PROJECT REPORT

TEAM ID :	PNT2022TMID25697
PROJECT NAME :	PERSONAL ASSISTANCE FOR SENIORS WHO ARE SELF-RELIANT
TEAM MEMBERS:	S R Vignesh M Vignesh P Pravin kumar S B Sivasasikumar N Vetrivel

1. INTRODUCTION

1.1. Project Overview

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. 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.Here Node-red connects the Web UI, Cloudant DB and IBM Watson IoT platform.

1.2. Purpose

The major purpose of this project is to help the elderly people who can assist themselves with the help of an voice alarm to take medicine at correct time. This avoids the irregular intake of medicine and keeps their body healthy. Some elderly people have oblivion to take medicine at right time but they can assist themselves in all other works these type of elderly people will make of this project to their best. This method of medicine alerts also avoids the need of personal care assistance expences and man power.

2. LITERATURE SURVEY

2.1. Existing problem

 The aging of population is a global issue all over the world and as the people start aging it is a common problem of getting diseases such as cholestrol, diabetes, blood pressure, etc, . It is not possible to assist elderly people with our presence with them to

take medicine at correct time, some elderly people have a problem in taking medicine at correct time and get confused to take which medicine due to forgetness, this leads to severe health issues for elderly people. To avoid this Existing problem new method is proposed to help elderly people to get voice messages to take which type of medicine at what time as an alert.

2.2. References

1. A. Wong, Population Aging and the Transmission of Monetary Policy to Consumption, 2015, https://economics.stanford.edu/sites/default/files/arlene_wong_jmp_latest-2g9f9ga.pdf.

2. B. Ma, The Monitor System of Elderly People Living Alone Based on the Comprehensive Computer Vision, Zhejiang University of Technology, 2014.

3. Y. Bai, J. Li, and J. He, "The design of the fall detection system based on embedded video monitoring," Television Technology, vol. 38, no. 15, 2014.
   View at: Google Scholar

4. L. Liu, E. Stroulia, I. Nikolaidis, A. Miguel-Cruz, and A. Rios Rincon, "Smart homes and home health monitoring technologies for older adults: a systematic review," International Journal of Medical Informatics, vol. 91, pp. 44–59, 2016.
   View at: Publisher Site | Google Scholar

5. A. Jacobsson, M. Boldt, and B. Carlsson, "A risk analysis of a smart home automation system," Future Generation Computer Systems, vol. 56, pp. 719–733, 2015.
   View at: Publisher Site | Google Scholar

6. C. D. Kidd, R. Orr, G. D. Abowd et al., The Aware Home: a Living Laboratory for Ubiquitous Computing Research International Workshop on Cooperative Buildings, Springer, Berlin Heidelberg, 1999.

2.3. Problem Statement Definition

Personal Assistance for elderly people for alerting them to take medicine on time is designed for helping the seniors who are self - reliant. The alerting mechanism also includes the medicine details for specific users so that it will be easy for them to find their medicine and take it at right time.

