**MEDICAL ASSISTANT**

**PROJECT PROPOSAL**



**Muhammad Rizwan Malik - 12126**

**Asad Ashraf - 12137**

**Syed Usama Shah - 12165**

*Supervised by*

**Muhammad Arif**

*Submitted for the partial fulfillment of BS Software Engineering degree to the Faculty of Engineering& Computer Science*

**NATIONAL UNIVERSITY OF MODERN LANGUAGES**

**ISLAMABAD**

**April, 2022**

# 

# ABSTRACT

Remembering the exact time of taking exact prescribed medicines can be very challenging for some especially for those who don’t have anyone to look after them. And in the times of current pandemic, this issue seems to be a common problem for many people. So, there should be some sort of assistant for these patients who can remind them to take proper medicines and right on time. There are some formal ways like through an alarm clock app or hiring a care taker. But these methods either don’t fulfill the needs of a patient or can be very challenging. To overcome these problem, we have proposed a system named as “Medical Assistant”.

Medical assistant will be an android based platform that will help the people in remembering the time and the medicine they need to take. As the problem of remembering the time and the medicine is mostly faced by older patients, so our system will have simple interfaces where they either choose to set an alarm for a reminder themselves or by using and OCR text reader that would read the test from the doctor’s prescription script and tell the patient about what’s written and if there is time written, then it will automatically set a reminder of that time. It will also have a QR scanner that will scan the QR code of a medicine if that medicine was bought from a medical store or purchased online and has a QR code. That QR code would give the information about the medicine and general timing of when and how they can be taken. Patients will also be able to check their records of medicines they took. A chat bot will also be available for patients to use that will help identify the disease according to the symptoms provided by the patient.

Our System will address the users the major aspects that have to be considered when developing a single platform for two different kind of users. Our system is a Mobile Application where user will be able to perform tasks on a friendly and easy-to-use UI. From Mobile Application Patient and Doctor both can perform their respective tasks.

**PROJECT PROPOSAL APPROVAL CERTIFICATE**

It is certified that project proposal titled ‘Medical Assistant’ submitted by Muhammad Rizwan Malik, Asad Ashraf, Syed Usama Shah for the partial fulfilment of the requirement of “**Bachelor’s Degree in Software Engineering**” is approved.

**COMMITTEE**

**HoD Software Engineering:**

Dr.Basit Shahzad Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Head Project Committee:**

Dr. Muzafar Khan Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Project Supervisor**:

Muhammad Arif Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Committee Member 1**:

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Committee Member 2**:

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Committee Member 3**:

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Dated:**

**UNDERTAKING**

We hereby undertake that we are marking this group for our final year project by our own choice. We entirely must complete this project in time. In case of failure or underperforming, neither the university nor the supervisor will be held responsible for unsatisfactory performance.

**Group Members Signature**

1. Muhammad Rizwan Malik \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Asad Ashraf \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Syed Usama Shah \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Contents

[ABSTRACT 2](#_Toc100004414)

[INTRODUCTION 6](#_Toc100004415)

[RELEVANCE TO COURSE MODULES 6](#_Toc100004416)

[PROJECT BACKGROUND 6](#_Toc100004417)

[ANALYSIS OF LITERATURE REVIEW 6](#_Toc100004418)

[EXISTING SYSTEMS 7](#_Toc100004419)

[PROBLEM DESCRIPTION 7](#_Toc100004420)

[PROJECT OBJECTIVE 8](#_Toc100004421)

[PROPOSED SYSTEM 8](#_Toc100004422)

[QR Scanner Module 8](#_Toc100004423)

[OCR Scanner Module 8](#_Toc100004424)

[Analytics Report Module 8](#_Toc100004425)

[Tutorial Module 8](#_Toc100004426)

[Visited Doctors Data saved in database Module 9](#_Toc100004427)

[Appointed Reminder by User Module 9](#_Toc100004428)

[REQUIREMENT SPECIFICATION 9](#_Toc100004429)

[USE CASES DIAGRAMS 9](#_Toc100004430)

[DETAILED USE CASES 10](#_Toc100004431)

[METHADOLOGY 14](#_Toc100004432)

[Android Application 14](#_Toc100004433)

[Model 15](#_Toc100004434)

[FEASIBILITY STUDY 16](#_Toc100004435)

[RESOURCE REQUIREMENT 16](#_Toc100004436)

[GANT CHART 16](#_Toc100004437)

List of Figures

[Table 1: Registration 10](#_Toc100004519)

[Table 2: Login 11](#_Toc100004520)

# 

# CHAPTER 1

# INTRODUCTION

# INTRODUCTION

In this chapter we will provide brief introduction of the project and the report. It includes problem statement, goals and objectives and scope of studies. The chapter provides the information about the feasibility of the project. In the following chapter along with the proposed system’s features, the software and hardware requirement are also discussed. The tool and technologies used for the system also discussed at the end of the chapter.

## Motivation

Many people those are suffering from blood pressure or sugar level diseases have to take medicines on regular basis according to given precautions but they face difficulty in remembering the time of medicine and forget to take those medicines on time which cause effect on their health and level of diseases does not remains balanced and get lowers or higher. Medical Assistant application will help patients through various digital features to remember medicine timings and appointment dates also patient can use chatbot to know use of a medicine which will help them to confirm whether they are taking the right pill or not. To know about the progress of the treatment, system will generate weekly reports of every medicine to check how much medicines patient has taken on time.

