REPORT

REPORT TEAM ID : PNT2022TMID31884

PROJECT NAME : PERSONAL ASSISTANCE FOR SENIORS WHO ARE SELF-RELIANT

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CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW:

The Project concentrates on creating a medicine reminder application. MedicineReminder Project is an native android application meant to aid the forgetful and busy senior citizens with reminding them to take their daily medications. It is designed for users who need a little help keeping track of their medication schedule and who are dedicated to keepingtheschedule but forget things easily. The application allows the user to store pill objects and multiple alarms for those pills in the correct timings.

1.2 PURPOSE:

The objectives of this project are to develop a prototype of a smart medicine reminder for elderly people that helps them consume the medicines right on time. In recent times, the rate of consumption of medicines has highly increased due to the wide spreading of different diseases and illnesses across the globe. While some diseases are temporary, many diseases have a toll on human health for a lifetime. In the pursuit of maintaining a healthy lifestyle, we often find ourselves to be sick. This could be threatening if not properly treated.

A visit to the doctor and consumption of the medical prescription becomes a necessity. Nevertheless failing to consume the medicine regularly could cause a lot of problems. Keeping in mind this problem, the idea of creating a smart device that alerts the patient to take medicines right on time, so that they would recover soon and stay healthy without any issues in the body.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING PROBLEM:

The design of caring for the seniors has always been an important issue for the development of society. With the aging population in many countries, there will be more and more elderly groups everywhere. Senior citizens play an important role in society: they form families and are responsible for keeping family members connected to eachother[1]. However, as the pace of social development is getting faster and faster, it is more and more common for seniors to live alone (either alone at home or with couples without children).

These elderly people often suffer from serious loneliness problems due to the lack of attention from their families, which can have a significant impact on the seniors, families and even society[2]. Loneliness among the elderly has become increasingly serious. This kind of loneliness and isolation may directly lead to the health problems of many elderly, which will have an impact on families and society. However, through the research on the living habits of the elderly, I found that the elderly always have their own medication plan, and medication management is a very important part of their dailylife[3].

Many elderly people have family members who are responsible for helping them manage their medications: dispensing medications for the elderly, classifying medications for the elderly, and so on.I found that the action of reminding was actually very human, and family members' reminding was more effective for the elderly to take medicine[4]

2.2 REFERENCES:

[1] AishwaryaChawariya, PrajaktaChavan, Akanksha Agnihotri, “Fundamental Research on Medication Reminder System”, International Research Journal of Engineering andTechnology, July 2019.
[2] Carl M. Rebman, Loreen M. Powell, “Building an Application for CustomMobile Medication Reminders in Healthcare: An Exploratory Study”, Issues in Information Systems, 2018.
[3] Hassan B. M. Mohammed, Dogan Ibrahim, NadireCavus, “Mobile device based smart medication reminder for older people with disabilities”, Springer, 2018.
[4] Shivani Sharma, Katyayni Tyagi, Pooja Shishodia, “A medicine reminder application using android”, International Journal of Advance Research, Ideas and Innovations in Technology, 2018.

