Unite Clinic: Connecting Clinics Online

Supriya Dadabhau Tambe, Nikhil Gorksh Pawar, Mahadev Sudhakar Garad, Sagar Ravindra Patil

***Abstract*—This system is designed to improve clinical workflow, and perform advanced appointment scheduling. This application shows how clinics and patient are connected online through web based application. In today's life no one has time to visit clinic and wait for appointment. This application will help for getting online appointment. Patient can get appointment through SMS or Internet.**

Receptionist will manage all the appointment. Doctor can make his schedule according to patient's appointment. Patient can see online how many people are waiting for appointment. Doctor will upload all the patient medical history on website. This information is visible to only that patient and to the visiting Doctors. Thus privacy is maintained. As patient and clinic are connected online if patient goes from one clinic to another clinic, visited clinics doctor can see medical history of that patient and personal information of patient. It is waiting room solution. All this services provided to users at free of cost.

***Index Terms*— Alert Notification, Appointment scheduling, Database management, Online Appointment, Report Generation, Secure private information, Unique ID.**

I. INTRODUCTION

As importance of web based application is increasing day by day, it is important to manage all the healthcare data online. Now everyone has internet connection and it is easy to use web application. This application will reduce the work of patient as well as doctor. Doctor does not need to take patient's weight, patient's blood group, because all this information is entered at the time of registration of patient on website. Doctor will automatically see patient's information. There is no more hardware required for patient and doctor.

Efficient appointment schedules reduced patient waiting time while keeping doctor idle time as low as possible without adding extra resources. Efficient and effective management of healthcare is imperative due to the efficient appointment scheduling.

There are following thing are required for Doctor:-

A. Computer or Laptop

B. Internet Connection

There are following things are required for Patient:-

A. Computer

B. Mobile

C. Internet Connection

Manuscript received on March 2013.

Supriya Dadabhau Tambe, Information Technology, Sinhgad Academy Of Engineering, University Of Pune, Pune, India.

Nikhil Gorksh Pawar, Information Technology, Sinhgad Academy Of Engineering, University Of Pune, Pune, India.

Mahadev Sudhakar Garad, Information Technology, Sinhgad Academy Of Engineering, University Of Pune, Pune, India.

Sagar Ravindra Patil, Information Technology, Sinhgad Academy Of Engineering, University Of Pune, Pune, India.

II. EXISTING SYSTEM

The earliest work studying the appointment scheduling issue was made by Bo Hang (2011) [1].

System was used to schedule an appointment and to determine the need for registration, the system is registering the customer's name, gender, ID number, telephone number and simple personal medical background information, etc., and accordance with the patient's registration department, visiting time period agreed upon their visits, visits of experts. After successful registration, the time of registration status set to "have an appointment taken". If the customer had previously used the reservation registration system, enter the customer's ID number. After the basic situation of the client as well as its previous record of registration and other information is displayed immediately, the patient miss an appointment can be registered directly; if the client ever had a history of default the system will automatically alarm, that the client is blacklisted.

In Existing system, Doctor and Patient both have to pay some money for using that system. But many users prefer using the system to which they don't have to pay money. So we are developing system which provides services to users free of cost. Hence our system will be more preferred than any other system.

III. UNIQUE ID

Every patient and Clinic will get unique ID at the time of registration. Each doctor in clinic will have unique ID on the basis of his/her clinic. This ID is useful in entire process. This ID will be used in searching patient, searching clinic. It is also useful to maintain privacy of patient and doctor's information.

Registered patient data will be verified by the clinic when patient meets to clinic first time, after that there is no need to verify the data by all the clinics. Clinical data and patient data will be verified by special authority so that there will not be any fraud data. After all this verification Final Unique ID is generated.

IV. SYSTEM IMPLEMENTATION

The application requires following software-

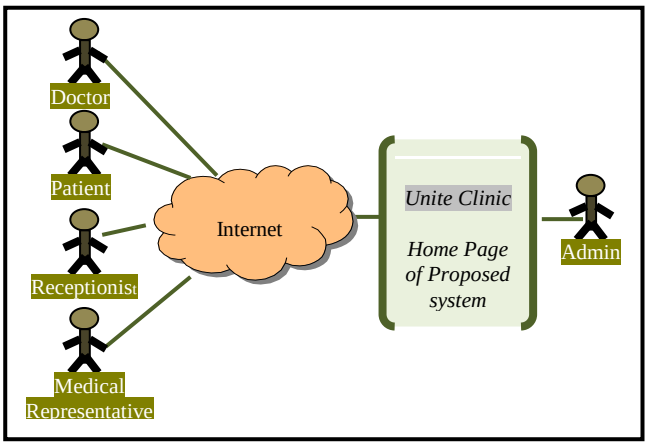
A. Java Runtime Environment and Java Development kit version 1.7

B. Apache Tomcat Version 7.0

C. Mysql Database 5.5 as backend

Proposed system is based on MVC (Model View Controller) architecture which describes our system, in that Mysql server database is acting as model, HTML GUI is view and JSP is acting as controller which controls communication between view and model. Users are connected to the Web Server through an Internet connection and communication with the database server through JDBC is established and data are accessed directly from the database Server. System's GUI elements ensure a very friendly User Interface. On the server

side there is Mysql server 5.5 acting as the database server and Apache tomcat 7.0 acting as a Web server.



