PERSONAL ASSISTANCE FOR SENIORS WHO ARE SELF - RELIANT

A PROJECT REPORT

Submitted By

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for the course of

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in

SETHU INSTITUTE OF TECHNOLOGY, KARIAPATTI

AN AUTONOMOUS INSTITUTION

CHAPTER 1

INTRODUCTION

1.1. 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.

1.2. 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.

2. LITERATURE SURVEY

2.1. 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 Assistanc.

Though the solutions give reminders, the voice commands or assistance given by this system is more efficient.

2.2. REFERENCES

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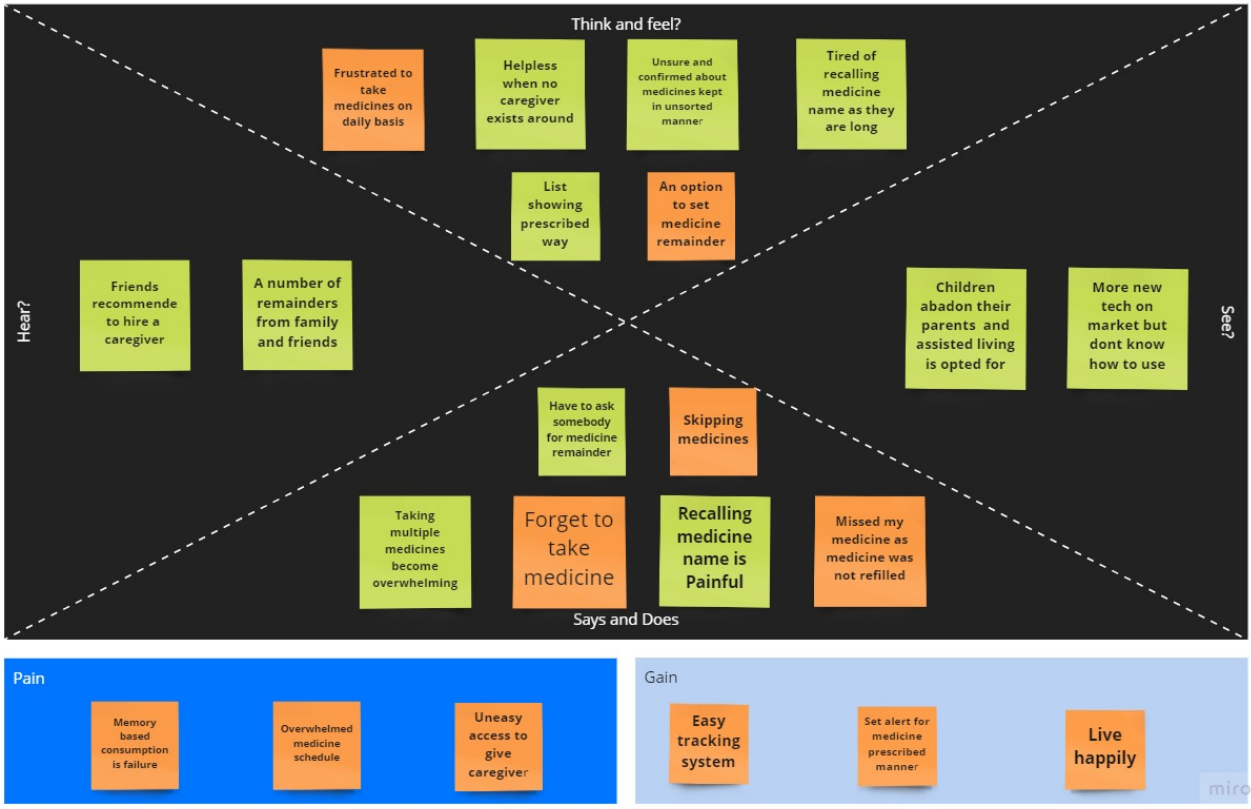
2.3. PROBLEM STATEMENT DEFINITION