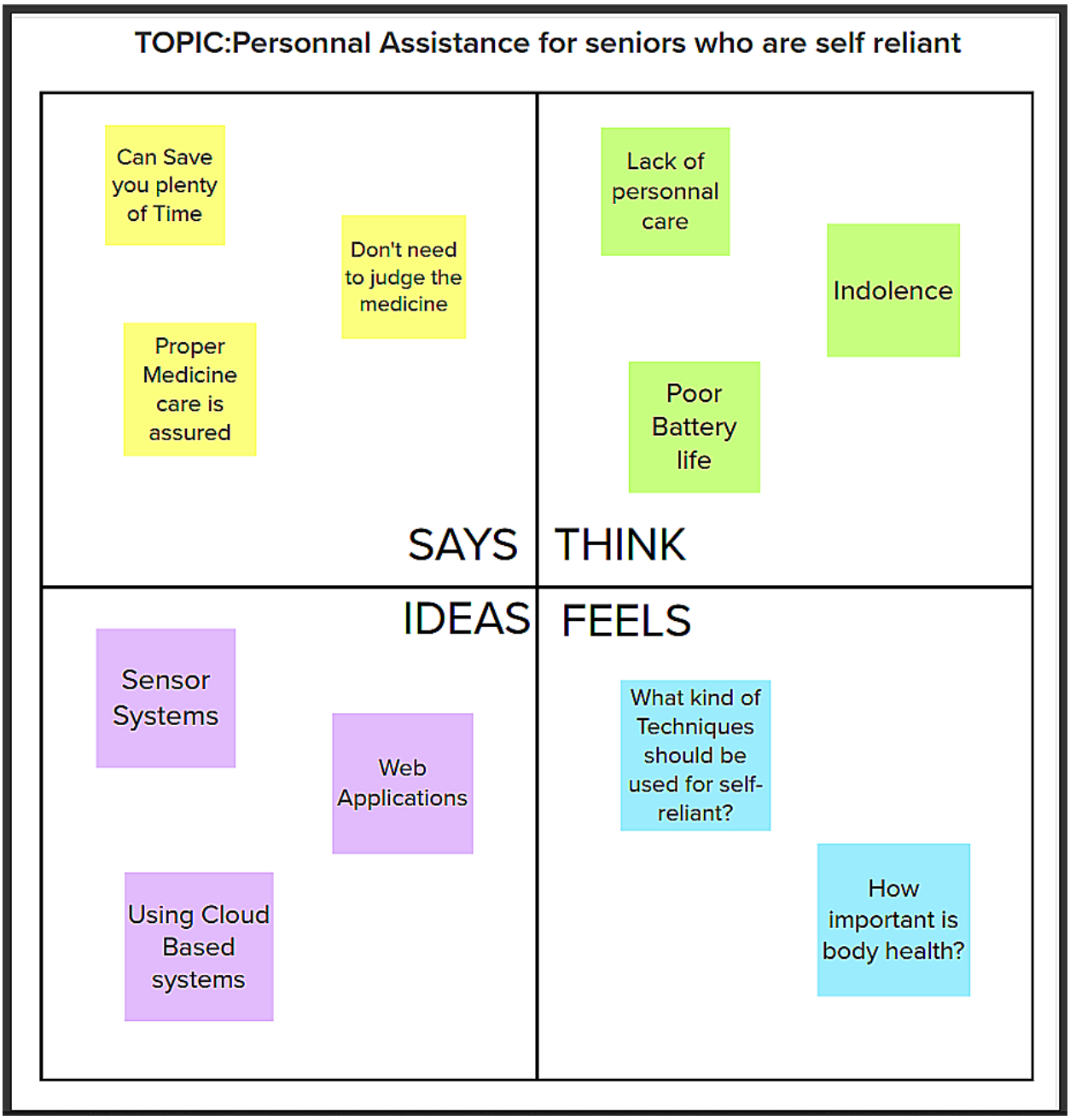
2.3 PROBLEM STATEMENT DEFINITION:

The main problem faced by senior citizen is they often get sick and have to regularly take medicines and the prescription of their medicine is very long as it is hard to remember to patients and also for their care giver. Also, Old age patients suffering from problems of forget to take pills on proper time which causes certain health issues for patients having Permanent diseases like diabetes, blood pressure, breathing problem, heart problems, cancer diseases etc. If they don’t take their medicine on time they may face consequences.

