IBM – NALAIYA THIRAN PROJECT

HX8001-PROFESSIONAL READINESS FOR
INNOVATION,EMPLOYAPILITY AND ENTREPRENEURSHIP

Personal Assistance for Seniors Who Are Self-Reliant

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1. INTRODUCTION:

In modern society, most of the time people remain busy in their daily life schedule. It is true that they give more preference to their work than taking care of their health. Several diseases like diabetes, blood pressure is nowadays very common. Maintaining daily medication become very difficult for old people. Sometimes younger is faced with the same problem. There are many people in our family who need constant help may it be our elderly people, younger or others. But it is not always possible for us to remind them of their medicine's dosages every time. For this purpose, there needs to be some facility for us which monitoring patient and take care. Nowadays we are all used to living technology-based life. We can use this technology in a way that will be beneficial for us. Cell phones aren't best utilized for calling but now maybe used as an ensemble of embedded sensors that together allow new packages including human services, healthcare, social networks, environmental tracking etc. Today in medical services frameworks, the usage of cell phones is turning into an expanding number of values .

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1.1 PROJECT OVERVIEW

Our smart medicine remainder system is designed for, but not restricted to, helping old people in taking care of themselves in taking their medication at the correct time and in the correct amount. it has been observed that people in general neglect their health and give preference to other things than taking their medicines. this is also the reson they forget to their prescriptions on time. many health maintainance organization, health practitioners and medical researchers have realized that increased use of patient reminders can significantly increase the treatment of chronic illness and delivery of medical services to the patients who need it.several organization have themselves started implementing the patient medicine reminder system in the health care field and it is currently being implemented in several hospitals in the western countries to see if the method reaps any benefits. It is known throughout that Over The Counter (OTC) medication taking patients should take prescriptions in a limited or prescribed quantity at the respective times they are supposed to take their medications. However, many patients and specially old people, do not take their medicines in the correct quantity.

1.2 PURPOSE:

Medication reminders **help in decreasing medication dispensing errors and wrong dosages** . The Reminder system consists of two parts – setting Alarm and getting notification. Set Alarm module- It helps in reminding about the medicines. User can add details of his dosage schedules.
The app provides features such as prescription and appointment reminders, as well as a parental control function. It took 4 weeks to finish this design session.

2. LITERATURE SURVEY

2.1. EXISTING SYSTEM

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.

