# A Development Project Report

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# A Remote Nursing Teleconsultation Portal (ReNT)

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Subject – Topics of Health Informatics (COMP 5413-WB)

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# Abstract

Migrating to any new town or country can be cumbersome and quite difficult for any person to adapt to the habitat and its weather, food, etc. Searching for a new doctor can be stressful-especially if you are managing a chronic condition or if a decision has to be made quickly. The proposed system offers a solution to eliminate few of these challenges by remotely connecting to your family doctor and the doctor(s) in turn connects with the local or international hospital nurses to address the patient in need.

We propose a system in which the patient communicates with the doctor through a video calling application/P2P Chat application to discuss health issues. Based on the conditions if the patient requires access to the portable medical device or need assistance in taking medications (e.g. Injection) the doctor with the help of our proposed system will connect to the nearby Hospitals in the patient's proximity. The doctor has the facility to tele-monitor or tele-consult the patient and decide if the patient requires medical attention via a nurse and files an eRx to the Hospital (Nurse Providers).

After receiving the eRx from the doctor, the hospital, in turn, will peek into the nurse database and look for the available nurse for patient medical service. Any available nurse can accept the call and visit the patient for assistance.

Key Words: Tele-Consultation, eRx (Electronic Prescription), Remote Nursing, Medical Attention, Amazon Web Services (AWS)

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# 1. Introduction

Immigration to new country exposes one to new people and makes him/her look like a complete stranger out there. You never know if the new food or climate can make you fall sick or lead to any disease. Even if such situation arises, one should have the awareness of the clinics or health care centers that reside in the neighborhood. To ease up this process of context awareness about medical professionals and doctors in your surroundings, we have proposed a system in which the patient can communicate with his personal family doctor (Who's also registered to our system) and get quick suggestions, tele-monitoring sessions and a nurse if needed for immediate medical attention. After consulting with the doctor, the doctor has been given the facility to find all the hospitals / care centers in the patient's proximity and send an eRx (Electronic Prescription) to the chosen Hospital for the patient service. The doctor can mark *'Nurse Attention needed'* in the eRx form and upon acknowledgement, the Hospital can schedule a Nurse in the matching availability window with patient for medical care and attention.

## 1.1.  Problem Statement

Searching for a new doctor can be stressful if you are under a chronic disease situation and feel the need to be consulted by a medical professional. The proposed system offers a solution to eliminate these complex difficulties by allowing the patient to communicate with his/hers family doctor or doctor of resemblance and leave the rest concerns. The doctor can monitor the patient, connect to the local hospitals in the proximity, communicate with the hospitals and arrive to a decision if patient requires immediate nurse care and attention. Additionally, the family doctor has a complete medical record, thus reducing the trouble of the patient to transfer entire medical history with accuracy to another medical professional

## 1.2.  Project Objectives

The three topmost prioritized goals of the proposed system to achieve the points listed below:

- To provide ease of communication between Patients, Doctors and Hospitals.
- Schedule the Nurses according to their availability match with patient, resulting in extra income opportunities to the Nurse without disrupting the parent organization services in working hours.
- Receive trusted medical care and attention in an entirely new place.
- Immediate medical attention under serious chronic situations.
- High response rate from all registered entities.

### 1.2.1. Importance of Project

The importance of this project is to eliminate the lengthy procedure of walking into a hospital, getting consultation sessions from a doctor and then give it a day or two to receive your reports. The doctors across the country or a town can register themselves to this portal and communicate with patients from remote locations. You can get an online appointment via a chat application or video tele-consultation session with a doctor and save energy and time which you were going to invest by walking into a clinic. The system allows doctors, patients and hospitals to register themselves to this portal and avail all the assigned features. For example, our system allows the doctor to Register, login, chat with a patient, video call a patient, search for hospitals around the patient's locality and send an eRx to the chosen Hospital.

   Secondary, the doctor can contact the Hospitals in the proximity and inform them to schedule an available nurse to patient's location if a decision is taken that patient needs personal monitoring and medical attention. The procedure will be valid and legit as the Hospital will be scheduling the Nurse IF and ONLY IF doctor mentions it in the electronic prescription (eRx).

- Proposed System

We propose a system in which the patient communicates with the doctor through a video calling, voice calling or a chat box (If voice and video calling fail) application to discuss health issues. Based on the teleconsultation and telemonitoring observations, if the patient requires access to the portable medical device or need assistance in taking medications (e.g., Injection, blood pressure check, personal medical attention) the doctor with the help of our proposed system will connect to the nearby Hospitals in the patient's proximity.  The hospital, in turn
We propose a system in which the patient communicates with the doctor through a video calling, will check all the nurse's availability in the portal and dispatch the nurse for patient service whose availability matches with the patient situation.

- Important terms, acronyms, or abbreviations

**Table 1: Important Terms and Acronyms**

| ReNT- Remote Nursing Teleconsultation Portal |
| --- |
| TC – Teleconsultation |
| PSe – Patient Service |
| eRx – Electronic Prescription |
| ACK- Notification Acknowledgement |
| EHR – Electronic Health Record |
| PHR – Personal Health Record |
| P2P  - Peer to Peer Chat Application |
| XAMPP – Windows Localhost-Apache-MySQL-PHP |
| AWS – Amazon Web Services |
| EC2 – Elastic Cloud |

### 1.2.2.    Scope of the Project

The scope of this proposed system is wide across Healthcare Domain of Computer science and not limited to the areas of healthcare listed below:

- The Personal Health Record (PHR) feature can extended to create an EHR (Electronic Health Record) with additional information such as previous diagnosis information, family details, family history details and other important information.
- The proposed system can be deployed at a state/province level as the project files are operated at cloud-level.
- The ReNT web application is developed as a '*prototype*' and has potential to achieve mass figures using huge databases.
- The system has the potentials to reside at an international level with high security measures and enhanced validation features.

# 2. Literature Review

A literature review is performed to determine and investigate the theory behind Teleconsultation, electronic prescription and Consumer Health Informatics. Specific focus is on Teleconsultation and eRx to promote our proposed system. The below sections mentions each of the health care concept.

## *2.1.   Teleconsultation and Telemonitoring*

Teleconsultation is a part of telemedicine that provide electronic communication between medical staff, health care provider and patient for delivery healthcare to remote areas./ Teleconsultation consists of 2 types of communication; real-time and store-and-forward. In the study Soontorn Saechow, Sinchai and Verapol Chandeeying (2014) found that most of them provide such 2 communication way in some level of complexity, making harder in deployment. The proposed system by these researchers consists of a framework of web-based teleconsultation for clinical diagnosis system. The system architecture is described. Some challenging issues are addressed, e.g. real-time service on webbased applications, for tele-medicine in particular.  T.C Chang, J.D. Lee and S.J Wu (2004) tried to develop the telemedicine and teleconsultation system between local & consulting expert site. The first application was used to develop a school based intervention program by using this system for school-age children in earthquake areas. The second application was used in the SARS case treatment. In our proposed system, we are using Teleconsultation for communication between the doctors and patients.

## 2.2.  *Consumer Health Informatics (CHI)*

There is a rapid increase in reaching, engaging and empowering the healthcare consumers directly through the various forms of information and telecommunication systems. Ann Fruhling, Rich Burkhard and Soussan Djamabsi (2014) described the use of 6 different Machine learning algorithms to predict the difficulty of health texts. The research explores the importance of understanding these differences and provides suggestions for incorporating them in the design of eHealth interfaces. As Consumer Health Informatics is all about engaging the patient in the healthcare context, where patient has been given the facility to monitor and modify its own personal medical records as and when one feels the need to update the doctor about the information. In our proposed system, we have given the 'View Personal Health Record' facility to create and update the patient's Personal Health Record resulting in a consumer health informatics integrated concept.

## 2.3.  *Electronic Prescription (eRx)*

Lorant and Gergely (2017), in the Hungarian electronic prescription, mentioned that the e-prescription is a central component of the Hungarian Electronic Health System (EEsZT). The eRx's are loaded into the central IT cloud by the doctors and become visible in the pharmacy system across the country. The later system, which was the new one, contributed to better control of adverse drug reactions and medication compliance. David Robert and Luca Dan Serbanati (2015) proposed an architecture for integrating legacy applications into the Romanian Health Information System platform. The authors felt the need because of lack of interoperability between legacy medical applications.  To resolve the issues, the proposed architectures introduces a HL7-Standardized Electronic Health Record that uses cloud tech and HL7 adapters. In our project, we are embedding all the information filled by the doctor along with the patient availability and the field which informs the Hospital if the patient needs urgent medical attention.

# 3.  Architecture and System Behavior

The system design has been categorized into two levels of architecture such as low-level and high-level architecture. Following the iterative development process, firstly, the project is executed on a local environment comprising of a localhost server on a single workstation. The low-level architecture has been mapped to the architecture obtained in a local environment. Moving further, the high-level architecture will describe the workflow and settings of modules at a cloud-level. The HI software is tested on local servers and then deployed on AWS cloud for client access. More details about low-level and high-level architecture are described below:
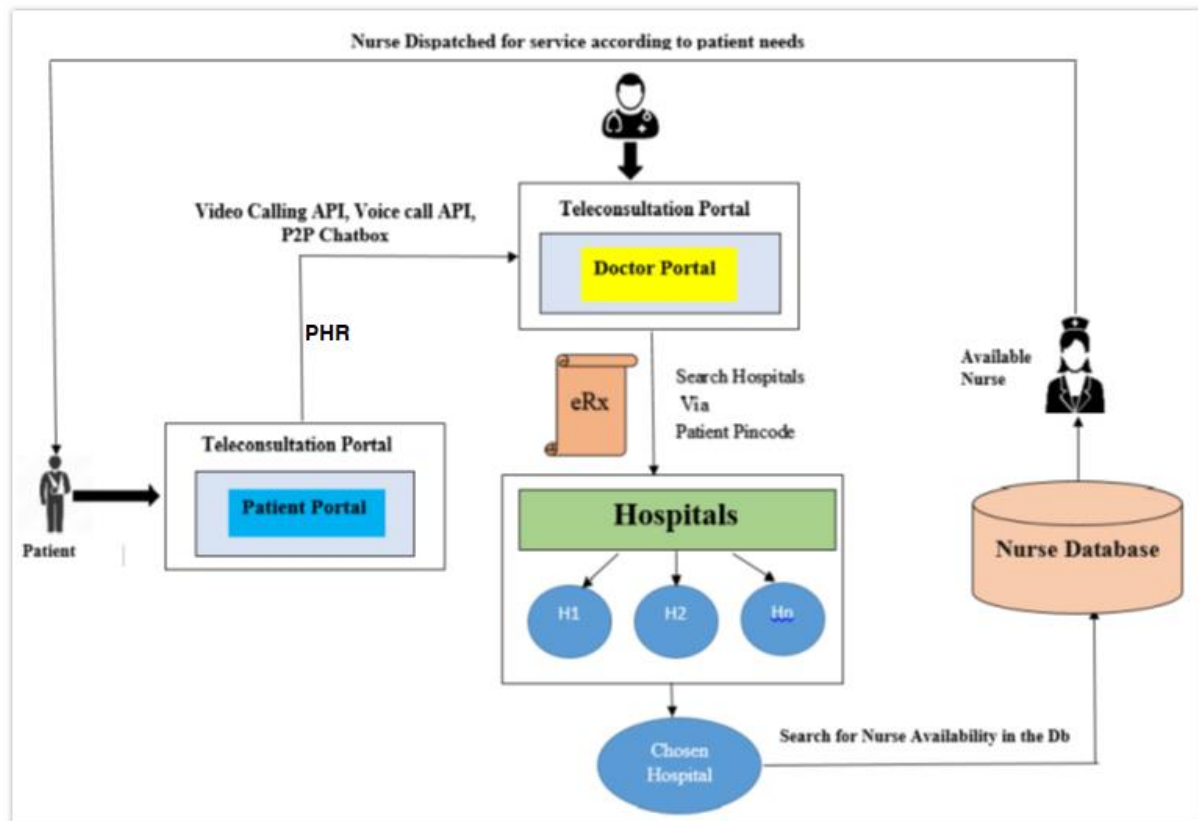
## 3.1. System Architecture