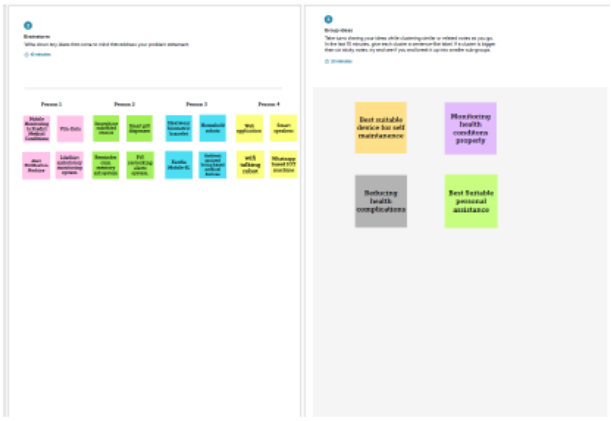
It is very difficult for the senior citizens (elder people) to remember their medicines.To avoid the skipping up the medicines,they can be remembered by using the voice commands of the medicine names at correct time specified. If the voice commands on the medicine name is not available, they are given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

3. IDEATION & PROPOSED SOLUTION

3.1. EMPATHY MAP CANVAS



3.2.IDEATION AND BRAINSTORMING



3.3.PROPOSED SOLUTION

S.NO	PARAMETER	DESCRIPTION
1).	Problem Statement (Problem to be solved)	Senior citizens who are in need of medicine reminder and selfassistance 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 Satisfication	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).	Scalabilty 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

3.4. PROBLEM SOLUTION FIT

4.0.REQUIREMENT ANALYSIS

4.1.FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Customer Registration	Registration through Email.
FR-2	Authorization	Get confirmation mail once registration complete.
FR-3	User interface Requirement	Mobile installed with web application.
FR-4	System design Requirement	Interaction to the IOT system with other system.
FR-5	Input Data	Store the data about patient in database.
FR-6	Output Data	Alarm, medicine.