* 1. Problem Statement

Remembering the exact time of taking exact prescribed medicines can be very challenging for some especially for those who don’t have anyone to look after them. And in the times of current pandemic, this issue seems to be a common problem for many people. So, there should be some sort of assistant for these patients who can remind them to take proper medicines and right on time. There are some formal ways like through an alarm clock app or hiring a care taker. But these methods either don’t fulfill the needs of a patient or can be very challenging. To overcome these problem, we have proposed a system named as “Medical Assistant”.

Most of the times, the hand writing of the doctor is not clear or understandable to the normal human which makes it very difficult to see the time of the prescribed medicine. To overcome that problem, we have included an OCR text reader in our system. Sometimes people need to just identify the use of a medicine just by entering the medicine name. For that, we have introduced a chat bot that would give disease name by just putting medicine name on the system.

* 1. Medical Assistant Application

There are some systems regarding Medicine reminder but they lack many important features like they do not provide Chatbot feature to identify use of a medicine by entering medicine name. They do not provide the feature of OCR and QR scanning that help patient in various ways. This system generates weekly report that can help patient and doctor to analyze progress of treatment.

Patients are increasing day by day and by having disease doctor prescribe patient a lot of medicines to get recover from disease and patient do not remember to take medicine at right time and the purpose of the medicine. Some medicines have different milligrams and by taking heavy dose medicine can also get patient in serious condition. So, to overcome these kinds of problems and situation our application can help them. Patient take medicines regularly at given time which is prescribed by the doctor and still they are not feeling better than they can search the nearby doctors and can save their appointment meeting timings and doctor details so they can contact with him by using our application.

* 1. Goals and Objectives

Medical Assistant system helps the patient to check on their medicine, prescriptions and their daily routine of medicines. If they do not know about the medicine knowledge and purpose of the medicine then he can scan the medicine and gets the information of the medicine from the application. The goal is to provide an easy manageable system to the patients to take care of their health. The application can also help the patient to analyze progress of the treatment where system will generate weekly reports of every medicine to check whether the patient has taken all medicines on time or not, so that patient can share that report with their doctor to analyze progress of treatment. Also patient can add appointment timing of the doctors on the system to get notification reminder.

* 1. Developed System Features

Features of the developed system are as follows:

* + 1. Alarm Reminder

The system sets alarm for the provided medicine details.

* + 1. Add Prescription

The system save prescription details entered by patient.

* + 1. OCR Scanning

The system will scan prescription image and will convert it into a digital image by recognizing the characters.

* + 1. QR Scanning

The system will scan QR code of any medicine to show medicine details.

* + 1. Generate Report

The system will generate a weekly or monthly report of medicines added to analyze progress of the treatment.

* + 1. Add doctor details

The system will save the details of the doctors entered by patient.

* + 1. Add an Appointment

The system will set appointment reminder of the provided doctor’s meeting.

* + 1. Medicine Checker

The system check medicine usage and details through Chatbot.

* + 1. Barcode Scanner

The system will scan QR code of any medicine to show medicine details.

* + 1. Feedback

The system will allow user to enter feedback and suggestions for the system.

* 1. Scope of the Study

The Medical Assistant system is to facilitate patients in various ways. The target of the application is to help the patients to maintain about the medicine information and purpose of the medicine so that he can scan the medicine for its purpose and take the particular medicine to get rid of the pain and if the person have to take medicine on regular basis then he can also get the alarm to take the medicine on regular basis. The aim is to help patient to keep track of their medicines. It will help them in both when to take their medicine and which medicine is for which disease or what purpose it serves. The system have a feature of Medicine Checker where patient will enter medicine name and system will show what is the purpose of that medicine and how they can use it. The system will also generate weekly reports of every medicine to check whether the patient has taken all medicines on time or not, this will help patient to know how much punctual he is in taking medicines.

* 1. Process Model

The different software companies choose the kind of development model which suits to their system. The water fall model is followed for the development of the system. The water fall model is considered as traditional approach for describing software development life cycle, the water fall model is a linear approach for development of software products and by this approach user also stay touch with the system that is under development and enabled to understand what is actually happening.

The water fall model is followed because:

* Comprehensive and functional.
* Handled simply as model is rigid.
* Saves effort and resources.
* Provide easy way for analysis and testing**.**
  1. Nature of the Project

This project is a desktop based application. Machine learning is also involved to train the data and to detect the human face in image and detect the prominent parts and after detection crop the prominent parts. The client-server architecture is developed to integrate python and c#. The machine learning algorithm are coded in python. The main IDE is designed using c#.

* 1. Overview of the Report

. The target of the application is to help the patients to maintain about the medicine information and purpose of the medicine so that he can scan the medicine for its purpose and take the particular medicine to get rid of the pain and if the person have to take medicine on regular basis then he can also get the alarm to take the medicine on regular basis.

The chapter is about to the problem statement, introduction, developed system purpose, developed system functionalities, possibility of the developed system, what resources software’s and hardware are required. The approaches and tools that are used to develop this app are discussed in the following chapter. The second chapter is about the reason behind the idea. The chapter describes existing system and their functionalities, and the about the flaws in developed system, its assessment, comparison with other existing system and its limitation are also conferred.

CHAPTER 2

BACKGROUND AND EXISTING WORK

**2.0 Introduction**

In this chapter we will discuss a synopsis of present systems. The detail analysis of My pill, My Therapy and Tke your pill is given with their pros and cons are enlisted.

* 1. **Important Constructs of the Application**

Following are some of the important constructs of the system.