**Figure 1: System Architecture**

Low-level design involves a lot of refinement process which can be used for designing data structures, planning the working of the system, explaining the source code. Low-level architecture has a lot of impact on pre-build system behavior and gives a detailed description of the post-build. The goal of the low-level design is to provide the internal logic code of the actual program and enhance the class diagrams. The above-shown figure explains the logic flow from one entity to other using communication anchors. The architecture aids the source code planning starting from making registration and login forms for the patient, following doctors and hospitals. There will be a systematic and synchronous flow of communication between all these modules using a notification system (E-mail). The communication features and flow of the system will be elaborated in the high-level architecture.
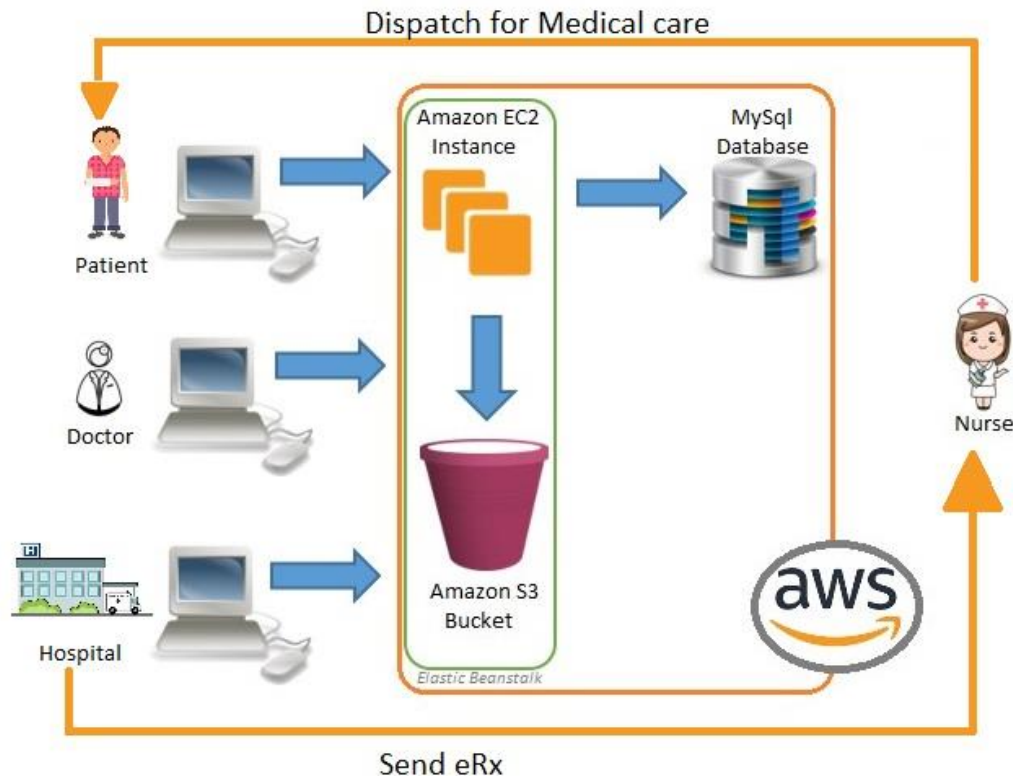
## *3.2.  High-Level Architecture*



**Figure 2: High-level Architecture –AWS**

The high-level architecture puts light on the AWS (Amazon Web services) modules and the association between those modules for achieving project success. The software files will be deployed on the cloud server on an Amazon EC2 with the help of Putty server. The AWS file deployment architecture is pretty simple, the files are uploaded to AWS via the putty server and given a MySQL connection for database access. For temporary settings, the EC2 instance has been assigned a static IP address, by which the users can access the website.

## *3.3.  Development Model*

- **RAD (Rapid Application Development) Method**

The main objective of our HI project is to rapidly develop the prototype at a local level and deploy it on the cloud for user access. Traditional waterfall model is sequential, but not very useful when it comes to developing an application at a faster pace because it involves testing phases, which in turn makes it complex to change the core functions of the software. We are going to refer both the models for sequential and speedy development of HI application. RAD

model is also believed to be a variation of the Spiral model, hence its more effective if compared with the spiral model.
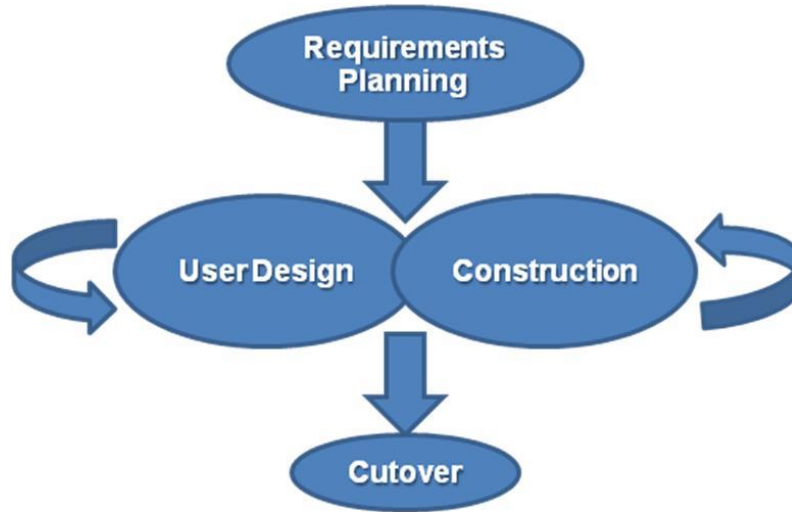


**Figure 3: Phases of RAD Method**

Steps in RAD model- A soon as the planning is done and project requirements are met, the user design is sketched, refined and a prototype is built rapidly. The application is tested for primary function and features and the model is cut-over to deployment. The application can undergo Beta testing later with advanced test cases.

Detailed Description:
1. External Link Reference: https://airbrake.io/blog/sdlc/rapid-application-development
2. External Link Reference:  https://www.lucidchart.com/blog/rapid-application-development-methodology

# 4. Project Methodology

## 4.1.  Data Collection

For this prototype system of ours, we have used a region based hospital database. The prototype can also be tested with a province wide database.

The Hospital database screenshots are attached below:

**Figure 4: Hospital Database Structure**


**Figure 5: Data Records of Hospital Database**

**Figure 6: Nurse Schedule Database**

## 4.2. Component Linking

The figure given below provides the basic overview of the software application in which we have deployed four portals in our web application, one each for the actor/user interacting with each other in the environment.

We have four entities interacting with each other via message passing or visual representation. The description of the entities along with their behavior and role in the system is mentioned below:

1. <u>Patient</u> – The patient contacts his/her doctor of interest based on the experience of familiarity using the web application communication facility. For reaching the doctor, the patient has to register with the system and login to the patient portal with the credentials. The patient can use video calling facilities and if it fails then the patient can chat with the doctor using a P2P chat box. The message will be delivered to the doctor if he/she is offline or away from the system. The patient portal also requires the patient to register his/her PHR so that the doctor can schedule a nurse.The PHR can be viewed and updated also.

2. <u>Doctor</u> – After having a teleconsultation session with the patient, the doctor logs in into the doctor's portal using the credentials. The doctor has access to the patients PHR, hence makes use of patients pin code to search the nearby hospitals and notify the one which is closest to the patient. The doctor has the facility to send the eRx (Electronic Prescription) and patient information to the selected hospital for nurse service.

3. <u>Hospital</u> – The chosen hospital by the doctor is responsible to ACK the eRx provided by the doctor, browse the nurse availability schedule in the database and match the potential nurse for dispatch. The Hospital has to notify the nurse with the patient address, legal document links and eRx forwarded by the doctor.

**Note:** Patient, doctor, hospital has to register themselves to ReNT to get linked to each other and to begin the interaction procedure. ReNT website is divided into four portals, one each for every entity.
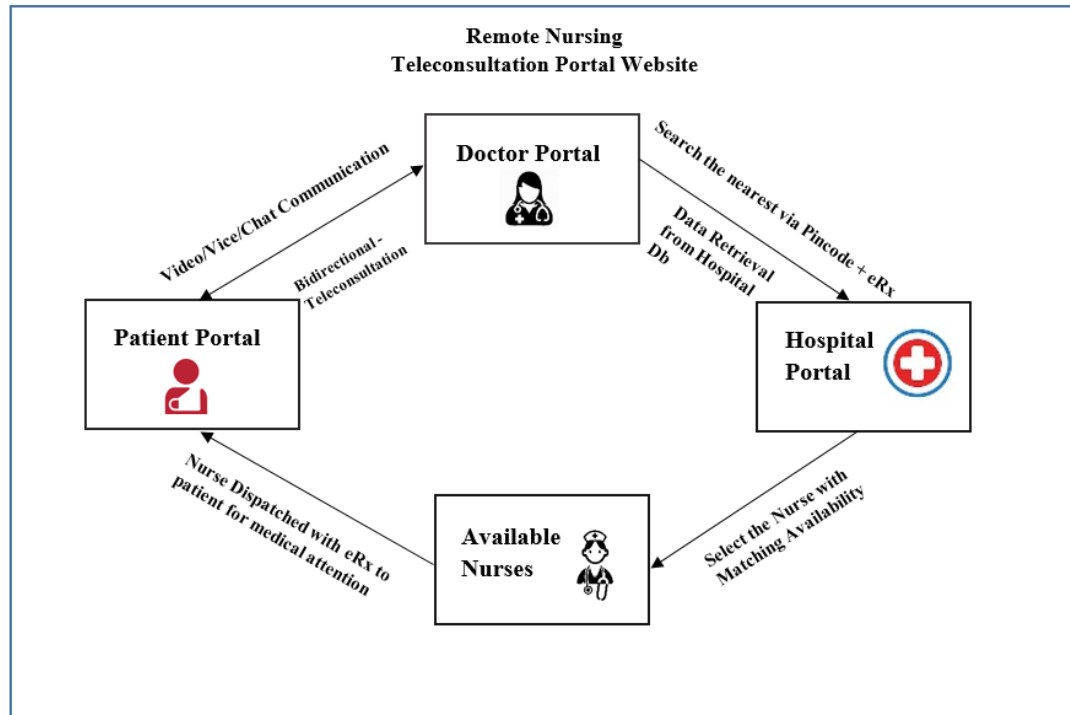


**Figure 7: Component Linking**

## *4.3.  Feature Description*

In this subsection, we are going to define all the functions and their core usage in the HI project.

- Patient service – The nurse is supposed to aid the patient with urgent medical care on request in her/his free time.
- eRx generation – The doctor after the teleconsultation session with the patient will fill in a form and generate an e-prescription for the patient and forward it to the closest hospital selected by the doctor itself.
- Pincode Search – The doctor has another duty of searching the closest hospitals in the range from the patient's locality and consult the chosen hospital.
- Nurse lookup- The chosen Hospital will look for an available nurse and contact the one which suits the schedule.

- Dispatch service – The hospital after looking for any available nurse in the Database will hand-over the PHR of the patient and dispatch the nurse for Medicare.

The responsibilities of all the modules are listed below:

- Patient Portal – The patient needs to register by filling up a form (patient portal → register → login). The patient can contact the doctor upon registration. The patient portal also shows up the list of registered doctors to the patients for communication. Patient can also create and view the personal health records and check nurse appointments.
- Doctor Portal – Doctors need to register themselves to the ReNT portal and then login to access services. The doctors are supposed to Tele-consult the patient over a video/voice call and search for the closest hospital inpatient radius. The doctors also have the facility to send an eRx to the hospital and view patient PHR.
- Hospital Portal - Hospital office admins are responsible to register and login like all the other users and then look up for the nurse in the database. The hospital is to allow the nurses to fill an extra availability form and store in the availability hour's information in the nurse database. After successfully acquiring the nurse-patient availability match, the nurse is dispatched for patient care service.

