

Doctor's eMate

Aditya Pawar¹, Vaishnavi Aigal², Vishal Wankhade³, Swati Gajbhiye⁴

^{1,2,3}Student, Dept. of Information Technology, Shah and Anchor Kuttchi Engineering College, Maharashtra, India

⁴Professor, Dept. of Information Technology, Shah and Anchor Kuttchi Engineering College, Maharashtra, India

Abstract - In the medical world, history of ailments and allergies of every patient is unique and therefore plays a huge part in accurate prognosis and diagnosis. For a health organization, it is very difficult to keep medical records and history of patients in physical form since it can result in loss, alteration, misuse of records. Also, as the population is growing, health issues are growing and the number of patients is increasing day by day. Keeping physical records of so many patients will lead to a lot of wastage of paper which will be difficult to store and also wouldn't be economical. Hence a system is required to automate the existing hospital management system.

Key Words: hospitals, e-management systems, health care, doctor.

1. INTRODUCTION

As diseases are increasing across the world, the number of those affected is also increasing and hence the need of more hospitals and clinics are increasing. These hospitals and clinics see a great influx of patients. Hence the amount of incoming data also increases. This data needs to be properly and accurately stored because usually when a patient is affected with a disease, it is largely affected due to the underlying diseases or the diseases that have occurred in past, or because of genes passed on from the family. Hence a history of each patient is very important to diagnose the patient. These records have to be stored systematically and should be available anytime and hold confidentiality and integrity. These measures are difficult to implement if records are kept in the physical form. Searching takes time, and since there is no security measure, there is a question on the integrity and confidentiality of data. Hence, we have proposed an E-management system for hospitals so that they can shift their management system online which will help them to decrease indexing time, keeping the data's confidentiality and integrity intact and also ensure that it assists the process of diagnosing a patient swiftly and accurately. This paper deals with the initial research, assessment and steps of the project.

2. RESEARCH BACKGROUND

Hospitals and clinics have been providing health care to citizens across the world for several decades. A very important thing to note is, during all these years, small hospitals and clinics have maintained patient records like name, age, gender, allergies, and hereditary diseases etc.

which are hand written in a book. Many are family doctors and hence hold records like bills and outstanding payments of family members as one entity. All this is handwritten and stored in books or sheets, and when a patient arrives at the clinic, the staff finds the patients history and their family history which is stored independently, regardless of the link between them. The records are then edited by merely erasing or scratching the records. This technique leads to inefficiency. The fact that all the staff has an access to the records means that the confidentiality, integrity and availability can be hampered without any logs as to who accessed the records. For the project, we needed a range of information about existing hospital management systems so that we don't miss any aspect needed by medical professionals. We have read and analyzed various technical papers from various Journals and inferred a lot of useful information from each of them which we implemented in our project. Some of the salient features of information from our project have been influenced from these papers. They are:

[1] This paper adopted the spiral model that has four phases planning, risk analysis, engineering and evaluation. The focus of this paper was to be on a web-based hospital management system that would be managing appointments, billing statements and official receipts as well as the medical prescriptions and medical certificates which would be automated. This paper made sure that the patient forms and databases are encrypted. We have adapted their database and networking techniques.

[2] This paper is a survey intended to identify the key performance indicators and standards of E - Hospital Management & Hospital Information Systems, to identify the key components of E - Hospital Management solutions. It is also focused on understanding the performance indicators of Hospital information systems (HIS). We understood various standards and protocols that have to be followed and maintained while creating a hospital management system like Healthcare Insurance Portability and Accountability Act, and Health Level 7

[3] The purpose of this paper is to design a system that helps to eliminate redundancy in term of data storage. This is a big issue when it comes to storing data in physical form as before adding a new entry, we either have to go through all records physically or add them as it is and increase the amount of records. This paper has a straightforward one directional methodology, wherein the data flows from admin to doctor to pharmacist. We have adopted this methodology for our system. This paper also tells us about a pharmacy

module which can not only gives the doctors an easy way to prescribe medicines to patients, but also it has a system which updates the admin about the stock of medicines and lets them add new amount of medicines. However, it does not show the expiry dates. We have adopted the pharmacy module from this paper and we intend to add the stock and the expiry date updates as we go ahead in future with this project.

[4] This paper is an active project which aims on automatizing hospitals that see hundreds of patients a day. The paper boasts different logins of – administrators (receptionists) who can keep a check on the patients’ appointments, doctors’ details and working of the site without seeing any private data, ‘patient login’ for patients to get their prescription, lab reports and medical certificates and also book appointments. ‘Doctors login’, from where they can access medical records, review them and edit them, and use them to prescribe medicines and other notes to patients. It also had a ‘Lab login’ where Lab in-charge could login and upload, review, or alter lab reports, and also check for patients that are going to arrive. All this information helped us to build the overall structure of our project.