* + 1. **Machine Learning**

In this domain the data is trained and image processing is done. Emgu.CV library is used. This **l**ibrary called open CV usually used for image processing and is used to detect the human face from an image and crop that face. The HaarCascade Frontal Face framework is used. Haarcascade is a framework that classifies the frontal face of human. OpenCV cascade classifier uses this framework to classify frontal face from an image. Dlib library is used. Dlib is a machine learning algorithm written in C++ is used to get the facial landmarks using given shape predictors i.e. 68 landmarks shape predictor.

* + 1. **Desktop App Development**

For the GUI the .NET framework is used. The main IDE is designed in .NET framework using c#. In this domain the distributable desktop applications for Windows, Mac and Linux.

* + 1. **Client Server Architecture**

The client-server architecture are developed to integrate python and c#. The machine learning algorithm are coded in python which work as a server. The main IDE is designed using c# which work as a client.

* + 1. **SQL Database**

MySQL is an open source relational database management system ([RDBMS](https://searchdatamanagement.techtarget.com/definition/RDBMS-relational-database-management-system)) which is backed by oracle and Structured Query Language ([SQL](https://searchsqlserver.techtarget.com/definition/SQL)) is used to perform operations in MySQL. For this system MySQL is used on window and MySQL runs virtually on all platforms. Although it is used in extensive variety of applications, MySQL is mostly linked with web applications and online issuing.

* 1. **Existing Systems and Their Limitations**

There are many systems that provides the Medicine tracking facilities but they have a lot of restrictions and flaws. Those systems are discussed below:

* + 1. **Take your pill**

Take your pill is one of the system that provides medicine tracking facilities. Take your pill provides simple functionality like medicine alarm reminder and checking history.

* + - 1. **Features**
         * Medicine alarm reminder
         * History Report.
         * Feedback.
    1. **My Therapy**

My Therapy have friendly interface and it is easily used by anyone. My Therapy provides functionalities like Medicine alarm reminder, add appointment, add healthcare and progress report.

* + - 1. **Features**
         * Medicine alarm reminder
         * Progress Report
         * Add appointment
         * Add healthcare professional
         * Add pharmacy
    1. **Med Control**

Med Control also have user friendly interface and it is easily used by anyone. Med Control provides a basic functionality of Medicine alarm reminder.

* + - 1. **Features**
         * Medicine alarm reminder
         * Feedback

* 1. **Limitations of the Existing Systems**

The limitation of the current systems are as follows:

* + 1. **Limitations of Take your pill**

This application have basic functionalities. It cannot add appointment meetings and healthcare professionals for future use. This application cannot Scan OCR to convert prescription image into digital text. It does not provide medicine usage and details.

* + 1. **Limitations of My Therapy**

This application cannot Scan OCR to convert prescription image into digital text. It does not provide medicine usage and details by scanning QR scanner. It does not allow user to send feedback and suggest any improvements for the system.

* + 1. **Limitations of Med Control**

This application only allows user to add medicine details to set alarm reminder. It does not provide facility of generating progress report. It cannot add appointment meetings and healthcare professionals for future use. This application cannot Scan OCR to convert prescription image into digital text. It does not provide medicine usage and details.

* 1. **Comparison of Existing System and Proposed System Features**

Table 2.1 describe the comparison between proposed system and existing system functionalities. The proposed system covers all the features while the existing system fails to perform all the features.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Features** | **Take your pills** | **My pills** | **My therapy** | **Med control** | **Our system** | |
| QR scanner | no | no | no | no | yes | |
| OCR scanner | no | no | no | no | yes | |
| Analytics report | yes | yes | yes | no | yes | |
| Add prescription | yes | no | no | yes | yes | |
| Review/Feedback | yes | no | no | yes | yes | |
| Add Healthcare Professional | no | yes | yes | no | yes | |
| Appointment reminder | no | no | yes | no | yes | |
| Medicine Checker | no | no | no | no | | yes |
| Alarm Reminder | yes | yes | yes | yes | | yes | |

* 1. **Summary**

In this chapter the important constructs of application domain that includes machine learning, android application development, client-server architecture and mysql database are explained. The existing systems which includes My Therapy, My pills, and Med Control are explained. The features of existing system are explained. And table 2.1 describes similarities and dissimilarities between the present systems.

CHAPTER 3

REQUIREMENTS SPECIFICATION

* 1. **Introduction**

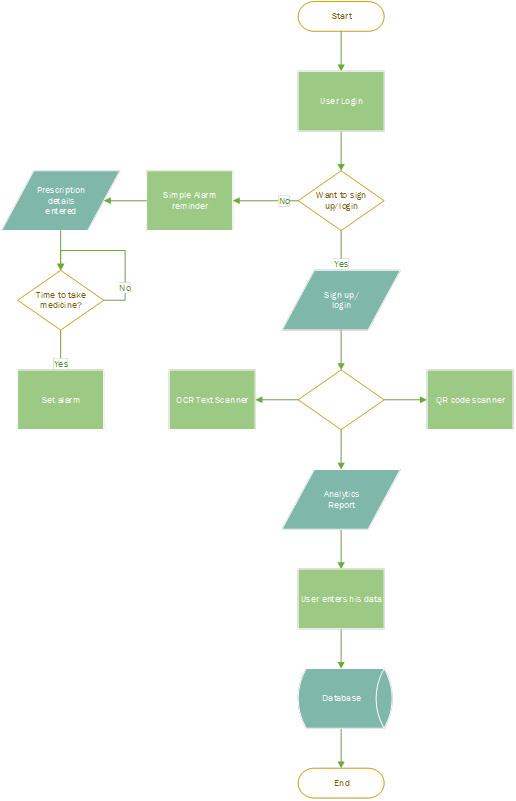
System modelling is the process of designing different models of a system in order to predict various perspectives or views of that system. In this chapter, system modelling is done by using a graphical notation based on Unified Modelling Language (UML). This will enable us to design a use case diagram.