## 4.4. Software & Hardware Requirements

**Table 2: Software and Hardware Requirements**

| Software's Used for Developing the Project |
| --- |
| 1.  PHP (Server side scripting) |
| 2.  HTML5 (Web GUI) |
| 3.  CSS (Designing of Web Pages) |
| 4.  JavaScript for Popups, Alerts and Dialog Boxes |

| Database Used at Local and Cloud Level |
| --- |
| 1.  MySQL |
| 2.  PHPMyAdmin (For MySQL GUI) |

| Minimum Hardware Requirements |
| --- |
| 1.  Operating System- Windows 7/8/10, Ubuntu 14+ |
| 2.  2 GHz Minimum Quad-core Processor |
| 3.  4 GB RAM |
| 4.  DirectX 11 or later compatible Video card |
| 5.  Compatible NVIDIA/AMD Graphics Card |

| |
| --- |
| 1.  XAMPP – Windows 8/10 |
| 2.  LAMPP – Ubuntu 14,14+,16 |

# 5. Design & UML Diagrams

This section describes all the logical and physical views of the system using UML diagrams. The references used for creating the diagrams are creatly.com and Umlet UML software. The explanation along with the diagrams are given below as follows:

## 5.1. Use Case View

Through our portal, the patient can interact with the doctor via a video/voice call or through text. The patient information which he entered while registering is then available to the doctor and the doctor through the interaction with the patient and the patients past medical history, searches the hospital nearby the patient area using his PIN code and transfers the electronic prescription along-with eRx to the hospital.
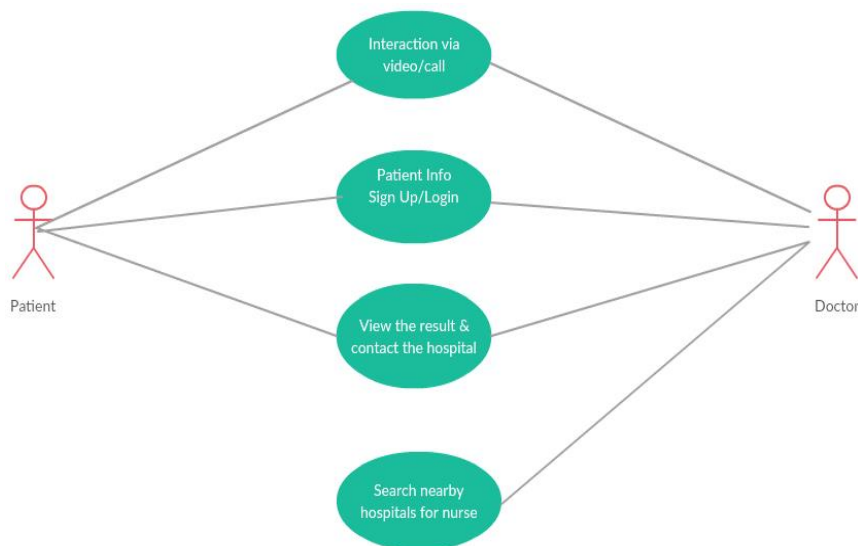


**Figure 8: Use Case level 1**

Once the hospital receives the request from the doctor, it then searches for the nurses in the database. The hospital then selects one of the available nurses and dispatches the nurse to the patient according to his needs.
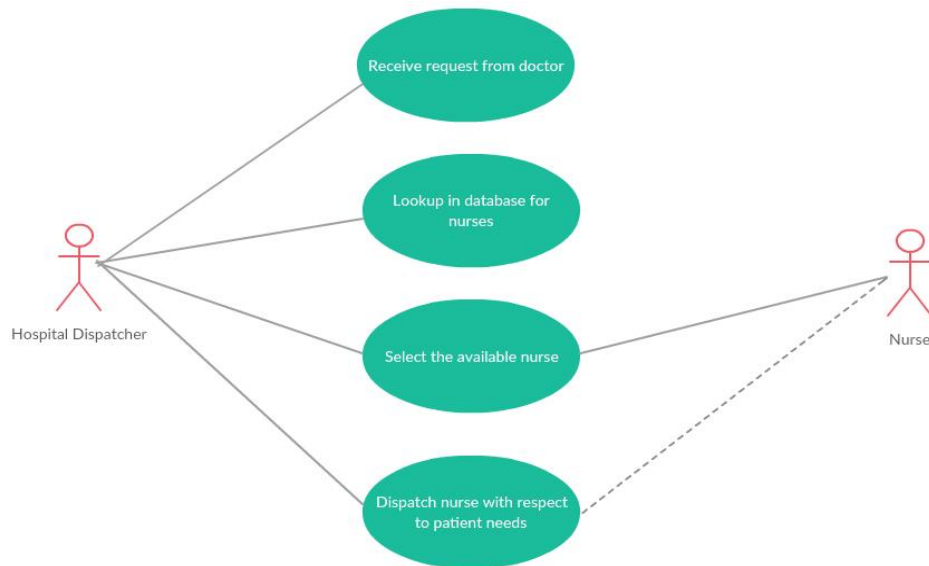
**Figure 9: Use Case Level 2**

## *5.2. Activity Flowchart*

The patient first logs in to the portal for accessing the services. If the patient can contact the doctor via video/voice call, then the doctor can monitor the patient. Otherwise, the patient leaves a message, and the doctor will monitor the patient in his free time. The doctor first searches the hospital nearby the patient area through PIN code then with the help of our portal generates and eRx and sends the eRx along-with the PHR to the hospital. The hospital now searches the available nurses in the nurse database. If the nurse is available, then it dispatches the nurse according to the patient's needs. If the nurse is not available, then the hospital searches until a nurse is available and send it to the patient.
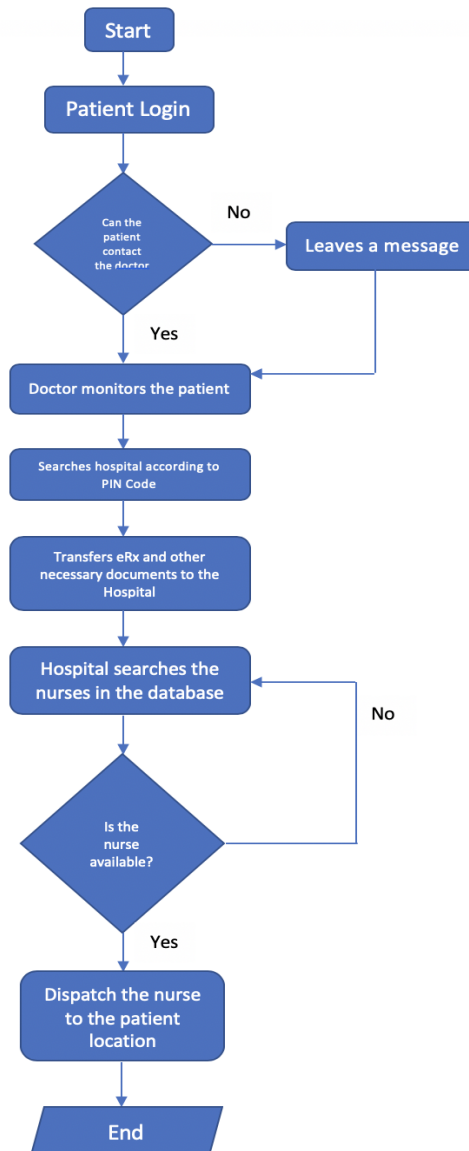
**Figure 10: Activity Flow Diagram**

## *5.3.  Class Diagram*

There are two partitions in the class diagram. The first partition shows the class name and the second partition shows the function which the class can perform. In our class diagram, the aggregation is shown with the help of a diamond shape. The dotted line represents a dependency. The controller functions are shown with the help of <<text>>.

**Figure 11: Class Diagram (Subsystem Architecture)**

# 6. Summary, Conclusions and Recommendations

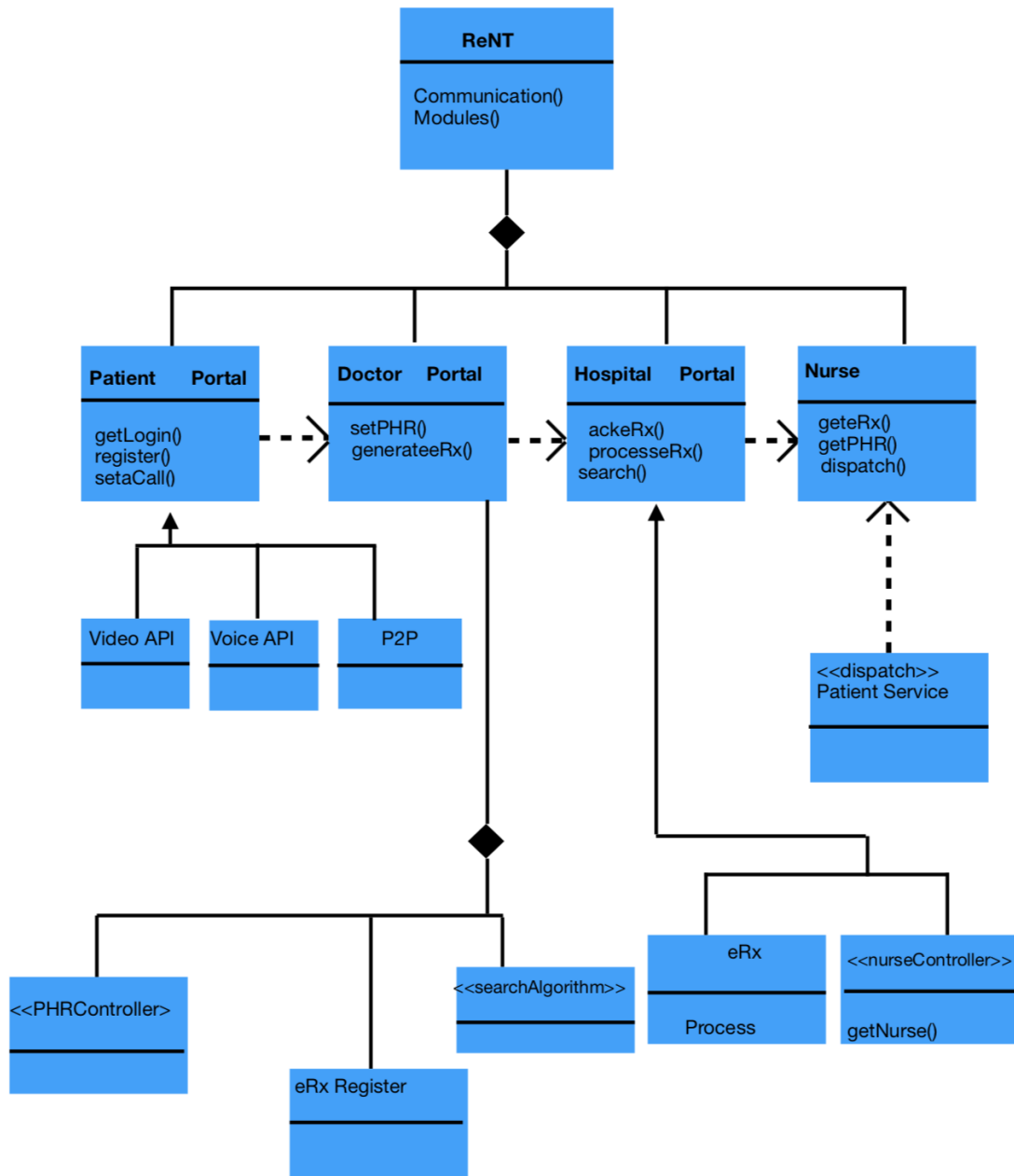The project summary, Test cases, Project Constraints, Business Outcomes along with Conclusion and Future Work is explained in this section.

## 6.1.  Project Summary

### Remote Nursing Teleconsultation Portal

   Prior to Migration, it usually takes some time for a person to adapt to the habitat, food and climate of the new country. During the adaptation process or later after a few months, the person might observe some symptoms of sickness and chronic conditions due to change of weather and food. If not the habitat, a human body can only resist a few days without being stable. Searching for a new doctor without any suggestions in a chronic body condition is cumbersome. It would be pretty easy for a person to consult his/her family doctor or any doctor of resemblance.

