**Personal Assistance for Seniors who are Self- Reliant**

# A PROJECT REPORT

Submitted By

|  |  |
| --- | --- |
| **J. PREETHI** | **(721719106045)** |
| **R. RASIHA** | **(721719106048)** |
| **R.SADHURYA** | **(721719106049)** |
| **P.SHOBA** | **(721719106058)** |

in partial fulfillment for the award of the degree of

**BACHELOR OF ENGINEERING**

in

**ELECTRONICS AND COMMUNICATION ENGINEERING**

P.A. COLLEGE OF ENGINEERING AND TECHNOLOGY, COIMBATORE

# INTRODUCTION

## PROJECT OVERVIEW

* + - An app is built for the user (caretaker) which enables him to set the desired time and medicine. These details will be stored in the IBM Cloudant DB.
    - If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform.
    - The device will receive the medicine name and notify the user with voice commands.

## PURPOSE

* + - Sometimes elderly people forget to take their medicine at the correct time.
    - They also forget which medicine He / She should take at that particular time.
    - And it is difficult for doctors/caretakers to monitor the patients around the clock. To avoid this problem, this medicine reminder system is developed.

# LITERATURE SURVEY

## EXISTING PROBLEM

Elderly people let slip the medications at the correct time and the existing solutions for this problem is setting reminders or using pill boxes, calendars, Personal Assistance. Though the solutions give reminders, the voice commands or assistance given by this system is more efficient.

## REFERENCES

1.A. Sawand, S. Djahel, Z. Zhang, and F. Na. Multidisciplinary Approaches to Achieving Efficient and Trustworthy e Health Monitoring Systems. Commun .China (ICCC), 2014 IEEE/CIC Int. Conf., pp. 187– 192, 2014.

1. D. a. Clifton, D. Wong, L. Clifton, S. Wilson, R. Way, R. Pullinger, and

L. Tarassenko. A large-scale clinical validation of an integrated monitoring system in the Emergency Department. IEEE J. Biomed. Heal. Informatics vol. 17, no. 4, pp. 835–842, 2013.

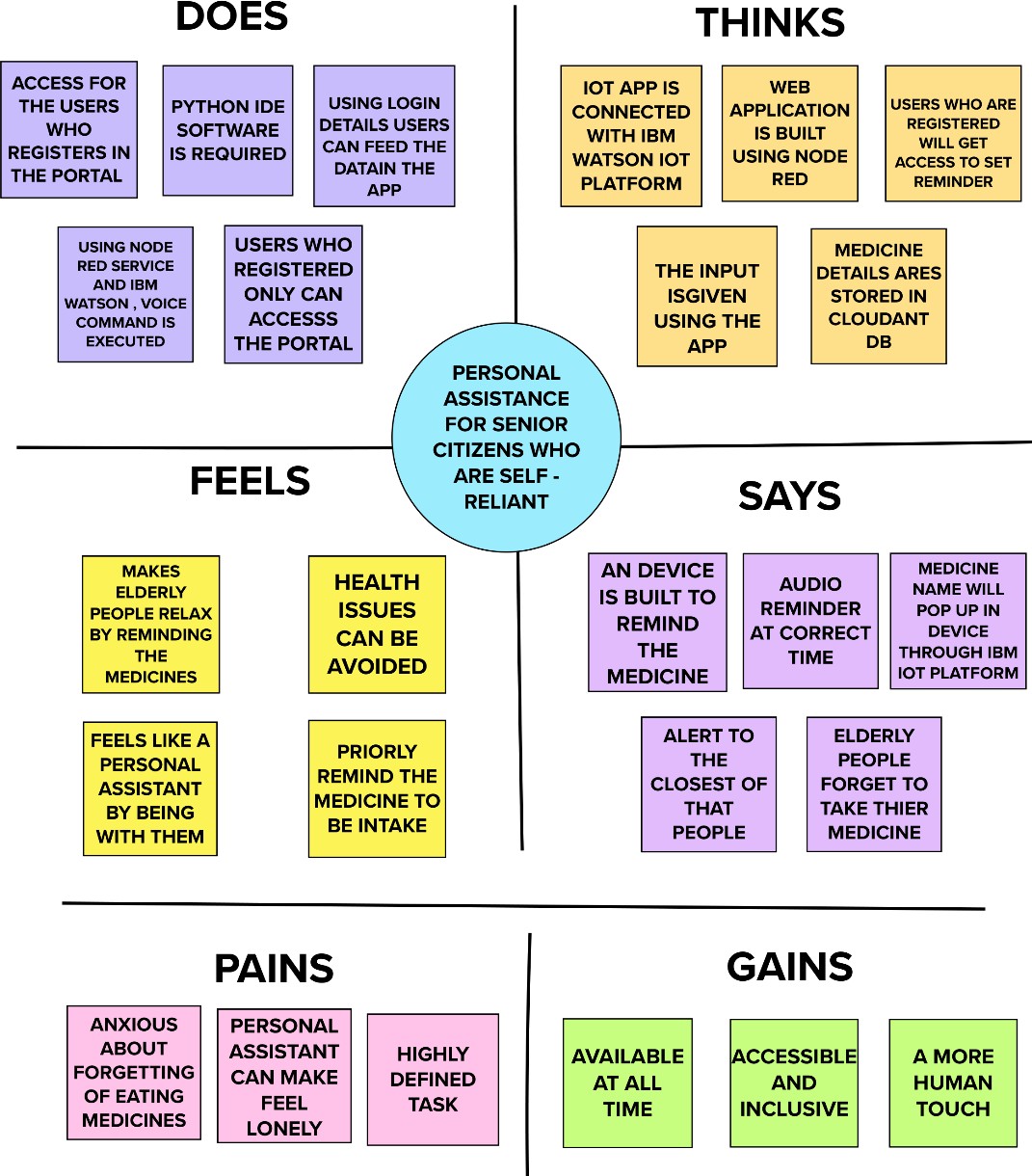
1. M. Parida, H.-C.Yang, S.-W.Jheng, and C.-J. Kuo.Application of RFID Technology for In-House Drug Management System.15th Int. Conf.Network-Based Inf. Syst., pp. 577–581, 2012.
2. L. Ilkko and J. Karppinen.UbiPILL A Medicine Dose Controller of Ubiquitous Home Environment. 2009 Third Int. Conf. Mob. UbiquitousComput.Syst. Serv. Technol., pp. 329–333, 2009.
3. A. Kliem, M. Hovestadt, and O. Kao.Security and Communication Architecture for Networked Medical Devices in Mobility-Aware e Health Environments,” 2012 IEEE First Int. Conf. Mob. Serv., pp. 112–114, 2012.
4. S. T.-B. Hamida, E. Ben Hamida, B. Ahmed, and A. AbuDayya.Towards efficient and secure in-home wearable insomnia monitoring and diagnosis system.13th IEEE Int. Conf. Bioinforma. Bioeng., pp. 1–6, 2013.
5. P. Ray.Home Health Hub Internet of Things (H 3 IoT): An architectural framework for monitoring health of elderly people.Sci. Eng. Manag.Res, pp. 3–5, 2014.
6. S. Huang, H. Chang, Y. Jhu, and G. Chen.The Intelligent Pill Box - Design and Implementation.pp. 235–236, 2014.
7. F.-T. Lin, Y.-C.Kuo, J.-C.Hsieh, H.-Y.Tsai, Y.-T. Liao, and H. C. Lee A Self-powering Wireless Environment Monitoring System Using Soil Energy. IEEE Sens. J., vol. 15, no. c, pp. 1–1, 2015.
8. S. S. Al-majeed.HomeTelehealth by Internet of Things (IoT).pp. 609– 613, 2015.

