

University Admit Eligibility Predictor Professional
PERSONAL ASSISTANCE FOR SENIORS WHO ARE
SELF-RELIANT

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CHAPTER - 1

INTRODUCTION

1.1 PROJECT OVERVIEW

In day-to-day life, most people need to take medicines which were not there in the past couple of years and the reason behind this is diseases are increasing in a large amount. So sooner or later many people encounter these diseases. Some diseases are temporary while many are permanent life-threatening diseases. Life-threatening diseases get mixed with the human body in such a way that they can't leave the body ever and they increase in rapid time. The life span of humans became less because of such diseases and to overcome or to live a better life we need to take medicines regularly and also in the large amount. We need to be on the advice of a doctor who tells us to take desired pills in the desired way so that patients face problems like forgetting pills to take at right time and when the Doctor changes the prescription of medicine patients have to remember the new schedule of medicine. This problem of forgetting to take pills at right time, taking the wrong medicines and accidentally taking expired medicine causes health issues for the patient and this leads to suffering from unhealthy life. Our project is to make a software-based helping system, which connects the caretaker of the patient with the patient, to send timely SMS alerts to them at the specified time and with the specified note set by the caretaker. The patient can be duly monitored by the caretaker and hence his/her health can be monitored better with this software

1.2 PURPOSE

The purpose of this project is to keep people fit and safe from health-threatening diseases. The sole purpose of medicines is to treat the patients and control their metabolisms properly so that the health risk can be reduced and thus the patient can get a cure for the illness and can live a longer life.

People, especially senior citizens are facing so much trouble remembering the time and name of the medicines to be taken. Therefore, the problem could create severity among people when medicines are not taken or are wrongly taken.

When this proposed solution is set to work, the problem can be reduced, as the caretaker on the other side, set the note of the medicine to be taken and the time at which the patient has to be alerted with the note. This software can alert the patient with clear information and hence the patient will not be forgotten to take medicine and will take the medicine at right time.

This solution can ultimately help the patients and caretaker to preset the schedule and he/she also need not remember the time to notify their patients, hence everything goes smoothly.

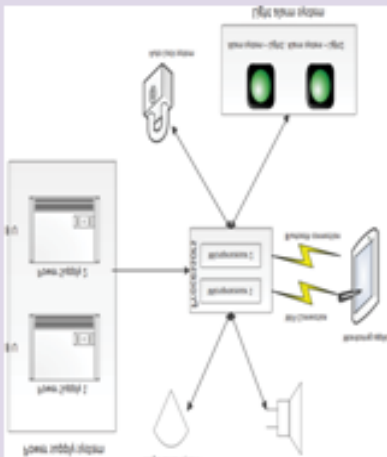
CHAPTER - 2

LITERATURE SURVEY

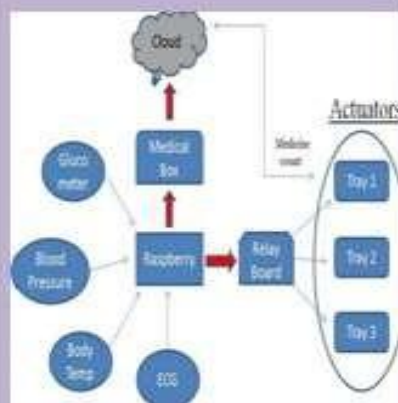
2.1 EXISTING PROBLEM

Smart Pill Box is based on the medicine bag concept to store pills, to remind and ensure timely intake of medicines. The system alerts if faulty medications are consumed. Each compartment of the box to organize pills can be separately programmed by specifying pill quantity, intake time and refill if necessary. The entire system is managed by some mobile applications which give connectivity between doctors, patients, and pharmacies. This system is connected to IoT, to regularly monitor patients' health details and to integrate it with the server for efficient record keeping and treatment.

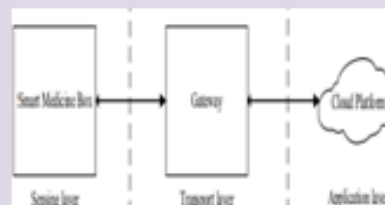
S.NO	TITLE & YEAR OF PUBLICATION	AUTHOR	UNIVERSITY NAME	METHODOLOGY	REFERENCE LINK
1.	Internet of Things (IoT) Based Smart Health Care Medical Box for Elderly People. Year: International Conference for Emerging Technology, 2020.	Obaidulla-Al-Mahmud ¹ , Md. Kausar Khan ² , Raideep Roy ³ , and Fakir Mashuque Alamgir	East West University, Dhaka, Bangladesh	A smart IoT based healthcare system has been proposed here, which contains an intelligence medicine box associated with sensors and server for regular health monitoring. This smart medicine box with wireless internet connectivity helps the patients to get regular health care and create easy communication between doctor and patient without meeting physically. The proposed medicine box helps the patient to take the right medicine at the right time along with an email which will help the patient to take the medicine. The objective of his project is focusing on proper medication of a patient. Older people who need regular monitoring of their medication will be benefited through this project. Server for storing medication time and other information, mail transferring protocol, temperature sensor for proper monitoring of patient body temperature has been integrated in this project.	https://www.researchgate.net/profile/Mr-Fakir-Mashuque-Alamgir/publication/343405977_Internet_of_Things_IoT_Base_d_Smart_Health_Care_Medical_Box_for_Elderly_People/links/62b9952460e77b7db83750db/Internet-of-Things-IoT-Based-Smart-Health-Care-Medical-Box-for-Elderly-People.pdf