   The proposed system offers a solution to eliminate few of these challenges by remotely connecting to your family doctor and the doctor(s) in turn connects with the local or international hospital nurses to address the patient in need. The system allows all the doctors, patients and Hospitals to register themselves to the portal and interact with each other to resolve patient queries. The doctor can have a P2P/video call with the patient, search any nearby Clinic/Medical center and forward the eRx to that hospital. *Note-The Hospitals also needs to be registered with the portal for achieving successful search results*. The hospital in turn, acknowledges and reads the erX. If the doctor has mentioned 'Yes' to 'Need Medical Attention Via Nurse' then the hospital peeks in the Nurse database, matches Nurse availability with the patient availability and schedules the Nurse for patient medical service.

   The hospital is responsible to inform Nurse about the shift scheduled. *The Nurse has no direct contact with ReNT website system.* The Hospital is also responsible to fill in the Nurse Availability form on Nurse's behalf.

## 6.2.  Test Cases

Software Testing plans – The testing plans have been arranged in levels, where each level adds a new layer of test description to the modules. The plans start with highlighting the test description, preparing test cases and then executing those test cases on a familiar platform. The test incident report, risk management reports and test logs will be combined to create a test summary report.
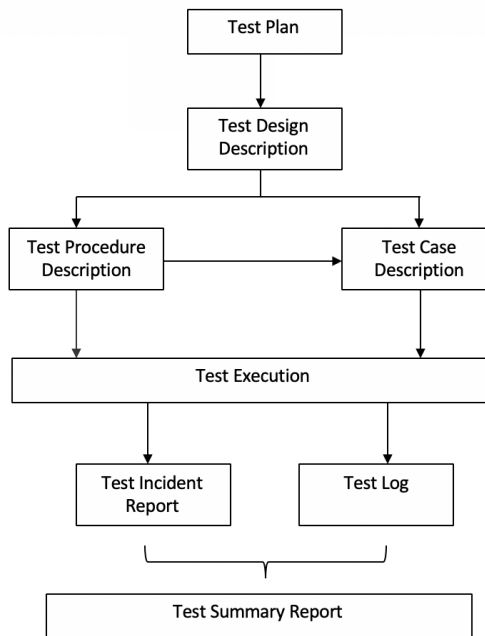
**Figure 12: Testing Plan for HI web-app**

- Test Cases planned and executed successfully:

**Table 3: Test Cases Planned & Executed**

| No. | Test Cases | Result |
|-----|-----------|--------|
| 1 | Checking of Portal functionalities | Check |
| 2 | Registration/Login of patient, doctor, hospital entries | Check |
| 3 | Successful Data insertion in MySQL Db | Check |
| 4 | Hyperlink & Precise Page re-directions | Check |
| 5 | Data view in each of the portal | Check |
| 6 | Textual Information alignment, language, color, font | Check |
| 7 | Deployment on AWS | Check |
| 8 | Replacing static IP address with localhost in pages on AWS cloud | Check |

## *6.3.  Constraints*

There is no big list of constraints as the project is small scaled based on a local population level. The constraints or limitations which have or will have a significant impact on the HI software web application project are listed down below with descriptions (If serious impact) as follows:

- Connectivity of patient and doctor via Video/voice calling feature: The patient should be able to reach the doctor via video or voice calling features of the website. The patient

can chat/send a message to the doctor if the highly integrated video or voice features fail.

- User session timeout: The user (patient, doctor, hospital) have a specific time range after which the session expires, and user is re-directed back to login page because of no activity performed.
- Availability or volatility of resources
- Standards compliance
- Interoperability & Security requirements
- SMTP, FTP, UDP protocol requirements of AWS(Amazon Web Services) cloud
- Verification and validation requirements: The fields entered in the forms on web application should be updated and should reflect the changes in the database at the back-end with validated information.
- The session carry forward hyperlinks should obey all the security measures and trespassing into other users account should be prohibited.

## *6.4.  Business Outcomes*

The proposed healthcare application provides a trust-based service to the patient from a remote location via our ReNT online portal. The patient need not necessarily know about the nearby clinics or Medicare providers from his location, and he still can demand a nurse service by a single teleconsultation/chat session with the doctor. This project provides an opportunity for the nurses to earn extra income in their flexible schedule when they are not currently on duty for their parent organization.

The opportunity eventually results in extra income and revenue generation for the patient, hospital, and doctors on a commission-based scheme and provides several benefits for the patients including e-prescription and medical service via a nurse.

## *6.5.  Conclusion*

The background information, previous work and case studies mentioned in above sections concludes that there was a need to integrate concepts of Tele-Consultation, Tele-Monitoring, sending electronic prescriptions (eRx) and Consumer Health Informatics (CHI) in one application for achieving high quality remote medical care and patient satisfaction. The primary objective is to cut down more than half of manual work of the patient and providing medical services on fewer button clicks. The proposed system succeeds in integrating video calling and chatting application for patient-doctor interactions and results in achieving Teleconsultation. After registration and login, patient has been availed the facility to create, view and edit his/hers Personal Health record (PHR), which leads to Consumer Health Informatics. The doctor has the freedom to choose a patient, fill in the eRx form and provide it to the hospital nearby for immediate medical service if and when needed. Therefore, the electronic prescription concept of Healthcare is accomplished. After receiving the prescription, the Hospital schedules a Nurse with matching availability for urgent patient service.

## 6.6. Future Work

The features and functions of the current system can be extended and expanded to focus on the following points:

- The Personal Health records (PHR) can be replaced by Electronic Health records (EHR) by asking family details, previous medical diagnosis and family medical history from the patient.
- There can be a separate Nurse Portal (Registration, Login, Access Patient details) included in the ReNT system for allowing Nurses to act independently.
- The web application deployed on AWS can be exported as a mobile application (APK file) for one-push direct downloads.
- Highly responsive notifications within the portals
- Additional Security and Validation

# 7. Project Screenshots

## 7.1. Patient Portal

This is the first page you will be viewing when you load the website (index.html). Where you have three options to navigate to such as: Patient – for patient registration/login, doctor – for doctor registration/login and hospital for hospital registration/login.
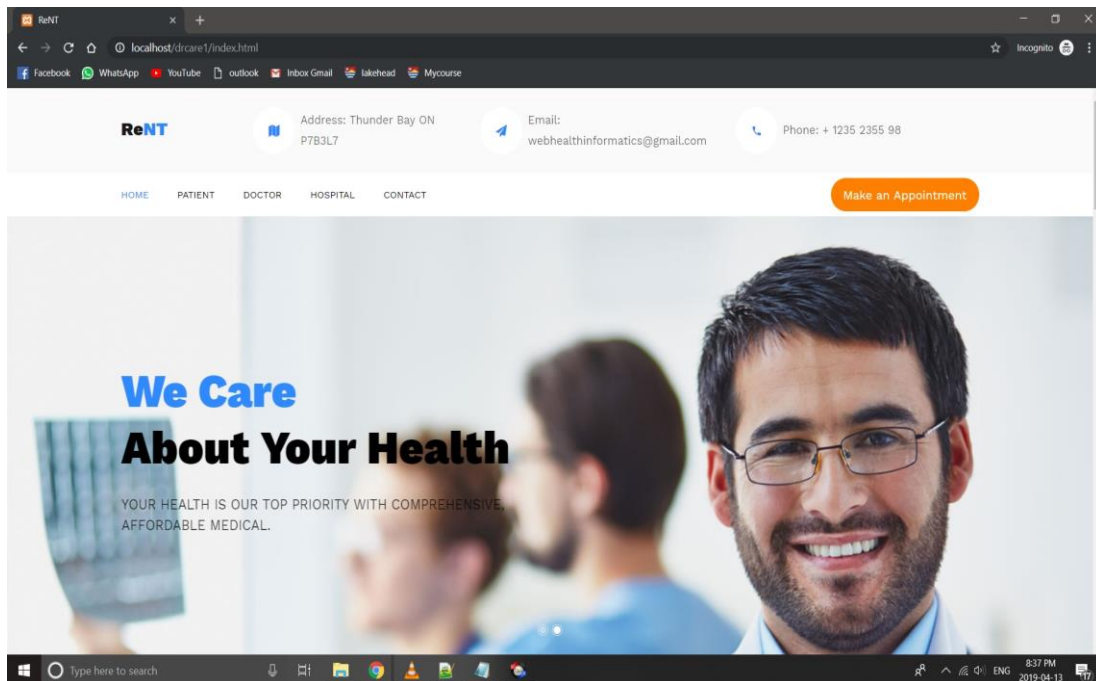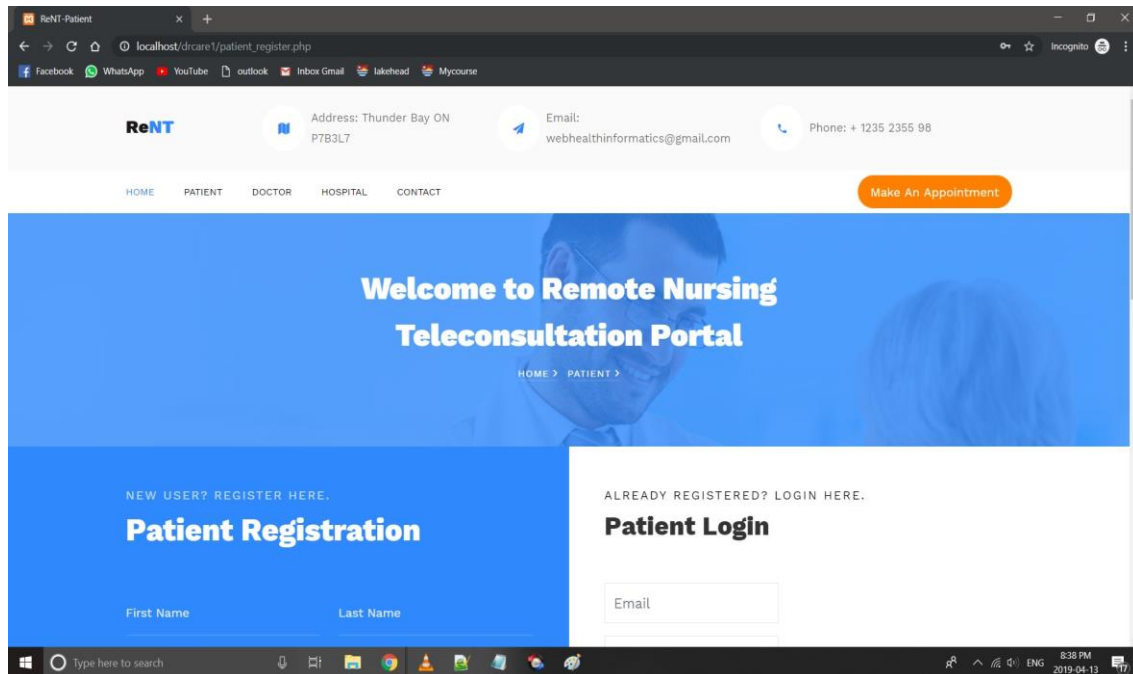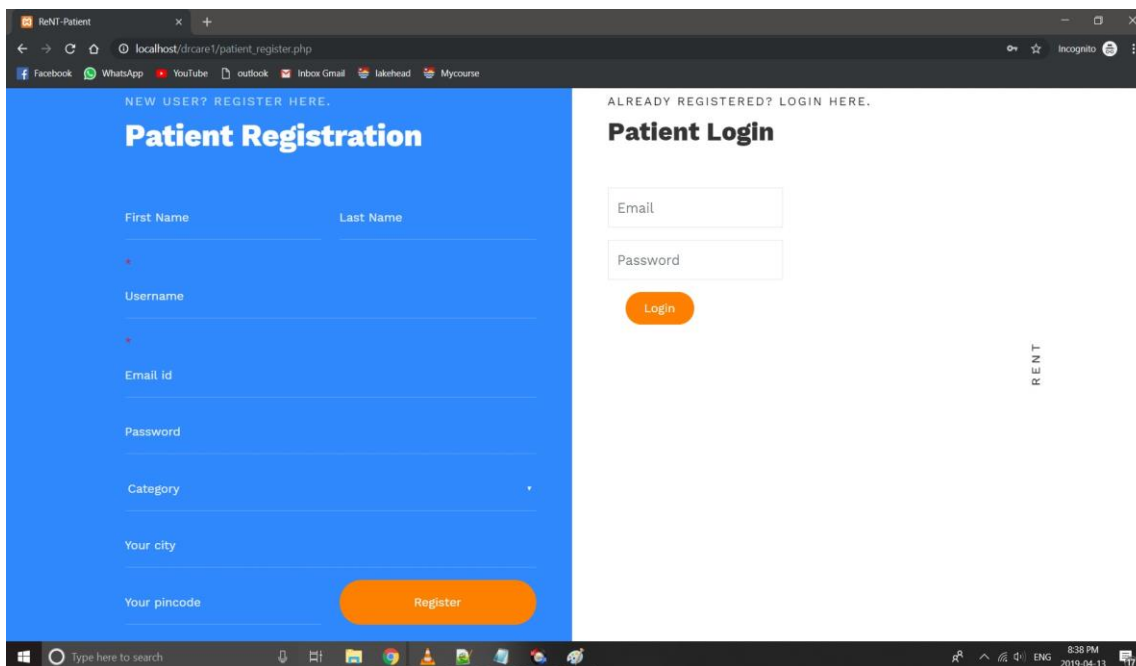


**Figure 13: Home Page for ReNT**

**Figure 14: Patient Registration Portal**

The patient has to fill up a registration form and keep a note of their email and password for logging in the patient portal.