* 1. **Developed System Flow**

The system flow has been thoroughly discussed in the system flow diagram. The system flow diagram depicts what the system is capable of and how it will be executed. All of the software's features are divided into sub-features and similar features are categorized together to make differentiating between them simpler and more comprehensible. Each feature of the system is explained separately to lower the complexity of the system and to heighten the understandability of the system.

The system starts by login in through email and password required. If the user is new then first of all the registration is done by sign up to the system. After logging in the system will display add medication screen where user can add medicine details to set alarm for that medicine accordingly. User can use add prescription and add doctor option where system will save prescription details entered by patient into the database.

There is an option of OCR on the main screen where system will scan prescription image selected by user and will convert it into a digital image by recognizing the characters. There is an option of QR scanner on the side bar of the main screen where user can scan QR code of the medicine to get medicine details. There is an option of Report where system will generate a weekly or monthly report of medicines added to analyze progress of the treatment.



3. 1 System Flow Diagram

* 1. **Interface Requirements**

The client-server architecture is developed for the system. The main interface is designed using JAVA. The machine learning algorithm are coded in python which work as a server.

**3.2.1 Hardware Interface Requirements**

|  |  |
| --- | --- |
| **Hardware** | **Requirement** |
| CPU | Intel core i5 5th gen or higher |
| Languages | Html, Java, Javascript, php,Xml |
| Database | SQL, SQL lite |
| Mobile Devices | Android supported |
| RAM | 8GB or above |
| OS | Windows |
| Compilers | Android Studio, Visual Studio |

**3.2.2 Software Interface Requirements**

The required software interface requirements for the system are:

* + - 1. **Visual Studio**

Microsoft's Visual Studio is an integrated development environment (IDE) that can be used to develop a wide range of applications, including graphical user interfaces (GUIs), console apps, web apps, mobile apps, cloud services, and web services. It supports managed and native code development and can be used with various programming languages such as C#, C++, VB (Visual Basic), Python, JavaScript, and other languages.

* + - 1. **MYSQL**

MySQL is an open source relational database management system ([RDBMS](https://searchdatamanagement.techtarget.com/definition/RDBMS-relational-database-management-system)) which is backed by oracle and Structured Query Language ([SQL](https://searchsqlserver.techtarget.com/definition/SQL)) is used to perform operations in MySQL. For this system MySQL is used on window and MySQL runs virtually on all platforms. Although it is used in extensive variety of applications, MySQL is mostly linked with web applications and online issuing.

* + - 1. **Python**

Python is a powerful, versatile programming language that is easy to read and write. Developed in 1989 by Guido van Rossum, Python has become one of the most popular languages among developers due to its easy syntax and dynamic semantics. Python also supports modules and packages, which encourages code reuse and modularity. With Python, you can create a wide variety of applications, including GUI applications, web applications, mobile apps server-side code, artificial intelligence (AI) algorithms, and machine learning algorithms.

* 1. **Functional Requirements**

The Basic functionalities of the system are:

System shall set the medicine alarm reminder. System shall allow to scan OCR of the prescription and convert it into digital text. System must be able to Scan QR code of the medicine and show results. Application should be able to generate weekly report of the medicines added for reminder. System shall set appointment meeting reminder. System should be able to add doctor details and prescription details in database.

* 1. **Use Cases**

A use case is the communication between an external actor and the system. It explains how a user interacts with the system and what actions are taken. A use case is a collection of specified sequences that cover every possible state of software for passing along implementation control. This results in all potential actions that a system could take.

In order to write a use case, we must adhere to the steps listed below: Name, Brief Description, Dependency, Actors, Preconditions, Basic Flow, Alternate Flows, Exception Flows and Post Conditions. The communication between external actors and the system is explained by a use case in order to achieve a goal. It's important to note that actors don't necessarily have to be human - an actor can be anything that asks the system for a certain action.

Use case analysis usually starts by demonstrating use case diagrams. For agile development, UML requirement model for many diagram showing use cases and some textual explanations, notes or use case briefs would be very insignificant and just enough for little or simple project use. As good complements to use case texts, the visual diagram representations of use cases are also effective facilitating tools for the better comprehension, communication and design of complex system behavioral requirements. Less defined use case detail tend to be more like business processes. In other words, when it comes to agile development, all you really need is a few diagrams and a few sentences to explain each one - anything more than that would be overkill and not necessary for such a project.