## PROBLEM STATEMENT DEFINITION

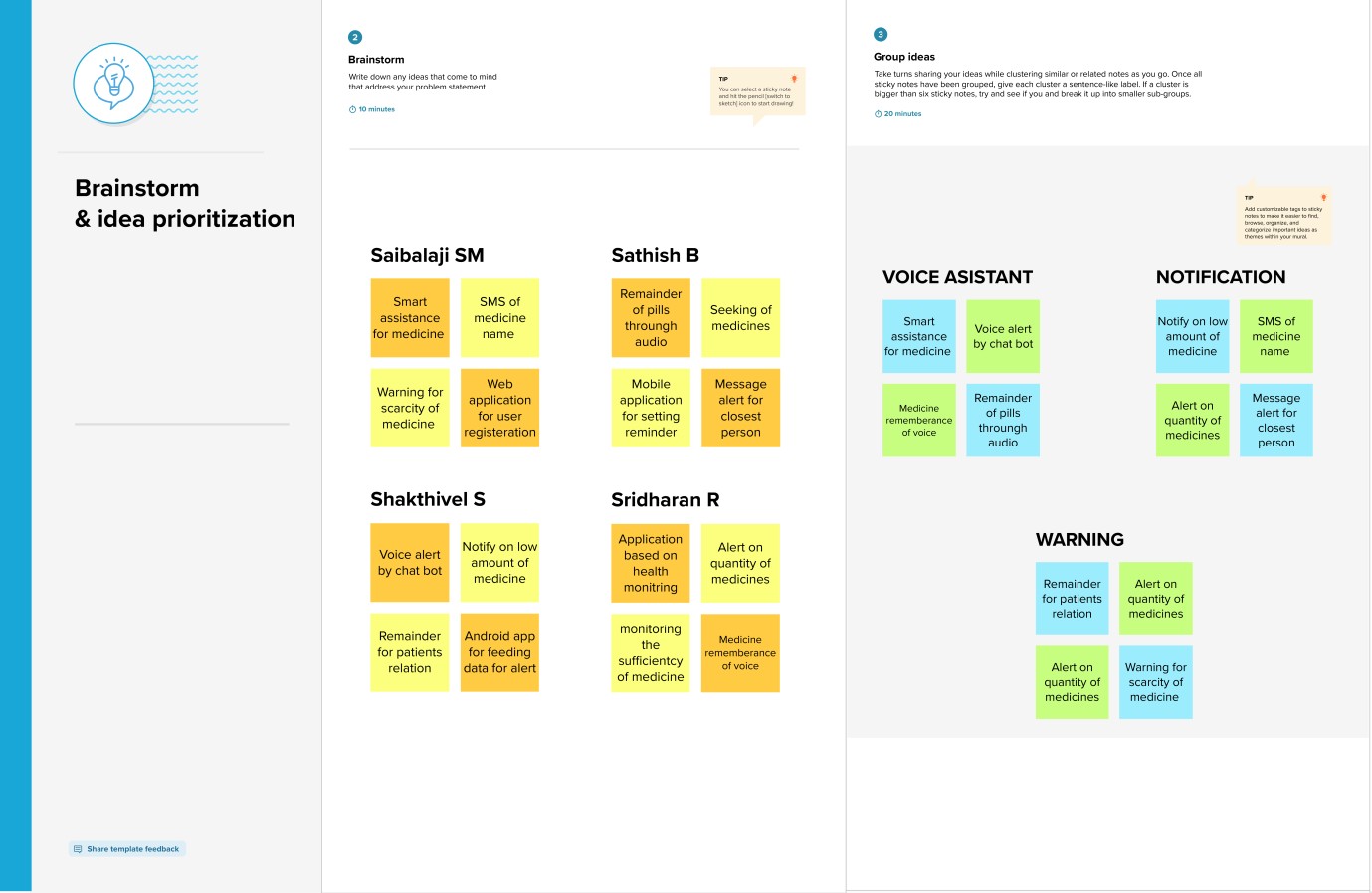
It is very difficult for the senior citizens (elder people) to remember their medicines. To avoid the skipping up the medicines,they can be remembered by using the voice commands of the medicine names at correct time specified. If the voice commands on the medicine name is not available, they are given the reminder of the medicine by SMS on their phone or to their closest person.