2.2. References

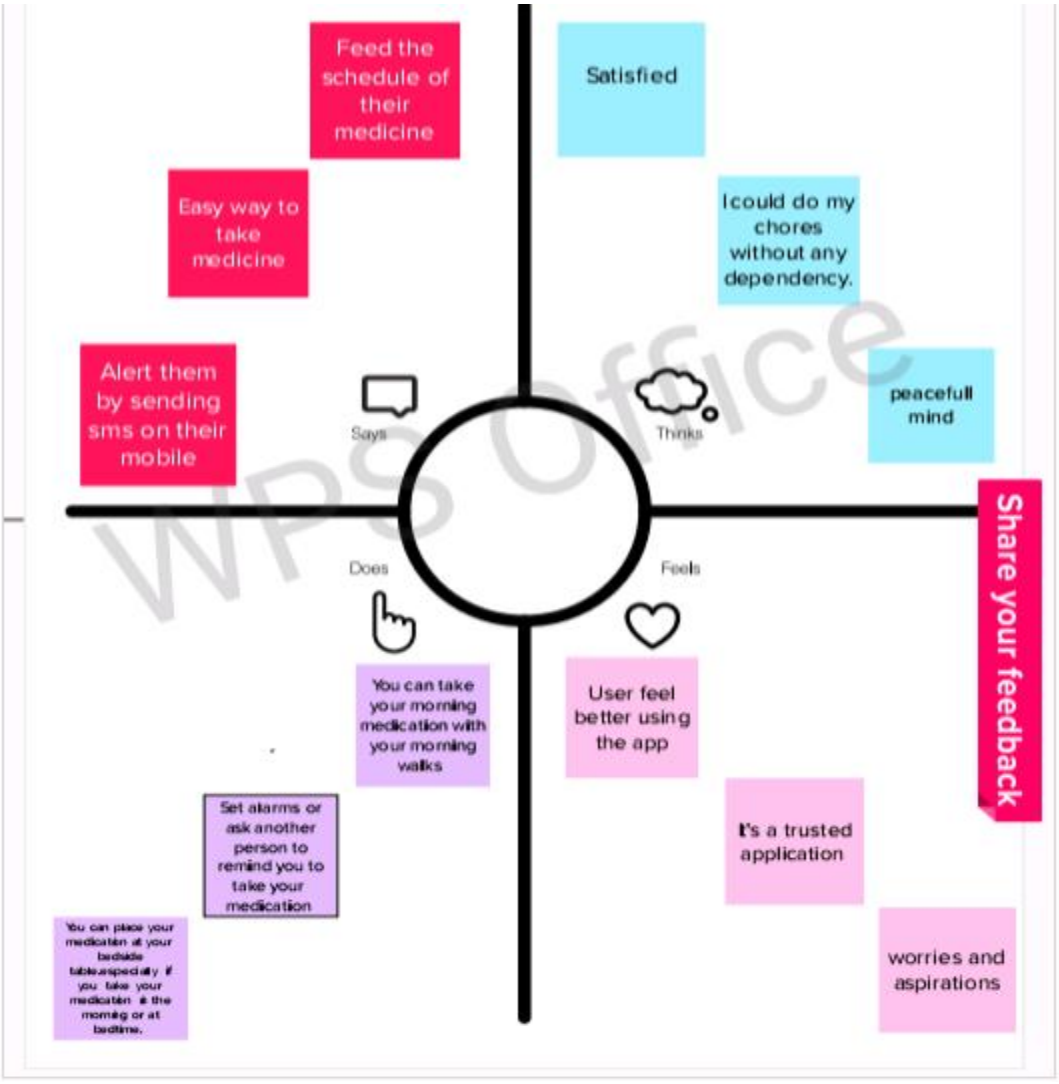
1) Visual Health Reminder: A Reminder for Medication Intake and Measuring Blood Pressure to Support Elderly People ; René Baranyi; Sascha Rainer; Stefan Schlossarek; Nadja Lederer; Thomas Grechenig
2) Cloud Computing based Medical Assistance & Pill Reminder ; A. Chinnasamy; Ram Prasad J; Syed Rafeeq Ahmed; Akash S

2.3. Problem statement definition

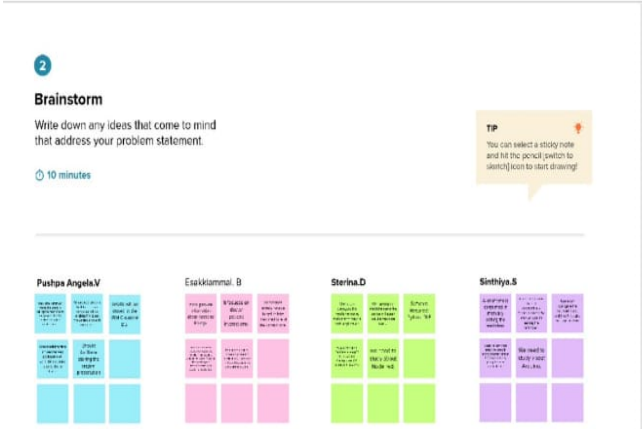
Skipping medicines can be serious for some medical health conditions; Sometimes elderly people forget to take their medicine at the correct time.They also forget which medicine one should take at that particular time. And it is difficult for doctors/caretakers to monitor the patients around the clock