2.	<p>Smart Medicine Box System.</p> <p>Year: IEEE International Multidisciplinary Conference on Engineering Technology, 2018.</p>	<p>Hiba Zeidan, Khalil Karam, Roy Abi Zeid Daou, Ali Hayek, Josef Bolercsoek.</p>	<p>Lebanese German University and Kassel University, Germany.</p>	<p>This paper presented about the two main functionalities that characterize this system: safety which assures the wellbeing of the patient and the good functioning of the system by duplicating the electrical components and the security that helps keeping the medication out of the reach of the children by automatically locking the medical box whenever the patient takes his pills. Alarms are being generated with medication box and via a mobile application that can be installed on the patient relative's phones in order to help monitoring him. Although this system was well operating, several adjustments can be made in order to increase its use and ameliorate its behaviour. A major drawback of this system is that it can contain only one type of medication.</p> 	<p>https://www.researchgate.net/profile/Roy-Daou/publication/328831450_Design_of_a_Safe_and_Smart_Medicine_Box/links/5c542fac6fdccd6b5d93ad2/Design-of-a-Safe-and-Smart-Medicine-Box.pdf</p>
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3.	<p>Enhancing Healthcare using m-Care Box.</p> <p>Year: International Conference for Innovative Mechanisms for Industry Applications, 2017.</p>	<p><u>Aakash Bharadwaj</u>, <u>Divyank Yarravarapu</u>, <u>Sadiparala Charan Kumar Reddy</u>, <u>Thirumalaraju Prudhvi</u>, KSP <u>Sandeep Obulam Siva Dheeraj Reddy</u>.</p>	<p>School of Mechanical Engineering SASTRA University Thanjavur, India.</p>	<p>In this paper they have used alarm-based device that helps in reminding patients about their medication. The use of Internet of Things (IoT) concepts and health sensing technologies make diagnosis easier and convenient for the doctors as well as the patients. This paper presents an overview of an assistive device for monitoring non-compliance of medication by providing a single platform and a closed loop connection between patients, doctors, and pharmacies.</p>	<p>https://sci-hub.mkxa.top/10.1109/ICIMIA.2017.7975594</p>
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4.	<p>Design of Docker-Based Cloud Platform for Smart Medicine Box.</p> <p>Year: International Conference on intelligent Green Building and Smart Grid, 2019.</p>	<p><u>Benbin Chen</u>, <u>Kun Zhou</u>.</p>	<p>School of Electrical Engineering and Automation, Xiamen University of Technology Xiamen, China.</p>	<p>This Experimental tests show that the platform can effectively monitory smart medicine boxes and have certain development capabilities. with the framework of <u>microservices</u>, the entire management business is split into multiple applications and the images of the applications are built by <u>Docker file</u>.</p>	<p>https://sci-hub.mkxa.top/10.1109/INCET49848.2020.9153994</p>
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2.2 PROBLEM STATEMENT DEFINITION

Creating a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love. Our main aim is to make a Smart medicine box for those users who regularly take medicines and the prescription of their medicine is very long as it is hard to remember for patients and their caregivers.

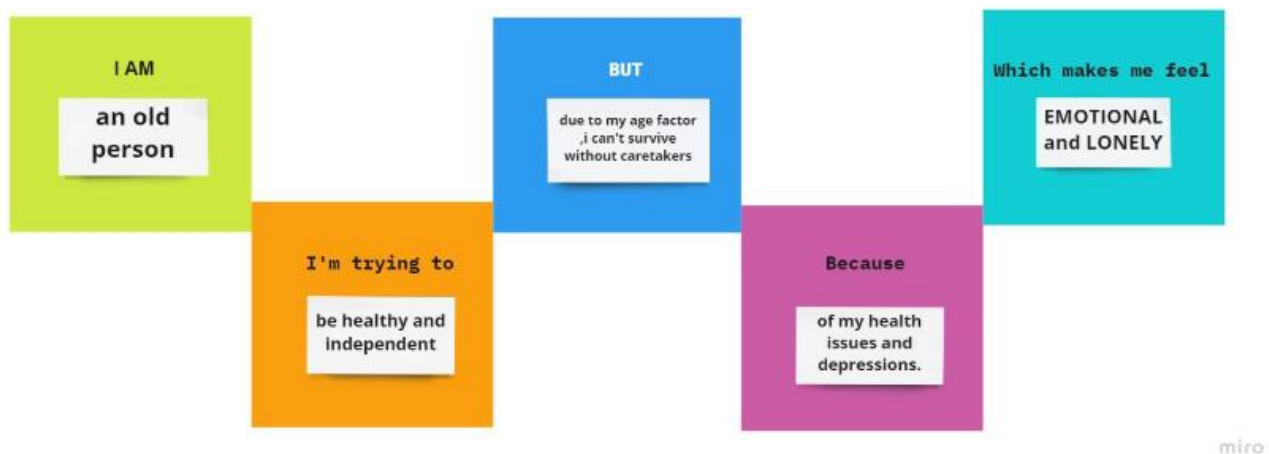


Figure 2.1. Problem Statement

CHAPTER - 3

IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes. It is a useful tool to help teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

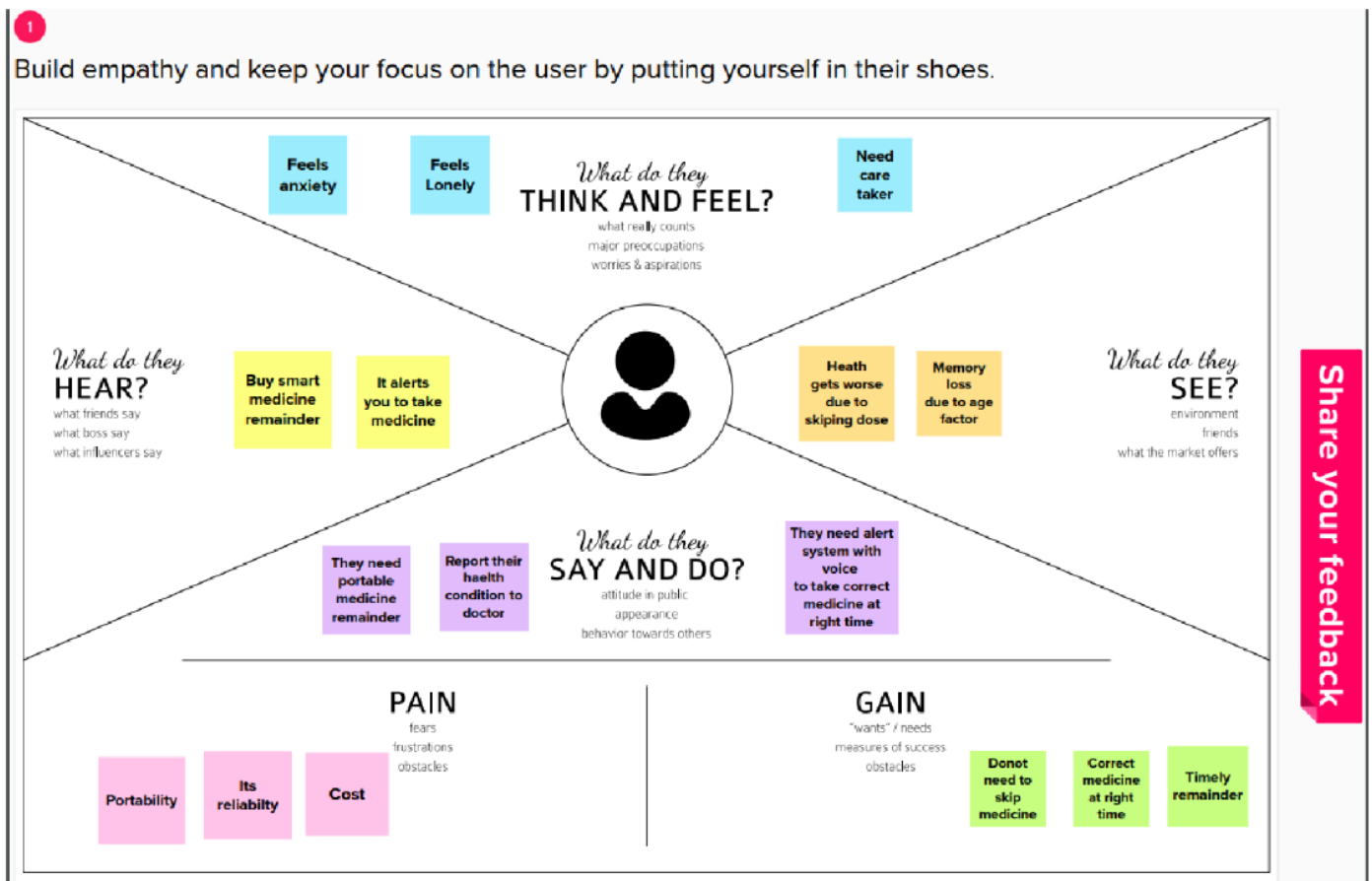


Figure 3.1. Empathy Map

3.2 IDEATION & BRAINSTORMING

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem-solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich number of creative solutions.