* 1. **Use Case Diagram**

Following are the use case diagrams which shows the communication of external actors with the system

* + 1. **System Use Case Diagram**

Database

Patient

Registration

Scanning OCR

Scanning QR code

Login

Add Doctors Info

Notification

View prescription

View Report

Enter Med info inFO

Add Prescription

Feedback

Set Alarm

View Doctor Info

3. 3 System Use Case Diagram

* + 1. **Reminder set Use Case Diagram**

Database

Patient

Registration

Add Alarm

Add Medication

Login

Info

Reminder Set

Add Medicine

View reminder

detail

Select Time

Select date

3. 4 Reminder Set Use Case Diagram

* + 1. **Add Doctor Use Case Diagram**

Database

View Doctors

View Doctors

Patient

Registration

Add A Doctor

Login

Info

Add doctor name

Add Doctor

View Doctors

3. 5 Add Doctor Use Case Diagram

* + 1. **OCR Use Case Diagram**

Database

Patient

Registration

Scan OCR

Login

Info

View OCR results

Open Camera

Upload image

3.6 OCR Use Case Diagram

* + 1. **Add prescription Use Case Diagram**

## 

Database

Patient

Registration

Add Prescription

Login

Info

Prescription added

Add Medicine

View Prescription

Prescription detail

3.7 OCR Use Case Diagram

* + 1. **QR scanner Use Case Diagram**

3.8 QR Use Case Diagram

Patient

Registration

Scan QR code

Login

Info

View QR results

Open Camera

* + 1. **Registration Use Case**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-01 |
| **Use Case**  **Name:** | Registration |
| **Actors:** | Patient |
| **Description:** | Patient will register him/herself to create the profile. |
| **Trigger:** | User click the “Register” Button. |
| **Preconditions:** | PRE-1. User must have an android device.  PRE-2. User must be connected to internet.  PRE-3. Application should be installed in device. |
| **Postconditions:** | POST-1. User is logged in the system.  POST-2. User Profile is created.  POST-3. Home page is displayed to the user. |
| **Normal Flow:** | 1. User will open the application, after installing it in device. 2. User will be asked to register him/herself in the system. 3. User will enter a unique username. 4. User will create a password. 5. User click the Register Button. 6. System will verify username and password. 7. User Profile will be created after the verification.   Home page is displayed. |
| **Alternative Flows:** | 1. If username is not unique, system displays a message “Re-enter username”. 2. If password is not verified, system displays a message “Re-enter your password”.   Normal flow continues from step1. |
| **Exceptions:** | None |
| **Business Rules** | None |
| **Assumptions:** | None |

* + 1. **Login Use Case**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-02 |
| **Use Case**  **Name:** | Login |
| **Actors:** | Patient |
| **Description:** | Patient will login to the system. |
| **Trigger:** | User click the “Login” Button. |
| **Preconditions:** | PRE-1. User Should be registered. |
| **Postconditions:** | POST-1. User is logged in the system. |
|  | POST-2. Home page is Displayed. |
| **Normal Flow:** | 1. User will open the application. 2. User will be asked to login the system. 3. User will enter username. 4. User will enter password. 5. User Click Login Button. 6. System will verify username and password. 7. User will be logged in, after the verification. 8. Home page is displayed. |
| **Alternative Flows:** | 1. If username is not unique, system displays a message “Re-enter username”. 2. If password is not verified, system displays a message “Re-enter your password”.   Normal flow continues from step1. |
| **Exceptions:** | None |
| **Business Rules** | None |
| **Assumptions:** | None |

* + 1. **Alarm Reminder Use Case**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-03 |
| **Use Case**  **Name:** | Alarm reminder |
| **Actors:** | Patient |
| **Description:** | User will select add medication option and system will display the page where patient will select date and time with medicine details and confirm details. System will set alarm reminder for that medicine and save details into the database |
| **Goal:** | Patient wants to add alarm reminder for a medicine. |
| **Preconditions:** | User should select future date and time. |
| **Postconditions:** | Reminder is successfully set for the medicine |
| **Normal Flow:** | 1. User will open the application. 2. User will select add medication button. 3. System will ask for medicine and timing details. 4. User will enter medicine info and select date and time. 5. User will confirm details to set reminder. 6. System will add and save reminder details in database. 7. System will display added reminder details on the screen. |
| **Alternative Flows:** | 1. If selected date is not of future, system displays a message “please choose future date”.   4. If user do not confirm medicine details, system will not add reminder”.  Normal flow continues from step1. |
| **Exceptions:** | None |
| **Business Rules** | None |
| **Assumptions:** | None |

* + 1. **OCR Use Case**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-04 |
| **Use Case**  **Name:** | OCR |
| **Actors:** | Patient |
| **Description:** | User will select scan OCR option and system will display the options to open camera or to upload image. User will choose option to scan image. System will scan image and convert it into digital text and will save it into database. |
| **Goal:** | Patient wants to convert prescription image into digital text. |
| **Preconditions:** | User should scan clear image that is visible on the camera. |
| **Postconditions:** | Image is successfully converted into digital text. |
| **Normal Flow:** | 1. User will open the application. 2. User will select OCR scan option. 3. System will ask for option to open camera or upload image. 4. User will scan image to convert it. 5. System will scan image and display results on the screen. 6. System will save result details in database. |
| **Alternative Flows:** | 1. If selected image is not clear, system displays a message “please scan image again”.   5. If mobile camera is not working properly, system will not show any results. |
| **Exceptions:** | None |
| **Business Rules** | None |
| **Assumptions:** | None |

* + 1. **QR Scanner Use Case**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-05 |
| **Use Case**  **Name:** | QR scanner |
| **Actors:** | Patient |
| **Description:** | User will select scan QR code option and system will display the options to open camera. User will choose option to scan code. System will scan QR code and show results on the screen. |
| **Goal:** | Patient wants to scan QR code to get medicine details. |
| **Preconditions:** | User should scan code with clear and working camera. |
| **Postconditions:** | QR code is successfully scanned and results are displayed. |
| **Normal Flow:** | 1. User will open the application. 2. User will select QR scan option. 3. System will ask for option to open camera. 4. User will scan code to convert it. 5. System will scan QR code and display results on the screen. |
| **Alternative Flows:** | 1. If mobile camera is not working properly, system will not show any results. |
| **Exceptions:** | None |
| **Business Rules** | None |
| **Assumptions:** | None |