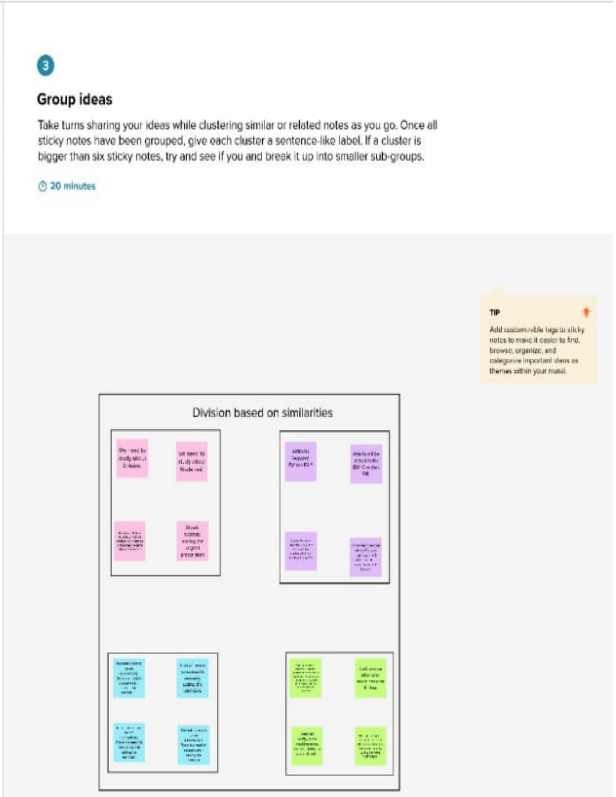
3.Ideation and proposed solution

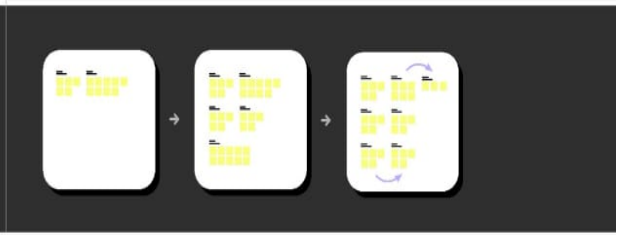
3.1. Empathy Map Canvas



3.2 IDEATION & BRAINSTORMING







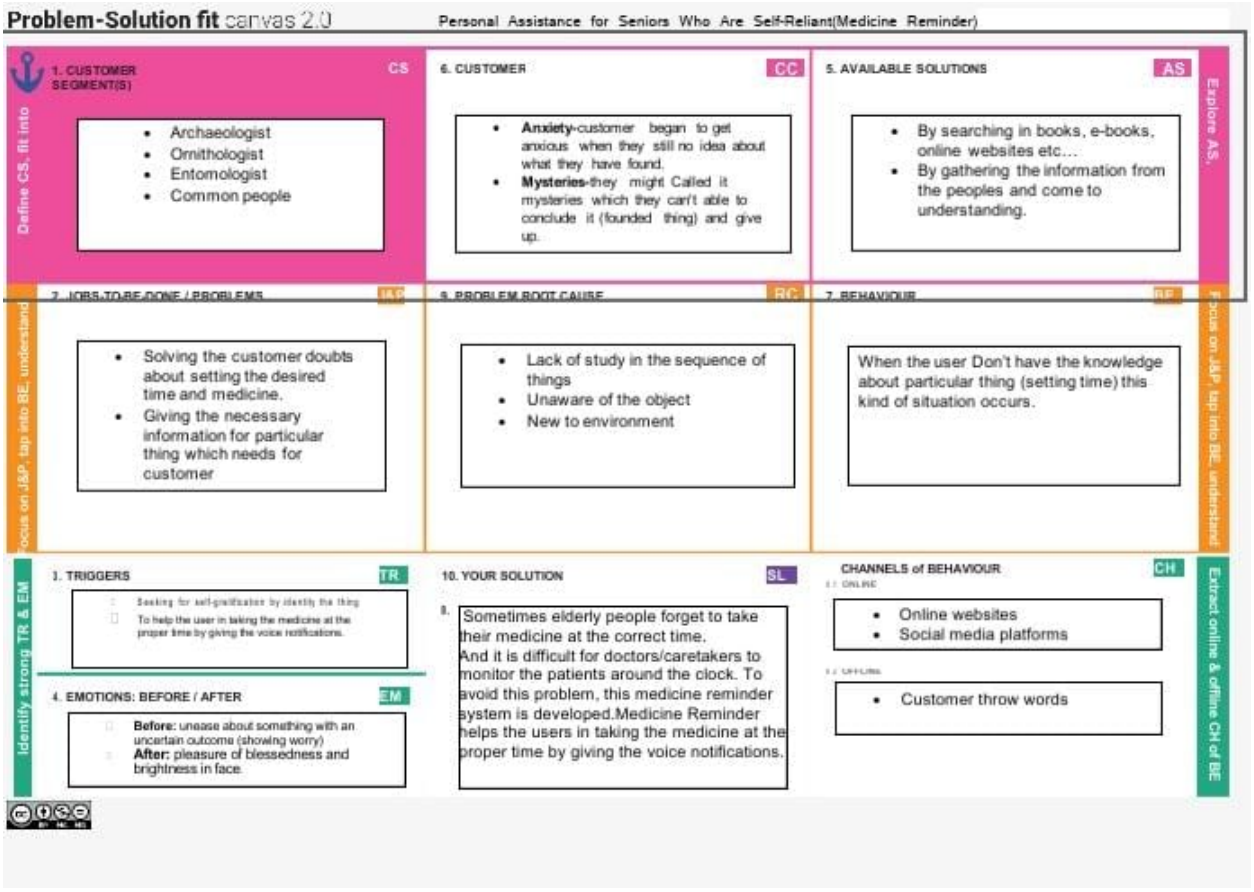
3.3. Proposed solution

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 should be taken at that particular time. And it is difficult for doctors/caretakers to monitor the patients around the clock
2.	Idea / Solution description	➢ A 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.
3.	Novelty / Uniqueness	➢ Keeping track of the medicines taken by the user at each time interval. ➢ Information is stored in the secured IBM cloud
4.	Social Impact / Customer Satisfaction	The reminder system enables the user to take tablets at regular intervals prescribed by the physicians.