V. SYSTEM ARCHITECTURE

Figure 1: System architecture of proposed model.

The above figure explains working of proposed system. Doctor, Patient, Receptionist and Medical Representative are client side users. All these users are connected to proposed system through internet. System is managed by Admin at server side. Proposed system's users are described below.

A. Patient

Patient can search doctor by doctor's degree or specification, doctor's name or clinic's name. If particular doctor have an emergency, then appointments are taken after that, and then rescheduling of appointments is done by the receptionist. This message is display on website, receptionist will report this message. Patient can utilize his/her time rather than going at early in the morning to take appointment and wait till the number came.

Secret information of patient is not visible to other patient; privacy of the patient is maintained. Time of the hospital and day when hospital is close is displayed. Emergency contact number of doctor will be displayed.

B. Doctor

Doctor can see the personal information and allergic information of patient, and depending upon the allergy, doctor can give him prescription. Doctor can also view the patient history. There is no need of paper to keep record of patient. All patient data is stored in the proposed system. It is easy for doctor to keep record of all patients, and also to retrieve the patient information.

C. Receptionist

Receptionist will help to manage appointment scheduling. Receptionist will inform whether doctor is available or not. Receptionist will send alert notification from his/her clinic to the patient. e.g. tomorrow clinic will be closed.

D. Medical Representative

Main revenue of proposed system is from Medical Representative. Medical Representative will advertise his medicine on website, and it is visible only for doctors. Medical Representative can insert record of new medicine and remove records of banned medicine.

E. Admin

Admin will manage all database of proposed system. Admin will update system time to time. And all these updates are available to user without any additional cost.

VI. APPOINTMENT MODEL

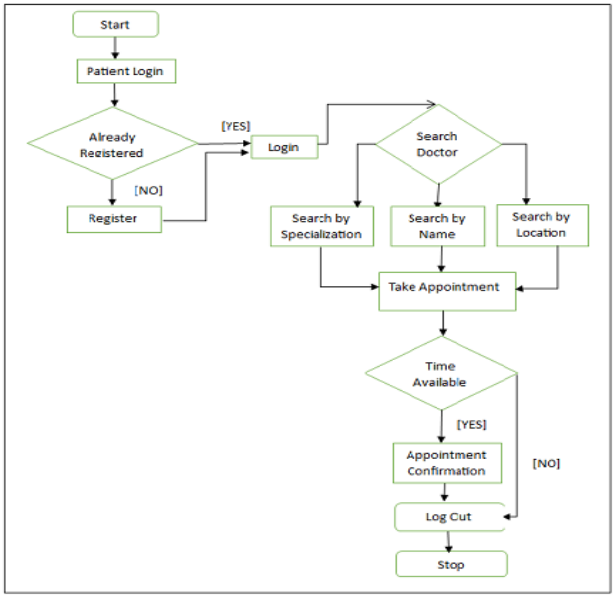


Figure 2: Patient appointment flow.

All new patients firstly need to do registration. If they have already registered then they can directly do the login. After login patient will search for the doctor depending upon doctor's name, specialization or location, if the required doctor is selected, then patient needs to select the date for appointment. If any time slot is available then confirmation message is send along with time. After receiving confirmation message, if time is not convenient for patient then the patient is given different time slots to select from and whichever is convenient is selected by the patient. After the procedure is completed the patient logs out.

VII. REPORT GENERATION

At the end of day all the clinics can generate report showing number of patient visited to the clinic. System can also able to generate report for number of patient suffering from particular disease for that clinic. All the clinics in city are connected so that we can get report for number of people suffering from particular disease from particular city. This report will be useful for government for making survey for diseases.

VIII. HISTORY MAINTENANCE

Patient record cover the following elements: Personal data, medical history list, medical examinations and tests, links to medical databases, etc.

This data is shown only to particular patient and doctor who are performing treatment on that patient. This assures privacy of patient data and also data security.

This helps doctor to apply good medical treatment on patient, as all information of patient, such as previously taken treatment and allergic information are available with doctor.

IX. ALERT NOTIFICATION

Notifications are of three types:

A. Mobile SMS

B. Email

C. Website

Patient will get appointment confirmation SMS on his mobile regarding time of visiting to the doctor. Patient will also receive health care tips regarding common diseases e.g.

swine flu and dengue. Alert notification also takes care of user's privacy as we are sending notifications according to their request and settings.