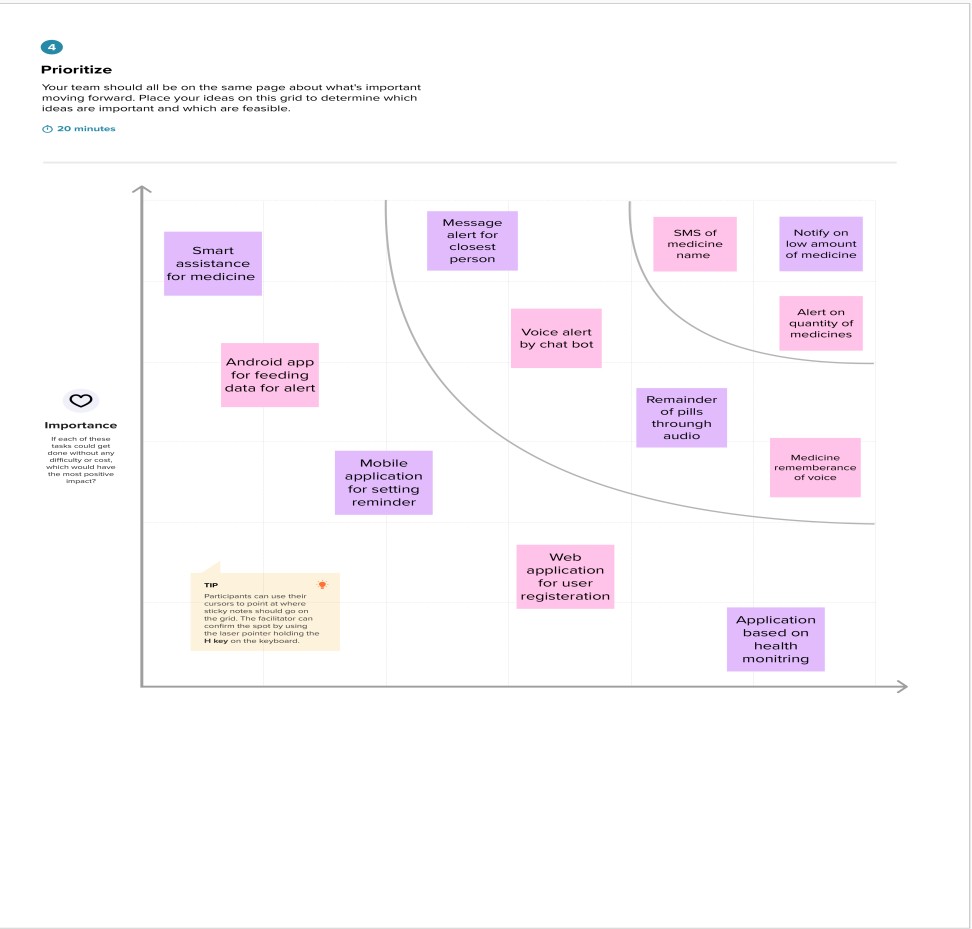
# IDEATION & PROPOSED SOLUTION

## EMPATHY MAP CANVAS



* 1. **IDEATION AND BRAINSTORMING**



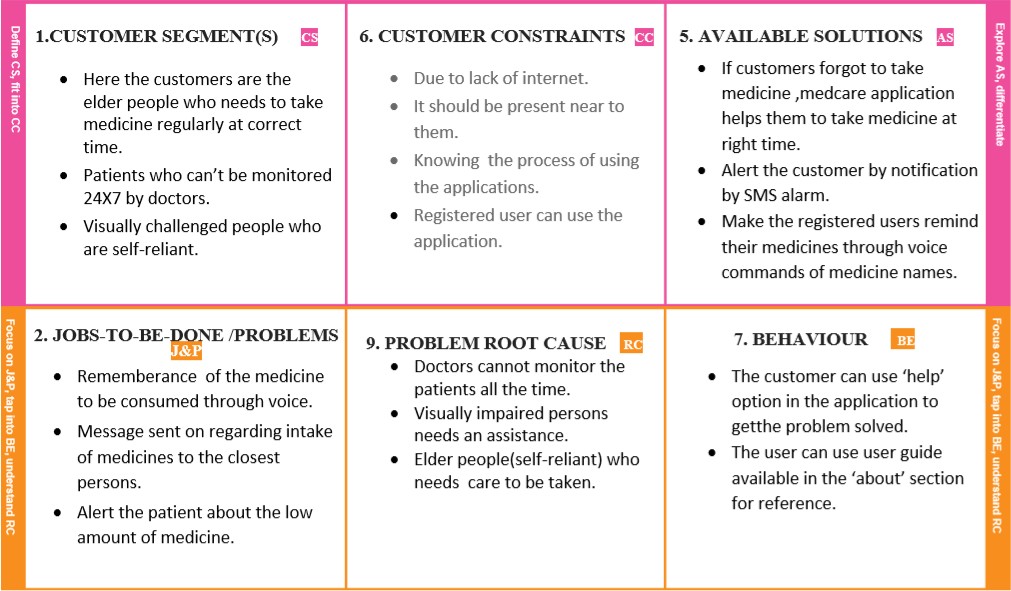


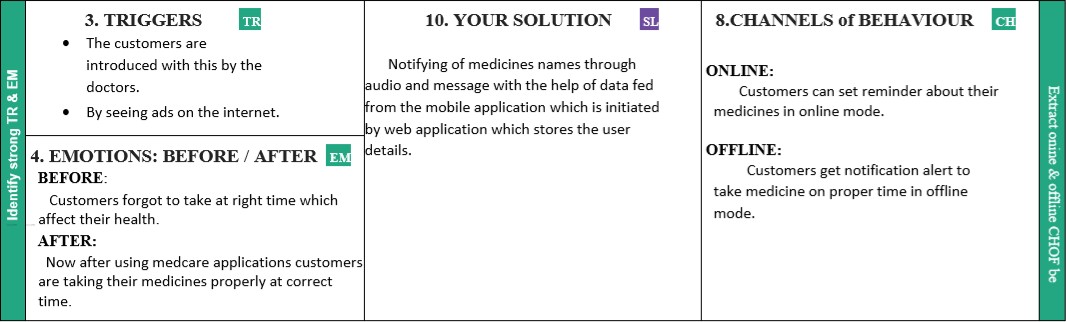
## PROPOSED SOLUTION

|  |  |  |
| --- | --- | --- |
| **S.No** | **Parameter** | **Description** |
| 1 | Problem Statement (Problem to be solved) | Senior citizens who are in need of medicine reminder and self- assistance because they don't want  to skip their intake of medicine |
| 2 | Idea / Solution description | Creation of the web application which remind the medicine name  and time through a voice alert |
| 3 | Novelty / Uniqueness | Blind people can get to know  their time of taking pills |
| 4 | Social Impact /  Customer Satisfaction | The users are satisfied with the  proper reminder and intake of pills |
| 5 | Business Model (Revenue Model) | By our web application the  revenue can be made in the form of popping up of advertisements or by |

|  |  |  |
| --- | --- | --- |
|  |  | overlaying add from third party  services |
| 6 | Scalability of the Solution | Vast number of people who are aged can be provided with portable devices to ensure their health  conditions by consuming medicines at correct time using web application |

* 1. **PROBLEM SOLUTION FIT**





# REQUIREMENT ANALYSIS

## FUNCTIONAL REQUIREMENTS

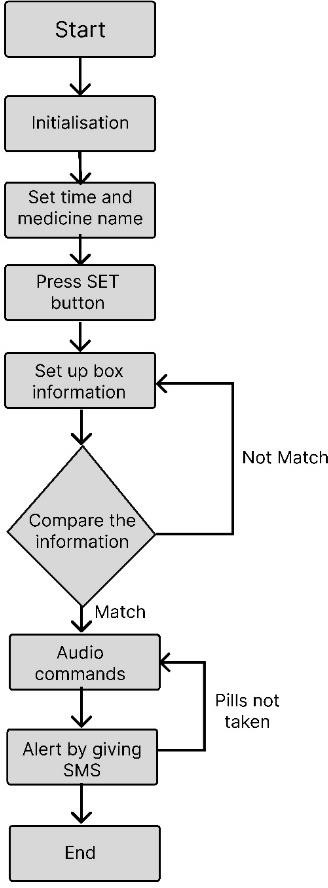
|  |  |  |
| --- | --- | --- |
| **FR**  **No.** | **Functional**  **Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| FR-1 | User Registration | Registration through Gmail  Registration by phone number |
| FR-2 | User Confirmation | Confirmation via Email  Confirmation through SMS/Messages |
| FR-3 | User Login (Web) | Login with registered mail id and  password |
| FR-4 | User Login (mobile app) | Login with registered mobile number and  password |
| FR-5 | User’s Medical Information | In the app, enter your medicine  details with date.Then set the time in the app. |

* 1. **NON-FUNCTIONAL REQUIREMENTS**

|  |  |  |
| --- | --- | --- |
| **FR**  **No**  **.** | **Non-Functional Requirement** | **Description** |
| NFR- 1 | **Usability** | The system should be user-friendly for the users. It is used to remaind the medicine names.  It alerts the users through voice commands. |
| NFR- 2 | **Security** | The login information should not be accessed by anyother users than the respective.  The data of the users should be kept confidential. |
| NFR- 3 | **Reliability** | Reminds on correct time  The user data should be updated and examined after certain period of  time. |
| NFR- 4 | **Performance** | The voice message will be delivered accurately tothe given time.  It works without any connection interruption |
| NFR- 5 | **Availability** | The system should be monitored 24X7 for the alert of medicines.  It can be used by any registered users from anyplace. |
| NFR- 6 | **Scalability** | It is easily adaptable  The device is compatible and portable  The application can handle any number of registration. |

# PROJECT DESIGN

## Diagram Description automatically generatedDATA FLOW DIAGRAMS



* 1. **SOLUTION & TECHNICAL ARCHITECTURE**

### IOT Device:

* Getting the information from the application about the time and name of the medicines.
* Sending an SMS to the persons.
* Gathering the user information from the web application in which the user registers.

To accomplish this, we have to complete all the activities listed below:

### Create and Configure IBM Cloud Services:

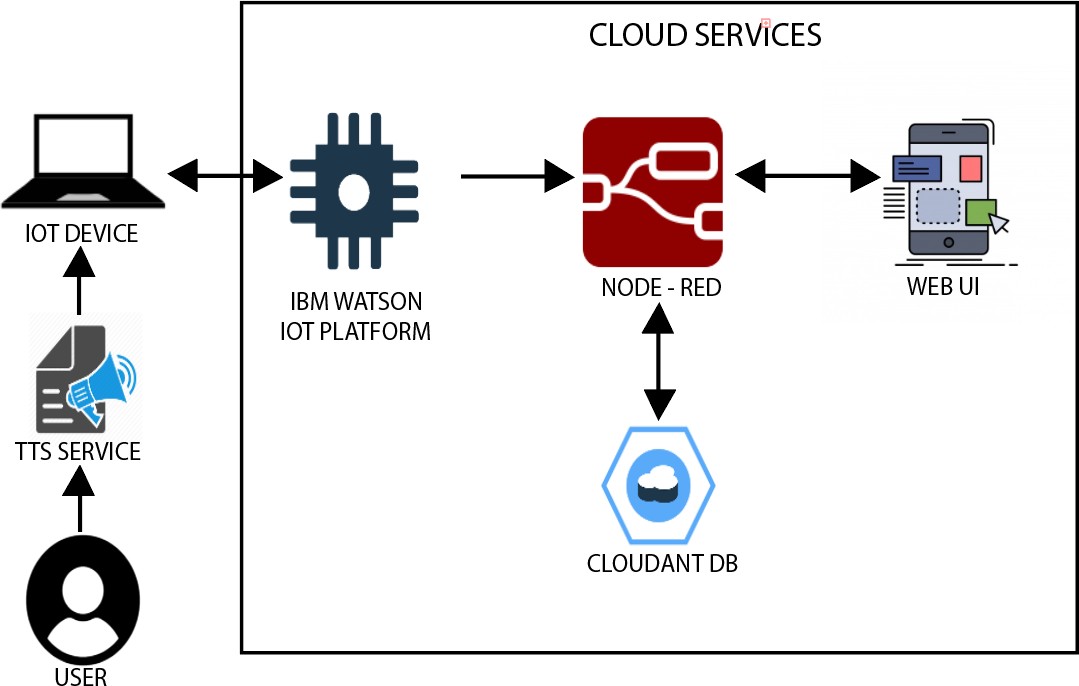
* Create IBM Watson IOT platform
* Create a device & configure the IBM IOT Platform
* Create Node-Red service
* Create a database in IBM Cloudant DB to medicine names and time.