5.	Business Model (Revenue Model)	Direct Mode: We gain revenue from selling the medical reminder system to hospitals, medical health centres and even in old age homes. Indirect Mode: We gain profit by having partnership with

		pharmaceutical companies.
6.	Scalability of the Solution	The medical alert system can be used in hospitals, medical health centres and even in old age homes for dispensing medicines. 3.4. Problem

3.4. Problem Solution fit



4.Requirement analysis

4.1. Functional Requirements:

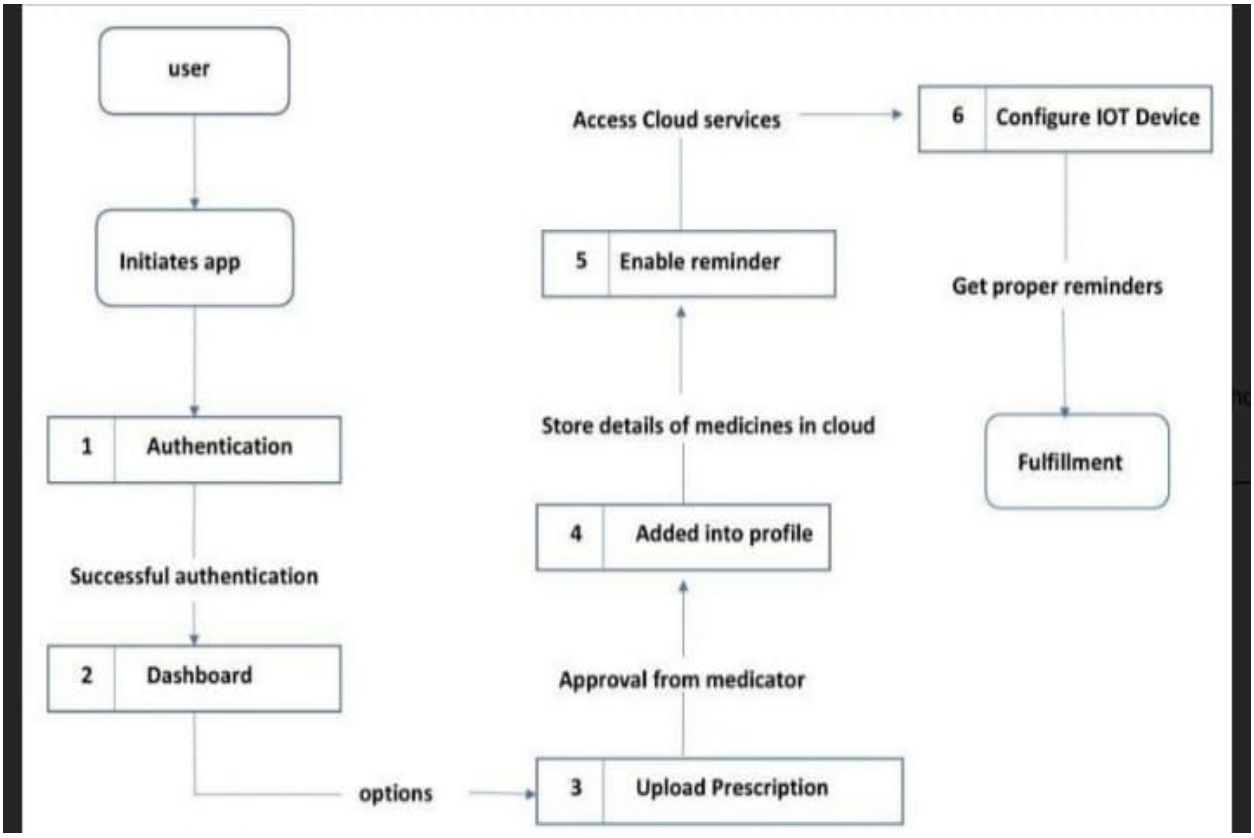
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Access Cloud services	Accessing the cloud service with correct credentials. Storing the details in the cloud database
FR-4	IOT configuration	Fine Tuning the IOT device based Cloud DB access via device. Manage the data request and response effectively