[5] This paper raises the question as to what are the issues with the physical ways of storing information and what is lacking in the existing automated system, it also gave us grounds on which a project should stand, they are Performance, Efficiency, Control and Security. Throughout our project, we aim to keep checking that our project fulfills all these criteria and that we build a system which is useful to the hospitals of the world.

Table 1- Comparative Analysis of Research Paper.

SR. NO.	PAPER DETAIL	METHODOLOGY USED	DISTINCT FEATURES	POTENTIAL CHALLENGES
1	Designing A Web Based Hospital Management System For MOUAU Clinic	Spiral software model -planning, risk analysis, engineering and evaluation.	Admission, Staff Details, Billing, Patient login, Ward Details, Ambulance Service	No payment option in Patient Dashboard.
2	E-Hospital Management & Hospital Information Systems – Changing Trends	3LGM2 (Three-layer Graph based meta model) - domain layer, logical tool layer and physical tool layer	Patient Billing & Insurance Module, Pharmacy Module, Blood Bank, Payroll Module, Dietary Module	Multi-vendor management system or system integrator is needed, system does not alert the pharmacy of the expiry date of drugs
3	Design and Implementation of Hospital Management System	one directional system - receptionist refers patient to doctors, doctors referring patients to the pharmacist to either in or out patients	Receptionist’s module, Pharmacist’s module for entering new stocks Creating receipts, querying all sales made in a day	The system does not alert the pharmacy of the expiry date of drugs

4	Advanced Hospital Database Management System	one directional system - receptionist refers patient to doctors, doctors evaluate and diagnose the patient	Lab panel, Android App panel for patients	Since patients fill forms from app, they may/may not be present at the hospital which can result in wastage of time
5	Design and Implementation of Hospital Management System Using Java	database, object-oriented programming language and networking techniques.	Patient database, Drug database, In - patient database	No database for Lab results of In-patients

3. METHODOLOGY

We have decided to go ahead with one directional system. The system will start with sign up for a first time user and login for an existing user, after which they will be directed to the dashboard. Here, they can choose to add a new or manage an existing patient and subsequently diagnose them. [4].

4. PROPOSED SYSTEM

To create a website for Hospitals and clinics so that patient records can be entered, stored and accessed easily by the doctor, so as to help in quick and accurate diagnosis. The proposed system will have following features:

- Register
- Login
- Doctor Profile
- Add Patient
- Manage Patient
- Add Families.
- Manage Families
- Add Medical History
- Drug Database
- Edit Medical History
- Payment Options
- Report & Receipt generation

The website will have a login for the doctor. After login, there are primarily two ways to aide in the checkup process of the patient viz.

- Add Individual Patient Module
- Family Module

4.1 Add Individual Patient Module

A patient can be added by the feature “Add Patient” or an existing patient’s record can be fetched through the feature “Manage Patient”. [5] The Personal details of the patient will be shown with previous visit records and outstanding bill, if any. The doctor can then add a medical history record, give

prescription through the inbuilt tablet/syrup/injection inventory and print the prescription for the patient.

4.2 Family Module

If a whole family visits the same doctor, then they can be added as one entity. This helps in understanding hereditary issues and the family bill can be treated as one entity instead of separate bills for separate members of the family. The family is linked to the head of the family and his mobile number. The doctor can then diagnose each and every family member separately.

4.3 Register

Under the consideration of potential new users, the system has a feature to register this new users. In order to register, the user has to enter their credentials: Username, e-mail, and a password of minimum length of 6 characters for security purposes, they desire to keep. The email which the user enters has to be unique as it will be used as a distinguishing factor from other users. After the details has been entered on can confirm it by simply submitting it using the 'submit' option.

4.4 Login

As a registered user feels to login in the system, they can use login in the system using the login page. The user must enter his unique e-mail address which they used to register their account along with the right password to confirm the authentication of the user. If the user wants to view the password which they are entering they can click on the 'view password' option, this will let the user to see the password they are entering.

4.5 Doctor Profile

This gives the credential information of the doctor: Charges of the doctor, timing from which they are available, their specialization, contact number, and their e-mail address. If the doctor wants to edit the same, he can do it simply by clicking on the edit option, which will toggle them to the edit page, from where they can easily edit their respective details and click on submit to confirm the changes they wish to make.

4.6 Add Patient

A new patient can be added using the 'Add Patient' option. In order to create a new entry, the details of the patient: Name, age, e-mail, phone number, address, their medical history, their family history, gender, and allergies, has to be entered. After entering the details, in order to complete the entry, one has click on the 'add' option to submit it.

4.7 Manage Patient

Manage Patient option gives user the control of the patient's record. Patient's personal details can be viewed by clicking on the 'edit patient' option, their previous history of visits in clinic and all the medications can be viewed by clicking on the 'view option'. If the doctor wishes to delete any record or any patient he can simply delete it by clicking on the 'delete option'.