### Develop a web application using Node-RED service:

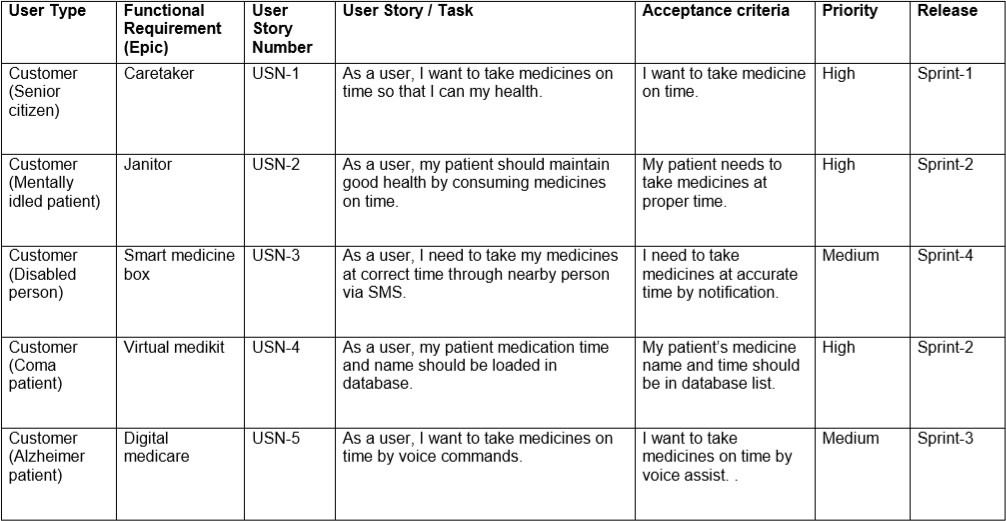
* Develop the web application using Node-RED.
* Develop a python script to publish the medicine names and time to remind details to the IBM IOT Platform.

### Develop an application:

* Develop an application in which the user can feed the data on the medicine name and time.
* Develop an application which can transmit the signal on the reminder of the medicines at the time specified.



* 1. **USER STORIES**



# PROJECT PLANNING & SCHEDULING

## SPRINT PLANNING & ESTIMATION

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sprint** | **Functional**  **Requirement (Epic)** | **User**  **Story Number** | **User Story / Task** | **Story Points** | **Priority** | **Team Members** |
| Sprint- 1 | Login | USN-1 | As a admin, I can log into the application by entering username &  password | 5 | Medium | Sathish B |
| Sprint- 1 |  | USN-2 | When the admin doesn’t enter the username it displays an error message  group | 3 | Medium | Sathish B |
| Sprint- 1 |  | USN-3 | When the admin doesn’t enter the password it displays an error message  popup | 4 | Medium | Sathish B |
| Sprint- 1 |  | USN-4 | When the admin enters the invalid credentials it displays an error popup | 5 | Medium | Shakthivel S |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sprint** | **Functional Requirement (Epic)** | **User Story Number** | **User Story / Task** | **Story Points** | **Priority** | **Team Members** |
| Sprint- 1 |  | USN-5 | When the admin enter the correct username and password it redirects to the  dashboard | 3 | High | Shakthivel S |
| Sprint- 2 | Dashboard | USN-1 | Creating a  Node-Red dashboard | 5 | Medium | Saibalaji SM |
| Sprint- 2 |  | USN-2 | Devoloping a Node-Red to  publish data to IBM cloud | 8 | High | Saibalaji SM |
| Sprint- 2 |  | USN-3 | Create a register form  in Node-Red | 7 | Medium | Saibalaji SM |
| Sprint- 3 | Creating device | USN-1 | Creating a device in IBM Watson IOT  platform | 10 | High | Shakthivel S |
| Sprint- 3 | Python | USN-2 | Connect the device created in wokwi to the device created in IBM  Watson IOT platform. | 10 | High | Saibalaji SM |
| Sprint- 4 | MIT app inventor | USN-1 | Create a Interface for  login page and Dashboard | 5 | Low | Sridharan R |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sprint** | **Functional Requirement (Epic)** | **User Story Number** | **User Story / Task** | **Story Points** | **Priority** | **Team Members** |
| Sprint- 4 |  | USN-2 | Connect MIT app to Node  Red | 5 | High | Sridharan R |
| Sprint- 4 |  | USN-3 | As a user, I can keep track of the  medicine time | 6 | Medium | Sridharan R |
| Sprint- 4 | Alert | USN-4 | Retrieving the time from cloudant and alert the user through voice  command | 4 | High | Sridharan R |

* 1. **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 | 4 Days | 31 Oct  2022 | 3 Nov  2022 | 20 | 2 Nov  2022 |
| Sprint-  2 | 20 | 5 Days | 04  Nov2022 | 8 Nov  2022 | 20 | 8 Nov  2022 |
| Sprint-  3 | 20 | 5 Days | 09 Nov  2022 | 13 Nov  2022 | 20 | 12 Nov  2022 |
| Sprint-  4 | 20 | 4 Days | 14 Nov  2022 | 17 Nov  2022 | 20 | 18 Nov  2022 |

## Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let’s calculate the team’s average velocity (AV) per iteration unit (story points per day)

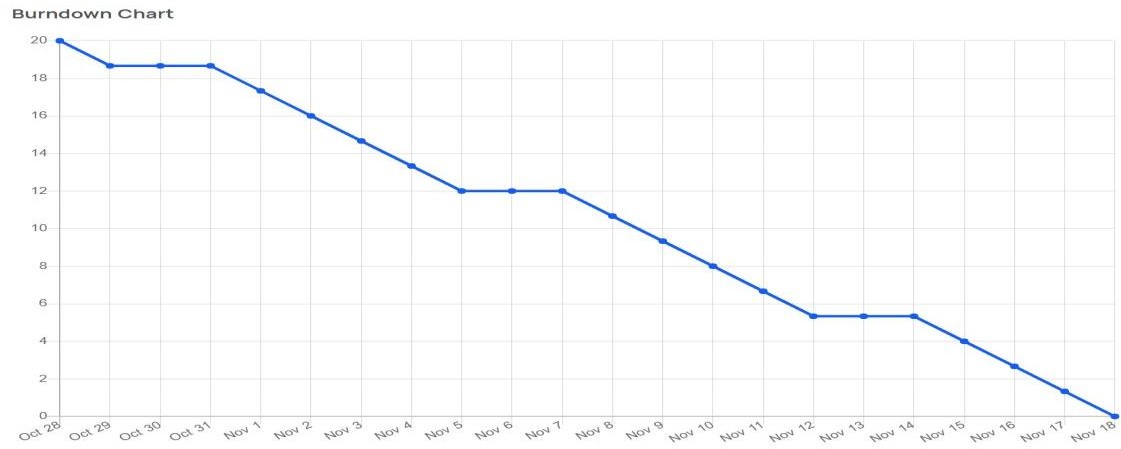
AV = Sprint duration / Velocity

= 20 / 18

AV= 1.11

### Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

<https://www.visual-paradigm.com/scrum/scrum-burndown-chart/> <https://www.atlassian.com/agile/tutorials/burndown-charts>

## REPORTS FROM JIRA

**PAFSWASR-1:**

|  |  |  |  |
| --- | --- | --- | --- |
| ***[PAFSWASR-1]*** [***Login page***](https://saibalaji05.atlassian.net/browse/PAFSWASR-5) *Created: 13/Nov/22 Updated: 13/Nov/22 Resolved: 13/Nov/22* | | | |
| **Status:** | Done | | |
| **Project:** | [Personal assistance for seniors wo are self-reliant](https://saibalaji05.atlassian.net/secure/BrowseProject.jspa?id=10000) | | |
| **Components:** | HTML,CSS,Javascript | | |
| **Affects versions:** | 5.0 | | |
| **Fix versions:** | 5.0 | | |
| **Type:** | Task | **Priority:** | Medium |
| **Reporter:** | [Saibalaji Sm](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636e0946847c699ac65253f1) | **Assignee:** | [shakthivel2308](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636e10ead7c060fdaa5c1398) |
| **Resolution:** | Done | **Votes:** | 0 |
| **Labels:** | None | | |
| **Remaining Estimate:** | 3 hours | | |
| **Time Spent:** | 21 hours | | |

|  |  |
| --- | --- |
| **Original estimate:** | 1 days |
| **Rank:** | 1 |
| **Sprint:** | Sprint 1 |

Generated at Sun Nov 13 14:17:39 UTC 2022 by Saibalaji Sm using Jira 1001.0.0- SNAPSHOT#100210-sha1:583150f45e96fe66b2cb2898eb1e9ae5719d8732.