4.2. Non-functional Requirements:

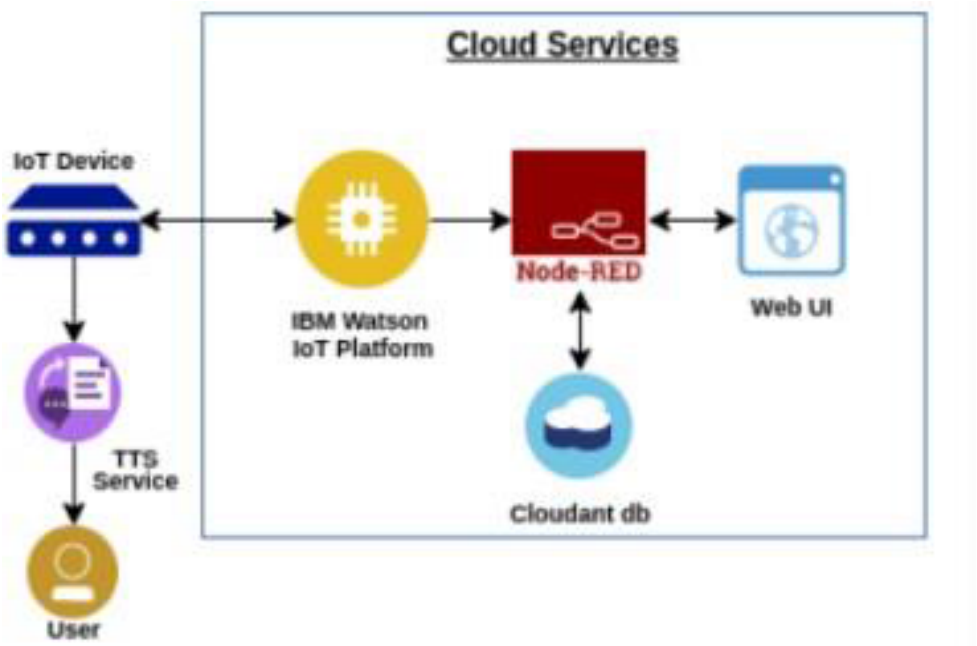
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	App can be used by anyone who has knowledge about applications and computers.
NFR-2	Security	For security, TFA is enabled and biometrics arealso added for user safety.
NFR-3	Reliability	Highly reliable since, It usestrusted and authentic cloud services like IBM.
NFR-4	Performance	Performance is better compared to other marketproducts.
NFR-5	Availability	Available on mobile app.
NFR-6	Scalability	Using Cloud services, makes the scalability higher the using traditional locally stored database.

5.Project Design

5.1. Data Flow Diagrams



5.2. Technical architecture



5.3. User Stories

User Type	Functioal Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email or mobile number, 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
		USN-3	As a user, I can register for the application through Gmail		medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering email or mobile number & password	I can access my account / dashboard	high	Sprint-1

User Type	Functioal Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
	Dashboard	USN-5	As a user, I can update my reminders and medicines wherever required		high	Sprint-2
		USN-6	As a user, I can check the application whether the medicine dosage is completed.		medium	Sprint-2
Customer Care Executive		USN-7	For any troubleshooting, the user can send a mail to the technical team.		low	