**Figure 15: Patient Login**

After entering the email and password, the patient enters the portal where he can create, view and update the PHR, call a doctor and try other options. (Refer the video attached with the files).
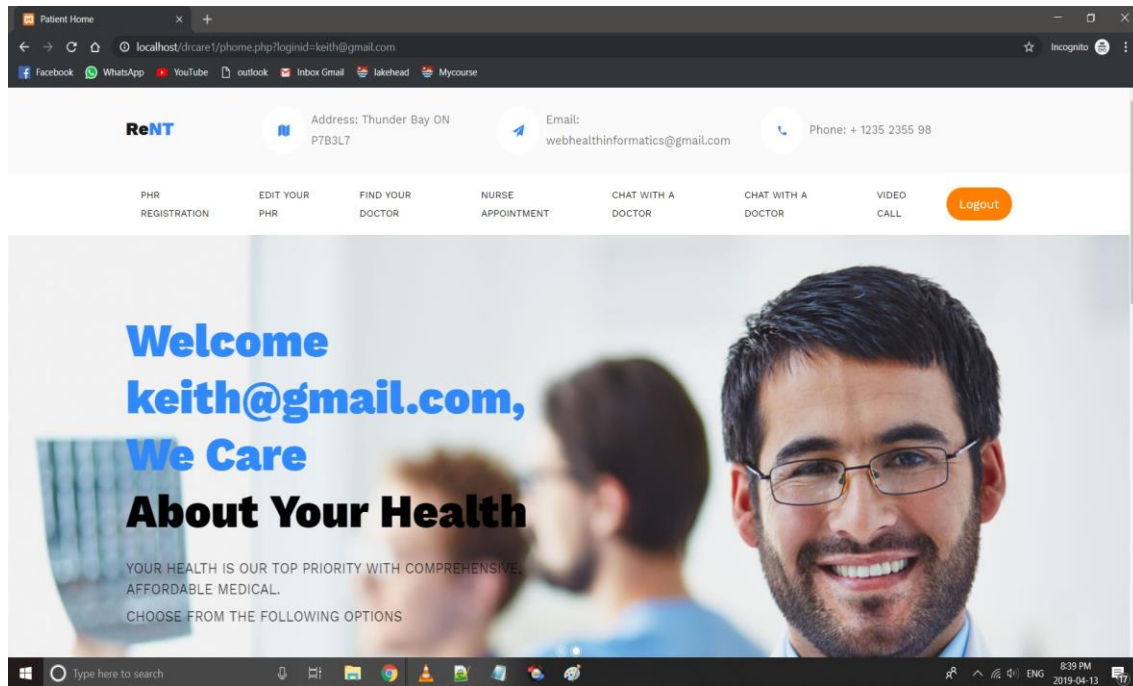


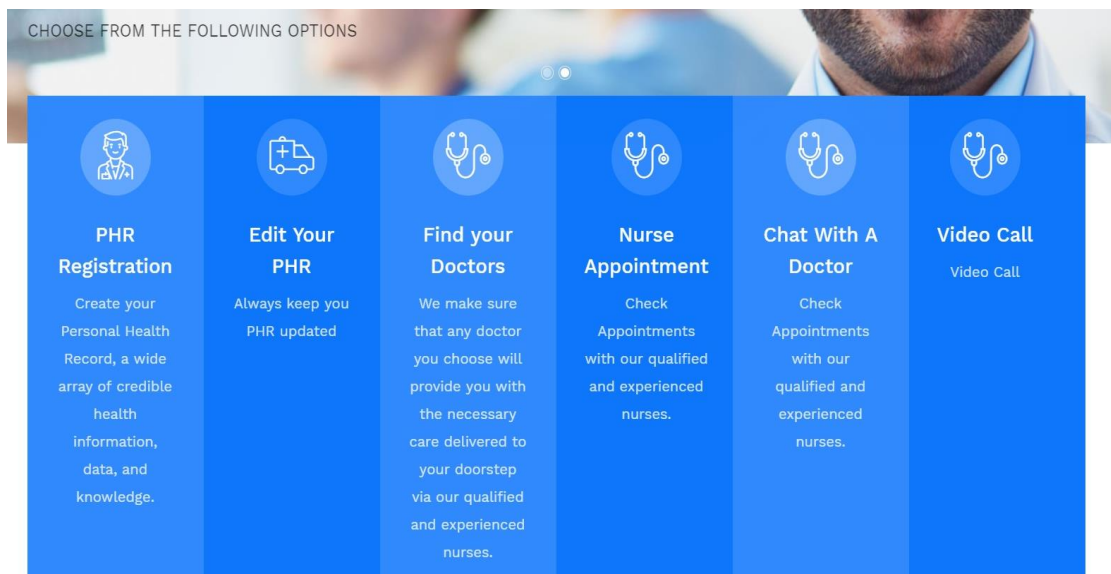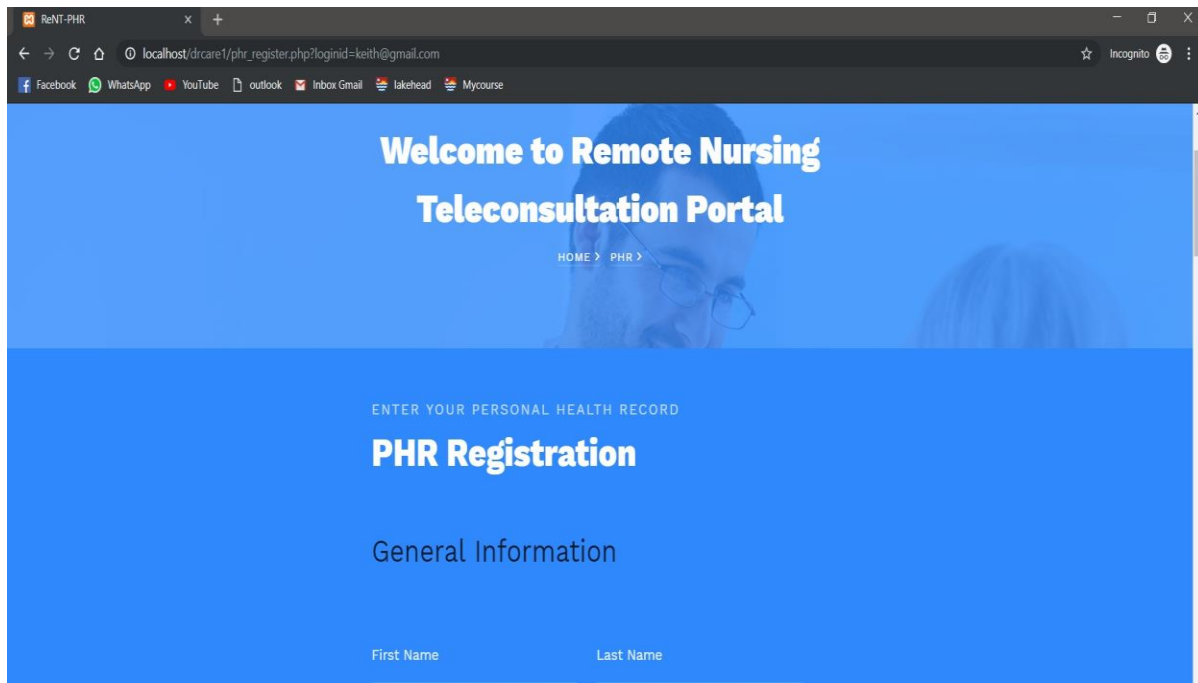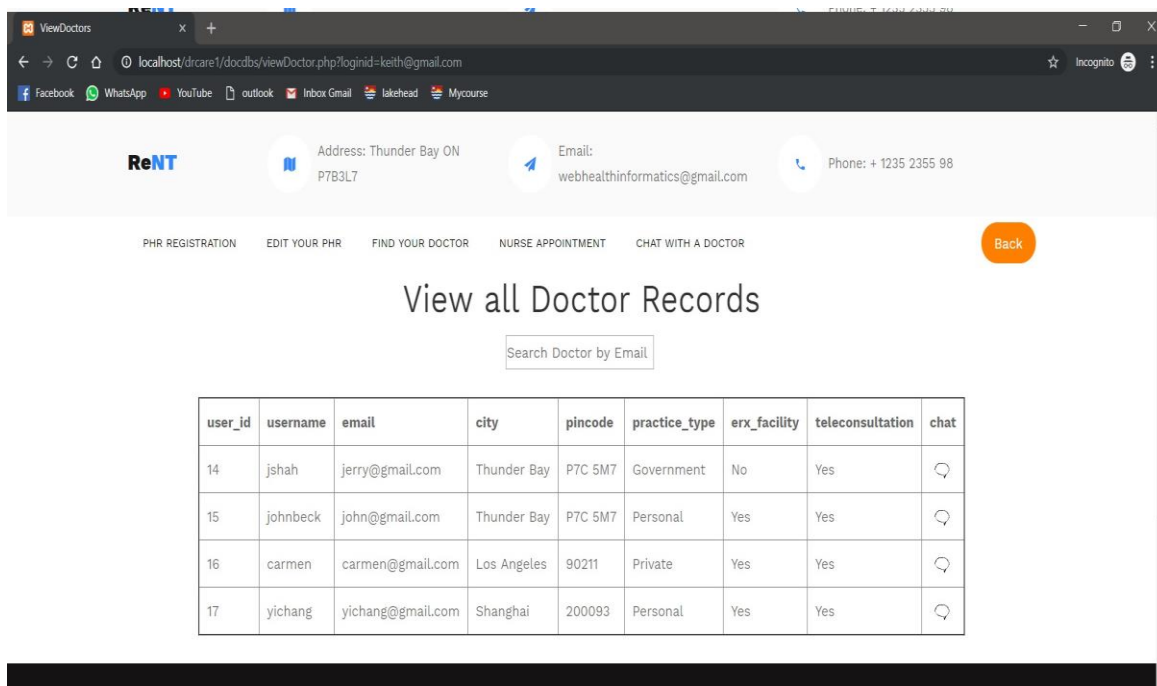**Figure 16: Patient Portal Home**



**Figure 17: Patient Portal Options**

**Figure 18: PHR Registration**

The patient can create his PHR by navigating to PHR registration and call or chat with a Doctor by navigating to 'Find your doctors'.