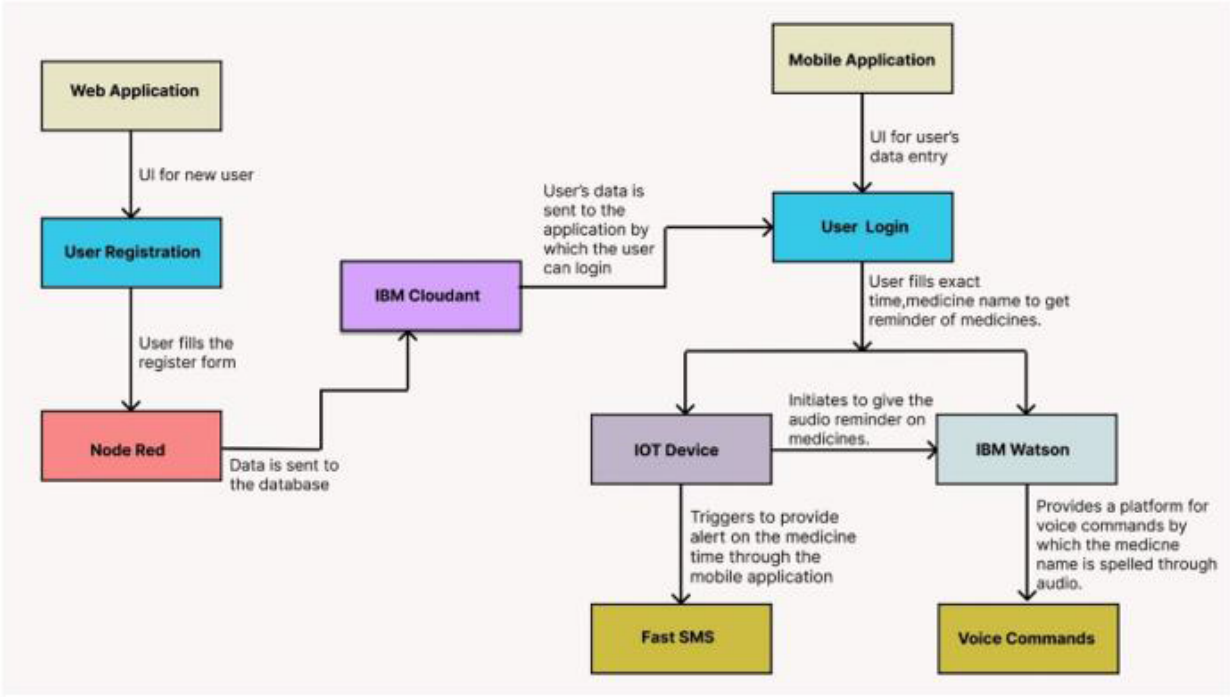
4.2.Non-Functional Requirements

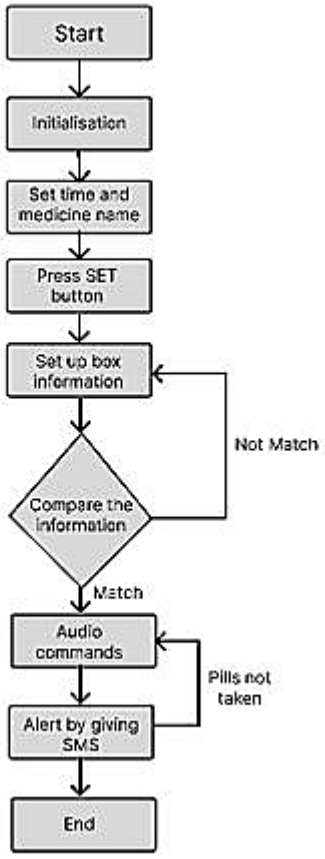
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The systemshould be user-friendly for the users.It is used to remaind the medicine names. It alertsthe users through voice commands.
NFR-2	**Security**	The logininformation should notbe accessed by anyother usersthan the respective. The dataof the usersshould be keptconfidential.
NFR-3	**Reliabilty**	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 giventime. It workswithout any connection interruption
NFR-5	**Availabilty**	The systemshould be monitored 24X7 for the alertof medicines. It canbe used by any registered users from anyplace.
NFR-6	**Scalabilty**	It is easily adaptable The deviceis compatible and

		portable The application can handle any number of registration.