3. IDEATION & PROPOSED SOLUTION

3.1. Empathy Map
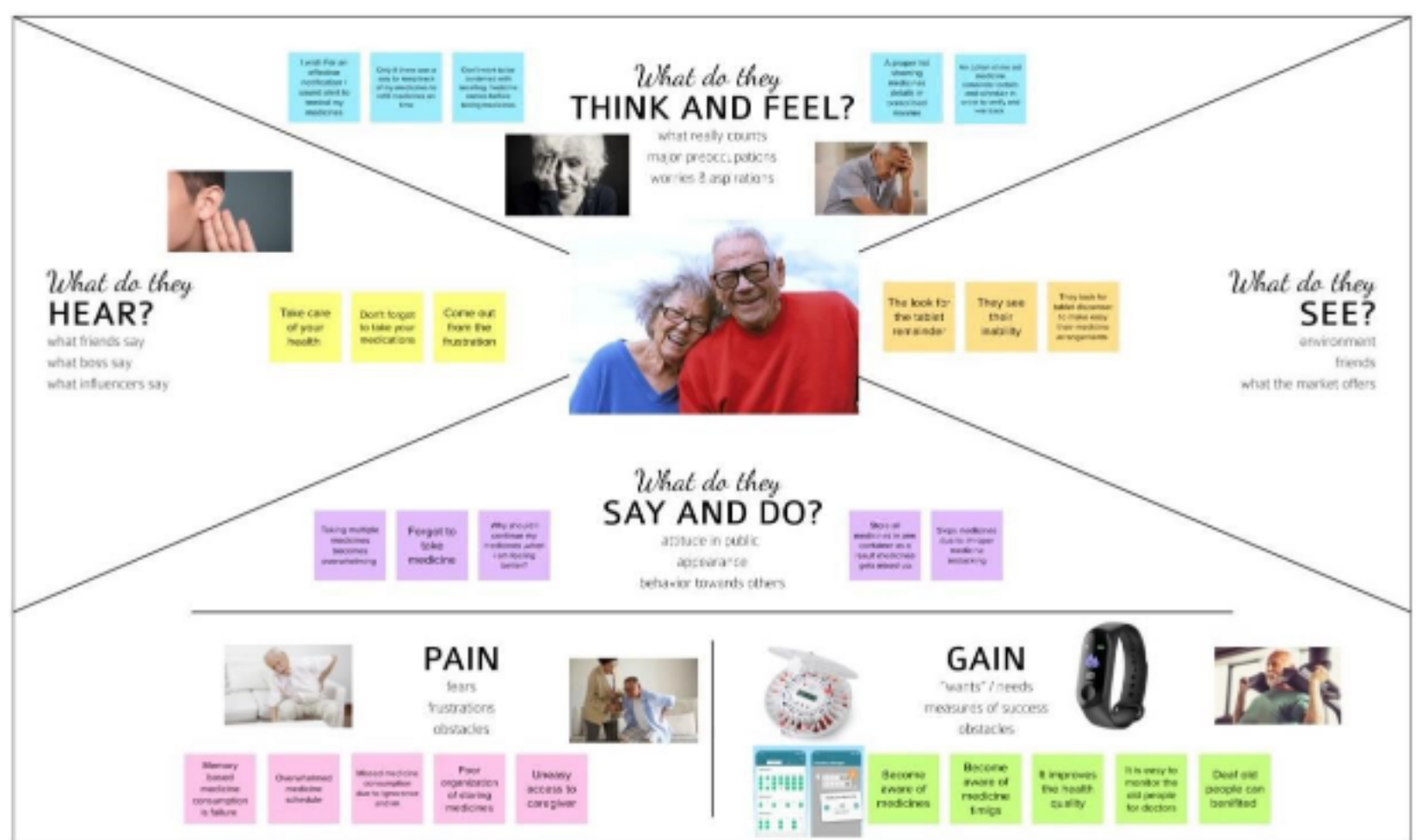
3.2. Ideation & Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 10 minutes to prepare
- 1 hour to collaborate
- 2-8 people recommended

Before you collaborate
A little bit of preparation goes a long way with this session. Here's what you need to do to get going.
- 10 minutes

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.
Open article →

Define your problem statement
What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.
- 5 minutes

PROBLEM
How might we (your problem statement)?

Key rules of brainstorming
To run an smooth and productive session
- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

Ste-3:Idea Prioritization

3.3. Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	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 .An app is built for the user (caretaker) which enables him to set the desired time and medicine.
2.	Idea / Solution description	we introduce a smart medicine reminder system based on IoT. The proposed scheme was particularly created for the Android platform. For our system, we implement a reminder system which provides an alarmwhen it is time for taking medicine. Along with that, there is an android application where the user can set their medicine time. In the application, there will some feature that help the user to know more details about their medicine. It keeps track for the medicine which means how much medicine they have to take they can be fixed in the application
3.	Novelty / Uniqueness	It is a user-friendly app that sends users medicationand refill reminders, provides drug interaction warnings, and helps caregivers manage prescriptions for lovedones
4.	Social Impact / Customer Satisfaction	When it comes to the business there is no onesize-fits- all solution. The model you choose depends on yourtarget audience , business goals , and the resources youalready possess.