**Figure 19: View all Doctors**

## 7.2. Doctor Portal


**Figure 20: Doctor Registration**

The below given figure shows the functionalities available to the doctor upon registration.
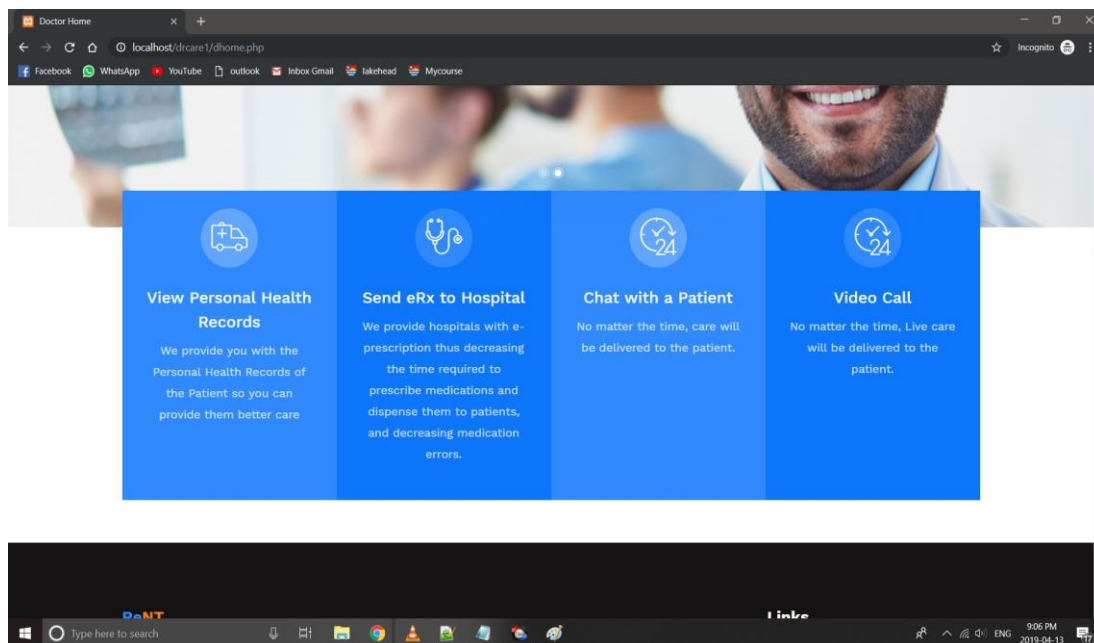

**Figure 21: Doctor Portal Functions**
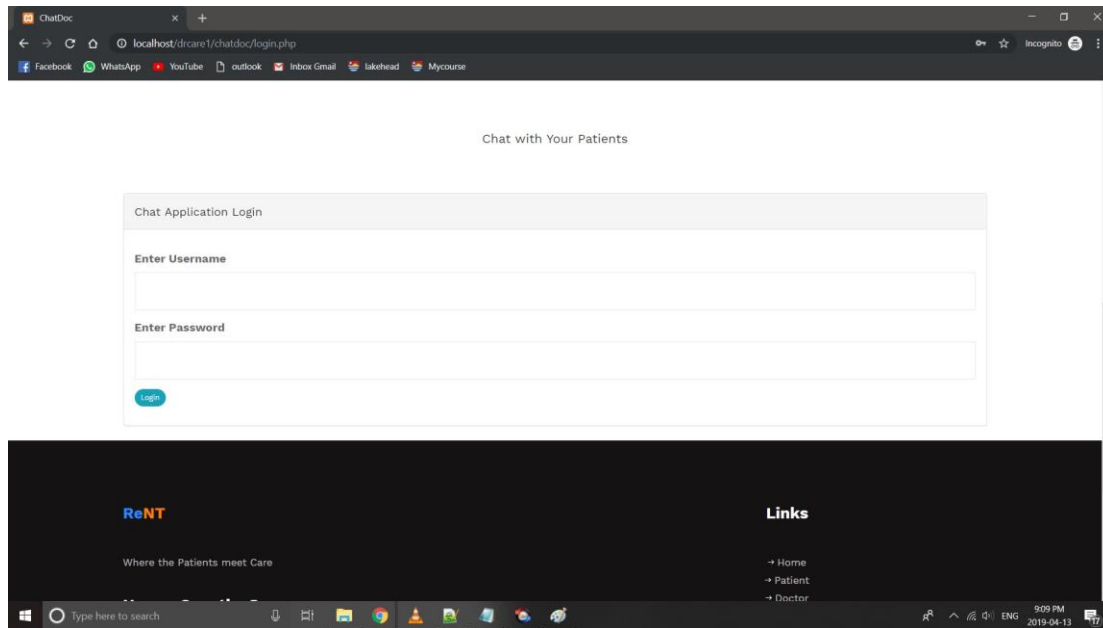
**Figure 22: Chat Application for Doctors**

The doctor can chat with the patients and vice versa using this integrated chat application feature.
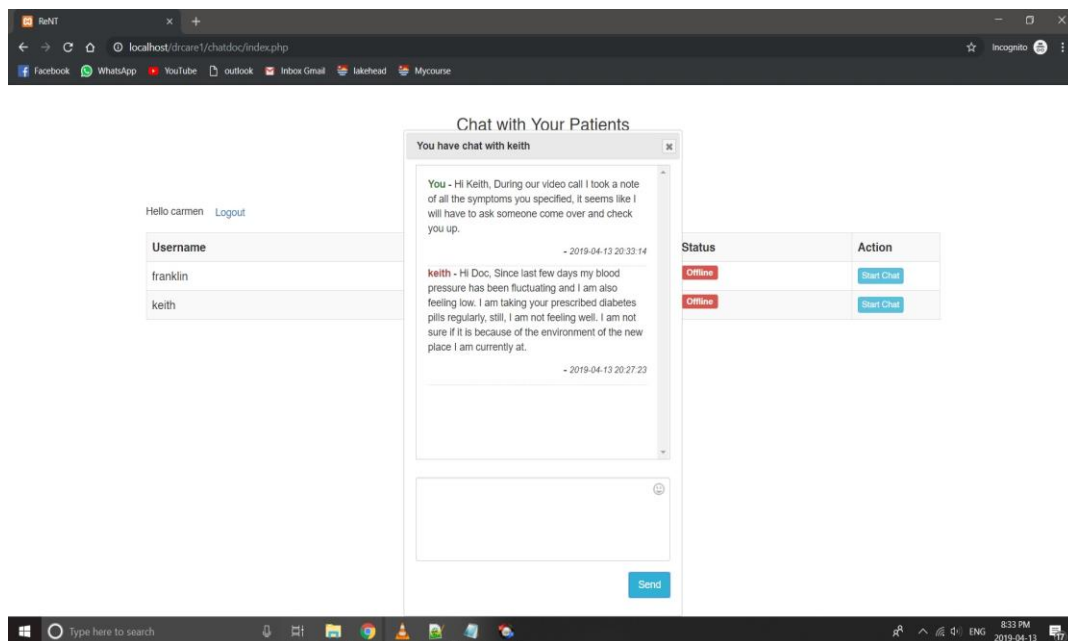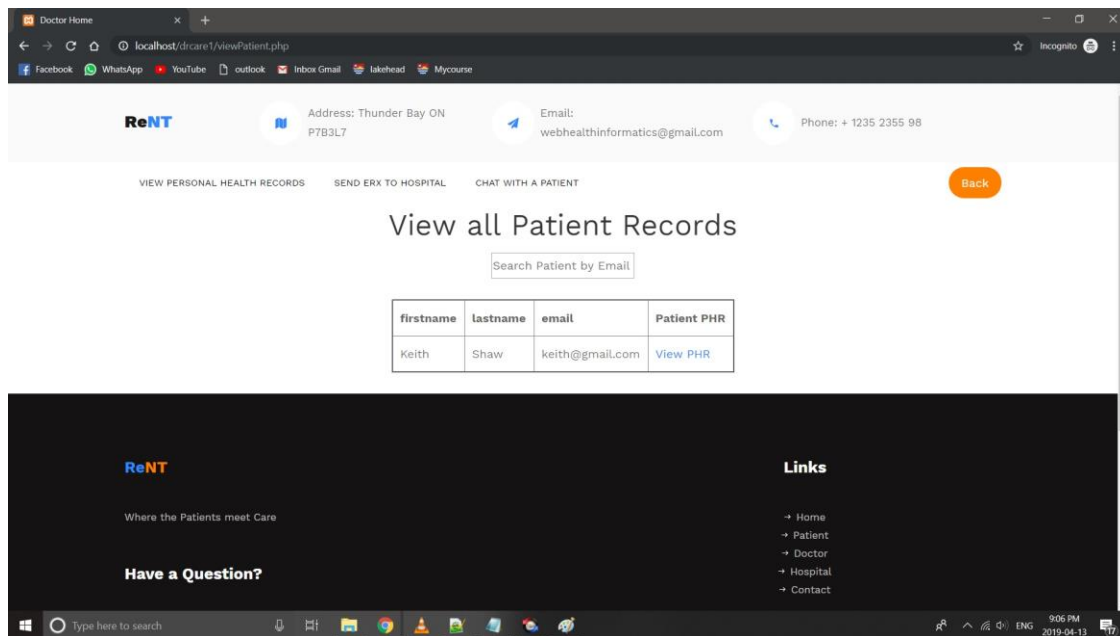
**Figure 23: Patient View to Doctors**

The doctors needs to view the patients PHR, note the pincode or hospital name and enter in the 'Search Hospitals' page field for generating and sending the eRx to that particular hospital.
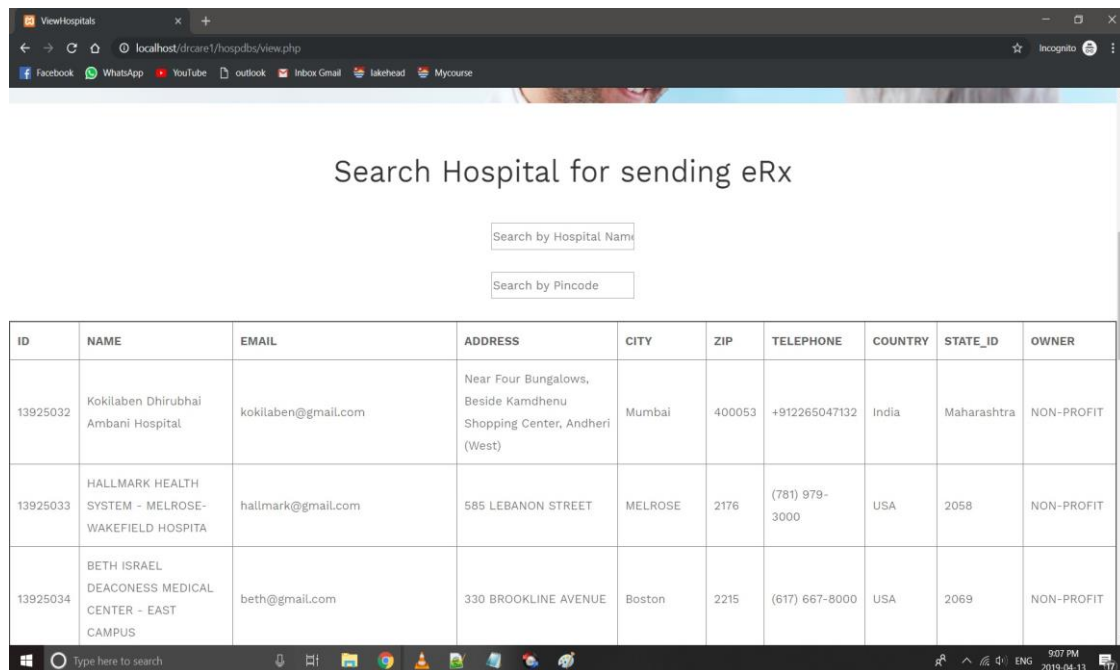