5.PROJECT DESIGN

5.1.DATA FLOW DIAGRAMS





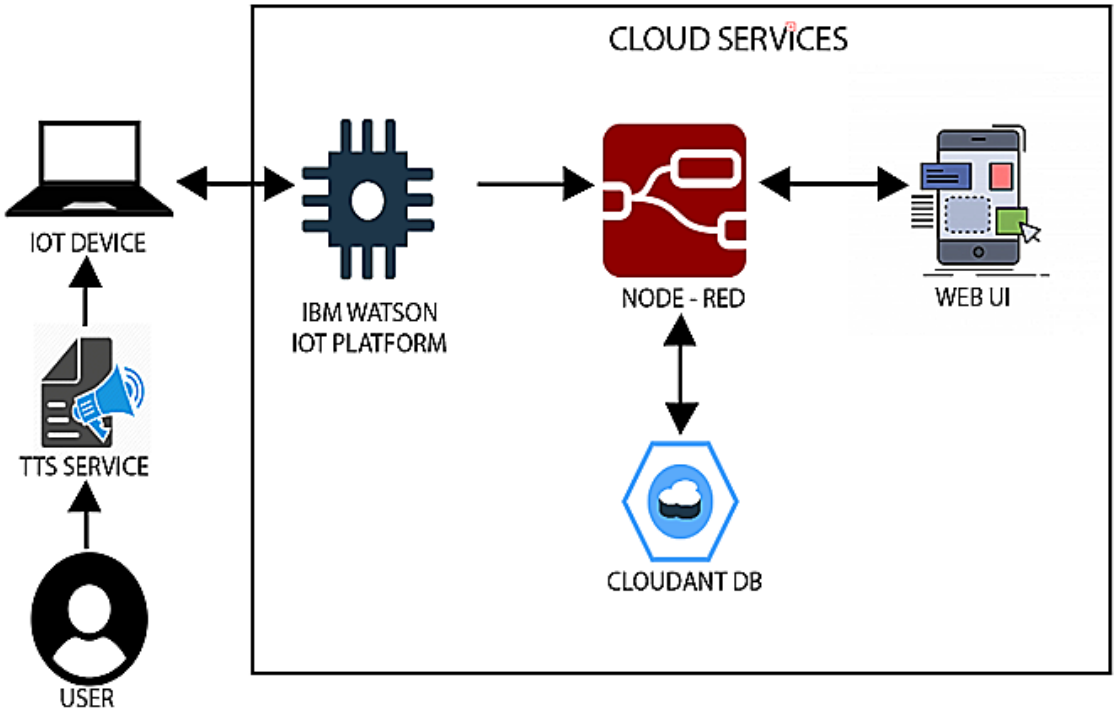
5.2. SOLUTION & TECHNICAL ARCHITECTURE

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.



5.3.USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Senior citizen)	Caretaker	USN-1	As a user, I want to take medicines on time so that I can my health.	I want to take medicine on time.	High	Sprint-1
Customer (Mentally idled patient)	Janitor	USN-2	As a user, my patient should maintain good health by consuming medicines on time.	My patient needs to take medicines at proper time.	High	Sprint-2
Customer (Disabled person)	Smart medicine box	USN-3	As a user, I need to take my medicines at correct time through nearby person via SMS.	I need to take medicines at accurate time by notification.	Medium	Sprint-4
Customer (Coma patient)	Virtual medikit	USN-4	As a user, my patient medication time and name should be loaded in database.	My patient's medicine name and time should be in database list.	High	Sprint-2
Customer (Alzheimer patient)	Digital medicare	USN-5	As a user, I want to take medicines on time by voice commands.	I want to take medicines on time by voice assist. .	Medium	Sprint-3

6.PROJECT PLANNNING & SCHEDULING

6.1.SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	CUSTOMER REGISTRATION	USN-1	As a User, I can register for the application by entering my mail, password and confirming my password.	3	High	Karthiga & Jocelyn Belinda
Sprint-2	AUTHORIZATION	USN-2	As a user, I will receive confirmation email	2	Medium	Keerthana & Oviya

			once I have registered for the application			
Sprint-3	USER INTERFACE	USN-3	Using Mobile application it is easy receive an alert when the medicine is missed to take and also giving correct medicines at correct time.	3	HIGH	Jocelyn Belinda & Keerthana
Sprint-4	SYSTEM DESIGN	USN-4	Uses cloud database to store medicinal reports. Connecting API to the cloud and mobile application. Connecting an IOT device to the cloud.	3	HIGH	Karthiga, Keerthana, Jocelyn Belinda, Oviya

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	15	5 Days	24 Oct 2022	28 Oct 2022	15	28 oct 2022
Sprint-2	10	4 Days	29 oct 2022	1 Nov 2022	10	1 Nov 2022
Sprint-3	20	6 Days	02 Nov 2022	07 Nov 2022	20	7 Nov 2022
Sprint-4	25	10 Days	08 Nov 2022	17 Nov 2022	25	17 Nov 2022