CHAPTER 3

IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS:



3.2 PROPOSED SOLUTION:

Proposed Solution :

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Some people find it difficult to learn new apps in this ever-expanding digital environment, and people nowadays tend to forget things more easily, such as taking their prescriptions. People need a way to remember to take their prescriptions without having to learn how to use sophisticated programs.
2.	Idea / Solution description	Create a basic, easy-to-use app so that users don't forget their medicine schedules, can easily discover pharmacies and clinics near them, and can be directed through the app by their loved ones if necessary.
3.	Novelty / Uniqueness	My research began with a series of inquiries directed at a variety of people in order to havea better understanding of their issues and demands in remembering their routines. The purpose of this study was to gain a better understanding of individuals and their needs, as well as to put them at the centre of our design process and product.
4.	Social Impact / Customer Satisfaction	I constructed these proto-personas, or names, based on the research findings from the user interview. They would be crucial to the rest of the design process. All design decisions may be assessed and re-evaluated using these personas, keeping the user and their perspective in mind.
5.	Business Model (Revenue Model)	By using the model, we can collect basic and some medical information about the persona that helps us in showing relevant and profitable advertisements.

3.3 PROPOSED SOLUTION FIT:

Project Title: Personal Assistance for seniors who are Self-Reliant Using IoT Technology

Project Design Phase-I - Solution Fit Template

Team ID: PNT2022TMID31884

Define CS, fit into CC

1.CUSTOMER SEGMENT(S) CS

- ✓ Elders or seniors i.e. Parents of Working children(nearly 55-70 + yrs)

6. CUSTOMER CONSTRAINTS CC

- ✓ Limited financial constraints.
- ✓ Too much of work pressure.
- ✓ Loneliness.

5.AVAILABLE SOLUTIONS AS

- ✓ Medicine reminder system to give notification when it times to take the medicine.
- ✓ Automatic Reminder system.
- ✓ Mobile Applications to monitor the elders when we are far away from home.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

- ✓ Elders are not caring by their children.
- ✓ Elders often forgot to take medicine at proper time.
- ✓ Sometimes elders also forgot what medicine they have to take.
- ✓ They requires some caretakers or doctors for monitoring them regularly which is impossible.

9. PROBLEM ROOT /CAUSE RC

- ✓ Due to the age factor of the elders, they often forgot to take medicine.
- ✓ Because of their loneliness, the elders feel uncomfortable and uneasy to take medicines.
- ✓ Because of their working children the elders are not caring properly.
- ✓ They can't able to keep caretakers because of their money problems.

7.BEHAVIOUR BE

- ✓ Searching for an alternative solution for an existing solution.
- ✓ Ask Suggestions from skilled persons for monitoring them regularly.
- ✓ Try to provide sufficient care for elders.

Focus on J&P, tap into BE, understand RC

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT:

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.