5.	Business Model (Revenue Model)	where the user can set their medicine time. In the application, there will some feature that help the user to know more details about their medicine. It keeps track for the medicine which means how much medicine they have to take they can be fixed in the application
6.	Scalability of the Solution	

3.4. Problem Solution fit

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) [CS] Elderly people who are self - Reliant	6. CUSTOMER CONSTRAINTS [CC] Elderly people should be at a distance of the alerting system and they should be awake to hear the alerting voice message such that they could take their medicine according to the instructions	5. AVAILABLE SOLUTIONS [AS] Elderly people usually take their medicine by themselves or with the care of family or doctors but it is not always good for them to depend on others	Explore AS, differentiate
Focus on J&P, tap into BE, understand RC	2. JOBS-TO-BE-DONE / PROBLEMS [J&P] • Alerts to take medicine on correct time • Which type of medicine should be taken will be specified in the alert message	9. PROBLEM ROOT CAUSE [RC] Elderly people have the problem of irregular intake of medicine or intake of wrong medicine due to oblivion	7. BEHAVIOUR [BE] Once the voice message is sent elderly people take their correct type of medicine at correct time	Focus on J&P, tap into BE, understand RC

Identify strong TR & EM	3. TRIGGERS [TR] We can request our customer to get an experience with our product and explain them the needs of our products 4. EMOTIONS: BEFORE / AFTER [EM] Before: Customer takes medicine at improper time interval and also could have possibility of taking wrong medicine After: Customer takes correct medicine at correct	10. YOUR SOLUTION [SL] We can get the details of the medicine and accurate time to take medicine and store the data in database and connect the IoT device to database and convert the text message to voice messages that could be listened by the elderly people	8.CHANNELS of BEHAVIOUR [CH] Online: Details of medicine and time could be fetched Offline: The data fetched and converted voice message could be delivered at high sound	Identify strong TR & EM

4. REQUIREMENT ANALYSIS

4.1. Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story/ Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login	login through User Id and Password.
FR-4	Network Connectivity	via wifi /mobile data.
FR-5	IBMIoT Platform	Access cloud storage via internet and it gives medication information.
FR-6	Node-RED	Uses to transfer the data fromIOT platform to UI platform and helpsin storing the data.

4.2. Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	It can easily track and monitor the medication time of users and share the information to the caregivers.
NFR-2	Security	Thecloudant database is highly secured and it prevents data fromhacking.
NFR-3	Reliability	Theprescription of medication for users is assured all the time.
NFR-4	Performance	It reminds users to take their medications and get themrefilled, warns about druginteractions, and assists caregivers in managing prescriptions.
NFR-5	Availability	Tokeep track the medication of users.
NFR-6	Scalability	The users can set the time for their medication and alsocan adjust how much medication to take within the application.