6.Project Planning and Scheduling

6.1. Sprint Planning and Estimation

Sprint	Functional Requiement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint- 1	registration	USN-1	As a user, I can register for the application by entering my email or mobile number, password, and confirming my password.	2	high	pushpa angela
Sprint- 1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	high	esakkiammal
Sprint- 1		USN-3	As a user, I can register for the application through Gmail	2	medium	sinthiya
Sprint- 1		USN-4	As a user, I can log into the application by entering email or mobile number & password	2	high	sterina
Sprint- 2	login	USN-5	As a user, I can update my reminders and medicines wherever required	1	high	pushpa angela
Sprint- 2	dashboard	USN-6	As a user, I can check the application whether the medicine dosage is completed	1	medium	sterina
		USN-7	For any troubleshooting, the user can send a mail to the technical team	1	low	sinthiya
Sprint- 3		USN-8	Ensures smooth functioning and data	1	medium	esakkiammal

			warehousing strategies			

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	7 Days 03 Nov 2022 10Nov 2022	20	10 Nov 2022
Sprint-2	20	5 Days 6 Nov 2022 11 Nov 2022	20	11 Nov 2022
Sprint-3	20	4 Days 8 Nov 2022 11 Nov 2022	20	11 Nov 2022
Sprint-4	20	2Days 13 Nov 2022 15 Nov 2022	20	15 Nov 2022

7.Coding and Solutioning

7.1 Feature 1

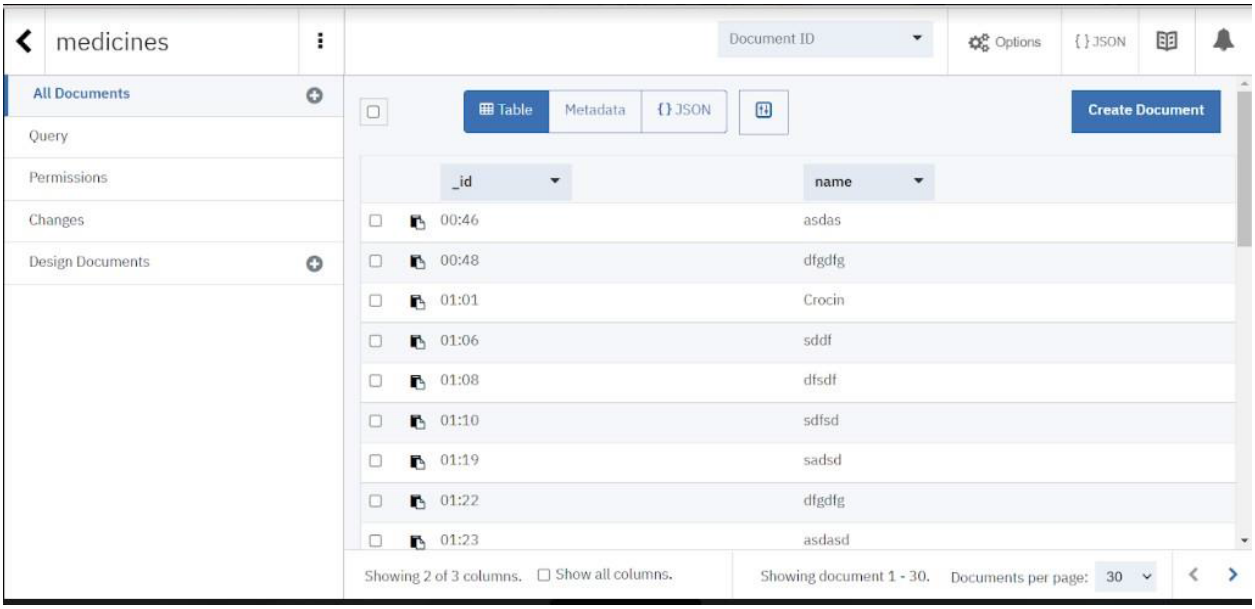
The mobile application developed has a feature of individual login by different users.

7.2 Feature 2

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

7.3. Feature 3

The project includes a cloud database system.