**Figure 24: Searching Hospitals for eRx**
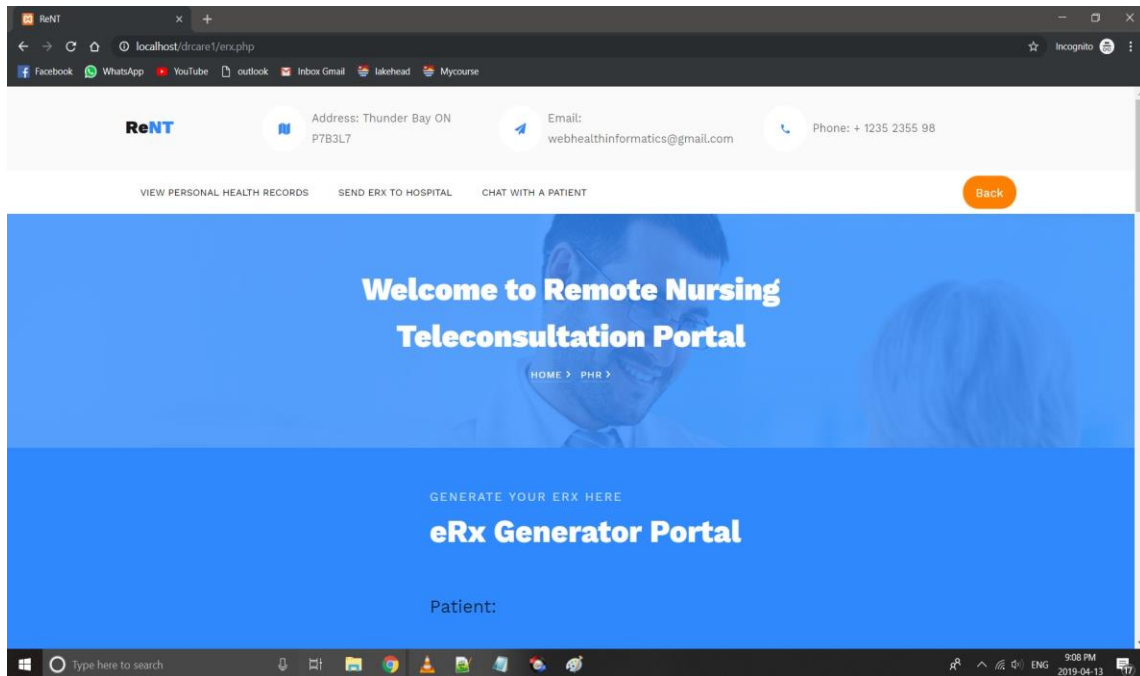
**Figure 25: eRx generator**

## 7.3. Hospital Portal

Like every other portal feature, the hospital needs to register itself and login into the website to access the functions.
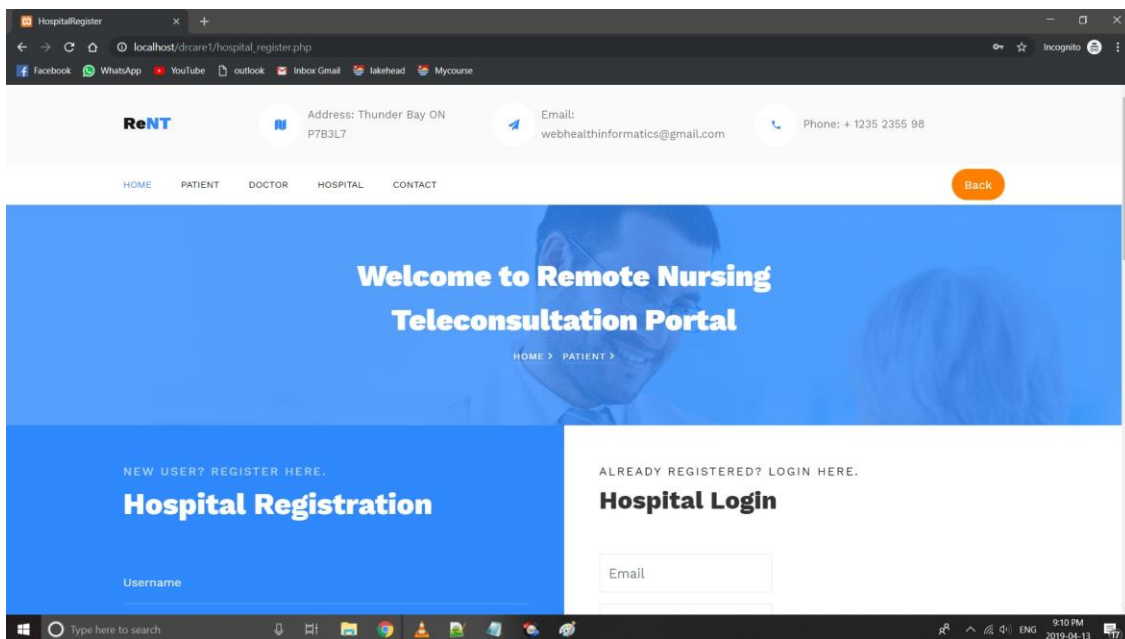

**Figure 26: Hospital Registration and Login**
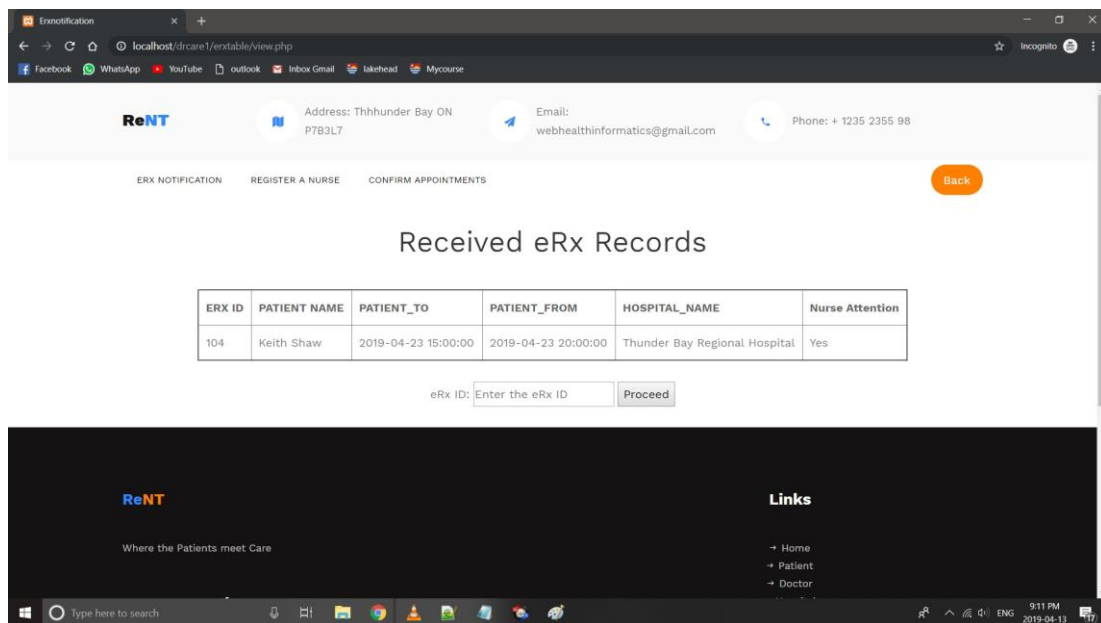
**Figure 27: Received eRx to Hospitals**

The hospital can to go 'eRx notifications' and check all the received eRx. The below given figure shows the patients eRx sent by the doctor to the Hospital.
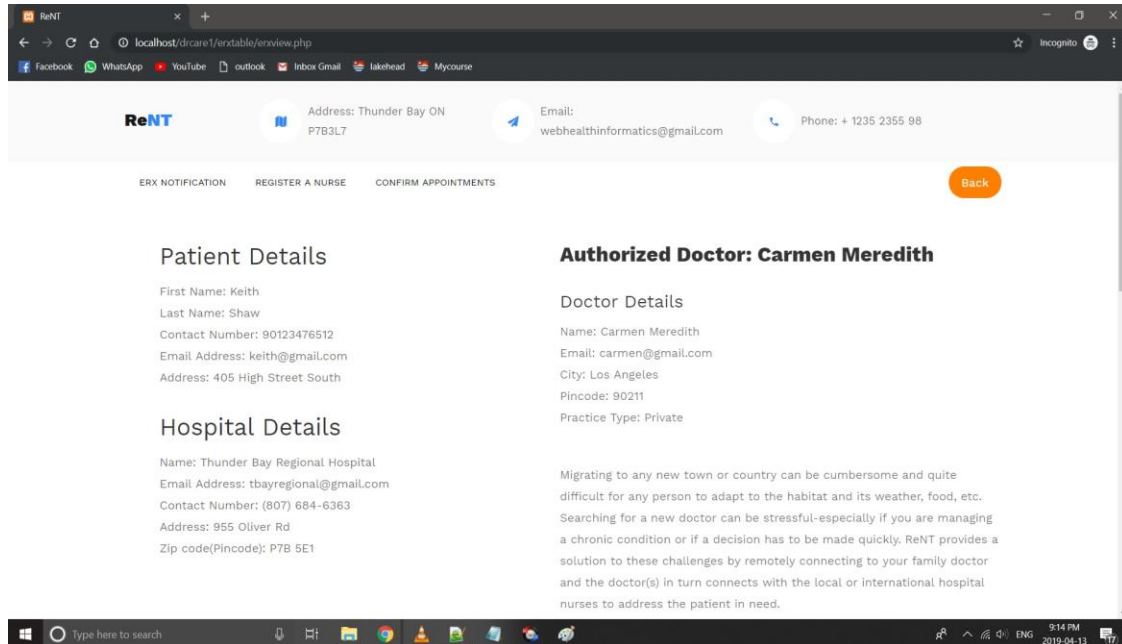

**Figure 28: eRx View to Hospital**
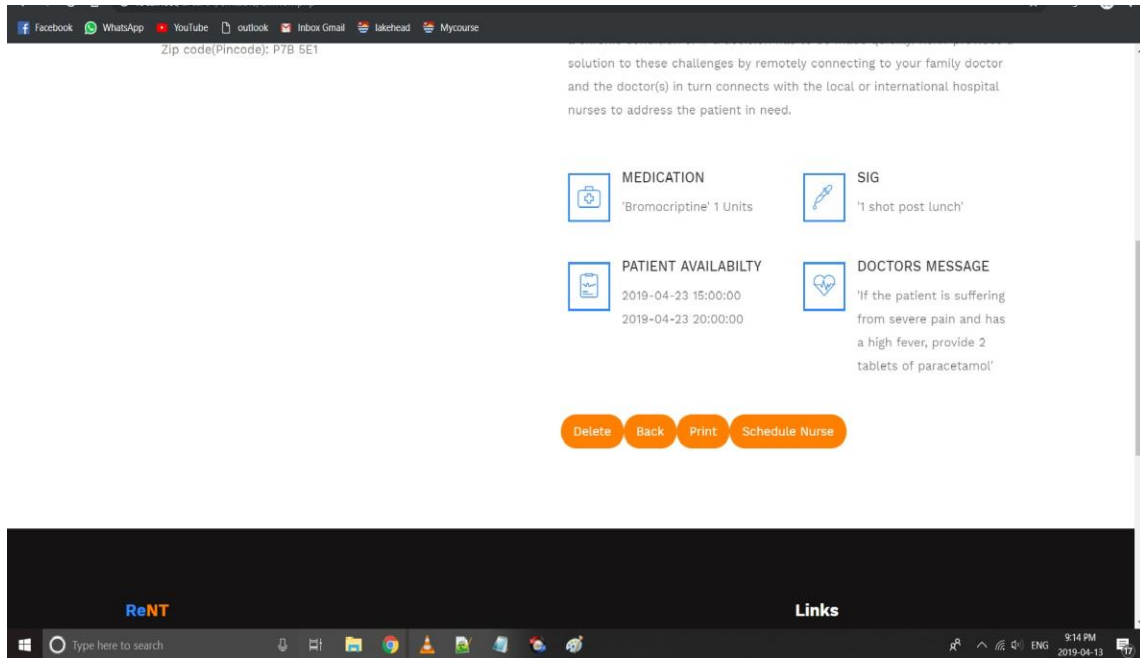
**Figure 29: eRx along with options**
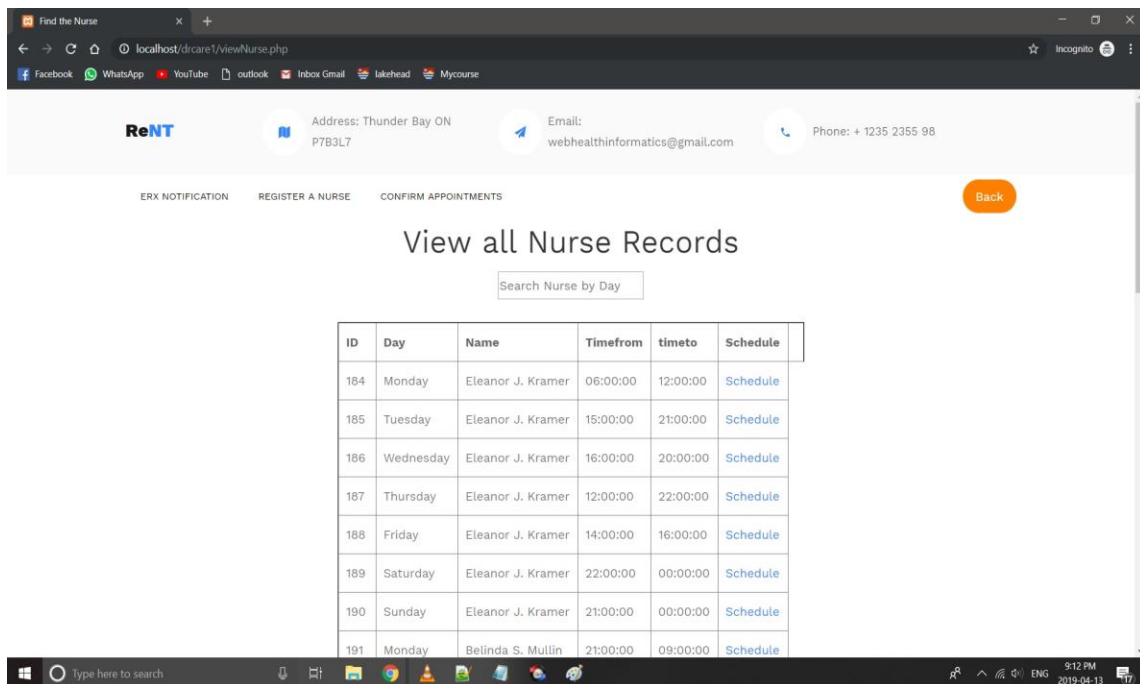