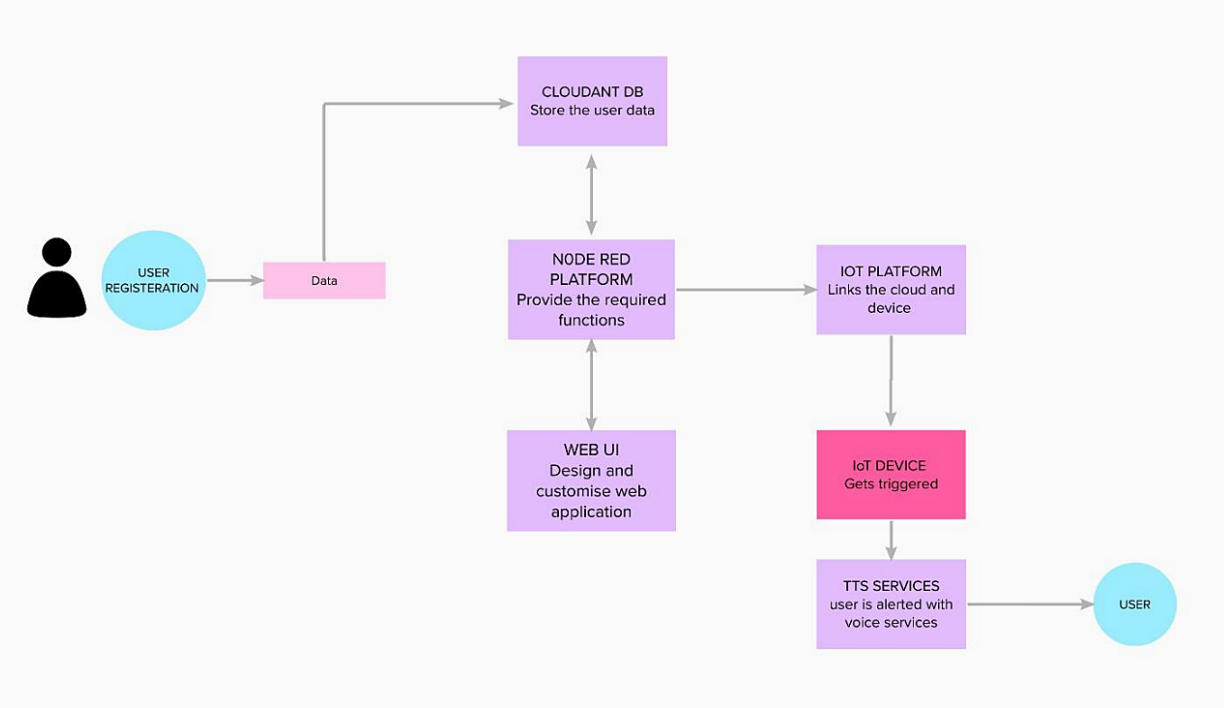
Non-functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The system should be user-friendly for the users. It is used to rem the medicine names. It alerts the users through voice commands.
NFR-2	**Security**	The login information should not be accessed byany other 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 to the 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 any place.
NFR-6	**Scalability**	It is easily adaptable The device is compatible and portable The application can handle any number of registration.

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAM:



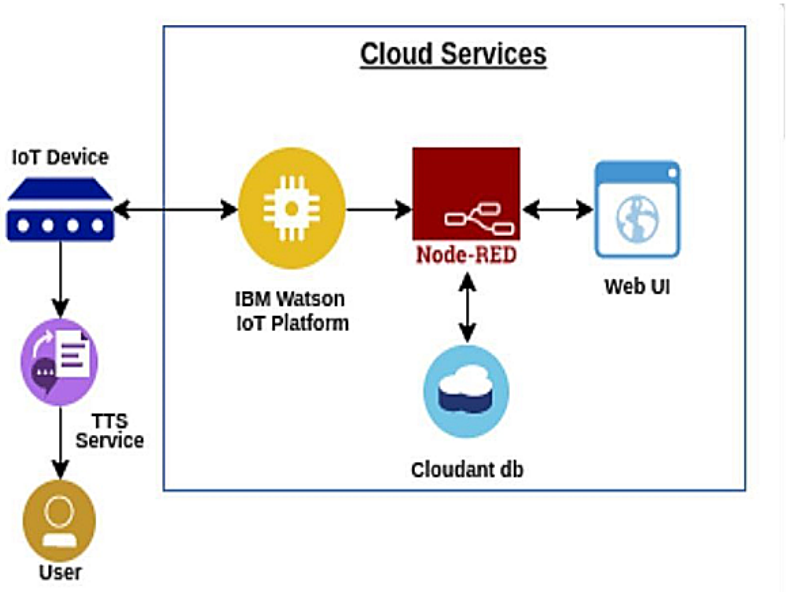
5.2 SOLUTION AND TECHNICAL ARCHITECTURE:

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Medicine Remainders serve as good way to stay on track and uphold appropriate schedule.
- It helps in decreasing medication dispensing errors and wrong dosages.
- It is used to organize your medication doses for a certain length of time.