STEP-1 TEAM GATHERING, COLLABORATION AND SELECTING THE PROBLEM STATEMENT

This step includes the formation of a team, collaborating with the team by collecting the problems of the domain we have taken and consolidating the collected information into a single problem statement.

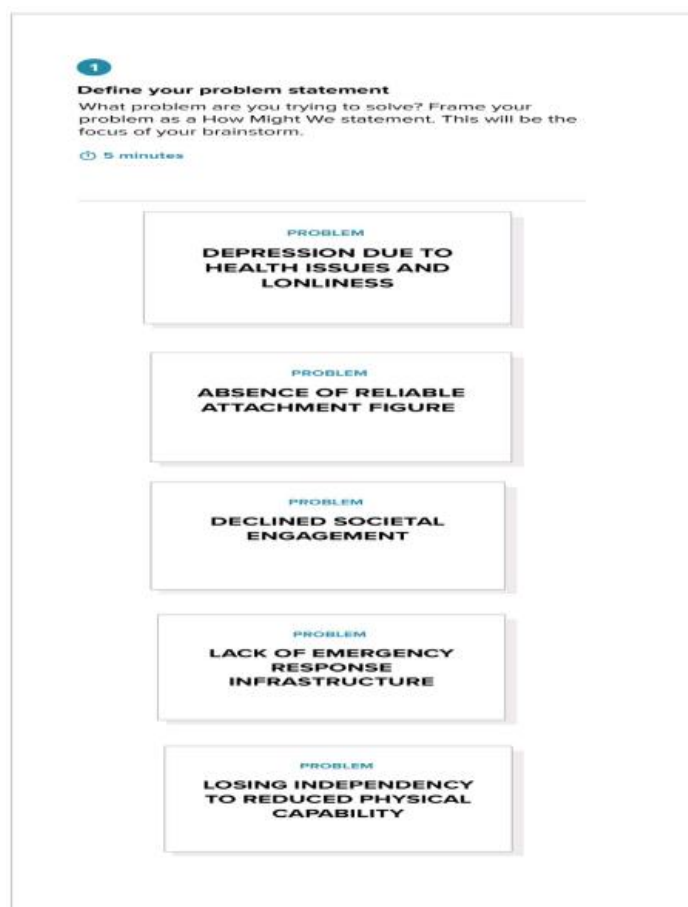


Figure 3.2. Ideation And Brainstorming

STEP 2 BRAINSTORM, IDEA LISTING AND GROUPING

This step of ideation includes the listing of individual ideas by teammates to help with the problem statement framed. All the individual ideas have been valued and made individual clusters.

Then discussed as a team and finally made an ideation Cluster A and concluded with the most voted ideas from all the clusters together and Cluster B with the least needed ideas.



Figure 3.3. Brainstorm, Idea Listing and Grouping

STEP 3 IDEA PRIORITIZATION

This step includes the process of listing necessary components to come up with the working solution and making a hierarchy chart by prioritizing the components based on importance, say from the higher being backend and lower being the user interfacing components.



Figure 3.4. Idea Prioritization

3.3 PROPOSED SOLUTION

S.NO	PARAMETER	DESCRIPTION
1.	Problem Statement (Problem to be solved)	This project aims at building a web App that automatically estimates food attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs Clarifai's AI-Driven Food Detection Model for accurate food identification and Food API's to give the nutritional value of the identified food.
2.	Idea / Solution description	The solution is a responsive web page that can be used in both mobile and computers. Cumulative results of pictures of food as input and provide nutritional information of food are used to achieve accurate prediction. The website provides a user-friendly interface and accepts multiple samples predicting them simultaneously. A detailed report of the concerned person's health will be generated.

		<p>AI-driven food recognition model to accurately identify foods.</p> <ul style="list-style-type: none"> ➤ A food API that reports the nutritional value of identified foods. ➤ Frequent checking of nutritional value and Customized food suggestions. ➤ Water and medicine monitoring. ➤ Keep a food journal.
4.	Social Impact / Customer Satisfaction	<p>Calculate the basal metabolic rate, body mass index, ideal weight and caloric intake. Nutrition Focused Food Banking. Targeted Food Assistance Programs.</p>
5.	Business Model (Revenue Model)	<p>Revenue is generated on a subscription basis, with big data processing and targeted in-depth reporting reviews that paid subscriptions the best.</p>
6.	Scalability of the Solution	<p>Furthermore, features can be extended in our application. Additional features such as sleep tracking, menstruation tracking can be done.</p>

3.4 PROBLEM-SOLUTION FIT

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioural patterns and recognize what would work and why



Figure 3.5. Solution Fit

CHAPTER - 4

REQUIREMENT ANALYSIS

4.1 Functional Requirements

FR No	Functional Requirements	Sub Tasks
FR 1	Correct Tablet at correct time	Updates medicine with time in database
FR 2	Proper medication	Remainder with tablet name
FR 3	Timely Remainder	Timely remainder using voice message

4.2 Non-Functional Requirements

Usability

Smart Medicine Box usability is the characteristics of the User Interface that facilitate Use, to make it easier for the users to perceive the information presented by the User Interface, to understand and decide based on that information

Smart

Smart Medicine Box, like other computer systems, can be vulnerable to security breaches, potentially impacting the safety and effectiveness of the device

Reliability

The probability of Smart Medicine Box will perform a required function without failure under static conditions for a specified period.

Performance

Medical device testing is the process of demonstrating that the device will reliably and safely perform in use.

.

Availability

Smart medicine box is available in overall conditions of weather and atmospheric pressure and can be carried out with us.

Scalability

In Feature, we can upgrade the smart medicine box to the health care assistant to monitor our healthcare and book appointments with doctors.

