Software Requirement Specification

for

Automation of IITG Hospital
(Medicine Delivery and Patient Management)

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Introduction

Overview

This Software Requirement Specification (SRS) gives information regarding the scope, purpose and functionality provided by our software. It highlights key issues which are addressed by our software and provides a step by step breakdown of the various features we will implement.

It also lists the various technologies that will be used in the project and the specific requirements needed to support the software.

The objective of this document therefore is to formally describe the high level requirements of the software including functional requirements, non-functional requirements and constraints.

Scope/Purpose:

1. This project is aimed at automating the medicine delivery system and patient management system at the IITG Hospital.
2. It aims at increasing efficiency of the hospital system by ensuring a smooth transition for the patient and removing any unnecessary delays.
3. Removes paperwork in the entire process, which makes sure that all information is documented and stored properly – making future retrieval easier.
4. The software aims at keeping an encrypted patient history database so that doctors have ease of access while treating patients and can use the information to give a more accurate diagnosis. At the same time, we ensure that only certain parts of this sensitive information is made available to the doctor, and is inaccessible to any other staff member.
5. The software maintains a database storing the medicines which are currently available in the hospital to:
   (a) Ease the process of necessary reimbursements.

(b) Ensure medicine transactions are done in a non-corrupt, transparent and documented way.
(c) Ensure that the doctor can prescribe alternate medicines if a medicine is not in stock
(d) Protect the patient from irresponsible decisions made by the pharmacist when a medicine is not in stock

6. We intend to keep a database of the hospital staff, which can later be manifested into a feedback system and information like average time of diagnosis can also be extracted from the database.

The software intends at automating the working of the IITG hospital to ensure that the patient can be given a great experience while visiting the hospital and is given medicines which correspond to the diagnosis.

The software is not only limited to the IITG hospital – due to its generic nature, it can be implemented in other places as well.

The removal of paperwork, efficiency and speed of diagnostic process, and proper and responsible maintenance of a patient's medical history are the key areas affected by this project.

Overall Description

Product Perspective

The automation of medicine delivery system is a self-contained system in the sense that we have broken down the functionality into many independent entities, making the entire software a collaboration of several smaller subsystems. Our software serves as a replacement to the less efficient and archaic methods currently being deployed by the IITG Hospital – which is mostly paper based and does not utilize modern technologies. The working of the software requires certain information to be present in the database – such as a list of staff names, patient names, a medicine inventory list, etc.

Product Features

The system can broadly be broken down into the following features:

1. **Registration:** Staff members have to explicitly register with the software and provide their details – which gives them access to the system with certain privileges, depending on the designation of the person. Once the person is registered, he/she may sign in with their user details.

2. **Receptionist Module:** Receptionists can sign in with their user name and password, and once the system validates their information, they will be redirected to a page which gives them ability to queue and register new patients. The queue will decrease as and when the doctor completes a diagnosis, after which the next person will be sent in.

3. **Doctor's Module:** After appropriate validation as specified above, the doctor will be able to access his account in which the patient queue will be displayed. The doctor can view (to a certain extent) the details of the current person in the front of the queue. Limited access to medical history will also be provided (to enable a more accurate diagnosis). The doctor can then complete the diagnosis and prescribe medicines from the medicines currently available in the inventory. The current inventory will help the doctor to provide suitable alternatives for the same and also arrange for adequate reimbursement in case of no other choice.

4. **Pharmacist Module:** After appropriate validation as specified above, the pharmacist will be redirected to his/her account which will have the user id and name of the next person in the queue, along with the medicines that he/she has been assigned. The pharmacist can then give the required medicines to the patient, decrease the quantity of the particular medicine in the inventory, and make an appropriate list of medicines which are currently not in stock but are needed to be bought. The pharmacist can then give the patient a printout containing the names and dosage specifications of the prescribed medicines.

User Classes and Characteristics

The user base will be composed of the IITG Hospital staff (the receptionists, the doctor and the pharmacists).