Solution Architecture Diagram:



5.3 USER STORIES:

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Senior user)	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 (Diabetes Patient)	Smart medicine box	USN-2	As a user, I want to take Medicines on time and monitor my health	I want to take my tablets on time by voice command	High	Sprint-1
Customer (Thyroid Patient)	Smart medicine box	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 needs medication time and prescription should load indatabase 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 AND ESTIMATION:

Sprint	Functional Requirement (Epic)	User Story Number	User Story /Task	Story Points	Priority	Team Mem
Sprint-1	Hardware or Simulation Software	USN-1	Using Wokwi , Connect ESP-32 withUltra Sonic Sensor with Python script	2	High	Sanjaykumar .R Sundar Raj.A Karan.S.K Dhanasekar.J
Sprint-2	Cloud Software	USN-2	Create Device in the IBM Watson IOTPlatform and link it to Wokwi	2	High	Sanjaykumar.R Sundar Raj. A Karan.S.K Dhanasekar.J
Sprint-3	Website	USN-3	Create a web application	2	High	Sanjaykumar.R Sundar Raj.A Karan.S.K Dhanasekar.J
Sprint-4	linking	USN-4	Link Device,IBM cloud and the developed application	2	High	Sanjaykumar.R Sundar Raj.A Karan.S.K Dhanasekar.J

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	26 Oct 2022	02 Nov 2022	20	02 Nov 2022
Sprint-2	20	6 Days	02 Nov 2022	08 Nov 2022	20	08 Nov 2022
Sprint-3	20	6 Days	08 Nov 2022	14 Nov 2022	20	14 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

CHAPTER 7

CODING AND SOLUTIONING

7.1. Feature 1

- IoT Device
- IBM Watson platform
- Node - Red
- Cloudant DB
- Web UI
- Python Code