## PAFSWASR-2:

|  |  |  |  |
| --- | --- | --- | --- |
| ***[PAFSWASR-2]*** [***create a node red dashboard***](https://saibalaji05.atlassian.net/browse/PAFSWASR-9) *Created: 13/Nov/22 Updated: 13/Nov/22 Resolved: 13/Nov/22* | | | |
| **Status:** | Done | | |
| **Project:** | [Personal assistance for seniors wo are self-reliant](https://saibalaji05.atlassian.net/secure/BrowseProject.jspa?id=10000) | | |
| **Type:** | Task | **Priority:** | Medium |
| **Reporter:** | [Saibalaji Sm](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636e0946847c699ac65253f1) | **Assignee:** | [Saibalaji Sm](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636e0946847c699ac65253f1) |
| **Resolution:** | Done | **Votes:** | 0 |
| **Labels:** | None | | |
| **Remaining Estimate:** | 5 hours | | |
| **Time Spent:** | 28 hours | | |

|  |  |
| --- | --- |
| **Original estimate:** | 2 days |
| **Rank:** | 2 |
| **Sprint:** | Sprint 2 |

Generated at Sun Nov 13 15:53:00 UTC 2022 by Saibalaji Sm using Jira 1001.0.0- SNAPSHOT#100210-sha1:583150f45e96fe66b2cb2898eb1e9ae5719d8732.

## PAFSWASR-3:

|  |  |  |  |
| --- | --- | --- | --- |
| ***[PAFSWASR-3]*** [***Create an app in MIT App Inventor for entering the details***](https://saibalaji05.atlassian.net/browse/PAFSWASR-11) *Created: 18/Nov/22 Updated: 18/Nov/22* | | | |
| **Status:** | Done | | |
| **Project:** | [Personal assistance for seniors wo are self-reliant](https://saibalaji05.atlassian.net/secure/BrowseProject.jspa?id=10000) | | |
| **Components:** | MIT App Inventor | | |
| **Affects versions:** | None | | |
| **Fix versions:** | None | | |
| **Type:** | Task | **Priority:** | Medium |
| **Reporter:** | [Saibalaji Sm](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636e0946847c699ac65253f1) | **Assignee:** | [Sridharan R](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636b8518c9b26a8d857c877a) |
| **Resolution:** | Done | **Votes:** | 0 |

|  |  |
| --- | --- |
| **Labels:** | None |
| **Remaining Estimate:** | 4 hours |
| **Time Spent:** | 15 hours |
| **Original estimate:** | 1 day |
| **Rank:** | 2 |
| **Sprint:** | Sprint-3 |

Generated at Fri Nov 18 18:26:22 UTC 2022 by Saibalaji Sm using Jira 1001.0.0-SNAPSHOT#100210- sha1:9b34d7cc56ccedf37042f403595483f2079121f4.

## PAFSWASR-4:

|  |  |
| --- | --- |
| ***[PAFSWASR-4]*** [***Simulation of device for medicine remainder***](https://saibalaji05.atlassian.net/browse/PAFSWASR-12) *Created: 18/Nov/22 Updated: 18/Nov/22* | |
| **Status:** | Done |
| **Project:** | [Personal assistance for seniors wo are self-reliant](https://saibalaji05.atlassian.net/secure/BrowseProject.jspa?id=10000) |
| **Components:** | Wokwi Simulator |
| **Affects versions:** | None |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fix versions:** | None | | |
| **Type:** | Task | **Priority:** | Medium |
| **Reporter:** | [Saibalaji Sm](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636e0946847c699ac65253f1) | **Assignee:** | [balamurugansam45](https://saibalaji05.atlassian.net/secure/ViewProfile.jspa?accountId=636e10ea3cbe3dde78b60c38) |
| **Resolution:** | Done | **Votes:** | 0 |
| **Labels:** | None | | |
| **Remaining Estimate:** | 2 hours | | |
| **Time Spent:** | 20 hours | | |
| **Original estimate:** | 22 hours | | |
| **Attachments:** | PDF FileSprint-4.pdf | | |
| **Rank:** | 1 | | |
| **Sprint:** | Sprint-4 | | |

Generated at Fri Nov 18 18:36:52 UTC 2022 by Saibalaji Sm using Jira 1001.0.0-SNAPSHOT#100210- sha1:9b34d7cc56ccedf37042f403595483f2079121f4.

# CODING & SOLUTIONING

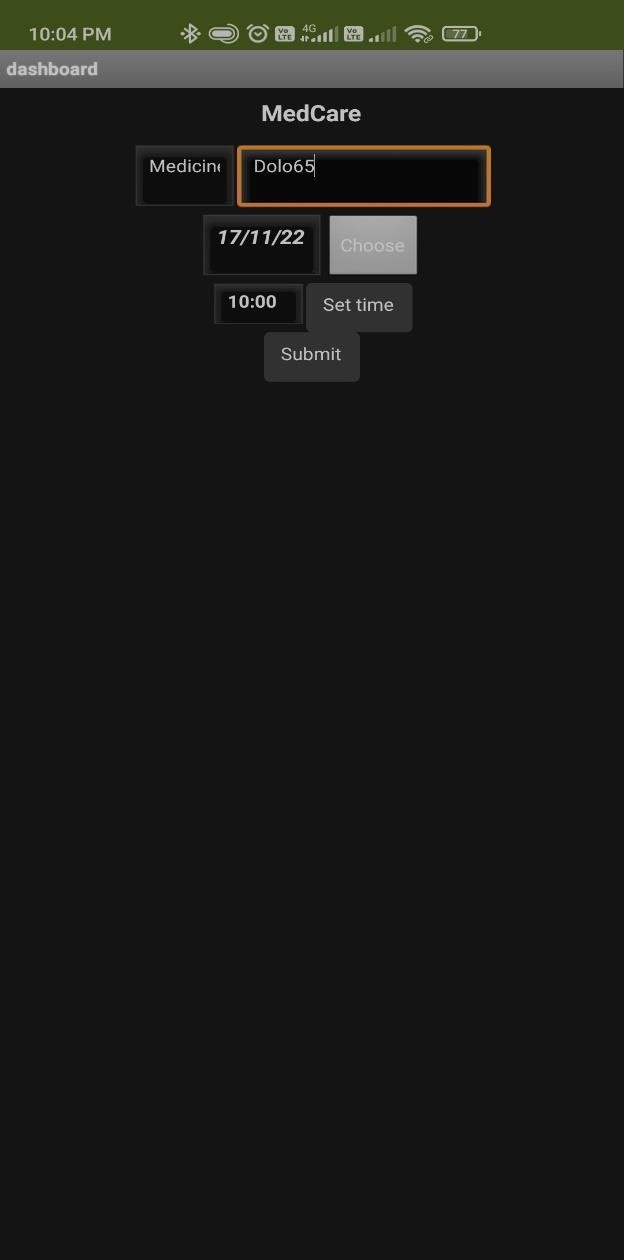
## Feature 1

The mobile application developed has a feature of individual login by different users.