(a) **Receptionist:** Will be provided ability to register new patients and insert incoming patients into a queue – which will change as and when the doctor completes diagnosis.

(b) **Doctor:** Will be given limited and constrained access to the incoming patient's medical history, along with the ability to modify the history by appending the current diagnosis.

(c) **Pharmacist:** Will be given access to the medicinal inventory stock and ability to increase and decrease the stock quantity as and when a change occurs.

Operating Environment

The main server where the web apps are hosted will simply require a XAMPP installation, and the modules which are in use in the hospital can be run on a platform with any specifications.

Design and Implementation Constraints:

There are various issues that might limit the success of the project:

(a) All three modules should have access to the main server, which will be hosted on the IITG network.

(b) Information such as incoming medicine inventory and staff and patient details should be made available in order to enable the smooth running of the software.

(c) The CC will be responsible for maintaining the software and making necessary changes to the database such as deleting details of patients who are no longer in campus, migrating the software to support more robust and modern technologies, etc.

User Documentation

For the most part, the software will be self-explanatory but a README file will be included with it highlighting all the features of the software and how to use it.

Assumptions and Dependencies

The only assumption is that a trained staff is operating the software and the system is compatible with all the requirements that are mentioned. Also, another assumption is that all the information needed for the database (eg, lists of available medicines, staff details, patient details) are provided by the administration.

External Interface Requirements

User Interface

The web app provides a very easy to use graphical interface in which tasks such as creating entries, deleting entries, updating entries, sending information from one server to the other etc. can be done with sufficient ease. The front-end interface is developed in Bootstrap, which collectively utilizes languages like CSS, JavaScript and HTML to their maximum advantage.

The interface provides features like auto completion and validation of users while registering onto the web page. It provides easy mechanisms for all three of the modules to send data to one another, while hiding the complexity of the project in the background (which uses HTTP requests to transfer from one server to the other). Registering of users, logging in, logging out, auto decrementing of medicine inventories, notification of medicines to be bought, visualization of the user queue are all features which make the UI powerful and easy to use.

Hardware Interface

As mentioned above, we have done the entire development in a Ubuntu machine powered by a LAMP stack, however since our software is a web app and deployed on a main server, no specific hardware requirements are necessary to run the software for the staff(apart from access to a browser and connection to the main IITG network).

Software Interface

The software interface below highlights the technologies we have used to develop the web app:

(a) **Database:** The web app uses MySQL which is an open source software developed by Oracle.

(b) **Operating System:** We have used an Ubuntu OS powered by a LAMP stack.

(c) **Back-end development:** The back end of the software is supported by PHP, which is a popular server-side scripting language used for web development.

(d) **Front end development:** The front end has primarily been developed in Bootstrap, with embedded JavaScript/JQuery.

Communication Interfaces

The web app requires a connection to IITG's network – using which it will interact with the MySQL database hosted on a central server. Also, the transfer of information from one computer to the other will be accomplished by this same network using HTTP requests and headers. There will be certain encryption issues while sending the data from one module to the other – such as phishing attacks and network analysis attacks by computers pretending to be servers.

System Features

(a) **Receptionist Module:**

1. Receptionist will be able to make an appointment for patients to the doctors of their choice. As many doctors are available in the hospital, patient can schedule an appointment with any doctor of his/her personal preference, provided that the doctor is not too busy/doesn't have a large queue.

2. The registration of new patients can be easily done by the receptionist. On registering a patient, the receptionist will be given a unique ID which can be given to the patient for future use. This ID can be used when the patient comes to the hospital in the future and wants to schedule an appointment.

3. The receptionist will be able to handle emergency cases where he/she can give higher priority to emergency patients while making an appointment to the doctor. The decision as to who is considered an emergency case is given to the receptionist, and the doctor can revoke the 'emergency' status of a patient if the claim is found to be fraudulent.

4. There will be different queues for different doctors and the receptionist will be able to add the patient to the specified doctor's queue.