CHAPTER - 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

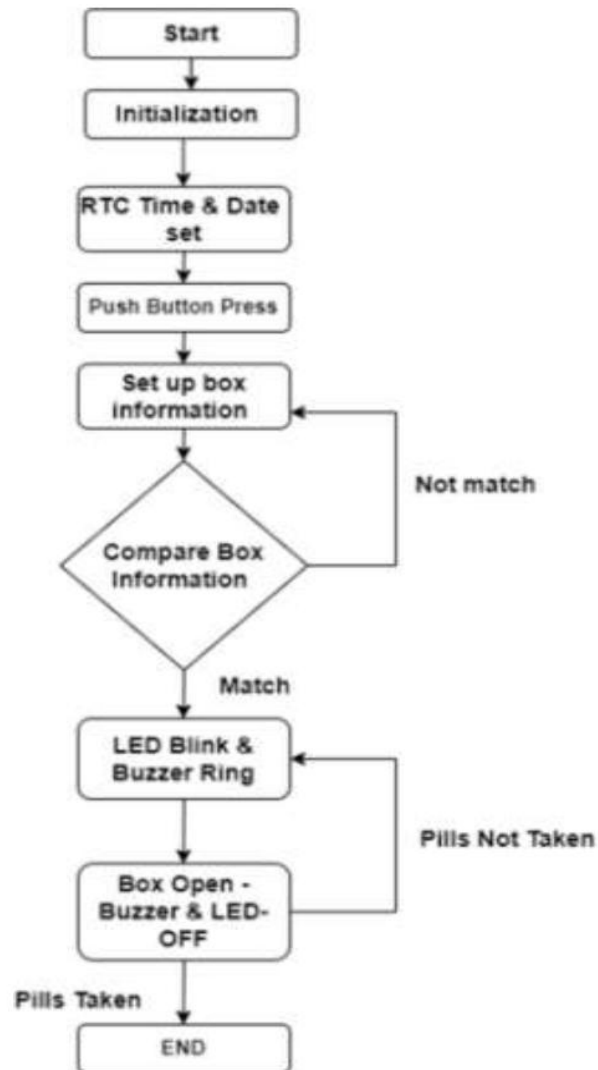


Figure 5.1. Data flow Diagram

5.2 SOLUTION AND TECHNICAL ARCHITECTURE

The solution architecture includes the components and the flow we have designed to deliver the solution.

Here, the application is planned to be designed, where the caretaker of the patients can feed the medicinal details to the database connected with the help of python and API calls. By monitoring that information in the program, timely message alerts are given to the patients to intake the medicine.

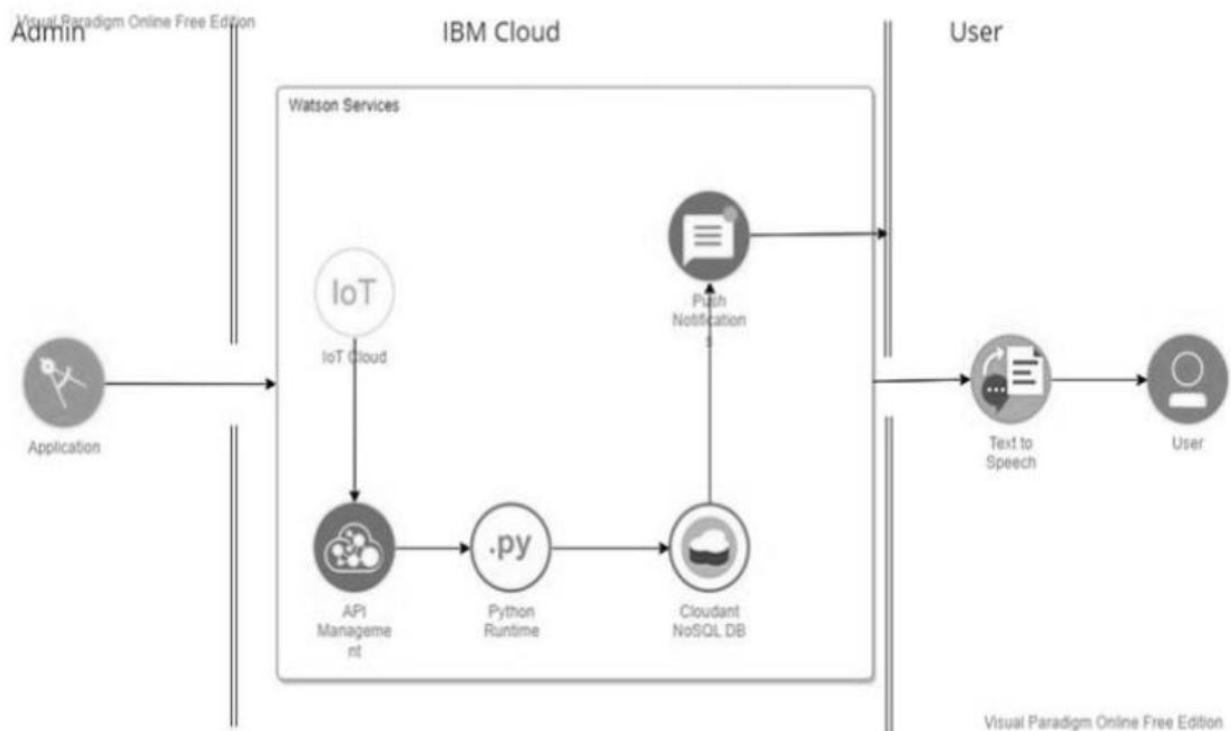


Figure 5.2. Technology Architecture

Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Mobile App	HTML, CSS, JavaScript
2.	Application Logic-1	Mobile App to enter the Medicine Details weekly	Python
3.	Application Logic-2	Gets the medication data from database	IBM Watson IoT API Call data
4.	Application Logic-3	Converts the text to speech to pronunciation for the user	IBM Watson Assistant
5.	Database	Medication time and tablets name on daily and	MySQL
6.	Cloud Database	Call the data IBM Cloudant is used and user login credentials	IBM DB2, IBM Cloudant
7.	File Storage	App code and IoT credentials are stored and API keys	IBM Block Storage
8.	External API-1	To get the medicine box status Open or not	IBM box status API
9.	External API-2	To get the login credentials in IBM DB2	Username and Password API
10.	Machine Learning Model	To convert the text into speech for voice command the tablet details	Text to speech
11.	Infrastructure (Server / Cloud)	To host the server and application	Cloud Foundry, Node Red

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	To develop the application interface, we use MIT App Inventor	MIT APP INVENTOR
2.	Security Implementations	To secure the users login credentials and personal information	SHA-256, OWASP
3.	Scalable Architecture	To scale the application database	IBM Auto scaling
4.	Availability	To make use the application and data are available 24/7	IBM Cloud load balancer
5.	Performance	To increase the performance the application is hosted in the high-performance instance	IBM instance

