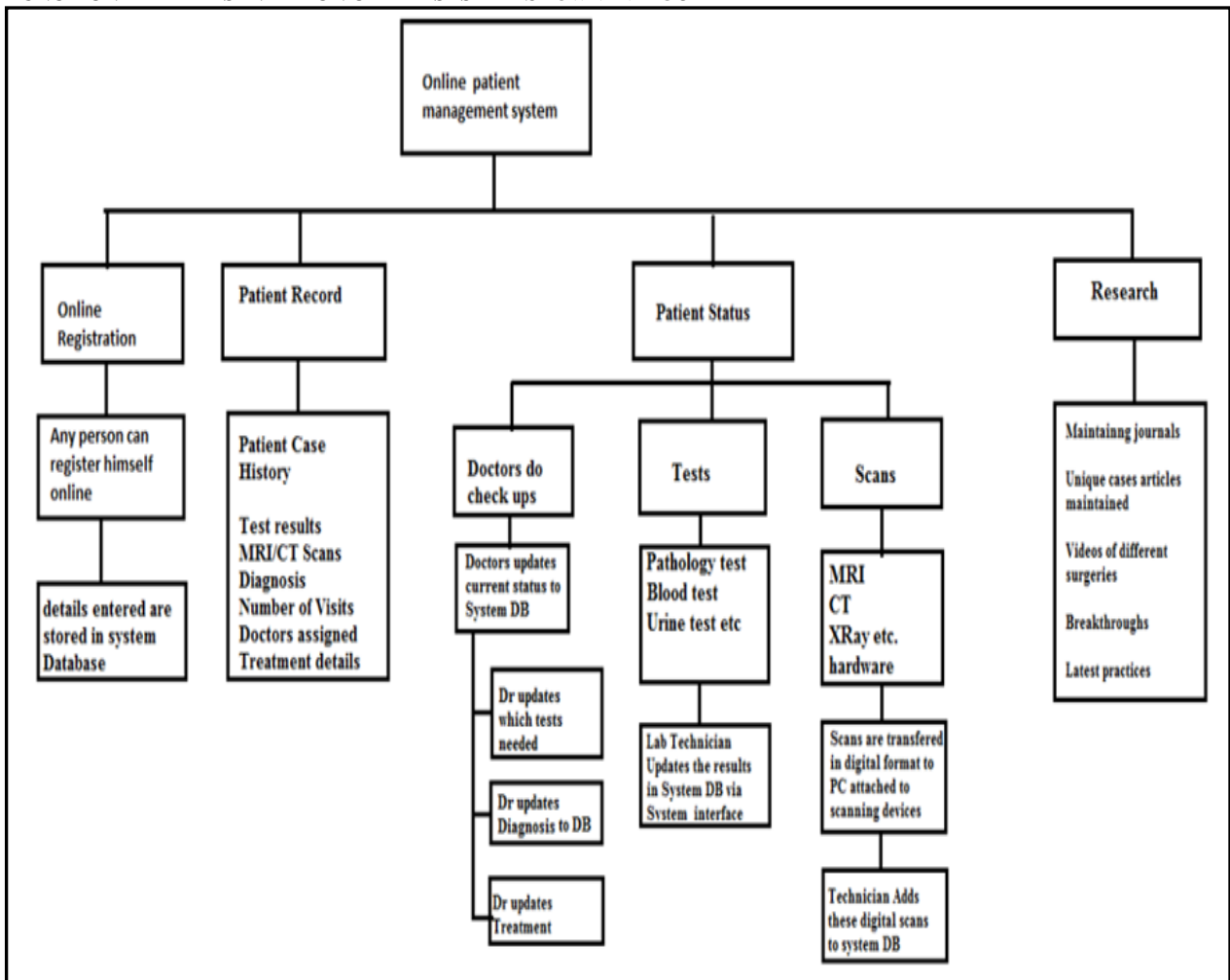**FUNCTIONAL REPRESENTATION OF THE SYSTEM** SHOWN IN FIG 5

FIG 5 FUNCTIONAL REPRESENTATION OF SYSTEM DIAGRAM

III. TECHNOLOGY AND HARDWARE CONSIDERATIONS

Cloud Computing

Cloud computing relies on sharing computing resources rather than having local servers or personal devices. It provides network based services, which appear to be provided by real server hardware but are actually served up by virtual hardware, simulated by software running on one or more real machines. These virtual servers can be scaled without affecting the end user. It maximizes the effectiveness of the shared resources and provides device and location independence.

We can make use of Software as a service (SaaS) model for implementing above web based application. In SaaS the software and the associated data are centrally hosted on the cloud. It is based on multi-tenant architecture where a single version of the application with single configuration of hardware, network and OS is used for all customers. With implementing the above web based application using SaaS portability can be achieved storing the large data of the patients on the cloud can be convenient. Also the load on the hospital's network is also reduced largely. Any record of the patient can be accessed by the doctor from any corner of the world. The doctor can also consult another doctor anywhere over these applications as the application will be shared by other doctors as well.

Android Programming for the personalized tablet applications

It is a process to develop new application for android OS, usually developed in JAVA programming language using Android Software development kit. It is an open source and cost efficient as wide range of android development tools are free to download. Android platform is quite flexible and hence the developers can work with greater flexibility, the open source technology gives freedom to developers to extend the source code to create effective and unique application. Android is based on Linux kernel therefore it provides very stable and secure platform. Using android application programming we can develop the customized tablet applications of this web based online medical application for every specialty of the medicine so the doctors can use the application on their respective tablets and android programming will make utilization of application very convenient stable and secure and user friendly and cost effective. Doctors can access their patient's records with a click.

Hardware and technical requirements

To implement this application we will require computers in each functional room of hospital for e.g. All the wards of hospital should have a computer to update the details about patient in those wards, all the departments like MRI, CT scan, X-ray rooms should have computers to store the reports on the system database and all these computers should be in network and it should have an updated browsers and internet connection. Every patient should be registered and have a patient ID, and every person who handles the patients in some or the other way should have a login access to the system so that person can update about the patient relatively. All the doctors should have a tablet with internet connection and connected with the other hospital computers, these tablets should contain the customized application of the system.

Other tools and languages that can be used

This web based application can be developed by using object oriented programming languages for front end like VB.net, java , C# , HTML5 which will provide the latest technology in developing quite user friendly user interface so there is very less difficulty for all the users to learn the system. The Database or backend can be created on relational database management system like MS SQL SERVER 2008 or Oracle or MySQL etc. these tools will help to design and develop very efficient database which we will require to store and manage a very huge amount of data on patients and doctors and their treatments etc.

IV. CONCLUSION

By implementing this web based application the website and customized application on the tablet. The management of the patients will be very much easier, efficient and less time consuming. It will be easy for the doctors and patient to access the records and reports as the history and reports are already present in the system , the patient will not have to carry all the reports files and big films of x-rays and MRI films etc. all a patient need is an ID which is enough for further actions. The patient details are already present in the database while registration so the need of form filling can be avoided during emergency cases. The doctors can check details of the patients on their tablets, provide prescription on a click which will be sent to the pharmacist this will reduce a huge amount of processing time as the pharmacist knows which medicines to be kept ready before hand, the communications among the doctor and patient is enhanced as the patient can get as much help online. It will help in reducing many manual efforts, time taken and cost.

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