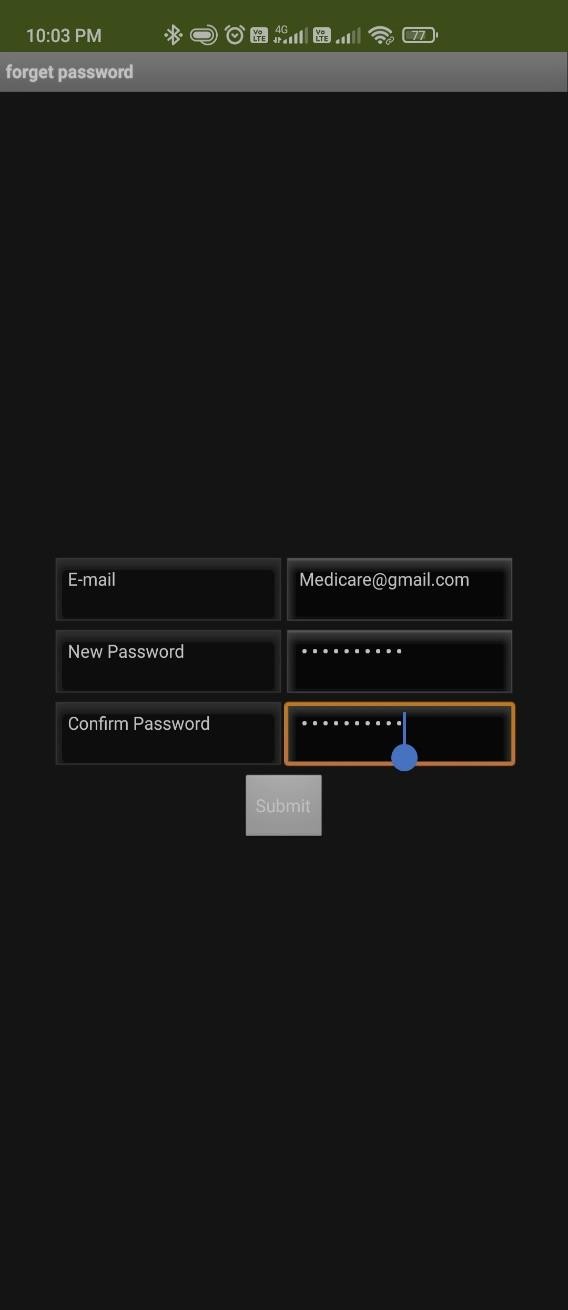
## Feature 2

The mobile application also has the feature of uploading medicine names in the cloud.



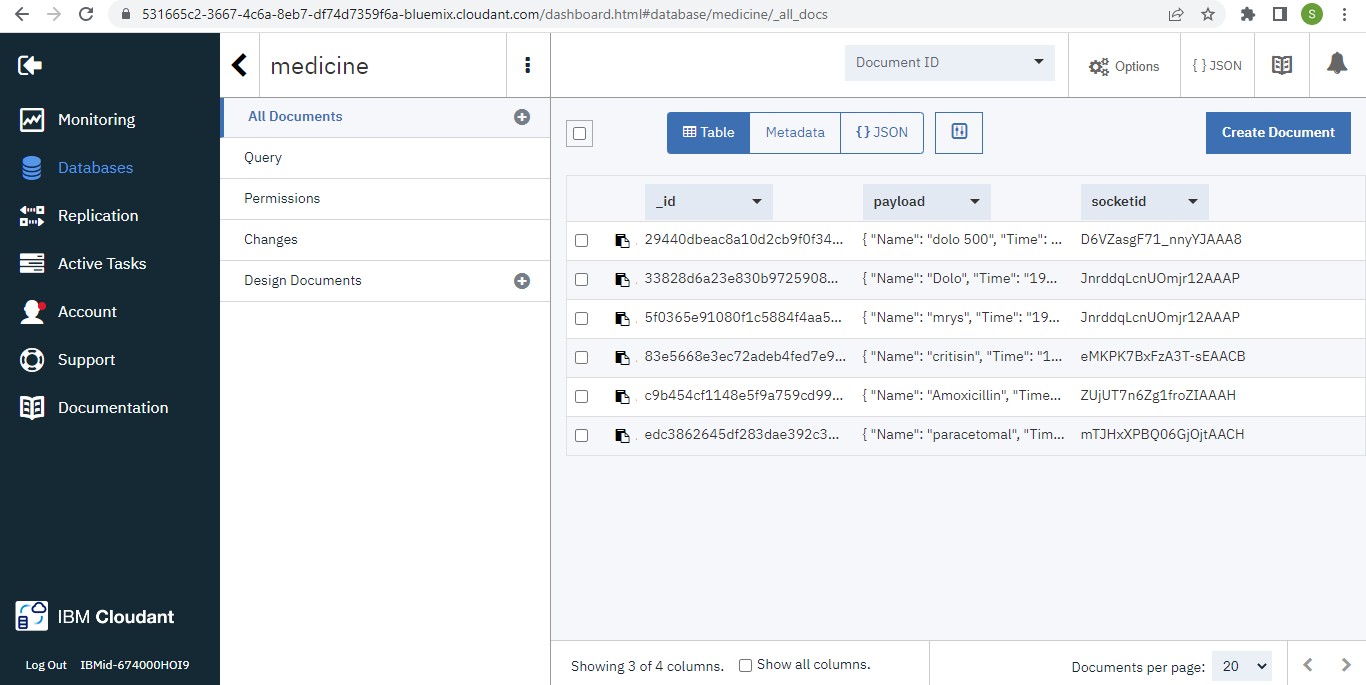
## Feature 3

The mobile application also has the feature of registering username in the database and forgot password feature.



## Feature 4

The project includes a cloud database system.



# TESTING

## TEST CASES

A test case is a document which has a set of conditions or actions that are per formed on thesoftware application in order to verify the expected functionalit y of the feature.After test scripts, test cases are the second most detailed way of documenting testing work.They describe a specific idea that is to be tested

, without detailing the exact steps to be taken

or data to be used. For example, in a test case, you document something like ‘Test if coupons

can be applied on actual price‘. This doesn’t mention how to apply the coup ons or whether

there are multiple ways to apply. It also doesn’t mention if the tester uses ali

nk to apply adiscount, or enter a code, or have a customer service apply it. Th ey give flexibility to thetester to decide how they want to execute the test.

## Test Case Format

The primary ingredients of a test case are an ID, description, bunch of inp uts, few actionablesteps, as well as expected and actual results. Let’s learn what each of them is:

* **Test Case Name**:A test case should have a name or title that is self explanatory.
* **Test Case Description:**The description should tell the tester what t hey’re going to test in brief.
* **PreConditions:**Any assumptions that apply to the test and any prec onditionsthat must be met prior to the test being executed should be listed here.
* **Test Case Steps:**The test steps should include the necessary data a nd

information on how to execute the test. The steps should be clear a nd brief, without leaving out essential facts.

* **Test Data:**It’s important to select a data set that gives sufficient cov erage.Select a data set that specifies not only the positive scenarios b ut negative ones as well.
* **Expected Result**:The expected results tell the tester what they sho uld experience as a result of the test steps.
* **Actual Result:**They specifies how the application actually behaved while test cases were being executed.
* **Comments:**Any other useful information such as screenshots that t ester want’s to specify can be included here.
  1. **USER ACCEPTANCE TESTING**

## Purpose of Document

The main Purpose of UAT is to validate end to end business flow. It does not focus on cosmetic errors, spelling mistakes or system testing. User Acceptance Testing is carried out in a separate testing environment with production-like data setup. It is kind of black box testing where two or more end-users will be involved.

UAT is performed by :

* + - * Client
      * End users



## Defect Analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resolution** | **Severit y 1** | **Severity 2** | **Severity 3** | **Severity 4** | **Subtotal** |
| By Design | 4 | 3 | 2 | 1 | 10 |
| Duplicate | 1 | 0 | 3 | 0 | 4 |
| External | 2 | 2 | 1 | 1 | 6 |
| Fixed | 4 | 3 | 5 | 19 | 31 |
| Not  Reproduced | 1 | 0 | 1 | 1 | 3 |
| Skipped | 0 | 0 | 1 | 1 | 2 |
| Won't Fix | 1 | 3 | 2 | 2 | 8 |
| Totals | 13 | 11 | 15 | 25 | 64 |

* + 1. **Test Case Analysis:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section** | **Total Cases** | **Not Tested** | **Fail** | **Pass** |
| Login Page | 5 | 0 | 0 | 5 |
| Node Red Dashboard | 32 | 0 | 0 | 32 |
| IBM Watson IOT platform | 2 | 0 | 0 | 2 |
| MIT App Inventor | 3 | 0 | 0 | 3 |

# RESULTS

## PERFORMANCE METRICS

These metrics are used to track and measure the effectiveness and profitability of various projects. Each stage of the project is tracked and measured against the goals that the project set out to achieve. The data compiled from the metrics can be used to plan future projects and gives insight on how to make projects more efficient.