5. PROJECT DESIGN
5.1. Data Flow Diagrams
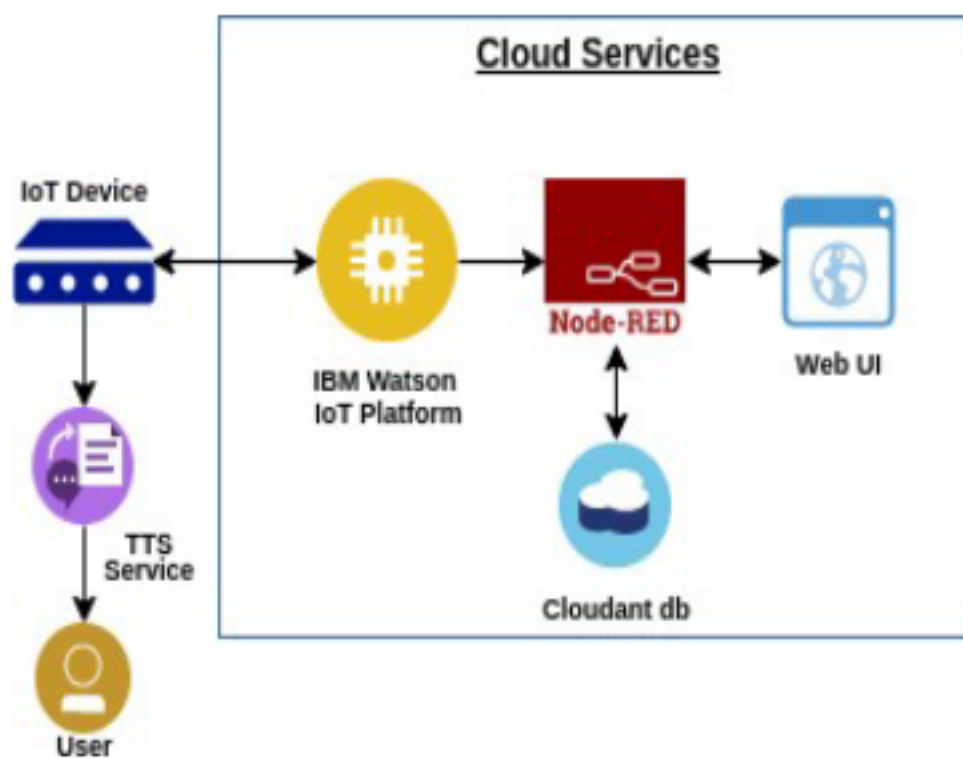
5.2. Solution & Technical Architecture
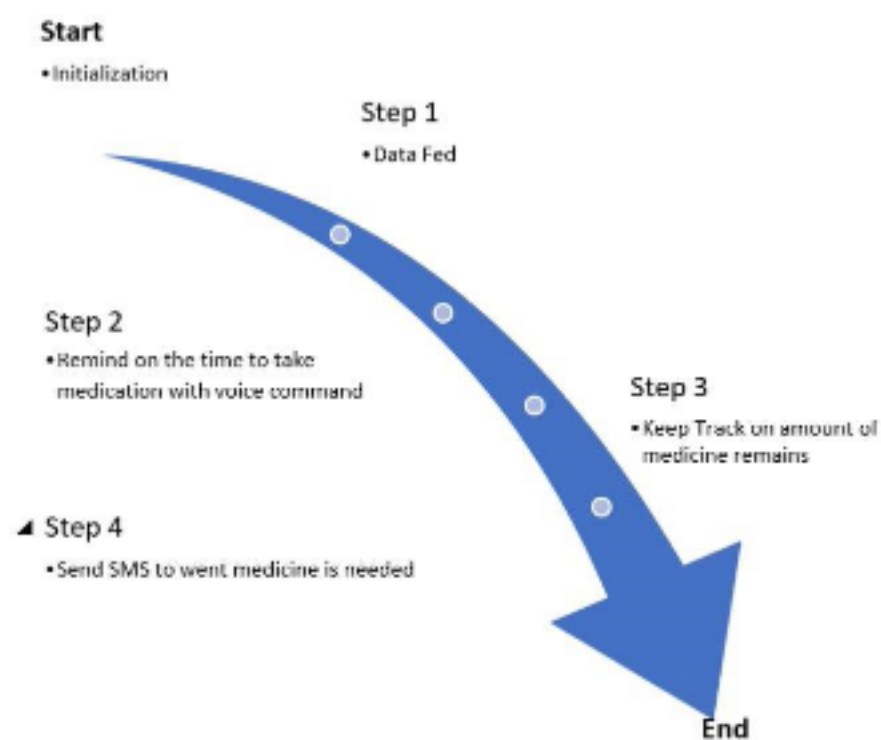
Table-1: Components & Technologies:

S. No	Component	Description	Technology
1.	User Interface	Mobile App	MIT
2.	Application Logic-1	Gathering medicine details and check thetimings	Python
3.	Application Logic-2	alarms	IBM Watson
4.	Cloud Database	Database Serviceon Cloud	IBM Cloudant DB

Table-2: Application Characteristics:

S	Characteristics	Description	Technology

N			
1	Open-Source Fra meworks	Mobile application development setup, programming the IoTdevice, text to speechservice, storing details in cloud	MIT, IBM Watson,node r ed, IBM cloud
2	Security Imple mentations	Implementing encryption for securit y purpose	SHA-256.
3	Scalable Architecture	Application is able to load as many membersaslogged in	MIT, IBM Watson
4	Availability	Application is available 24/7	MIT, IBM Watson, node red, IBM cloud
5	Performance	Reminder with correct timing	IBM Watson, IBMIoT Platform

5.3. User Stories

User Type	Functional requirement	User story number	User story/task	Acceptance criteria	Priority	Release
Customer (Mobile user, Web user, Care executive, Administrator)	Registration	USN-1	As a user, I can register for the application by entering my mail, password, and confirming my password	I can access my account/ dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
	Dashboard	USN-3	As a user, I can register for the application through internet	I can register & access the dashboard with Internet login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail	I can confirm the registration in Gmail	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can login with my id and password	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

Sprint	Functional Requirement (Epic)	User Story/Task	Story Points	Priority
Sprint-1	Intializing the Resources	Create an account in Open Weather API	1	LOW
Sprint-1	Code in Software is written	Write a python script using the inputs given from OpenWeather API	2	MEDIUM
Sprint-2	Sending the software to cloud	The python code from sprint 1 should be sent to cloud so that it is easily accessible	1	MEDIUM
Sprint-3	Initialising the connection between hardware and cloud	The hardware should be intergrated for the easy access of the cloud functions	2	HIGH
Sprint-4	User input-output optimisation and error identification and rectification	Rectify all the shortcomings/errors and initiate the optimisation for better	3	HIGH