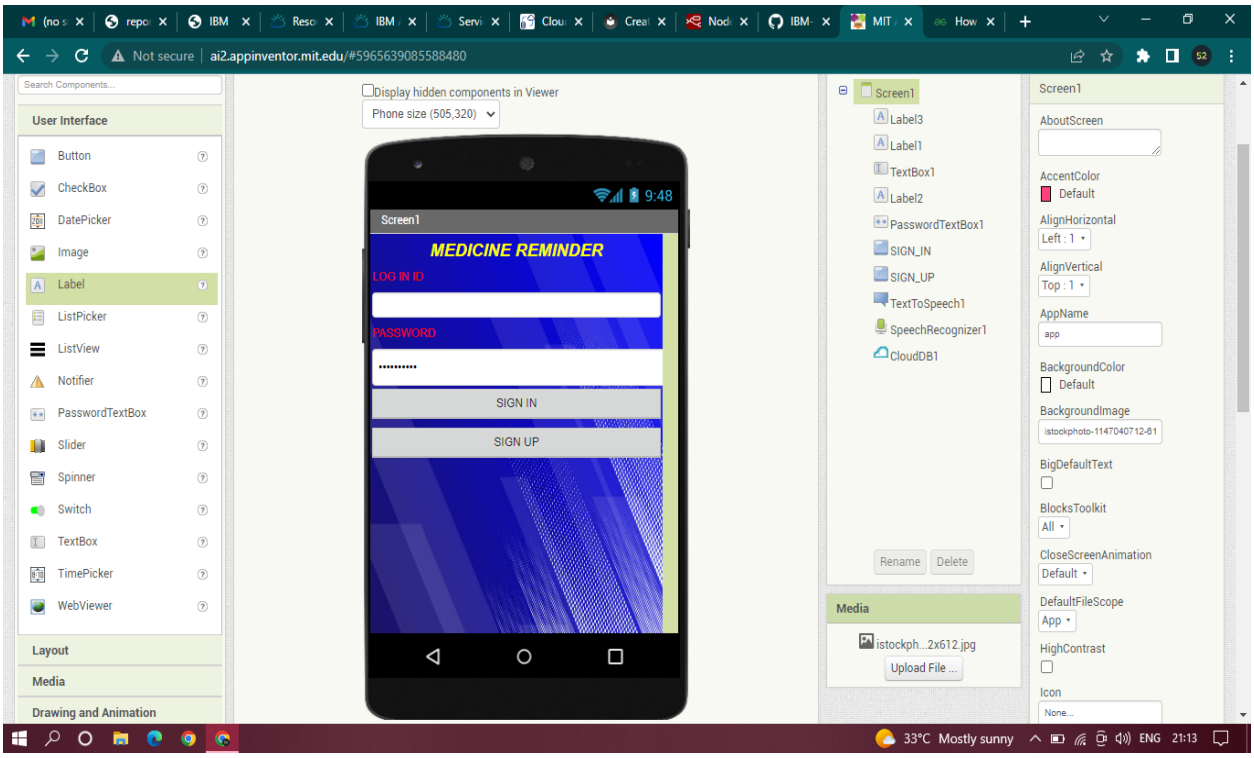
7.2. Feature 2

- Login
- Wokwi

CHAPTER 8

TESTING

TEST CASE 1:

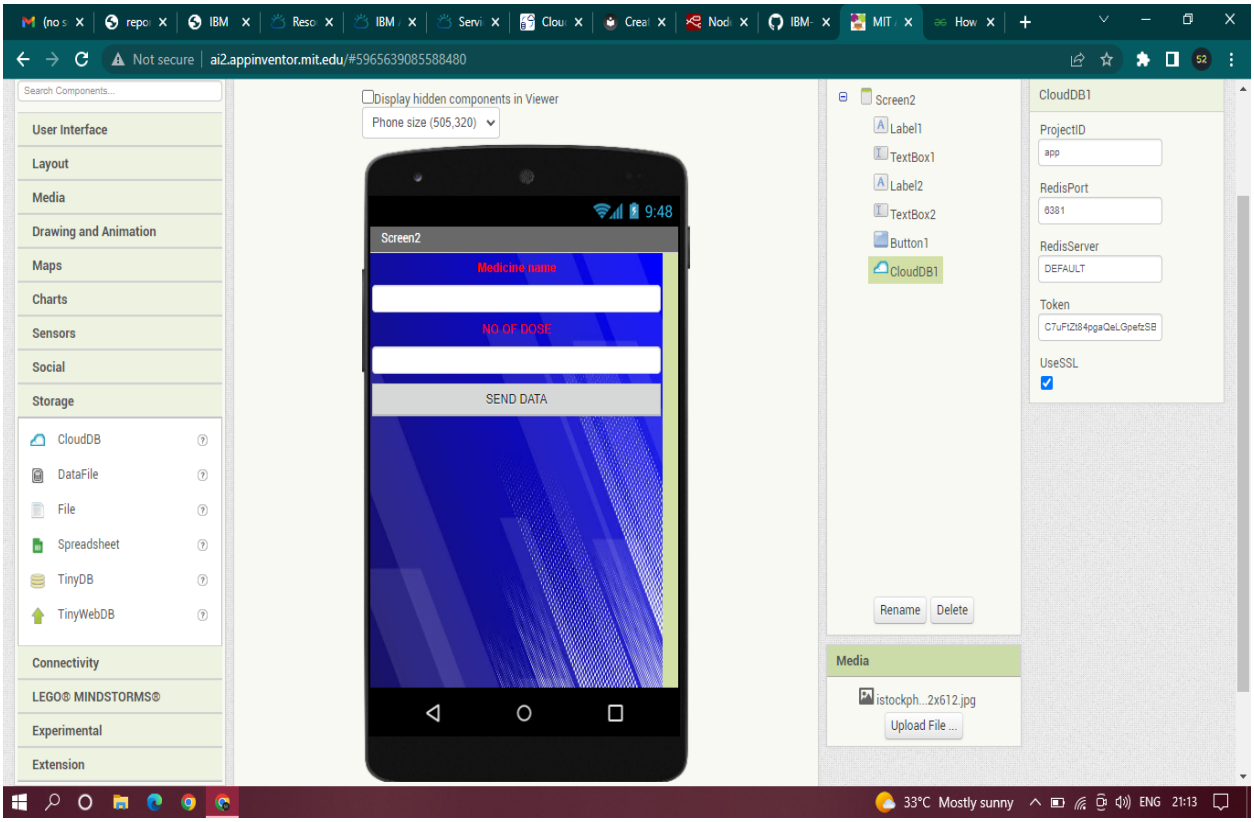


USER ACCEPTANCE TESTING:

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 use


Not secure
ai2.appinventor.mit.edu/#5965639085588480
Search Components...
User Interface
Layout
Media
Drawing and Animation
Maps
Charts
Sensors
Social
Storage
CloudDB
DataFile
File
Spreadsheet
TinyDB
TinyWebDB
Connectivity
LEGO® MINDSTORMS®
Experimental
Extension
Display hidden components in Viewer
Phone size (505,320)
9:48
Screen2
Medicine name
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SEND DATA
Screen2
Label1
TextBox1
Label2
TextBox2
Button1
CloudDB1
Rename
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Media
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Upload File ...
CloudDB1
ProjectID
app
RedisPort
6381
RedisServer
DEFAULT
Token
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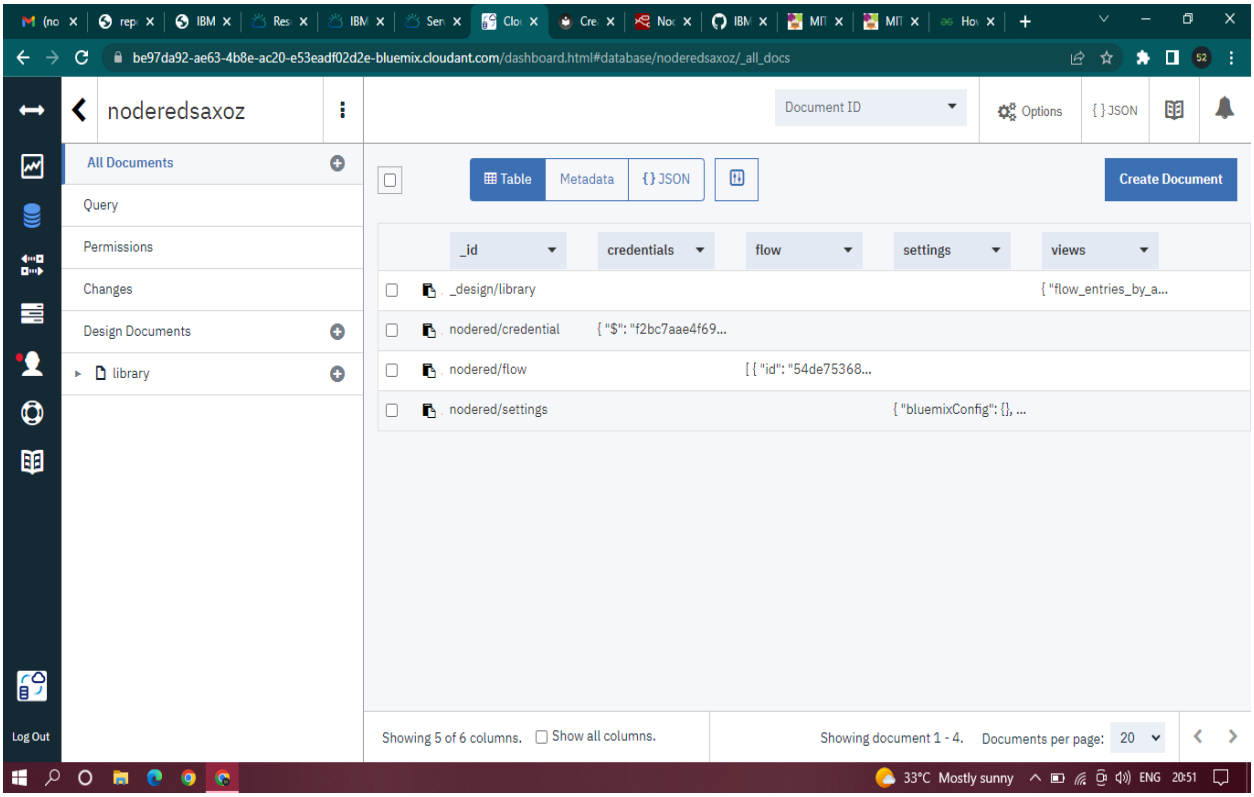
CHAPTER 9

RESULTS

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.