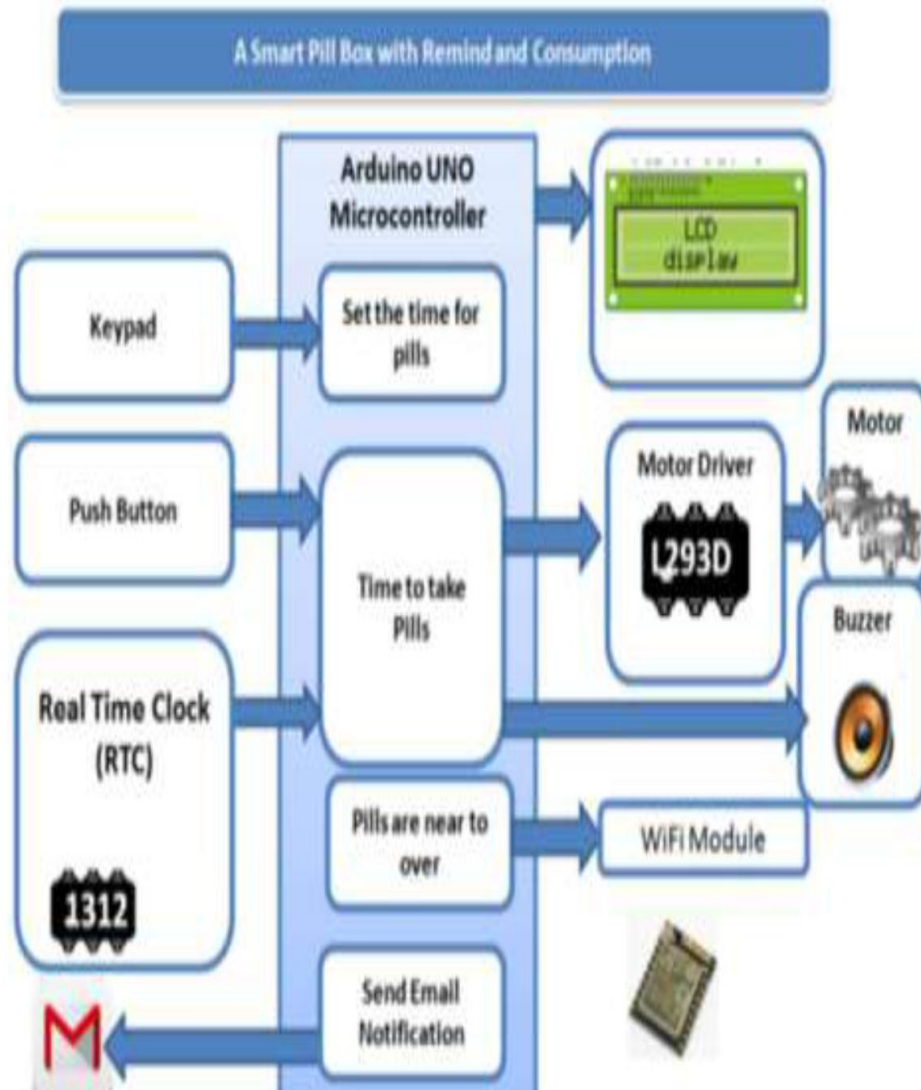


Figure 5.3. Solution Architecture

5.3 USER STORIES

Table 5.1. User Stories

User Type	Functional Requirement(Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Senior citizen)	Caretaker	USN-1	As a user, I want to take Medicines on time and monitor my health	I want to Take Medicines on time	High	Sprint-1
Customer (Alzheimer patient)	Smart medicine box	USN-2	As a user, I want to take my tablets on time by voice command	I want to take my tablets on time by voice command	High	Sprint-1
Customer (Mentally idled patient)	Caretaker	USN-3	As a user, my patient needs to take medicines on time and monitoring the activity	My patient needs to take medicines on time	Medium	Sprint-2
Customer (Coma patient)	Caretaker	USN-4	As a user, my patient medication time and prescription should load in database for upcoming week	My patient medication time and prescription should be in database list	Low	Sprint-4
Customer (Disabled people's)	Smart medicinebox	USN-5	As a user, I need to take my medicine in nearby places with light notification	I need to take my medicine in nearby Places with light notification	Medium	Sprint-3

CHAPTER - 6

PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

Table 6.1. Sprint Delivery Schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Create and Configure	USN-1	Create IBM Watson IOT platform device and configure IBM-IOT platform.	4	High	Subalakshmi C Pavithra M Abirammi S Deepthika S
Sprint-2	Create and store the data in node-red	USN-2	Create Node Red service, Text to speech service and a database in cloudant DB to store the medicine details.	4	High	Subalakshmi C Pavithra M Abirammi S Deepthika S
Sprint-3	Develop a web application	USN-3	Develop a web application using Node Red service and also create a form.	4	High	Subalakshmi C Pavithra M Abirammi S Deepthika S
Sprint-4	Write a function code and develop a python script	USN-4	Write a function to compare the medicine time and develop a python script for IBM IOT platform and generate voice alert.	4	High	Subalakshmi C Pavithra M Abirammi S Deepthika S

6.2 SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	30 Oct 2022	5 Nov 2022	20	4 Nov 2022
Sprint-2	20	6 Days	5 Nov 2022	10 Nov 2022	20	9 Nov 2022
Sprint-3	20	6 Days	10 Nov 2022	15 Nov 2022	20	14 Nov 2022
Sprint-4	20	6 Days	16 Nov 2022	21 Nov 2022	20	20 Nov 2022