8.Testing

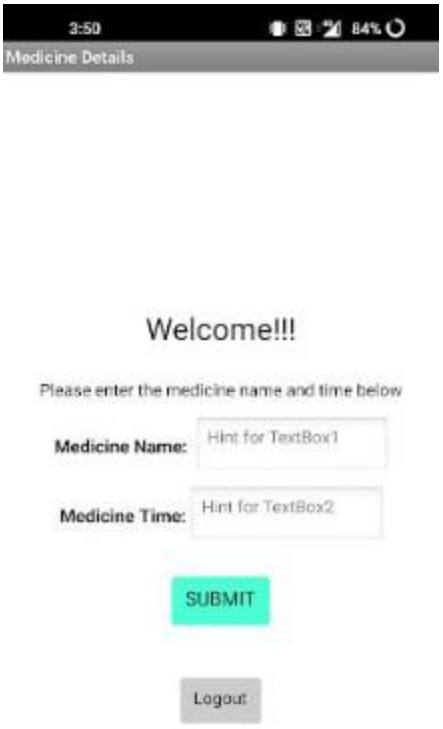
8.1. Test cases

Test case	Precondition	Test steps	Test data	Expected result
Verify login with valid credentials	User should have a network connection	1. Launch URL 2. Enter valid username. 3. Enter valid password 4. Click on the “Login” button.	user name:pushpa password:1234	users should be able to login successfully
Verify login with invalid credentials	User should have a network connection	1. Launch URL 2. Enter valid username. 3. Enter valid password	user name:pushpa password:1234	users should not be able to login.

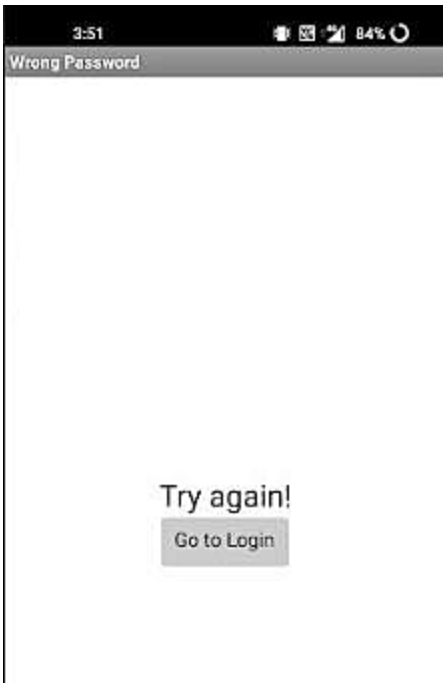
		4. Click on the “Login” button.		
Update the medicine name with the time.	User should have a network connection	1. Launch URL 2. Enter valid username. 3. Enter valid password 4. Click on the “Login” button.	Medicine name:cetirizine medicine Time:20.00	User should be able to update it successfully.

8.2. User acceptance testing

Login page testing



Incorrect login attempt



Medicine page testing

9.Results

9.1. Performance Metrics

S. NO	Parameter	Performance
1.	Response Time	0.2s (Average of 10 trials)
2.	Workload	500 users (Calculated based on Cloud Space)
3.	Revenue	Individual users and pharmaceutical industries.
4.	Efficiency	Simple and straightforward workflow, which makes the process efficient.
5.	Down Time	Almost no down time due to IBM Cloud enabled solution.

10.Advantages and 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.

11.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.

12.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.

