

Personal Assistance for Seniors Who Are Self-Reliant

**PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND
ENTREPRENEURSHIP - HX8001**

Submitted by

Ayesha Parvez Alam	512219104003
Divya T	512219104005
Mahalakshmi S	512219104010
Suruthika M	512219104019

TEAM ID PNT2022TMID40129

Of

Department of Computer Science Engineering



SKP ENGINEERING COLLEGE

Tiruvannamalai ,606611

College Mentor: Mr.Sankaran

Industrial Mentor: Kumar Juluri

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INTRODUCTION

Personal Assistance for seniors who are self-reliant .Personal assistance for seniors who are self-reliant is which provides a way for improving the health care services. This device tracks the medicine remainder and the motion of the person is tracked by ARDUINO IDE and their respective readings are displayed in the mobile application. IOT medicine remainder and Arduino IDE can be connected to communicate and transfer information between patient and doctor. This system can assist the elderly with health check-ups. So doctors or care takers can follow the health condition of the elderly. Moreover, due to the functional and physical limitations.Arduino is to launch a scenario of notifications. It is necessary to add the services that are required to be notified from before creating a scenario. Then add an action, choose the service to be used and write the text to be sent. Arduino IDE is the only argument to be attached.Without a specific request from the client, Push notification, is the delivery of information from a software application to a computing device The foremost advantage of pop-up messages in versatile registering is that the innovation doesn't require explicit programs on a cell smartphone to be open all together for a message to be gotten. This permits a mobile smartphone to get and display internet based totally life or instantaneous message alarms in any event, when the gadget's display is bolted and the web networking software this is pushing the attention is closed.The main parts of softwareare mobile applications for doctors or caretakers, mobile application for patients, thingspeak, pushingbox notifications. Mobile Application for doctors: The mobile application for the caretaker is All things talkmaker.This platform is developed by allthings talk. The values of the sensors are displayed in this mobile application or the web application interfaces.

1.1 Project Overview

Medicine Reminder Android App Project is an native android application meant to aid the forgetful and busy with remembering 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 keeping the schedule. The application allows the user to store pill objects and multiple alarms for those pills. Alarms have one time of day and can occur on multiple days of the week. The user is able to view their pills in a today view and can select date to view medicines. In addition, the application stores the history of when each medication was taken; this will aid the user in keeping track of their medication usage.

In the Home page, you will see 1 buttons in the bottom right of the application. #####Plus sign: This will take you to the Add Activity where you will be able to create an alarm. The application will automatically link up all the alarms to a specific pill with the same Pill Name. If you attempt to create an alarm to a pill that does not exist, it will automatically create a pill object for you. #####Calendar sign: This will take you to the Schedule Activity where you can see all the pills and alarms organized by the day of week.

1.2 Purpose

In our busy and hectic life, we sometimes forget to take medicines on time. In hospitals it becomes difficult for doctors to remind every patient to take the medicines on time. The perfect solution for this problem should be a **Automatic Medicine Reminder Alarm System** which will alert the patient either by sending Voice mail/SMS or by triggering some alarm. In this tutorial we will build an IOT Medicine Reminder Project using which will get the time from internet as a reminder to take medicines according to the schedule of medication.

LITERATURE SURVEY

Internet Of Things(IOT) can be described as the network of things embedded with electronics, sensors, network connectivity, and software. IOT creates opportunities for better and seamless integration between computer-based systems and the physical world. When augmented with sensors and actuators, it becomes an instance of the more general class of cyber - physical systems since each thing is uniquely identifiable and can interoperate with in the existing network infrastructure. Since the IOT results in improved.

Efficiency, accuracy and economic benefits, it is estimated that the IOT will consist of billions of objects in a few years. IOT solutions enable to collect all kinds of information from a few bytes to several megabytes depending on the application requirements.

Life expect an all around the world is becoming higher. In some high-income countries, most elderly care is funded by government grants and property taxes and care cost spaid by elderly people themselves are subsidized and based on specific rates. Some municipalities have been opting to privatise some part sorall of their elderly care services and allowing private care providers to operate with specific business models. Compared to other age groups elderly people are more prone to most health problems. The adverse effect so funfore see able events such as sudden illnesses and falls can be prevented or alleviated to some extent with real time monitoring and alarm systems. More over ,most of those system I so allow their users to communicate their urgent needs to the health care provider using specific prerecorded audio messages played via smart phone screens.

In recent years ,progress in wearable devices and sensor technologies has started to improve the prospects of health careservices for assisting the elderly and disabled. Since most of the elderly suffer from age-related health problems, using wearable technologies healthcare providers monitor their vital signs continuously and comfortably. In this paper, we view state-of-the-art IOT solutions and applications that can be used for elderly and disabled care and investigate prospects and research challenges. There's to this paper is as follows. The second section presents the background of this work as wel las related works on IOT solutions and various applications designed for the elderly and disabled. The third section is devoted to research challenges. The fourth section focuses on future research directions.