# ADVANTAGES & DISADVANTAGES

### Advantages

* Help the elderly people to take their medicine at the correct time.
* Avoid personal assistants or caretakers needed for medically sick people.
* Cost efficient.
* Can store multiple data and many notifications can be generated.
* Since it includes voice assistance, even blind people can use our device.

### Disadvantages

* Makes people lethargic and makes them dependent always on others.
* Requires a stable internet connection.

# CONCLUSION

The project offers the elderly or medically sick people a personal assistant which reminds them of the medicines to be consumed at the particular time. Skipping tablets may lead to serious problems if the person has a severe illness and this can be avoided. Since the cloud is integrated with the mobile application, numerous data can be fed into the database and notifications can be generated. The mobile application developed is highly customisable by the user and easy to use.

# FUTURE SCOPE

The project can be further developed by bringing into the feature of informing the medicine name during the notification. The voice assistance which is given can be customized by adding the user's voice or the caretaker’s voice. Further the mobile application can update medicines by taking voice commands as an input from the user.

1. **APPENDIX Source Code** Device Simulation:

#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 typr of dht connected

void callback(char\* subscribetopic, byte\* payload, unsigned int payloadLength);

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

#define ORG "kizp10"//IBM ORGANITION ID

#define DEVICE\_TYPE "IOTdevice"//Device type mentioned in ibm watson IOT Platform

#define DEVICE\_ID "1234567890"//Device ID mentioned in ibm watson IOT Platform

#define TOKEN "1234567890" //Token String data3="";

int buzz= 13;

//-------- Customise the above values --------

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name

char publishTopic[] = "iot-2/evt/Data/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(0x27,16,2);

//

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); 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 = 0; i < payloadLength; i++) {

//Serial.print((char)payload[i]); data3 += (char)payload[i];

}

Serial.println("Please take your medicines”); if(data3 != "")

{

lcd.init();

lcd.print("Its time for your medicine”);

digitalWrite(LED,HIGH); delay(20000); digitalWrite(LED,LOW);

}

else

{

digitalWrite(LED,LOW);

}

data3="";

}

### Database connection:

import time import sys

import ibmiotf.application import ibmiotf.device import random

#Provide your IBM Watson Device Credentials organization = "kizp10"

deviceType = "IOTdevice" deviceId = "1234567890" authMethod = "token" authToken = "1234567890"

# Initialize GPIO

def myCommandCallback(cmd):

print("Command received: %s" % cmd.data['command']) status=cmd.data['command']

if status=="lighton": print ("led is on")

elif status == "lightoff": print ("led is off")

else :

print ("please send proper command")

try:

deviceOptions = {"org": organization, "type": deviceType, "id":

deviceId, "auth-method": authMethod, "auth-token": authToken} deviceCli = ibmiotf.device.Client(deviceOptions) #..............................................

except Exception as e:

print("Caught exception connecting device: %s" % str(e)) sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10 times

deviceCli.connect()

while True:

#Get Sensor Data from DHT11

temp=random.randint(90,110) Humid=random.randint(60,100)

data = { 'temp' : temp, 'Humid': Humid } #print data

def myOnPublishCallback():

print ("Published Temperature = %s C" % temp, "Humidity = %s

%%" % Humid, "to IBM Watson")

success = deviceCli.publishEvent("IoTSensor", "json", data, qos=0, on\_publish=myOnPublishCallback)

if not success:

print("Not connected to IoTF") time.sleep(10)

deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud deviceCli.disconnect()

### Text-to-Speech:

from ibm\_watson import TextToSpeechV1

from ibm\_cloud\_sdk\_core.authenticators import IAMAuthenticator

authenticator = IAMAuthenticator('KSTdsMPsUS62SL58EqzaZbAFtEW2JlggKYHUI- NKLuvx')

text\_to\_speech = TextToSpeechV1( authenticator=authenticator

)

text\_to\_speech.set\_service\_url('https://api.eu-gb.text-to- speech.watson.cloud.ibm.com/instances/10758658-1ffd-49e5-ae59- ffb2aaa3b131')

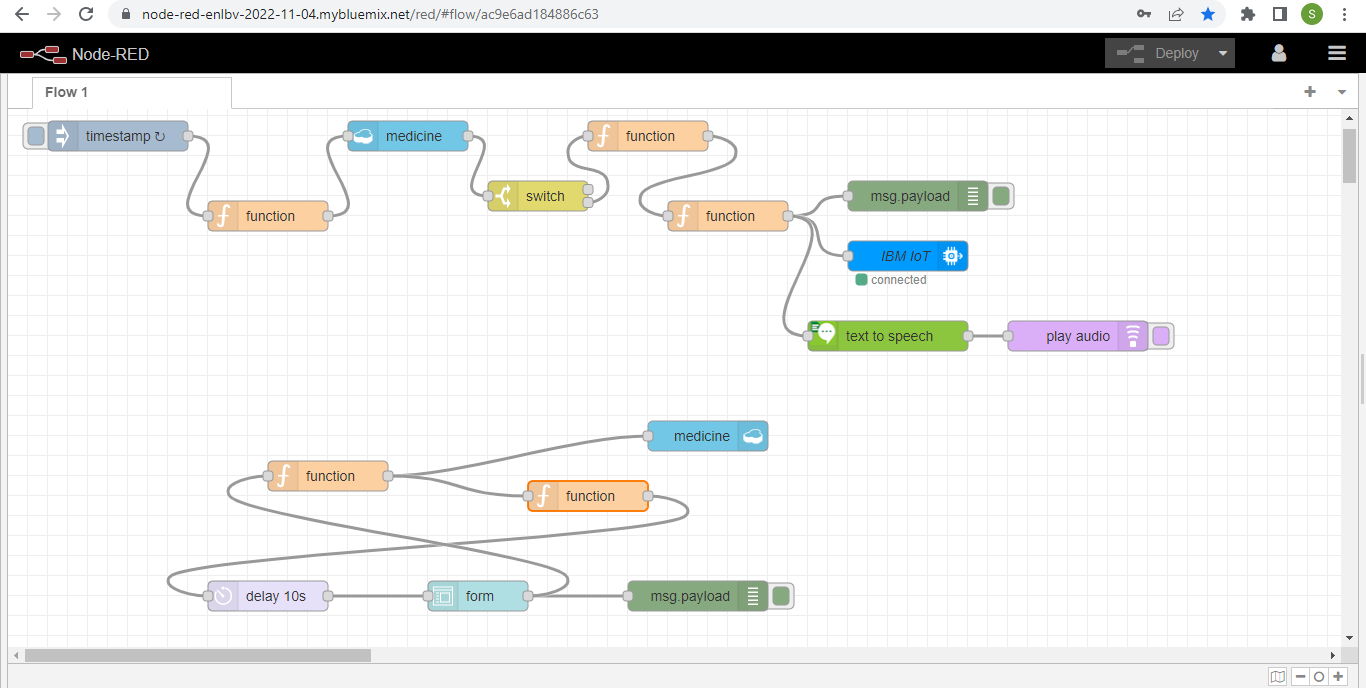
with open('Medicine.wav', 'wb') as audio\_file: audio\_file.write(

text\_to\_speech.synthesize( 'Its time for your medicine',

voice='en-US\_AllisonV3Voice', accept='audio/wav'

).get\_result().content)

### Node-red Flows:



**Flows.json:**

[{"id":"ac9e6ad184886c63","type":"tab","label":"Flow

1","disabled":false,"info":"","env":[]},

{"id":"e791d51f8f5649c5","type":"inject","z":"ac9e6ad184886c63","name":" ","props":[{"p":"payload"},{"p":"topic","vt":"str"}],"repeat":"10","crontab":"