Velocity:
Sprint 1 average velocity:
Average velocity = 15 / 5 = 3

Sprint 2 average velocity:
Average velocity = 10 / 4 = 2.5

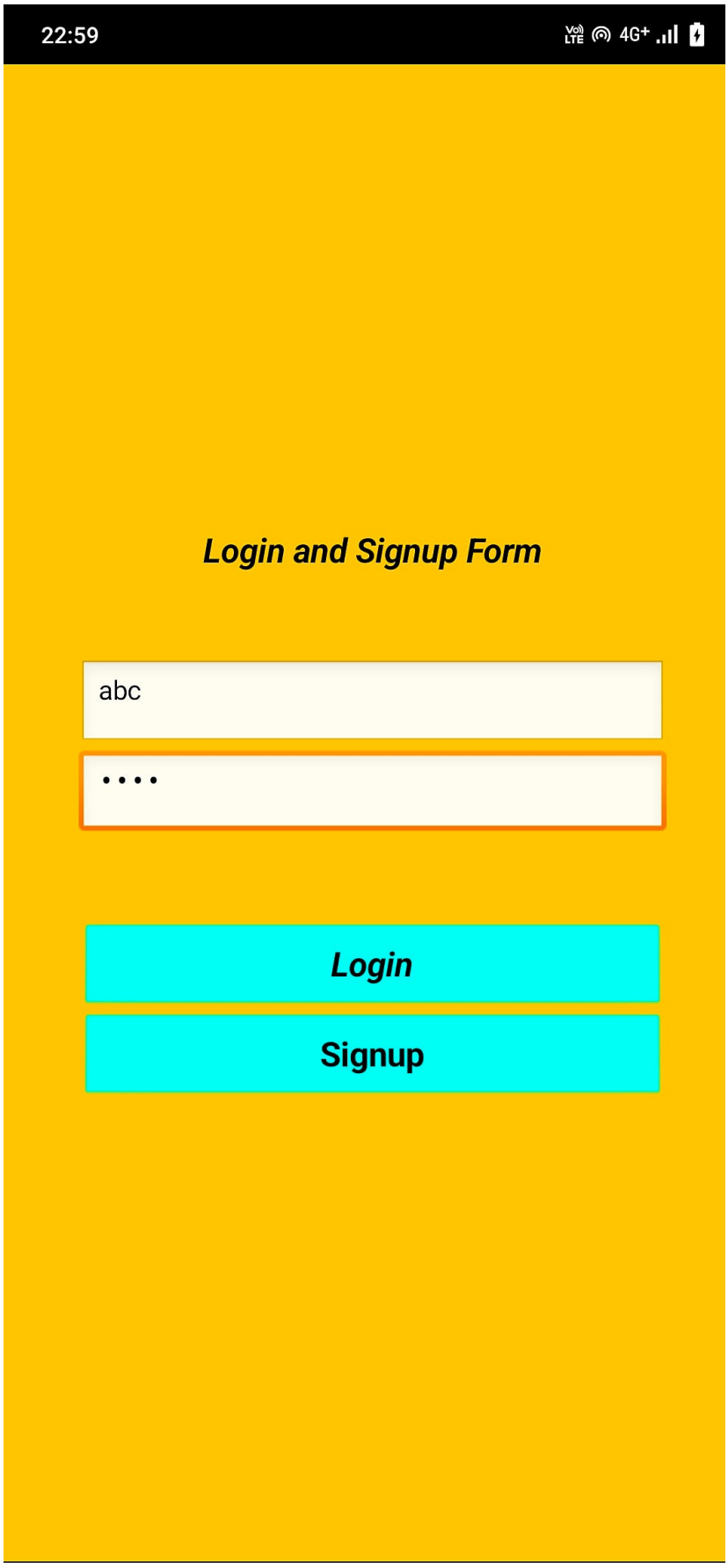
Sprint 3 average velocity:
Average velocity = 20 / 6 = 3.3