7. CODING & SOLUTIONING

7.1. Feature 1

•IoT Device

•IBM Watson platform

•Node - Red

•Cloudant DB

•Web UI

•MIT App Inventor

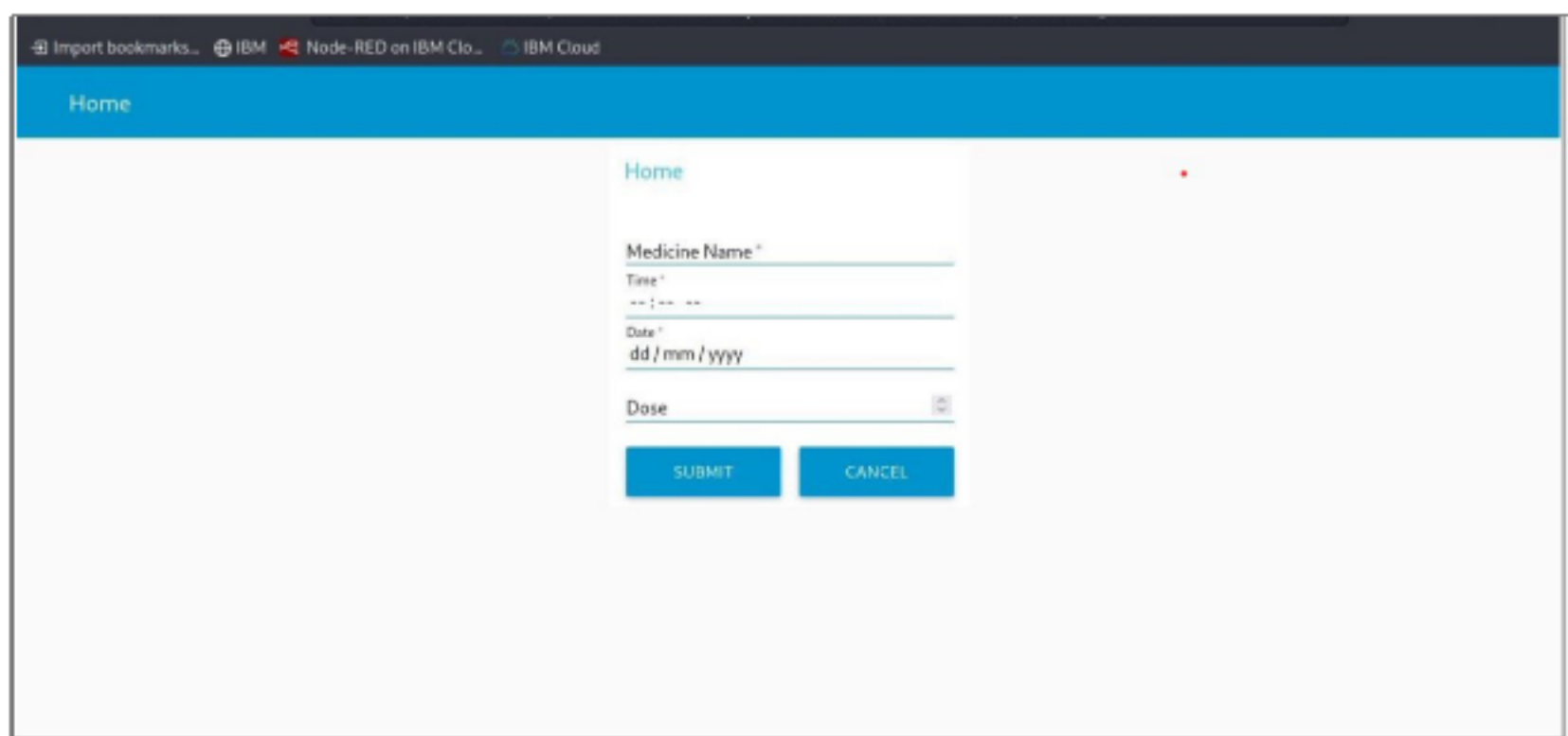•Python Code

7.2. Feature 2

•Login

•Wokwi

8. TESTING
8.1. Test Cases

This report shows the number of test cases that have passed, failed, and untested.