X. FUNCTIONAL REQUIREMENTS

There are five modules involved which are:

A. User Access Module

This module is used to authenticate and authorize the user. This module includes registration and validation on username and password to access the system.

B. User Maintenance Module

This module is used to manage and maintain the users. Administrator is given privilege to maintain patient and doctor record. Patient and doctor can also update their personal information and password through the system.

C. Appointment Module

This module is to handle appointments for patients. Patient can select the available time slot of particular doctor to make an appointment. The system will automatically check the patient's status according to appointment. If slot is available, the appointment will be confirmed immediately. Besides that, the system does a complete check to avoid appointment conflict. Once appointments are full, the system will change the consultation status to "full". Patients can view their current appointments and appointments history.

D. Report Module

The Admin also can view their appointments list. Since all the appointments are stored in the database, the users are able to trace back whenever they need to. There are also appointment search functions to allow the user to locate appointment quickly. In addition, the user can easily print the report.

E. Presentation Module

The proposed system is designed to be simple in order to eliminate the complexity and provide simplicity to the processes and operation. The human computer interaction (HCI) guidelines are considered to design the presentation model [3].

XI. FUTURE SCOPE

A. Prescription via SMS

Prescription will sent directly on patient's mobile via SMS. This will save written work of doctor as well as paper. Digital signature will verify prescription.

B. Android application

As most of the mobile uses Android operating system, android application of unite clinic will be available.

C. Application can be hosted on Cloud

In today's world, use of cloud computing is increasing at rapid rate, so in upcoming future we will host our system in cloud computing.

D. Medical stores

Pharmacist will view prescription given by doctor to patient. Pharmacist will enter patients ID and then he will able to view the prescription for patient.

E. Suggestion for doctor

We are making survey of treatments given by doctors, from which we are creating reports. That reports will be available to other Doctors for reference.

XII. CONCLUSION

The Proposed system is used to connect all clinics in a city. System is available to doctor, patient and receptionist at free of cost. System assigns unique ID to each doctor and patient. System manages all records. Also ensures security, integrity, privacy and availability of information. Appointment Management scheduling software allows patients to manage scheduling appointments.

XIII. ACKNOWLEDGMENT

First and foremost we would like to thank our project guide Mr. Anand Magar and doctors from Pune, Dr. Bade, Dr. Shaha and Dr. Borkar for their valuable guidance and advice. They have inspired us greatly to work on this project. Their willingness to motivate us contributed tremendously to our project.

We wish to thank our project supervisor Mr. Anand Magar, for his valuable guidance, support, constant supervision and for providing all the necessary information regarding the project.

We would like to express our special gratitude and thanks to our HOD Prof. Abhay Adapanawar, Mr. and Mrs. Bangare whose kind co-operation and encouragement helped us in the project.

Our thanks and appreciation also goes to our colleagues who have helped us out to the best of their abilities.

REFERENCES

[1] Bo Hang, "Web based long-distance appointment registered system," CCTAE, 2010 International Conference, vol. 3, Page(s): 232 – 235.
[2] Lu, K.M.; Hamid, S.H.A., "Conceptual Design of Web-Based Appointment Management System using Object WebML," ISITAE '07, Page(s): 354 – 359.
[3] Marinos, S.; Nikolopoulos, P.; Pavlopoulos, S., "A WEB-based patient record and appointment management system," BMES/EMBS Conference, 1999, Vol. 2.
[4] Wijewickrama, A. "Simulation analysis of appointment scheduling in an outpatient department of internal medicine," Simulation Conference, Dec. 2005.
[5] Hung, K.; Yuan-Ting Zhang "Implementation of a WAP-based telemedicine system for patient monitoring," Information Technology in Biomedicine, Vol.7 , Issue: 2, 2003 , Page(s): 101 – 107.
[6] Marinos, S ,"A WEB-based patient record and appointment management system Assessment of user satisfaction with an Internet-based integrated patient education system for diabetes management," Engineering in Medicine and Biology, 1999 ,vol.2.

Supriya Dadabhau Tambe Currently pursing Bachelor of Engineering in Information Technology from Sinhgad Academy Of Engineering affiliated to University of Pune.

Nikhil Gorksh Pawar Currently pursing Bachelor of Engineering in Information Technology from Sinhgad Academy Of Engineering affiliated to University of Pune.

Mahadev Shudhakar Garad Currently pursing Bachelor of Engineering in Information Technology from Sinhgad Academy Of Engineering affiliated to University of Pune.

Sagar Ravindra Patil Currently pursing Bachelor of Engineering in Information Technology from Sinhgad Academy Of Engineering affiliated to University of Pune.