Implied Polyclinic – A Diversified Swotting

Himanshu Yadav[1] Kanishka Arya[2] Deeksha Gajbhiye[3] Ms. Nupur Agrawal[4] Ms. Kavita Namdev[5]
[1,2,3]Student [4]Assistant Professor [5]Sr. Assistant Professor
[1,2,3,4,5]Department of Computer Science and Engineering
[1,2,3,4,5]Acropolis Institute of Technology & Research Indore, India

Abstract— Web-based applications are worldwide flourishing day by day. The web application is an application that runs on any operating system. So, the "Implied Polyclinic" is based on the concept of integrated care system. Stakeholders for the system are Doctors, Patients, Labs and Chemists. Here we have developed a web-based application software that provides a Multi-specialized Hospital that has created a vision to provide 24/7 Primary Care at Doorstep of Patients using a panel of high-quality doctors. Further, the Hospital has decided to provide quality medicines vide authorized Pharmacies at the door-step at discounted prices as well as give door-step Laboratory services wherever possible vide specimen collection. The aim is to help elderly and infirm people as well as people who need regular monitoring services to get access to quality healthcare services at affordable prices at the Door-step. It is envisaged that preventive and regular monitoring services can reduce hospital admissions and reduce the suffering in General.

Keywords: Web-based application, Stakeholder, Swotting

I. INTRODUCTION

"Implied Polyclinic - An Integrated Care System" aims to automate the health-care system of the modern world. The primary aim is to detail out/ describe the whole system and clearly lists all its functionalities. "Implied Polyclinic" is based on the concept of integrated care system. Stakeholders for the system are Doctors, Patients, Labs and Chemists. Doctor generates a prescription comprising of Diagnosis, Medicines and Lab Requests (if needed) based on the symptoms provided by the patient.[1] The prescription is received by patient, nearest local chemist and nearest local lab. Using the prescription Chemist provides medicines to the patient via offline delivery. Labs, too, use the same prescription to collect specimen from patient and make the delivery of lab reports based on lab tests and also update the report on the system to view for the patient anytime. For Chemists and Labs, the information required to them is displayed thereby protecting the Patient' confidentiality. The Doctors and the Administration Staff will maintain/ operate the system. It is also meant for authorized Chemists and Labs who are associated with the Hospital. Lastly, it is also meant for Patients/general public at large who will register themselves and request for appointments/ consultations. In lieu of Patients, it is expected that Hospital Staff will identify the information acquired from Patients, Chemists and Labs. They are the ones who will state the requirements of the software and their feedback will also be needed to modify the existing requirements.

II. LITERATURE SURVEY

Over the last two decades, the primary health care (PHC) has become the most important healthcare service in many developed countries. This is because it provides continuing and universally accessible health care services to the local individuals and families in a community. In recent years, the concept of "patient-centeredness" has become the norm in primary health care. In comparison with disease centered, technology-centered or physician-centered health care practices, the patient-centered primary care practice requires care providers to consistently address patients' concerns and adequately share management options with patients.[3] Current health care organizations, however, own large number heterogeneous information sources that impeded the information sharing and exchanging within primary health. This is because most of current existing health care systems consist of isolated, stand-alone applications operated by different Database Management Systems (DBMS).

The online appointment system was developed by the first author and installed in a server machine in the CHC at the end of January 2011. There is a web link at the home page of the medical centre Web site, clicking on it would allow a person to enter the web-based online appointment system.

Information about the online appointment system was disseminated to consumers through the following channels:

1) Fliers to be left at the reception desk for anyone to take for fee.
2) Posters placed at the prominent locations in the medical centre.
3) Advertisement at CHC web site.

[4] The information disseminated includes the web link to the online appointment system, the steps to follow to make an appointment using the online appointment system. Figure 2 shows the patient login web page. Once a patient has successfully logged in, the appointment selection web page will be displayed as shown in Figure 3. The patient can select their preferred appointment date, time and doctors. If the initial preference cannot be met, an alternative choice will be presented automatically, including the available time, date and doctors in the medical centre. After patients make their final choice, a confirmation web page will be displayed as shown in Figure 4. The confirmation web page provides an opportunity for patients to reconsider their choices before the information is finally stored into the database. It displays start and end time of the appointment, patient's name and doctor's name. Patients can reselect a new appointment slot or cancel the current selection. Once the patient clicks "Confirm" button, the appointment confirmation service is involved and the appointment information will permanently be stored into the clinical database. Then the system will generate a confirmation e-mail letter and send it to the patient's e-mail address.