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

Test Case 1:

8.2. User Acceptance Testing

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 user

Defect Analysis

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

Resolution	Severity 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

9. RESULTS

9.1. Performance Metrics

An experiment is conducted on an elderly person who is in need of Personal Assistant Device and the following results are obtained, it shows the medicine reminder that gives the information regarding the intake of medicine by the person using the personal Assistant Device. The stored data in cloudant database on specified time alerts user with a voice message.

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES

•Availability

One of the primary preferences of possessing a PDA is the capacity to stay in contact with individuals through email, text informing and telephone. Since PDAs are so convenient and networks so broad, clients can take them anyplace.

•Association

Another advantage of possessing a PDA is expanded association. Schedule and rundown applications make it simple to monitor arrangements, make notes in a hurry and document past discussions or other information.

•Status

For some PDA clients, the gadget has the additional advantage of meaning a specific status. Organization gave PDAs might be held for more significant level representatives and can come to connote a place of power or significance. For individual clients, having the most recent PDA might be an indication of riches or innovative information.

•Broad Internet Connectivity

For occupied people, the primary preferred position of getting a PDA is being able to remain associated through email, calls, text informing and different courier applications. These are worked with broad organization network so clients can get to the Internet anyplace they are.

DISADVANTAGES

•Cost

One of the greatest hindrances of a PDA is the expense. Other than paying for the gadget itself, most PDAs require the purchaser to buy in to a utilization contract. This includes a month to month bill and the chance of overage charges if the client outperforms his designated free telephone minutes or information limits.

•Interruption

PDAs may likewise turn into an interruption when they're not satisfying an authentic need. The capacity to be constantly associated can prompt sat around riding the Web, settling on telephone decisions or messing around. Some business clients whine of being "available to come in to work" when their colleagues and bosses can reach them whenever.

•Restricted in Scope

PDAs are restricted in degree. They are neither PC substitutions nor would they be able to be successfully used to supplant mobile phones. PDAs are not furnished to manage miniature preparing capacities.

•Time constraint

PDAs are not generally the best response to business arrangements. Paper-based coordinators are a more reasonable choice since PDAs are hard to utilize, information passage is abnormal, they are moderate and beginner clients discover them superfluously unpredictable.

11. CONCLUSION

With the continuously increasing utilization of internet in this point in time, this assignment paintings has been engaged to execute a framework depending on web innovation which could discuss through internet for health checking of patients and for giving assist to vintage people. It utilized to apprehend the development of patient which sends this statistics to everything communicate producer to reveal the readings . During the crisis situations, a caution might be raised over the internet level telling the expert/overseer by way of the patient simply by squeezing a seize in the helpful machine. This offers a trustworthy framework which can screen the well-being reputation continuously of a patient or an vintage individual.

12. FUTURE SCOPE

Whether or not the role of IoT as the best solution to provide help for the weak elderly citizens is accepted, yet these people are certainly in need of care. There are some strong and determined persons who manage to preserve their mind and body active until an old age. Still there are many who are in need of aid in their routine life as well

as those people who totally depend on others. It provides an effective homecare monitoring and care support for elderly people by communication and coordination with professional helpers and thereby improving the quality for independent life of old aged.Future elder care IoT projects will also more than likely have the ability to take on medical diagnostics, as well as use facial recognition algorithms to determine how someone is feeling.But despite all of this future capability, there still exists a dichotomy of things that IoT can do way better than humans and things they simply cannot do at all. For instance, an elder care IoT based projects in the future may easily be able to find and retrieve a pill box from another room, however, without an excellent mobility system, it will be stopped dead in its tracks should it get caught on something along the way. Collaboration and integration between researchers, private industry, investors, and the government will be key in the years to come.

13. APPENDIX

13.1. Source Code

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt

#include <LiquidCrystal_I2C.h>
#define LED 2 void callback(char* subscribetopic, byte* payload,
unsigned int payloadLength);


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

#define ORG "88ju36"//IBM ORGANITION ID
#define DEVICE_TYPE "Node-MCU"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "2"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "123456789"    //Token
String data3="";


//------ Customise the above values ------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
```

```cpp
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,
```

```cpp
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 "+ data3);
if(data3 != "")
  {    lcd.init();
lcd.print("Take"+
data3);

digitalWrite(LED,HIGH);
delay(20000);
digitalWrite(LED,LOW);
 }
else
 {
digitalWrite(LED,LOW);




 }
data3="";
}
```