Sprint 4 average velocity:
Average velocity = 25 / 10 = 2.5

7.CODING & SOLUTIONING

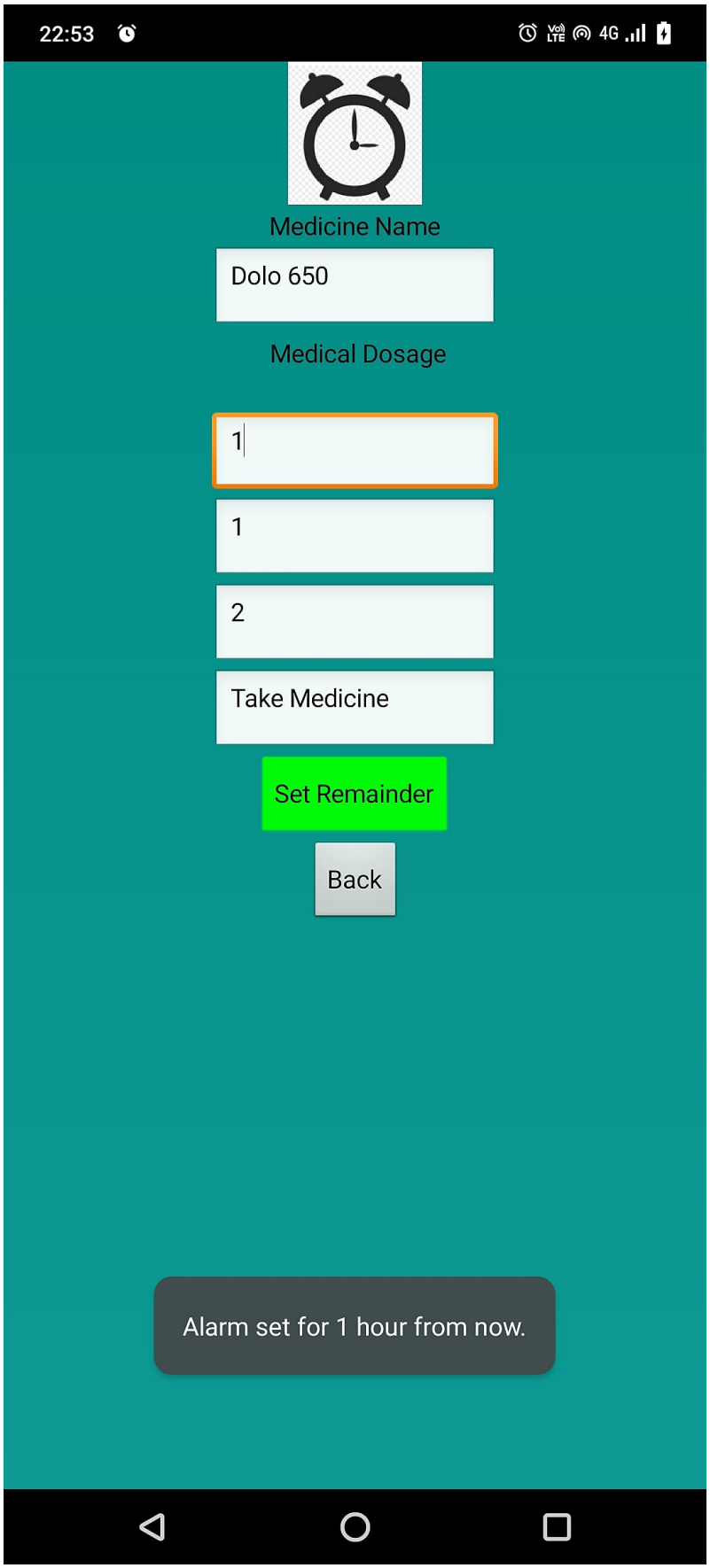
7.1. Feature 1

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


22:59
Login and Signup Form
abc
Login
Signup

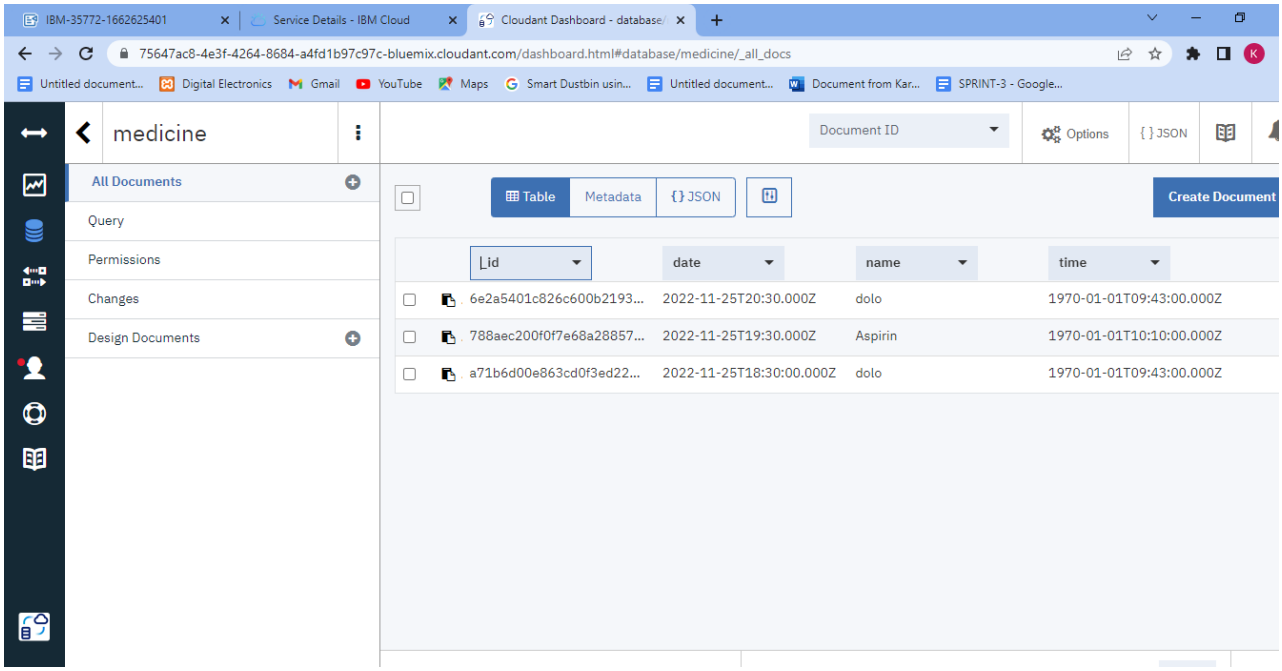
7.2. Feature 2

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


22:53
Medicine Name
Dolo 650
Medical Dosage
1
1
2
Take Medicine
Set Remainder
Back
Alarm set for 1 hour from now.

7.3. Feature 3

The project includes a cloud database system.



8.TESTING

8.1. TEST CASES

A test case is a document which has a set of conditions or actions that are performed on thesoftware application in order to verify the expected functionality 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 coupons or whether there are multiple ways to apply. It also doesn't mention if the tester uses alink to apply adiscount, or enter a code, or have a customer service apply it. They 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 inputs, 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 they're going to test in brief.

● PreConditions:Any assumptions that apply to the test and any preconditionsthat must be met prior to the test being executed should be listed here.

● Test Case Steps:The test steps should include the necessary data and information on how to execute the test. The steps should be clear and brief, without leaving out essential facts.

● Test Data:It's important to select a data set that gives sufficient coverage.Select a data set that specifies not only the positive scenarios but negative ones as well.

● Expected Result:The expected results tell the tester what they should 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 tester want's to specify can be included here.

8.2. USER ACCEPTANCE TESTING

1.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

2.Defect Analysis

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
Won't Fix	1	3	2	2	8
Totals	13	11	15	25	64

3.Test Case Analysis:

Section	TotalCases	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