In the first-tier, patients can access appointment information with a web-browser through Internet. The middle-tier connects the first tier with the third tier for

information exchange. A middle-tier database is used to cache the data retrieved from database in order to minimize network traffic flow and disk access. In addition, detailed information about each scheduled appointment slot, such as patient login and contact information, is also stored into the middle-tier database. The third-tier - enterprise information tier (EIS) is composed of a group of adapters to connect with the system.

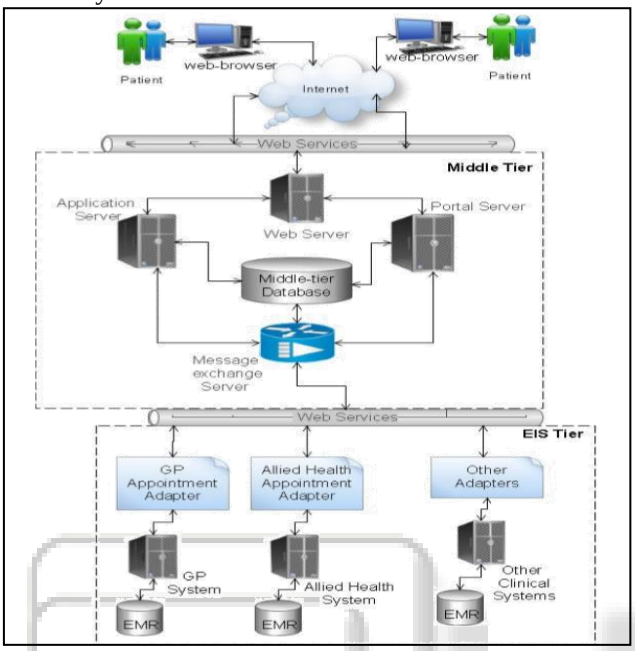

Fig. 1: The overall system architecture.

User login and registration requests are processed by the portal server which located in middle tier. The security mechanism in login process is enhanced through a MD5 hash generator. This encrypted login procedure ensures that only identified users can access the relevant medical resources. The application server is a component that manages the complete end-to-end appointment tracking and scheduling services. The key functions of application server include:

1) Multiple-practitioner scheduling,
2) Centralized and consolidated patient appointment tracking,
3) Available appointment searching,
4) Appointments rescheduling
5) Appointment confirmation and cancellation.

Fig. 2: Patient login web page

Fig. 3: The page of Selecting Appointment

Fig. 4: Confirmation web page.

III. RESEARCH METHODOLOGY

A good software needs to be divided into several modules based on characteristics. These modules contain the information based on the tasks we plan to achieve. They are working all for the single entity but will have to refer to each other for the whole system to work [5]. The measure by which the quality of the design of modules and their interaction between them is measured is known as coupling and cohesion. Cohesion is a measure that defines the degree of dependability within the elements/components of module. Coupling is a measure that define the level of inter-dependability among the different modules of the program.

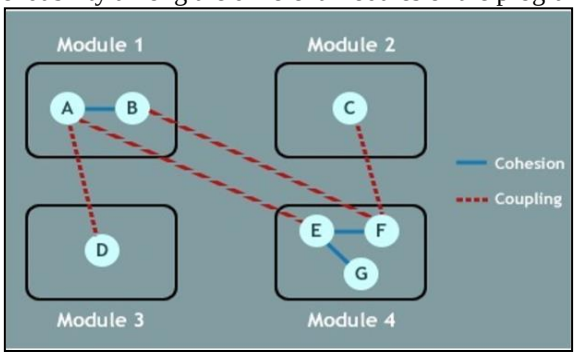

Fig. 5: The level of inter-dependability of different modules

For a good system, there should be more cohesion and less coupling. Why is coupling and cohesion required? Coupling and cohesion is required to make the entire big and complex system into different modules that serve independent functions and are loosely coupled with each other. Different components of the module may be strongly cohesive in nature to give better results. The advantages of modularization are: Parallel Development - Modularization ensures that loosely coupled modules can be developed in parallel Debugging: Modularization makes it easy to debug the code. In a loosely coupled design, the number of interfaces and the number of parameters/data passed are low, thereby ensuring easy debugging of code. Reusability: if one module (say a Class) has to be changed then only that can be changed and others can be reused, thus a loosely coupled system is advantageous. Maintainability: The independence enforced by loose coupling improves maintainability of the system i.e. if there is a future requirement then it can easily be addressed looking at the module (say a Class) and the component that requires the change. Robustness - Highly Cohesive modules loosely coupled together are a measure of software robustness (i.e. quality) and is a highly desirable feature. How coupling and cohesion is done.