## **OCR Use Case**

|  |  |
| --- | --- |
| **Use Case ID:** | UC-06 |
| **Use Case**  **Name:** | Report |
| **Actors:** | Patient |
| **Description:** | User will select Report option and system will display screen to add medicine details. User will add medicine details. System will save details in database and will prepare weekly report for that medicine. |
| **Goal:** | Patient wants to generate weekly progress report. |
| **Preconditions:** | User should add medicine details and reminder to get weekly report. |
| **Postconditions:** | Weekly progress report is in progress to be generated successfully. |
| **Normal Flow:** | 1. User will open the application. 2. User will select report option. 3. System will ask for add medicine details and reminder. 4. User will add medicine details and reminder. 5. System will save details in database and report get in progress. |
| **Alternative Flows:** | 1. If user does not save medicine details in report, system will not generate report. |
| **Exceptions:** | None |
| **Business Rules** | None |
| **Assumptions:** | None |

## Architectural design

Database Layer

Application Layer

Presentation Layer

(

User Interface

)

**Figure 1: Architecture Diagram**

# Activity Diagram:



# Process Flow Diagram:

**Scan Medicine**

Display main menu

Select

"

Scan

Medicine

"

Scan Medicine

?

Scan Again

Show Medicine Info

Y

N

**Figure 2: Activity Diagram for Scan Medicine**

**Add Prescription:**

Display main menu

Select

"

Add

Prescription

"

Add Prescription

?

Medicine Not Found

Medicine Found

Y

N

Fill the Fields

Prescription Added

**Set Alarm:**

Display main menu

Select

"

Set Alarm

"

Alarm

?

Prescription Not

Found

Prescription Found

Y

N

Set Alarm

**Figure 4: Activity Diagram for Set Alarm**

**Update Prescription:**

Display main menu

Select

"

Prescriptions

"

Fill the Fields

Update prescription

Select

"

Update

Prescription

"

**Figure 6: Activity Diagram for Update Prescription**

## Sequence Diagram:

**Add Prescription:**

**User**

**System**

**Mongo DB**

Select Prescription

Add prescription

prescription data

Add details

Display Prescription

**Figure 8: Sequence Diagram for Add Prescription**

**Set Alarm:**

**User**

**System**

**Mongo DB**

Request set alarm

Displays a options filled for set alarm

Select Date

Displays calendar

Add date manually

Select time

Displays Clock

Request save Alarm

Add reminder

Successfully add reminder

**Figure 9: Sequence Diagram for Set Alarm**

## RELEVANCE TO COURSE MODULES

The developed project is related to following courses we studied in our Degree:

* Object Oriented Programming
* Algorithm and Data Structure
* Intro to Database
* Software Engineering
* Software Requirement Engineering
* Software Design and Architecture

## PROJECT BACKGROUND

If we talk about previous image scanning application, then we can have Chinese mobile application Camscanner which was released in 2011 which is used to scan and edit image inside it. CompuServe is the first chatting session company which was founded in 1969 and later it introduced live session in 1980. The location guide of doctor and hospital are implemented by using Google map which was introduced in 2005.Now a days every social platform have live session feature. A large number of people are using WhatsApp and Imo to have call with their relative doctor but one doctor is not specialized in every field so different patient have to look for different specialized field doctor and our application can help them to find them the specialized doctor.

## ANALYSIS OF LITERATURE REVIEW

One of the key features that the proposed system has above from the previous system is that our application provides information and medicine timing alarm to the patient by scanning the QR code or the OCR scanner.

In our system, patient can use image scanning functionality(OCR), where system converts image text in to digital text and that digital text can be used to set an alarm for prescribed medicine.

Similarly, QR code would give the information about the medicine and general timing of when and how they can be taken. Patients will also be able to check their records of medicines they took.

A chat bot will also be available for patients to use that will help identify the disease according to the symptoms provided by the patient.

## EXISTING SYSTEMS

These are some of the apps available on the play store that provide similar functionalities:

1. Take your pills.
2. My pills.
3. My therapy.
4. Med control.

These are the functionalities that they are providing:

1. User management sign up/Login
2. Alarm reminder to set notification alarm for medicine reminder
3. User Review/Feedback option where user can share their reviews after using the system
4. Record of the customer/patient, medicines and overall progress.
5. Sharing progress with friends to for informing them about application.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Features** | **Take your pills** | **My pills** | **My therapy** | **Med control** | **Our system** |
| QR scanner | no | no | no | no | yes |
| OCR scanner | no | no | no | no | yes |
| Analytics report | no | no | no | no | yes |
| Tutorial for starters | no | no | yes | no | yes |
| Review/Feedback | yes | yes | yes | yes | yes |
| Doctor’s data for future use | no | no | no | no | yes |
| Appointment reminder | no | no | no | no | yes |

# PROBLEM DESCRIPTION

Remembering the exact time of taking exact prescribed medicines can be very challenging for some especially for those who don’t have anyone to look after them. And in the times of current pandemic, this issue seems to be a common problem for many people. So, there should be some sort of assistant for these patients who can remind them to take proper medicines and right on time. There are some formal ways like through an alarm clock app or hiring a care taker. But these methods either don’t fulfill the needs of a patient or can be very challenging. To overcome these problem, we have proposed a system named as “Medical Assistant”.

Most of the times, the hand writing of the doctor is not clear or understandable to the normal human which makes it very difficult to see the time of the prescribed medicine. To overcome that problem, we have included an OCR text reader in our system.