6.2 REPORTS FROM JIRA

Burndown chart

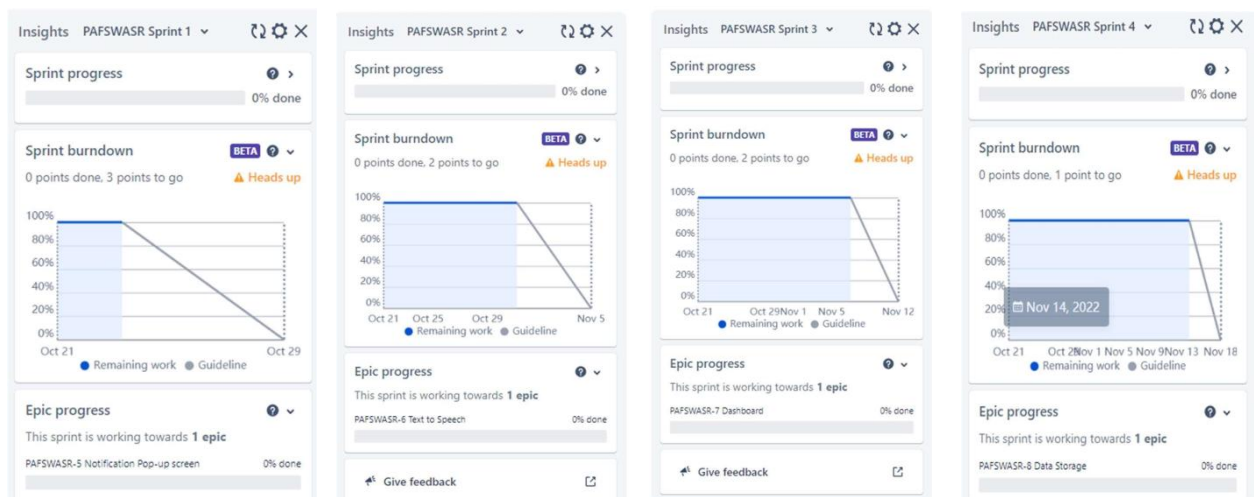


Figure 6.1. Burndown Chart

Road map

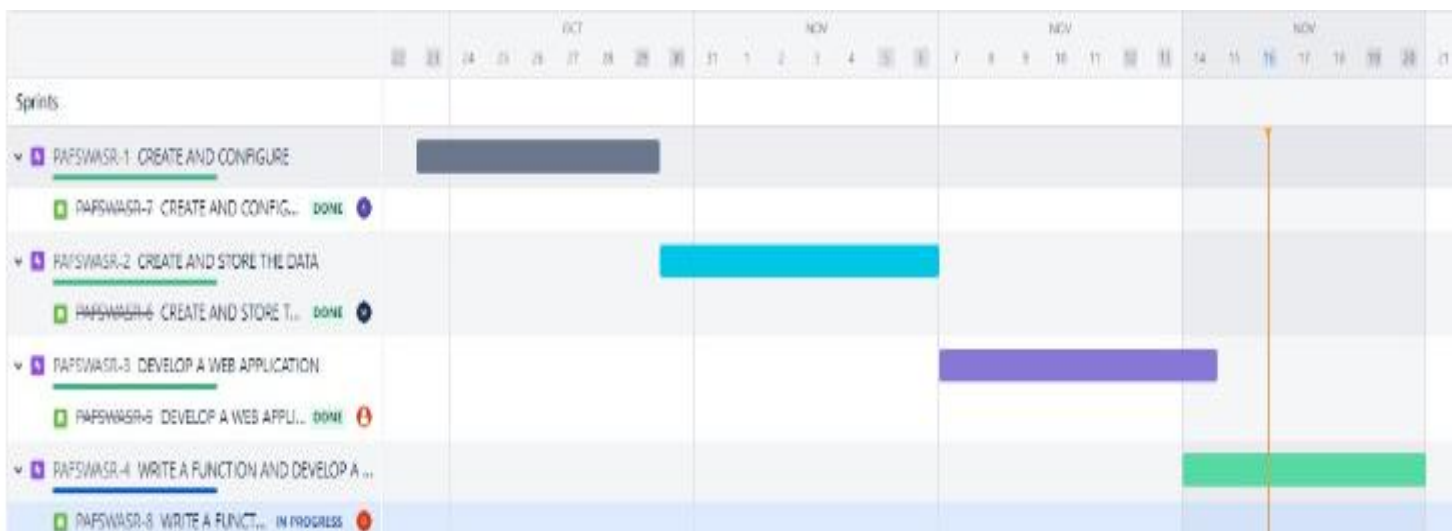


Figure 6.2. Road Map

CHAPTER - 7

CODING AND SOLUTIONS

7.1 FEATURE 1

Node-Red:

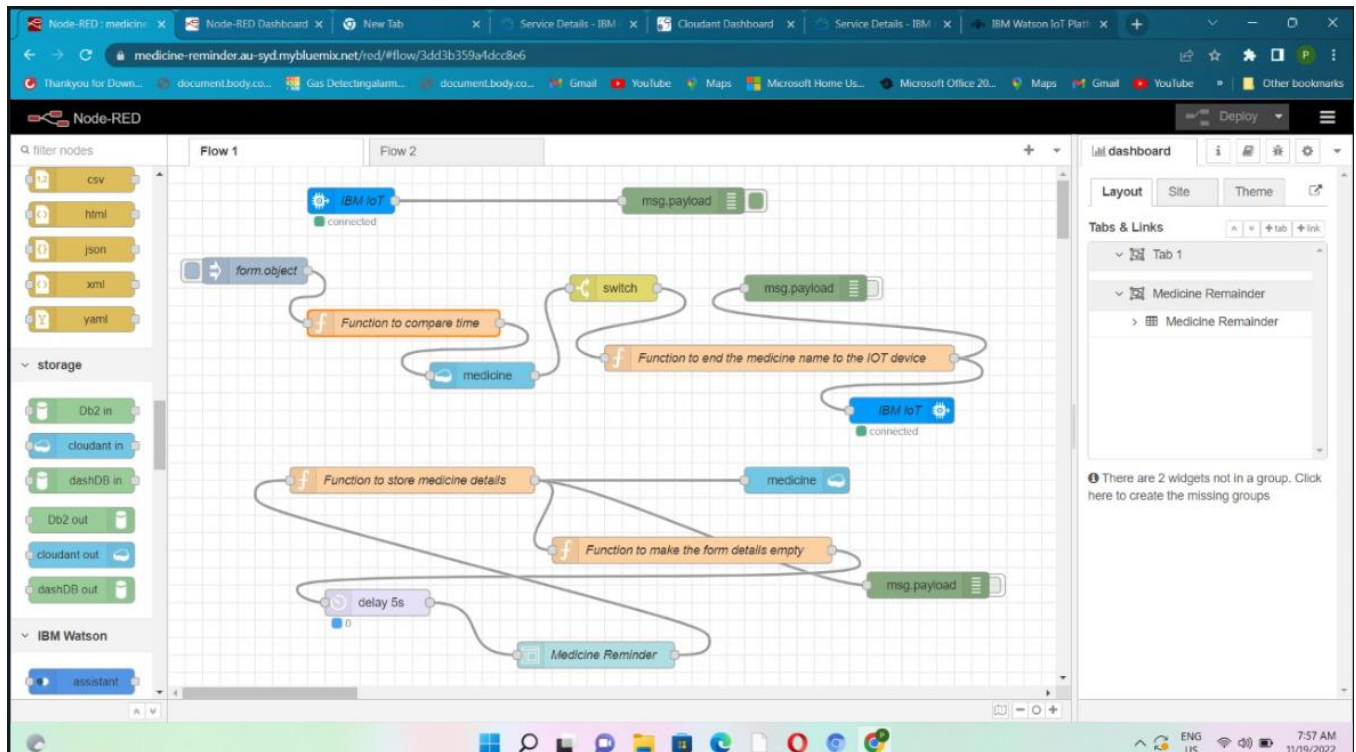
It is built on Node.js, which is a non-blocking, lightweight I/O model, making it lightweight and efficient. Flows created in Node-RED are stored using JSON, and can be imported and exported and shared with ease

json code:

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  n", "z": "25e80d5f7eabd726", "name": "", "func": "var d= new Date();\nvar utc=d.getTime() + (d.getTimezoneOffset() *
  60000);\nvar offset=5.5;\nnewDate = new Date(utc + (3600000*offset));\nvar n=newDate.toISOString()\nvar date =
  n.slice(0,10)\nvar time = n.slice(11,16)\nnglobal.set('time',time)\nmsg.payload=date+' ' +time\nreturn
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  t=msg.payload.time\nmsg.payload={ n \"medicine\": msg.payload.medicine, n \"_id\":d+' ' +t\n }\nreturn
  msg;", "outputs": 1, "noerr": 0, "initialize": "", "finalize": "", "libs": [], "x": 250, "y": 340, "wires": [ [ "7b0e41295a320ce5", "d7
```



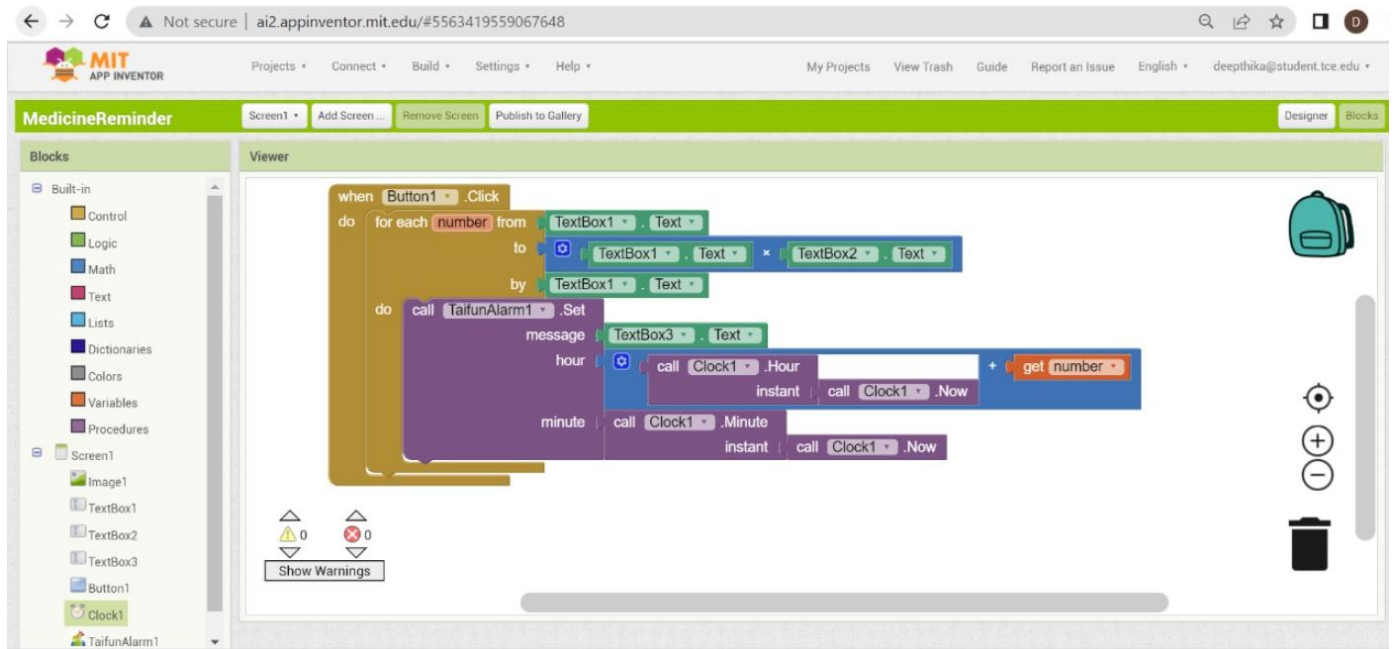
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: ""}, {"id": "d439f3bef0e4b698", "type": "ui_tab", "name": "Main", "icon": "dashboard", "disabled": false, "hidden": false}]
```



7.2 Feature 2

MIT App inventor

MIT App Inventor is an online platform designed to teach computational thinking concepts through development of mobile applications. Students create applications by dragging and dropping components into a design view and using a visual blocks language to program application behavior



7.3 Database Schema (if Applicable)

IBM Watson IoT Platform

abirammi@student.tce.edu
ID: 7kzrii

Browse Action Device Types Interfaces Add Device +

medicineapp Disconnected nodemcu Device Nov 18, 2022 5:30 PM → ...

Identity Device Information **Recent Events** State Logs X

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event_1	{"randomNumber":18,"time":18,"date":100}	json	a few seconds ago
event_1	{"randomNumber":50,"time":52,"date":87}	json	a few seconds ago
event_1	{"randomNumber":40,"time":75,"date":98}	json	a few seconds ago

1 Simulation running

CHAPTER - 8

TESTING

8.1 TEST CASES

A test case might be created as an automated script to verify the functionality per the original acceptance criteria. After doing manual exploratory testing, QA testers might suggest other functionality be added to the application as well as updated test cases be incorporated in the automated test suite.

Table 8.1. Test Case

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test Data	Expected Result	Actual Result	Status
SplashScreen_TC_OO1	Functional	Home Page	Verify the splash screen is working good	1.Enter URL and click go 2.The splash screen will open 3.click the image in splash screen	https://drive.google.com/file/d/13vcj8LGrt4_fgnGKDyyosiMQbrMZFvS2/view?usp=share_link	Splash screen should display	Working as expected	Pass
HomePage_TC_OO2	UI	Home Page	Verify the UI elements in Home screen	1.Enter URL and click go 2.Enter the medicine details to store data: a.Enter the medicine name b.Enter the Date c.Enter the Time 3. click next button to move to the next page	https://drive.google.com/file/d/13vcj8LGrt4_fgnGKDyyosiMQbrMZFvS2/view?usp=share_link	Application should show below UI elements: a.Name of Medicine text box b.Date text box c.Time text box d.Next button	Working as expected	pass

Remainder Page_TC_ OO3	Functional	Home page	Verify user is able to get the remainder alarm with medicine name displayed	1.Enter URL and click go 2. automatically display the medicine data in the text box 3.The alarm should ring at the user entered time	It' Time to Take Medicine Glipizide	Get the remainder alarm	Working as expected	pass
DB_TC_O O4	Functional	Login page	verify the data is stored in cloudant DB	1.Enter URL and click go 2.go to cloudant DB 3.Verify the data	{ "id": 2022-11-18 21:23, "medicine":Glipizid e}	The Medicine data should stored in the DB	Working as expected	pass
Simulation _TC_OO5	Functional	Login page	Verify the simulation is Working Good	1.Enter URL and click go 2.Run the simulation 3.The LED should Blink 4.The Alarm should ring	Glipizide	The Alarm should come through buzzer and the LED also Blink then the Medicine name should display in the LED	Working as expected	pass

8.1 USER ACCEPTANCE TESTING

Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the Medicine reminder project at the time of the release to UserAcceptance Testing (UAT).

Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Table 8.2. Defect Analysis

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	9	3	2	1	15
Duplicate	0	0	1	2	3
External	2	3	0	1	6
Fixed	8	2	4	14	28
Not Reproduced	0	0	1	0	1
Skipped	0	0	0	1	1
Won't Fix	0	0	0	1	1
Totals	19	14	8	20	55

Test Case Analysis**Table 8.3. Test Case Analysis**

Section	Total Cases	Not Tested	Fail	Pass
User Application	5	0	0	5
Caretaker Application	20	0	0	20
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

CHAPTER - 9

RESULTS

9.1 Performance Metrics

NFT - Detailed Test Plan

Table 9.1. NFT - Detailed Test Plan

S.No	Project Overview	NFT Test approach	Assumptions/Dependencies/Risks	Approvals/Sign Off
1	Medicine Reminder Web -UI	Stress	App Crash/ Developer team/ Site Down	Approved
2	Medicine Reminder Web -UI	Load	Server Crash/ Developer team/ Server Down	Approved

End Of Test Report

Table 9.2. End Of Test Report

Project Overview	NFT Test approach	NFR - Met	GO/NO-GO decision	Identified Defects	Approvals/ Sign Off
Medicine Reminder Web -UI	Stress	Performance	GO	Closed	Approved
Medicine Reminder Web -UI	Load	Scalability	NO-GO	Closed	Approved

CHAPTER - 10

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- The software can help people set free from remembering the medication time and names.
- It helps the caretaker to determine the medication time, which can be variable sometimes, depending upon the patient's severity.
- The software is very user-friendly; the need not install any external app by the patient, economic for the caretaker too.
- The single software can be used by the caretaker for managing multiple patients at the same place.
- The details of the time scheduled, and patients' intake is stored in the database for future reference easily.
- Accessibility of electronic medical records allow patients to receive quality care and help healthcare providers make the right medical decisions and prevent complications.
- The overall stress of patients and caretakers is reduced and maintained under control by the software.

DISADVANTAGES

- The software currently can only alert the patient to take medicine, we cannot ensure whether they have taken it or not.
- The software currently can only alert people with SMS, it cannot make phone calls to help the illiterate.
- Failure or bugs in the hardware or even power failure can impact the performance of sensors and connected equipment placing healthcare operations at risk. In addition, skipping a scheduled software update may be even more hazardous than skipping a doctor checkup.

CHAPTER - 11

CONCLUSION

The project can help senior citizens who forget to take their mandatory medications on time. As such situations can put them into trouble like an instant increase in blood pressure, heart rate, etc. Therefore, our project helps them by acting as a virtual assistant which can give them timely reminders to take the specified medicines. Thus, the problem of missing the timely intake of medicines is reduced and the health of the patient is well monitored by the caretaker. This project is economic and easy to use by anybody with a client, and caretaker connectivity.

The project helps private users and their connected caretakers by procuring the medication details from the caretaker and securely processing the data for the desired result of SMS alerts. Senior citizens are properly monitored by their caretakers and thus, caretakers can make sure that their patients are taking the right medicines at the right times without delay.

With this solution, the problem can attain an economic and easily usable way to overcome the difficulties faced by senior citizens. Thus, the result of our system provides fast curing of patient health by using our advantageous system.

CHAPTER - 12

FUTURE SCOPE

The project can be enhanced with many other features that can serve senior citizens even better. IOT has a lot of potentials and it's not only in healthcare. In future challenges of IOT in healthcare, many companies are working on new ways to solve the challenges with the help of this technology to help our medical world.

The product currently is a simple basic version which can only send SMS alerts on time. Some other additional features that are planned to be incorporated with this existing product are listed below:

- The system can be enhanced with a smartwatch or health devices so that the health conditions can be continuously connected with the hospitals, and doctors to supervise and help them during emergencies.
- The system can relate to hardware product that stores and automatically opens the container and alerts with a voice message
- The system can further relate to the medical shop so that the hardware system automatically senses the tablet counts and alerts the medical shop to deliver the medicine.

CHAPTER - 13

APPENDIX

13.1 SOURCE CODE

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQTT
#include <LiquidCrystal_I2C.h>
#include <DHT.h>// Library for dht11
#define DHTPIN 15    // what pin we're connected to
#define DHTTYPE DHT11 // define type of sensor DHT 11
#define LED 2
DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and type of
dht connected
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-----credentials of IBM Accounts-----

#define ORG "7kzrri"//IBM ORGANIZATION ID
#define DEVICE_TYPE "nodemcu"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"    //Token
String data3="";
int buzz= 13;

//----- Customise the above values -----
char server[] = ORG".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/type/nodemcu/id/12345/evt/status/fmt/json";// topic
name and type of event perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd REPRESENT
command type AND COMMAND IS TEST OF FORMAT STRING
char authMethod[] = "use-token-auth";// authentication method
```

```

char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
LiquidCrystal_I2C lcd(0x27,32,2);

//-----
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client
id by passing parameter like server id,portand wificredential

void setup()// configureing the ESP32
{
  Serial.begin(115200);
  dht.begin();
  pinMode(buzz, OUTPUT);
  pinMode(LED,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}
void loop()// Recursive Function
{
  if (!client.loop()) {
    mqttconnect();
  }
}

/.....retrieving to Cloud...../
void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");

```

```

    delay(500);
}

    initManagedDevice();
    Serial.println();
}
}
void wificonnect() //function defination for wificonnect
{
    Serial.println();
    Serial.print("Connecting to ");
    WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the
connection
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
    Serial.println("");
    Serial.println("WiFi connected");
    Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
}
void initManagedDevice() {
    if (client.subscribe(subscribetopic)) {
        Serial.println((subscribetopic));
        Serial.println("subscribe to cmd OK");
    } else {
        Serial.println("subscribe to cmd FAILED");
    }
}

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
    Serial.print("callback invoked for topic: ");
    Serial.println(subscribetopic);
}

```

```

for (int i = 13; i < payloadLength-2; i++) {
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
}
Serial.println("Medicine Name: "+ data3);
if(data3 != "")
{
    lcd.init();
    lcd.print(medicine);
    digitalWrite(LED,HIGH);
    tone(buzz, 100, 1000);
    delay(2000);
    digitalWrite(LED,LOW);
    noTone(buzz);
    delay(1000);
}
else
{
    digitalWrite(LED,LOW);
}
data3 = "";
}

```

Github link:

<https://github.com/IBM-EPBL/IBM-Project-26961-1660041630>

Demo link:

https://drive.google.com/file/d/1IGBQMWmvVDRy2aYy5a1fK7HoIDTDJpsx/view?usp=share_link