4.8 Manage Family

An unprecedented feature of this system 'Manage Family' has been set up, this option gives the user the simplicity of viewing patients belonging to the same family. User has to select the 'head of the family' in order to view the list of members belonging to that family and from there they can choose to edit, add, or delete the details of the respective family member.

4.9 Add Family

A new family can be added in the 'Manage Family' section using the 'Add family' option. The user needs to enter the details of the 'head of the family': Name, e-mail, address, phone number, gender, and their medical history. After that other members of the family can be added in the list.

4.10 Manage Family

Details of the family members of the family can be edited, viewed, updated, or deleted using the 'Manage Family' option. The user needs to select the 'Head of the family' they wish to work on.

4.11 Add Medical History

Patients medical history being of crucial and vital importance, it is imperative for the doctor to note every visit and patient's medical details during that visit: Blood pressure, weight, sugar, body temperature, medicine prescribed, and note if there is any. These details are recorded and can be of tremendous help in the next visit. These details can also be edited by simply clicking on the 'edit' option.

4.12 Drug Database

In order to save time and surmount an issue faced by the doctor on daily basis by keeping on typing some of the most generic medicines each time, there has been a built in drug database[5] in the system, which will help the doctor to select the medicine with just a click and expedite the whole process. The system has a wide range of 40 medicines from which they can choose from, or else can simply type the medicine which is not in the list.

4.13 Edit Medical History

In case of any cursory work done, or mistake made while entering the medical details of the patient, the user can easily correct the mistake by using the 'Edit Medical History' option. After that, they can make the respective change they wish to make.

4.14 Payment Options

This is a system which has never seen before payment system which follows the traditional 'Khata system' of India. The payment system is divided into two segments: family and individual patients. In the family segment; the payment of the whole family, where bill of each family member will be accrued to a net bill will be generated and will be displayed in front of the family's head name. This amount can also be paid individually in the family's section. In the other segment of the payment option, a bill of an individual patient will be generated and will be displayed in the 'Bill' section. In any of the segments, if the user wishes to pay a part of the net amount, then, they can do it, and the resultant amount will be displayed in the 'Balance' amount.

4.15 Report and Receipt Generation

If the patient wants a report to carry for his perusal, or the doctor wants to give a report to the patient, they can print that report using the 'Print' option which will generate both the bill and report of the patient. [3] This will also include the dates of the next visit or the follow up and doctor's advice, if any.

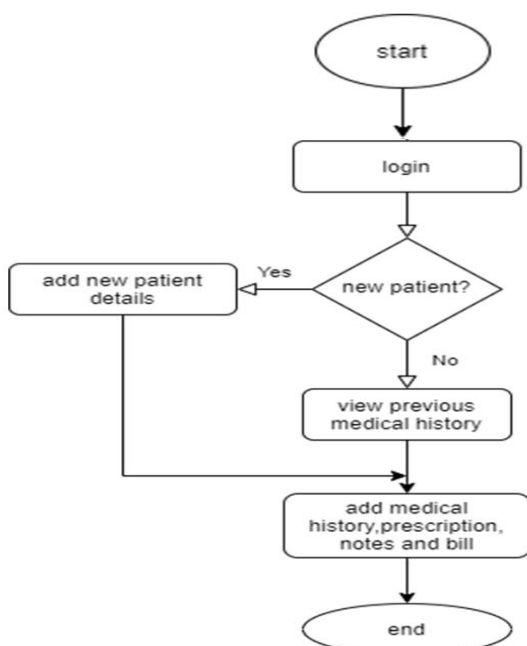


Figure 1: Work Flow Diagram

5. CONCLUSIONS

Due to technological assistance, hospitals and clinics will be able to evaluate their patients' medical status with a click and diagnose the patient accurately according to their personal medical details like blood sugar, allergies etc. and also according to the medical issues in their family. It will also analyze the entered data and present it to the doctor using a color scheme. This will give a sophisticated and better view to the doctor. The doctor will also be able to monitor the payment dues of an individual or a family altogether. Furthermore, doctors can find out who has previously diagnosed the patient in their previous visit and check if they have left any note for the follow up visit. Overall, this project will ensure a drastic reduction in time per patient, paper wastage and effort, and will increase efficiency in diagnostics.

FUTURE SCOPE

Even though the preliminary stage of the project covers some of the most prodigious features concurrently keeping the use of the system simple, in order to augment and revamp the existing project, we aspire to make an android based app for a versatile use, and to increase the convenience for patients and doctors. We also plan to give the user the leeway to change the themes of the UI for a better aesthetic experience. We aim to build a prospective system for use in large hospitals for managing a huge number of patients. Following are some of the features we primarily strive to implement in the project.

- A calendar for doctor's appointment.
- Medicine inventory can be enhanced with expiry dates.
- Staff details and payroll
- Increase security of records by adding methods like One Time Password, etc.

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