Sometimes people need to just identify the use of a medicine just by entering the medicine name. For that, we have introduced a chat bot that would give disease name by just putting medicine name on the system.

# PROJECT OBJECTIVE

The main objective of our system is to provide additional ways to remind them about the time and type of medicine they should take. Our system, “Medical assistant” will be an android based platform that will help the people in remembering the time and the medicine they need to take. As the problem of remembering the time and the medicine is mostly faced by older patients, so our system will have simple interfaces where they either choose to set an alarm for a reminder themselves or by using and OCR text reader that would read the test from the doctor’s prescription script and tell the patient about what’s written and if there is time written, then it will automatically set a reminder of that time. It will also have a QR scanner that will scan the QR code of a medicine if that medicine was bought from a medical store or purchased online and has a QR code. That QR code would give the information about the medicine and general timing of when and how they can be taken. Patients will also be able to check their records of medicines they took.

# PROPOSED SYSTEM

Our system consists of following modules:

## QR Scanner Module

This part will scan the QR code printed on the medicine. This can be done by Reed-solomon error correction method and the RSA algorithm.

## OCR Scanner Module

This part will scan the text of the prescription and if the text is successfully processed, it will set an alarm for that medicine. These steps include image input, pre-processing, tesseract-OCR engine, Post processing, and finally converting it into readable text.

## Analytics Report Module

This part will have an interface where patient can enter the details of his previous prescriptions and also how punctual they were in taking the medicines. The system will also save the data of the timings and the medicines as the user will keep on using the app and entering the data either through simple alarm reminder, QR scanner or OCR scanner.

## Tutorial Module

This part will have a tutorial guide for the people(mostly old) to help them use the app easily. This will be done by giving a simple info about the app the 1st time the patient installs the app

## Visited Doctors Data saved in database Module

This part will have an interface where the user can enter the details of the doctors to he/she has already been to and if necessary, could be visited again

## Appointed Reminder by User Module

This part will also have an interface where the user can enter the details of the appointment and set a reminder of it accordingly

# REQUIREMENT SPECIFICATION

All the use cases, uml diagrams and system requirement are shown in this section.



# METHADOLOGY

The standard software development life cycle stages will be used in the development of our app. Initially requirements and data will be collected. Then there will be the analysis part where all the requirements will be analyzed for the coding part. After coding, a prototype testing approach will be followed where we will test our app in different devices. If successful, then we will present it to the final panel.

## Android Application

Our system will be mainly android based. The app will have a user login option but that will not be mandatory to use our app. There will be a simple alarm reminder option with options of QR code scanner and OCR text scanner. There will also be an option to insert the information of a doctor and if required, an appointment reminder can be set through that interface.

## Model



The prototype model requires that before carrying out the development of actual software, a working prototype of the system should be built. A prototype is a toy implementation of the system. A prototype usually turns out to be a very crude version of the actual system, possible exhibiting limited functional capabilities, low reliability, and inefficient performance as compared to actual software. In many instances, the client only has a general view of what is expected from the software product. In such a scenario where there is an absence of detailed information regarding the input to the system, the processing needs, and the output requirement, the prototyping model may be employed.

# CHAPTER 6

**SYSTEM TESTING**

## Introduction

This chapter provides the overview of the testing techniques that are used to test the system. In this chapter many testing methodologies are discussed. The main functionality of the system are tested by developing test cases. Black box, unit and integration testing are explained and is used to test the functionality and performance. Each and every test case is explained with the help of table.

## Test Methodology

The testing is performed to checks that system functionalities works accurately or not. All features of the application are tested in software testing. The application’s response time to the user’s input is observed. The output that is generated by the system against every input is analyzed. Each feature of the system is tested in real world environment. Functionalities are checked by analyzing the output of the system against user different inputs. Test cases are generated for each and every single feature of application to test that weather system satisfies all the requirements or not. Several testing techniques used to perform testing for example unit testing, white box, black box, integration testing and system testing. In black box testing the internal mechanism or structure of the system is unknown. The user/tester is not familiar with the internal working of the system. Black box testing is performed to test the system. In white box testing the internal mechanism or organization of the system is known. Unit testing is performed when the system contains module in separate form to test whether each module of system developed is working well or not according to design. When all the modules are integrated then the system capture any error while performing integration testing. Test cases are tested by giving several inputs and commands to every part/module/component of system so that the whole system can be tested. For testing of system PC (personal computer) is used to test the application. Testing confirms that all the features are working properly. During testing bugs/failures/defects are identified. These bugs are removed by making some changes and improvements in system. Selenium tool is used for automated testing.

## Test Bed

The process of testing of specific module of software like function, class or object in a specific method is called bed. In test bed software, operating system and hardware

are required to test the complete Application. In this system PC (personal computer) is needed to check and run the application which runs on Window 8.1 or higher.

## System Test Case

Testing ensures that all the requirements are working properly. During testing bugs/failures/defects are identified. These bus/errors are removed later.

## Test Cases

Testing is fundamentally collection of certain actions applied on system to check that whether the system is performing tasks accurately or not according to the requirements. After performing the testing the software tester choose which test case is passed and which test case is failed. The testing of every module is performed separately. Every test case is specifically generated for a certain situation. Test cases contain different characteristics like test case ID, QA test engineer, and use cases reference, name of personnel, revision history, test date, objective, assumptions, and pre-conditions, testing environment, steps and the rank of test case. The test cases are planned to ensure the quality of the system to determines that whether the system functionalities works accurately or not what more improvements are required.