13.Appendix

Source Code:

```
#include <Wire.h>
#include<EEPROM.h>
#include <RTClib.h>
#include <LiquidCrystal.h>

LiquidCrystal lcd(7, 6, 5, 4, 3, 2);
RTC_DS1307 RTC;
int temp,inc,hours1,minut,add=11;
int next=10;
int INC=9;
int set_mad=8;

#define buzzer 13

int HOUR,MINUT,SECOND;

void setup()
{
 Wire.begin();
 RTC.begin();
 lcd.begin(16,2);
 pinMode(INC, INPUT);
 pinMode(next, INPUT);
 pinMode(set_mad, INPUT);
```

```
 pinMode(buzzer, OUTPUT);

   lcd.setCursor(0,0);
   lcd.print("Medicin reminder");
   lcd.setCursor(0,1);
   lcd.print(" Using Arduino  ");
    delay(2000);
    lcd.setCursor(0,0);
   lcd.print("By Saddam khan  ");
   lcd.setCursor(0,1);
   lcd.print("Engineers Garage");
    delay(2000);

 if(!RTC.isrunning())
 {
 RTC.adjust(DateTime(_DATE,TIME_));
 }
}

void loop()
{
   int temp=0,val=1,temp4;
   DateTime now = RTC.now();
   if(digitalRead(set_mad) == 0)      //set medicine time
   {
     lcd.setCursor(0,0);
   lcd.print("  Set Medicine  ");
   lcd.setCursor(0,1);
   lcd.print("  Reminder time ");
    delay(2000);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Enter Time 1");
    defualt();
    time(1);
    delay(1000);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Enter Time 2");
    defualt();
    delay(1000);
```

```
    time(2);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Enter Time 3");
    defualt();
time(3);
     lcd.setCursor(0,0);
   lcd.print("Medicin reminder");
   lcd.setCursor(0,1);
   lcd.print("  time has set  ");
    delay(2000);
 }
 lcd.clear();
 lcd.setCursor(0,0);
 lcd.print("Time:");
 lcd.setCursor(6,0);
 lcd.print(HOUR=now.hour(),DEC);
 lcd.print(":");
 lcd.print(MINUT=now.minute(),DEC);
 lcd.print(":");
 lcd.print(SECOND=now.second(),DEC);
 lcd.setCursor(0,1);
 lcd.print("Date: ");
 lcd.print(now.day(),DEC);
 lcd.print("/");
 lcd.print(now.month(),DEC);
 lcd.print("/");
 lcd.print(now.year(),DEC);
 match();
 delay(200);
}

void defualt()
{
  lcd.setCursor(0,1);
  lcd.print(HOUR);
  lcd.print(":");
  lcd.print(MINUT);
  lcd.print(":");
  lcd.print(SECOND);
}
```

```
/Function to set alarm time and feed time into Internal eeprom/

void time(int x)
{
  int temp=1,minuts=0,hours=0,seconds=0;
    while(temp==1)
    {
     if(digitalRead(INC)==0)
     {
      HOUR++;
      if(HOUR==24)
      {
       HOUR=0;
      }
      while(digitalRead(INC)==0);
     }
lcd.clear();
      lcd.setCursor(0,0);
    lcd.print("Enter Time ");
   lcd.print(x);
    lcd.setCursor(0,1);
    lcd.print(HOUR);
    lcd.print(":");
    lcd.print(MINUT);
    lcd.print(":");
    lcd.print(SECOND);
    delay(100);
    if(digitalRead(next)==0)
    {
      hours1=HOUR;
      EEPROM.write(add++,hours1);
     temp=2;
     while(digitalRead(next)==0);
    }
    }
    while(temp==2)
    {
if(digitalRead(INC)==0)
     {
      MINUT++;
```

```
      if(MINUT==60)
      {MINUT=0;}
      while(digitalRead(INC)==0);
     }
      lcd.clear();
      lcd.setCursor(0,0);
    lcd.print("Enter Time ");
   lcd.print(x);
    lcd.setCursor(0,1);
    lcd.print(HOUR);
    lcd.print(":");
    lcd.print(MINUT);
    lcd.print(":");
    lcd.print(SECOND);
    delay(100);
      if(digitalRead(next)==0)
      {
       minut=MINUT;
       EEPROM.write(add++, minut);
       temp=0;
       while(digitalRead(next)==0);
      }
    }
    delay(1000);
}


/* Function to chack medication time */

void match()
{
  int tem[17];
  for(int i=11;i<17;i++)
  {
    tem[i]=EEPROM.read(i);
 }
  if(HOUR == tem[11] && MINUT == tem[12])
  {
   beep();
   beep();
   beep();
```

```
 beep();
 lcd.setCursor(0,0);
 lcd.print("  Take Group One  ");
 lcd.setCursor(0,1);
 lcd.print("     Medicine     ");
 beep();
 beep();
 beep();
 beep();
}

 if(HOUR == tem[13] && MINUT == tem[14])
 {
   beep();
 beep();
 beep();
 beep();
  lcd.setCursor(0,0);
 lcd.print("  Take Group Two  ");
 lcd.setCursor(0,1);
 lcd.print("     Medicine     ");
  beep();
 beep();
 beep();
 beep();
 }


 if(HOUR == tem[15] && MINUT == tem[16] )
 {
   beep();
 beep();
 beep();
 beep();
  lcd.setCursor(0,0);
 lcd.print("Take Group Three ");
 lcd.setCursor(0,1);
 lcd.print("     Medicine    ");
 beep();
 beep();
 beep();
```

```
   beep();
   }
}

/* function to buzzer indication */

void beep()
{
   digitalWrite(buzzer,HIGH);
   delay(500);
   digitalWrite(buzzer, LOW);
   delay(500);
}
```

Github link :

Project demo link :

https://drive.google.com/file/d/1fXYToC-Wp2V9LktIut7zTuKCMvOzlxw7/view