(b) **Doctor's Module:**

1. The doctor will have the benefit of writing the medicine only once in the computer (in the present scenario, the doctor writes the medicine with hand in 2 different sheets of paper which is tedious for doctors and consumes a lot of time).

2. Auto completion to ease the process of prescribing medicines to patients.

3. The doctor will be able to determine through our portal whether the medicine is available in the pharmacy or not in real time so that if the prescribed medicine is not there he/she can change the medicine.

4. The doctor will have the ability to check the medical history of the patient (to some extent) in order to provide a more accurate diagnosis.

5. The above feature helps in claiming reimbursement as well. As if the medicine is not available in the pharmacy then this will be noted and stored in the database so when the patient claims for reimbursement its correctness can be checked with the database and will remove any delay of verifying it with the receipts. With the current system, receipts can be lost (which will be a problem while claiming for the reimbursement), but with this software the solution to this problems comes handy.

(c) **Pharmacist Module:**

1. This module will provide the feature of altering the medicine inventory to the pharmacist.

2. He/ She can add/delete medicines in the inventory as and when a change occurs (a medicine stock is bought or a stock is depleted)

3. When giving medicines to the patients, the module will automatically decrement the quantity of that particular medicine so that medicine inventory remains up to date at any point of time without explicitly updating such type of information.

4. This module has the feature of printing medicine receipts which can be easily read by anyone opposed to the handwritten medicine receipt we get from IITG hospital now.

Non Functional Requirements:

Performance and Capacity

The system should give somewhat fast responses after checking patient information (in less than two seconds). Hardware should be able to support this sort of basic lookup.

The system should be able to support the insertion of atleast 40-50 people in the queue at a time. Multiple queues will be setup corresponding to the number of doctors available.

Safety/Security

(a) **Patient Identification:**

The system will require the patient to identify himself/herself by his/her Hospital card number.

(b) **Login Id:**

Any staff member i.e. receptionist/ doctor / pharmacist require a login Id password to login to access the respective functions.

(c) **Registration:**

In the actual software, registration of the staff will be supported only by the IITG hospital staff coordinator. The coordinator will ensure that only valid staff members get a place in the database.

(d) **Modifications:**

Login system ensures that no modification is done by a non-authorized person.

(e) **Encrypted details:**

The medical history and personal details of all the patients will be encrypted and only the doctor has the necessary authorization to view these details. Also, even the doctor can access only certain parts of the medical history, ensuring that the privacy of the user remains the topmost priority while at the same time enabling a better and more accurate diagnosis.

(f) **Front desk staff rights:**

The receptionist can only add to the database – the right to delete entries is reserved by the staff coordinator/CC, who can then be held responsible for any irregularities.

(g) **Difference in Access Rights:**

Each of the three personnel have different access rights to the database information, ensuring that only information which is needed is displayed.

(h) **Prevention of SQL Injection:**

All measures have been taken to prevent SQL injection and cross side scripting (e.g., escaping all strings, using security encoding libraries, etc.). Also, all passwords have been hashed into the database using a non-reversible md5 hash.

(i) **Secure Transmission:**

Transmission from one server to the other should be as secure as possible to avoid phishing attacks by hackers.

Software Quality Attributes

The software has various attributes which make it a superior product.

(a) **Use over multiple platforms:**

Can be used over any platform whatsoever, the only requirement being that the system has access to the IITG network and a web browser.

(b) **Portability and Reliability:**

Use of extremely popular and common technologies like MySQL, PHP and Bootstrap ensure that the software is both portable and reliable.

(c) **Usability:**

The software has a specified target audience and provides adequate usability to that specific set of people.

(d) **Maintainability:**

Handing over the responsibility of updating of databases/migration of technologies to the CC ensures that the database and software is maintained to the proper standards.

(e) **Others:**

Other software quality characteristics like correctness, flexibility, interoperability and robustness are embodied in our web app.