","once":false,"onceDelay":0.1,"topic":"","payload":"","payloadType":"date",

"x":110,"y":60,"wires":[["89f826db8e77a778"]]},{"id":"b337577ceeabe768",

"type":"cloudant in","z":"ac9e6ad184886c63","name":"","cloudant":"c21434afa56c67cf","data base":"medicine","service":"Cloudant-h8- 23515","search":"\_id\_","design":"","index":"","x":400,"y":60,"wires":[["c95 98cd486e11a13"]]},{"id":"fc1e9b8ab90c65ab","type":"cloudant out","z":"ac9e6ad184886c63","name":"","cloudant":"c3cf7d0d9d56e309","d atabase":"medicine","service":"\_ext\_","payonly":true,"operation":"insert","x"

:700,"y":360,"wires":[]},{"id":"39c5174e84d207ec","type":"ui\_form","z":"ac 9e6ad184886c63","name":"","label":"","group":"c2b7d001b83103cd","order ":1,"width":0,"height":0,"options":[{"label":"Enter the

medicine","value":"name","type":"text","required":true,"rows":null},{"label"

:"Time(HH:MM)

","value":"time","type":"time","required":true,"rows":null},{"label":"Date(Y

YYY/MM/DD)","value":"date","type":"date","required":true,"rows":null}],"f

ormValue":{"name":"","time":"","date":""},"payload":"","submit":"submit"," cancel":"cancel","topic":"topic","topicType":"msg","splitLayout":"","classNa

me":"","x":470,"y":520,"wires":[["be40b40b2a27b0de","a7d08bb7e7e4d9cc"

]]},{"id":"89f826db8e77a778","type":"function","z":"ac9e6ad184886c63","n ame":"","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)\nglobal.set(\"time\",time)\nmsg.payload=date+\"

\"+time\nreturn msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":260,"y":1 40,"wires":[["b337577ceeabe768"]]},{"id":"be27a4f287349a79","type":"func tion","z":"ac9e6ad184886c63","name":"","func":"msg.payload=msg.payload. name\nreturn msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":640,"y":6 0,"wires":[["753a71cd01bf517f"]]},{"id":"ae3740ed090a2d5d","type":"functi

on","z":"ac9e6ad184886c63","name":"","func":"msg.payload = {\n

\"date\":\"\",\n \"name\":\"\",\n \"time\":\"\",\n}\nreturn msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":580,"y":4 20,"wires":[["a19f2c1fa687e0ce"]]},{"id":"c9598cd486e11a13","type":"swit ch","z":"ac9e6ad184886c63","name":"","property":"payload","propertyType ":"msg","rules":[{"t":"null"},{"t":"else"}],"checkall":"true","repair":false,"ou

tputs":2,"x":530,"y":120,"wires":[[],["be27a4f287349a79"]]},{"id":"3bf3784

2d99948c2","type":"debug","z":"ac9e6ad184886c63","name":"","active":true

,"tosidebar":true,"console":false,"tostatus":false,"complete":"payload","target Type":"msg","statusVal":"","statusType":"auto","x":910,"y":120,"wires":[]},

{"id":"be40b40b2a27b0de","type":"debug","z":"ac9e6ad184886c63","name": "","active":true,"tosidebar":true,"console":false,"tostatus":false,"complete":"p

ayload","targetType":"msg","statusVal":"","statusType":"auto","x":690,"y":5

20,"wires":[]},{"id":"a19f2c1fa687e0ce","type":"delay","z":"ac9e6ad184886

c63","name":"","pauseType":"delay","timeout":"10","timeoutUnits":"seconds

","rate":"1","nbRateUnits":"1","rateUnits":"second","randomFirst":"1","rand omLast":"5","randomUnits":"seconds","drop":false,"allowrate":false,"outputs ":1,"x":260,"y":520,"wires":[["39c5174e84d207ec"]]},{"id":"c5bcf7f29be64

599","type":"ibmiot out","z":"ac9e6ad184886c63","authentication":"apiKey","apiKey":"7b603bf8 891bac1a","outputType":"cmd","deviceId":"1234567890","deviceType":"2.2

.2","eventCommandType":"command","format":"json","data":"Data","qos":0

,"name":"IBM IoT","service":"registered","x":900,"y":180,"wires":[]},{"id":"a7d08bb7e7e4

d9cc","type":"function","z":"ac9e6ad184886c63","name":"","func":"var d=msg.payload.date\nvar t=msg.payload.time\nvar date=d.slice(0,10)\nvar time=t.slice(10,25)\nvar hit=new Date(date+time)\nhit.setDate(hit.getDate()+1);\nvar utc=hit.getTime()+(hit.getTimezoneoffset()\*60000);\nvar offset=5.5\nnewDate= new Date(utc+(3600000\*offset));\nvar n=newDate.toISOString()\nvar da=n.slice(0,10)\nvar ti=n.slice(11,16)\nmsg.payload={\n \"\_id\":da+\" \"+ti,\n

\"name\":msg.payload.name,\n}\nreturn msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":320,"y":4 00,"wires":[["fc1e9b8ab90c65ab","ae3740ed090a2d5d"]]},{"id":"3b561d7e9 84ea35b","type":"watson-text-to- speech","z":"ac9e6ad184886c63","name":"","lang":"en-

US","langhidden":"en- US","langcustom":"NoCustomisationSetting","langcustomhidden":"","voice"

:"en-US\_LisaVoice","voicehidden":"en- US\_LisaVoice","format":"audio/wav","password":"","apikey":"KSTdsMPsU S62SL58EqzaZbAFtEW2JlggKYHUI-NKLuvx","payload- response":true,"service-endpoint":"https://api.eu-gb.text-to- speech.watson.cloud.ibm.com/instances/10758658-1ffd-49e5-ae59- ffb2aaa3b131","x":880,"y":260,"wires":[["830464e98a3da3e6"]]},{"id":"830

464e98a3da3e6","type":"play audio","z":"ac9e6ad184886c63","name":"","voice":"0","x":1070,"y":260,"wi

res":[]},{"id":"753a71cd01bf517f","type":"function","z":"ac9e6ad184886c63 ","name":"","func":"var st={\"please take

\":msg.payload}\nmsg.payload=JSON.stringify(st)\nmsg.payload=msg.paylo ad.replace(':','');\nreturn msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":720,"y":1 40,"wires":[["3bf37842d99948c2","c5bcf7f29be64599","3b561d7e984ea35b "]]},{"id":"c21434afa56c67cf","type":"cloudant","host":"https://apikey-v2- 2jzy07gxh6foo2jhn5tfo1k8c12ueqn3weg9kolpkm2n:7b9e69c73c1ff8711d0f3 23f05376bbd@531665c2-3667-4c6a-8eb7-df74d7359f6a- bluemix.cloudantnosqldb.appdomain.cloud","name":""},{"id":"c3cf7d0d9d5 6e309","type":"cloudant","host":"https://apikey-v2- 2jzy07gxh6foo2jhn5tfo1k8c12ueqn3weg9kolpkm2n:7b9e69c73c1ff8711d0f3 23f05376bbd@531665c2-3667-4c6a-8eb7-df74d7359f6a- bluemix.cloudantnosqldb.appdomain.cloud","name":""},{"id":"c2b7d001b83 103cd","type":"ui\_group","name":"Medicine

Details","tab":"ac2a2774050646b1","order":2,"disp":true,"width":"6","collap

se":false,"className":""},{"id":"7b603bf8891bac1a","type":"ibmiot","name"

:"IBM

IOT","keepalive":"60","serverName":"","cleansession":true,"appId":"","share

d":false},{"id":"ac2a2774050646b1","type":"ui\_tab","name":"Medicine details","icon":"dashboard","disabled":false,"hidden":false}]

**GitHub link:** [https://github.com/IBM-EPBL/IBM-Project-18767-](https://github.com/IBM-EPBL/IBM-Project-18767-1659689727) [1659689727](https://github.com/IBM-EPBL/IBM-Project-18767-1659689727)