9.RESULTS

9.1. 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.

10.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.

11. CONCLUSION

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.

12. APPENDIX

Source Code

```
#include <WiFi.h>//library for wifi
 #include <PubSubClient.h>//library for MQtt
 #include <LiquidCrystal_I2C.h>
#include "DHT.h"// Library for dht11
#define DHTPIN 15 // what pin we're connected to #define DHTTYPE DHT11 // define type of sensor DHT 11
```

```
#define LED 2 DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and typr of dht connected
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);



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

#define ORG "5gj4a1"//IBM ORGANITION ID
 #define DEVICE_TYPE "Sample"//Device type mentioned in ibm watson IOT Platform
define DEVICE_ID "12345678"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678" //Token
 String data3="";
int buzz= 13;

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

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/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 wificredenti
al 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(); } }
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 = "5gj4a1"
deviceType = "ISamplee"
 deviceId = "12345678"
 authMethod = "token"
#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
```

from ibm_watson import TextToSpeechV1
from ibm_cloud_sdk_core.authenticators import IAMAuthenticator

authenticator = IAMAuthenticator('63s6J5crAYXonyQBql09wrk3J-kkSONLepEibsit4UKW')

Text to Speech

```
from ibm_watson import TextToSpeechV1
from ibm_cloud_sdk_core.authenticators import IAMAuthenticator

authenticator = IAMAuthenticator('63s6J5crAYXonyQBql09wrk3J-kkSONLepEibsit4UKW')

text_to_speech = TextToSpeechV1(
    authenticator=authenticator
)

text_to_speech.set_service_url('https://api.au-syd.text-to-
speech.watson.cloud.ibm.com/instances/6e24c0dd-412e-45de-9165-d02d2963be23')
```

```
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