**Figure 30: Schedule Nurses by Hospitals**

After viewing the eRx, the hospital has to schedule the nurses and dispatch for patient service. The patient can view the Nurse Dispatch details by navigating to 'Nurse Appointments'.

**Figure 31: Nurse Registration via Hospital**

The hospital can fill up the nurse availability form on behalf of the nurses by considering the nurses preferences.


**Figure 32: Nurse Dispatch for patient**

The Patient can navigate to 'Nurse Appointments' to view the nurse dispatch for his/her medical service.

# 8. Roles and Responsibilities

**Table 4: Roles & Responsibilities**

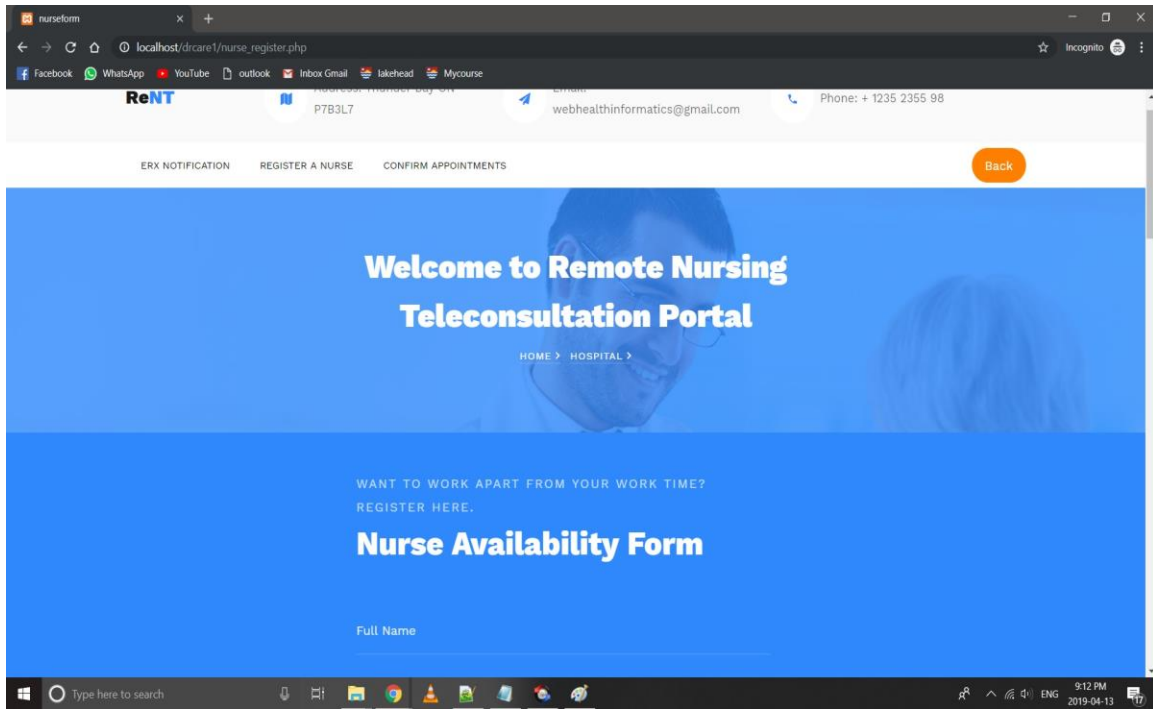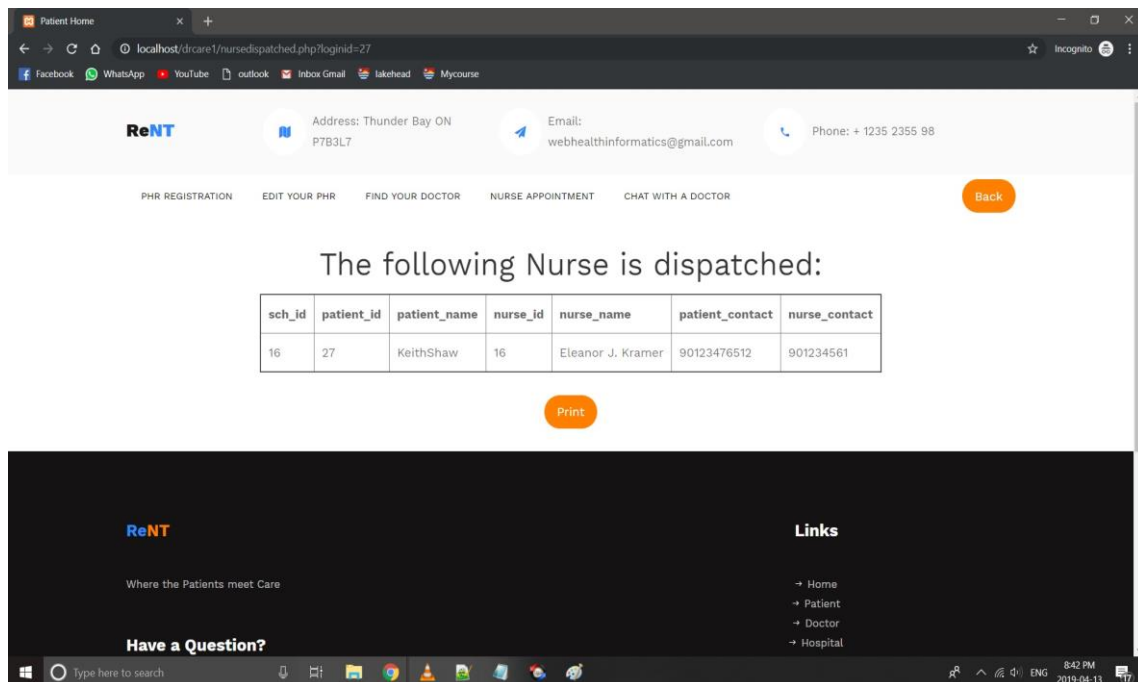| Name | Roles | Responsibilities |
|------|-------|------------------|
| Ajinkya Kunjir(0876835) | UI/UX Designer | 1. Coding Registration & Login forms for patient, doctor, hospital portal in HTML and CSS<br>2. Creating tables and connection to Database, Creating Patient and Doctor Databases.<br>3. Contributed in making the software design document and final report<br>4. UI Designing (Buttons, Prompts, Alerts, Color theme)<br>5. Hyperlinking between the pages |
| Jugal Shah(0892691) | Cloud & Database Development | 1. Creating database connection between the pages<br>2. Assigning Databases to the respective forms for patient, doctor and hospital<br>3. Coding, declaring and defining the variables<br>4. Uploading files to Github & AWS<br>5. Data passing and retrieval from back and forth to the GUI and backend. |
| Navdeep Singh(885043) | Backend Development | 1. Contributing to the Design document and final report<br>2. Creating UI files and back-end connection<br>3. Contribution in making the presentation<br>4. Contribution in making the video for the final project<br>5. Coding the dependencies in the pages |
| Tejas Wadiwala(0889445) | Cloud & UI Development | 1. Creating database connection between the pages<br>2. Contribution in database development and UI development<br>3. Contribution in making the video and final presentation<br>4. Contribution to project with AWS<br>5. Contribution to front-end form creation |

## 9. User Guide

There are two ways by which you can run this website on your choice of platforms listed below:
1. Local Host on any Operating System (Windows/Ubuntu) - XAMPP
2. Go to http://99.79.98.118/drcare/index.html  (AWS Deployed Website)

- XAMPP- Download XAMPP from https://www.apachefriends.org/index.html → Install it to any spacious drive → Go to 'htdocs' folder and paste the extracted folder in it  → Go to PhpMyAdmin → Import the mysql database file (Find it in 'database' folder within the extracted folder) → Open chrom/Firefox and type localhost/extracted_folder/index.html → You will see the home page → Start as a patient/doctor/hospital
- Amazon Web Services (AWS): Go to      & Start as a patient/Doctor/Hospital.

### *Project Links:*

1. Github Link - https://github.com/Webhealthinformatics/ReNT
2. AWS Deployed Link - http://99.79.98.118/drcare/index.html


3. Follow the below given steps to observe the implementation details:


- Go to Patient Portal(patient_registration.php) → Register by your preferred credentials → Login into Patient portal → Chat/ Video call with a doctor → Come back to patient portal → Create a Personal Health record (PHR) → View and edit your PHP (See changes in Database if XAMPP) → Logout

- Go to Doctor portal(doctor_registration.php) → Register by your preferred credentials → Login as a doctor →View the patients PHR → Search Hospital by entering zip codes(referred from patients PHR) → Proceed → Fill the erX → Enter Nurse needed 'yes' /'No' without skipping the field → Proceed to see the generated eRx →Back → Logout

- Go to Hospital → Register & Login→ Fill Nurse Availability form→ Logout

- Go to Hospital → View the received eRx and check for  Nurse needed field → If 'Yes', enter the erX ID below and proceed → Schedule the available Nurse by matching the days and time.

- Navigate back to Patient portal → Login → Nurse Appointment → See the details of the Nurse Scheduled for you

# 10.  Glossary

The ordered list of all the concepts, term, abbreviations and definitions used throughout in the document.

**Table 5: Glossary**

| 1 | ReNT | Remote Nursing Teleconsultation Portal |
|---|------|----------------------------------------|
| 2 | eRx | Electronic Prescription |
| 3 | PSe | Patient Service or Patient medical attention |
| 4 | TeCo | Teleconsultation by the doctor to the patient |
| 5 | ACK | Acknowledgment Notification |
| 6 | Ping, Pingback | Checking the reaching of the message from one portal to other |
| 7 | HER | Electronic Health Record |
| 8 | PHR | Personal Health Record |
| 9 | UML | Unified Modelling Language |
| 10 | AWS | Amazon Web Services – Cloud Platform to deploy the application |
| 11 | EC2 | Elastic Cloud 2 |
| 12 | XAMPP | Local environment for running the project (XAMPP- Windows-Apache-MySQL-PHP-Pearl) |

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