CHAPTER 10

ADVANTAGES AND DISADVANTAGES

10.1 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. Scheduleandrundown 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 PDAis beingabletoremain 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.

10.2 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 out performs 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.

- 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.

- 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

CHAPTER 11

CONCLUSION

With the progress of science and technology in modern society, the problem of human health care has gradually become an important part of a family. Due to the limitations of the elderly population (such as immobility, memory loss, etc.), there are many problems with medication. Therefore, medication for the elderly needs more attention from the society. Drug use accounts for a large proportion in the elderly population, and many products are designed for the elderly. However, many products do not fully conform to the usage habits of the elderly. Intoday's society, more than 40 percent of the elderly feel lonely. The data show that the happiness of the elderly is largely due to the support and encouragement from their families. The relationship between the elderly and their adult children has also become an important social issue. Many times due to not taking the medicines on time it leads to death or severe issues. So to avoid such situations this application will be very helpful.

CHAPTER 12

FUTURE SCOPE

I believe that in the future, we will have many reasons to care about and for the elderly community, because this is not only a moral thing, but also a prerequisite for the continuation of the development of the world. We need to pay enough attention to this group, and I believe that medicine reminder application will be of great use to the elderly peoples as they can be independent and live happily and healthily.

CHAPTER 13

APPENDIX

13.1 SOURCE CODE:

WOKWI SIMULATED CODE

```
#include <WiFi.h>
#include <PubSubClient.h>



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



#define ORG "lrv63o"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"
#define DEVICE_ID "IBM123"
#define TOKEN "(GgH2GfMqCHfAC&nRw"
String data3;
float dist;

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

char publishTopic[] = "iot-2/evt/Data/fmt/json";

char subscribetopic[] = "iot-2/cmd/test/fmt/String";

char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id



WiFiClient wifiClient; t
PubSubClient client(server, 1883, callback ,wifiClient);

int alarm = 4;
```

```
int trig = 5;
int echo = 18;
void setup()
{
Serial.begin(115200);
pinMode(trig,OUTPUT);
pinMode(echo,INPUT);
pinMode(alarm, OUTPUT);
delay(10);
wificonnect();
mqttconnect();
}
void loop()
{

 digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW);
  float dur = pulseIn(echo,HIGH);
  float dist = (dur * 0.0343)/2;
  Serial.print ("Distancein cm");
  Serial.println(dist);


  PublishData(dist);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}




void PublishData(float dist) {
  mqttconnect();

  String object;
  if (dist <100)
```

```
  {
    digitalWrite(LED,HIGH);
    Serial.println("object is near");
    object = "Near";
  }
  else
  {
    digitalWrite(LED,LOW);
    Serial.println("no object found");
    object = "No";
  }

  String payload = "{\"distance\":";
  payload += dist;
  payload += "," "\"object\":\"";
  payload += object;
  payload += "\"}";



  Serial.print("Sending payload: ");
  Serial.println(payload);




  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");

  }
 else
 {
    Serial.println("Publish failed");
  }

}
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()
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);
  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("data: "+ data3);
 if(data3=="Near")
  {
 Serial.println(data3);
digitalWrite(alarm,HIGH);

   }

  else
   {
 Serial.println(data3);
 digitalWrite(alarm,LOW);

  }
data3="";


}
```

DEMO LINK:

https://drive.google.com/file/d/1y2AArny7xrmJltYEjY34bezBv147dgc8/view?usp=share_link