1) Patient module: In this module components handling patient registration, patient consultation request will be there. These components need to be highly cohesive as they are strongly dependent on each other.
2) Doctor module: In this module components handling doctor details and prescription generated by doctor. Again, these components need to be strongly bonded together in order to make this module work hence high cohesion.
3) Chemist and Lab module: These modules have lab and chemist details and the services provided by them.
4) Admin module: These modules will have components which can add doctors, chemists, labs, get a summary of the patient details, appointments made.

If one looks all the modules then one can find all of them can do their work independently but still needs to be loosely coupled with each other. E.g. a doctor can provide consultation only if there is a consultation request by a patient and similarly a chemist can deliver medicines only if a doctor generates a prescription. The reason why our system will have loose coupling and tight cohesion is: The template system will know nothing about Web requests, the database layer will know nothing about data display and the view system doesn't care which template system a programmer will use. An example for bad loose coupled system is your URL being coupled to underlying code. We will be using MVC architecture for it uses loose coupling and tight cohesion.

A. Process Diagram:

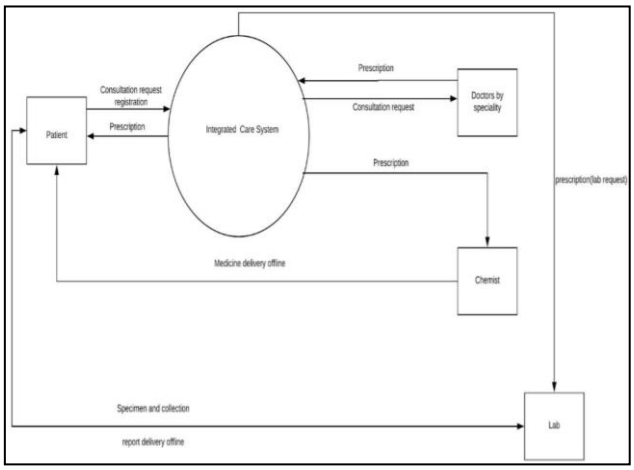

Fig. 6: Process Diagram

The above figure clearly shows various processes associated and how data flows between an entity and database via a specific process. Admin populates specialty database based on various specialties present in the medical domain. Then it links the specialties to the doctors and populates the doctor database. It takes information from labs and chemists to populate their databases. Patient registers into the system by filling his/her details. When patient generates a consultation request then doctor sees that request and gives the diagnosis. The prescription generated by doctor is sent to patient, chemist and labs. Chemist uses this prescription to deliver the desired medicines to the patient. Labs too use the prescription to collect specimen from the patient and deliver lab report to the patient and update the report into the system for future reference for the patient.

IV. RESULT

System is setup and functional. Admin is logged in. A Patient account has been created. A Patient has successfully logged in, created an appointment, cancelled the appointment, and logged out Admin is on Activity Page. The page shows in a table format, the activities done login, appointment creation, cancellation of appointment, and logged out along with the time of each activity. Patient Registration System is setup and functional.

1) User clicks on register button
2) User enter email as username
3) User enters password, first name, last name
4) User reenters password
5) User clicks register button.

Page displays profile page for user and an option to logout. Patient Registration System is setup and functional

1) User clicks on register button.
2) User enter email as username.
3) User enters password, first name, last name
4) User reenters password but different then the above first password.
5) User clicks register button.

Page displays error message saying second password field doesn't match. Restore Users. System is setup and functional. Admin is logged in and is on Archived Users page.

1) Admin clicks on Restore user option for the user wanting to restore
2) Pages show a confirmation box to restore the user.
3) Admin clicks Confirm User restore.

The user is successfully restored and shows the name on the user's page. View Activity page.

V. CONCLUSION

The successful implementation should make it easy for users to effortlessly sign up as patients so that the hospital can, without difficulty, manage their procedures and patient related tasks to optimize day today workflow. Further it will provide quality medicines vide authorized Pharmacies at the doorstep at discounted prices, also have a facility to collect Lab specimens vide Authorized (reliable and certified) labs at discounted prices. The capacity to access, integrate and analyze patient records and clinical data within a healthcare system represents an opportunity to ensure and enhance clinical quality and to reduce costs in a carefully planned and controlled manner [6,7]. Moreover, such capability should improve healthcare delivery (efficiency) and provide the hospital/clinic with a level of integration of services achieved by few healthcare services providers. With the aid of emerging technology, the concept of a virtual diagnostic clinic will serve to prepare services providers for the advent of managed care and other anticipated changes in healthcare, while ensuring continued ability to deliver high quality, cost-effective medical and health-related services

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