### User Registration Test Case

The registering new user is a simple process. The user is required to provide needed information. Once the user provide all the required information for registration. The system perform processing on the data and validate the data. If the user provide the valid data then the user is successfully registered otherwise, the user will be not registered. The test case determines whether the system performs registration as per requirements and most importantly, does the system give out the expected outcomes against the values entered by the user. Table 6.1 describe the registration test case for user. The user is tested for the registration. The test case shows that first of all the user open the registration page and then the user provide all the required data and then the system process that data. The outcome of the current test case is that the system verifying the data provided by the user and successfully registered the user. This test case follows the black box testing methodology and functional testing type. In black box testing the internal mechanism is unknown, it only focuses on the external working of the system that is checking the output against the given

input. In this test case, the system response is checked against the given input in the text fields for the User Registration form.

**6. 1 User Registration Test Case**

|  |  |  |
| --- | --- | --- |
| **Test Case ID** | **Use Case Reference** | |
| TC-1 | UC-2 | |
| **Test Date** | 28-11-2019 | |
| **Revision History** | None | |
| **Objective** | To register the new user. | |
| **Environment** | User Mode | |
| **Assumptions** | User is registered successfully. | |
| **Pre-Requisite** | User is at login page. | |
| **Steps #** | **Execution Description** | **Procedure Result** |
| **1.**  **2.**  **3.** | User opens the registration page  User provides the required information  Submitting details by selecting submit option | Registration page is displayed.  Registration form is filled successfully  Details submitted successfully |

### User/Admin Login Test Case

Table 6.2 explains the successful sign in of a user/admin so that user/admin is authorized and is able to use the Application. In the present test case the user provide the login information. The system validate the information. If the user is registered already.

In the system and admin, the system successfully login the user and takes to the main page. Otherwise if the username and password matches with the user data, the system successfully login the user and opens to user page. Black box testing methodology is used in this test case.

6. 2 User/Admin Login Test Case

|  |  |  |
| --- | --- | --- |
| **Test Case ID** | **Use Case Reference** | |
| TC-2 | UC-1 | |
| **Test Date** | 28-11-2019 | | |
| **Revision History** | None | | |
| **Objective** | User/Admin want to login to the system. | | |
| **Environment** | User Mode, Admin Mode | | |
| **Assumptions** | User/Admin logged in successfully. | | |
| **Pre-Requisite** | User/Admin is at login page. | | |
| **Steps #** | **Execution Description** | **Procedure Result** | |
| **1.**  **2.**  **3.**  **4.** | User/Admin Open the login form  User/Admin enters correct “User name” and “Password”.  System verify the information entered by the user. The system successfully validate the information. | Login page is displayed.  Registration form is filled successfully.  The waiting screen is displayed to the user. | |
| **4.** | User/Admin login by Clicking on login button | Successfully logged in | |
| **Comments**  Only list of available Items will be displayed and then further steps will be taken accordingly. | | | |

### QR Scanning Test Case

Table 6.3 explains loading an image. This test case also determines the performance testing as well. It ensures that the application performing fast to select the image and displays the results.

6. 3 QR Scanning Test Case

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Case ID** | **Use Case Reference** | | |
| TC-3 | UC-3 | | |
| **Test Date** | 28-11-2019 | |
| **Revision History** | None | |
| **Objective** | Admin wants to scan image. | |
| **Environment** | Admin/User Mode. | |
| **Assumptions** | Image is loaded successfully. | |
| **Pre-Requisite** | System is in running condition. | |
| **Steps #** | **Execution Description** | **Procedure Result** |
| **1.** | Admin select on browse image/camera button. | System ask for image path from admin/user. |
| **2.** |  |  |
|  | Admin select image/camera to load. | Image selected/camera loaded successfully |
| **3.** | Admin click load to load image. | Image loading is started and after few moments loaded successfully. |
| **Comments**  System allows all image formats to select. | | |

# FEASIBILITY STUDY

## RESOURCE REQUIREMENT

|  |  |
| --- | --- |
| **Hardware** | **Requirement** |
| CPU | Intel core i5 5th gen or higher |
| Languages | Html, Java, Javascript, php,Xml |
| Database | SQL, SQL lite |
| Mobile Devices | Android supported |
| RAM | 8GB or above |
| OS | Windows |
| Compilers | Android Studio, Visual Studio |

## GANT CHART

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Features** |  | |  |  | **2021-2022** | | |  |  |  | |
| **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Oct** | **Nov** | **Dec** | **Jan** |
| Proposal Writing |  |  |  |  |  |  |  |  |  |  |  |
| Requirement  Analysis |  |  |  |  |  |  |  |  |  |  |  |
| Prototype of User interface |  |  |  |  |  |  |  |  |  |  |  |
| Black Box Testing for Interface |  |  |  |  |  |  |  |  |  |  |  |
| Database Design |  |  |  |  |  |  |  |  |  |  |  |
| Building Database |  |  |  |  |  |  |  |  |  |  |  |
| Test Database |  |  |  |  |  |  |  |  |  |  |  |
| Build System |  |  |  |  |  |  |  |  |  |  |  |
| Integration of system |  |  |  |  |  |  |  |  |  |  |  |
| System testing |  |  |  |  |  |  |  |  |  |  |  |
| Black Box Testing of System |  |  |  |  |  |  |  |  |  |  |  |
| Final Report |  |  |  |  |  |  |  |  |  |  |  |
| Presentation |  |  |  |  |  |  |  |  |  |  |  |