Emergency Assistance and Response:

Emergency assistance and response systems are the key component in the design of assistive domotics. The first generation of emergency assistance and response systems consist of personal alarm systems and emergency response phones. A typical system in this generation consists of a mini wireless send and trans receiver and a central unit plugged into a phone jack, with a microphone and loudspeaker. If the pendant is activated, a 24/7 control centre which has some information about the monitored person, such as medical symptoms and medication allergies, is called. Then the control centre speaks to the monitored person to identify whether he/she needs help. If help is needed, emergency services are dispatched.

Memory:

Considering the cognitive impairment in elderly people, automatic reminder systems are another important solution for the elderly. They make specific announcements about taking medicine, doctor's appointments, and everyday activities and tasks such as locking doors, closing the blinds, turning of the stove, eating lunch and walking the dog over an intercom depending on users' preference. Some user activities such as turning on/off the lights or controlling room temperature can be automatically performed. While these systems are a potential application of IoT technology, IoT based simple and cheaper solutions such as a wrist watch with text message and medical alert can function as a reminder system.

Medication Assistance:

Medication dispensing device allow necessary medications to be taken at appropriate times and can be quite useful for the elderly who live alone. They can be used alone or be complemented with other solutions such as glucose monitors, blood pressure and pulse monitors and digital thermometers. Talking glucose monitors designed for diabetic patients allow the users to test their blood sugar level and take the appropriate injection. High body temperatures can be recognised by digital thermometers and if necessary doctors can be alerted. Automatic blood pressure and pulse monitoring systems dispense hypertensive medications if needed. In recent years, spoon-feeding

robots have been designed, too. IoT technology can be used in all these device categories. Figure 1 lists common healthcare services and applications for elderly people.

Eye sight and Hearing:

Enhanced alarms on doors, doorbells, home appliances, and smoke detectors alert people with hearing or visual impairments about home-related incidents.

2.1 Existing Problem

Patients may often fail to comply with their medication whether it was from forgetting to take the medicine, from taking medicine at the wrong time or even from taking too much medicine. Therefore, there are many systems such as reminder, alarm, and so on to remind patient. We have focus on those patients who having difficulty to take medication on time, we tried to design and to aid patients with managing their medical prescriptions, through a reminder app they will use to look at and manage their medications. The Pill Reminder will facilitate users to require the right medication on time. This system provides a real time monitoring system that allow related people to monitor the patient's activity remotely.

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2.3 Problem Statement Definition

A senior citizen have my medicines at the correct time without anyone's help i always forget the medicine time no one is there to remind me to eat medicines at time malaise patient remind medicines at correct time not able to eat at the correct time I am a memory loss patient frustrated.

3 IDEATION & PROPOSED SOLUTION

Senior citizens are dependent, sick and weak in terms of health economical, physical and psychological phenomena which leads to several medical problems.Sometimes they forget to take their medicine at correct time. They also forget which medicine they should take at that particular time. Then it becomes difficult for doctors/caretakers to monitor the patients around the clock.

An app is build for the user that 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 the voice commands.

3.1 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes. It is a useful tool to help teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.



Reference:

<https://app.mural.co/invitation/mural/personalassistanceiot1556/1661678524873?sender=u8992ea2eef9e41f418d89588&key=7af7b370-acf2-480d-aa6c-3b07abc5c9cf>

3.2 Ideation & Brainstorming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions. 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.

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

The image shows a digital brainstorming template interface with three main columns and a bottom navigation bar.

- Column 1: Personal Assistance For Seniors Who Are Self-Reliant**
 - Icon: A lightbulb with a brain inside.
 - Text: "KIT solutions enable seniors to live in their homes safely. It's a key to ensuring seniors emerging from pandemic isolation have the potential for quality of life as their mobility and independence."
 - List:
 - 1. 40-minute lecture
 - 2. 10-minute lecture
 - 3. 15-minute presentation
 - Link: [View the presentation](#)
- Column 2: Define your collaboration**
 - Text: "A digital collaboration space bringing with the seniors those who provide care to seniors."
 - Link: [View the presentation](#)
 - List:
 - 1. **Teamwork**
 - 1.1. Collaborate with seniors and seniors
 - 1.2. Collaborate with seniors and seniors
 - 2. **For the good**
 - 2.1. Collaborate with seniors and seniors
 - 2.2. Collaborate with seniors and seniors
 - 3. **For the good**
 - 3.1. Collaborate with seniors and seniors
 - 3.2. Collaborate with seniors and seniors
 - Link: [View the presentation](#)
- Column 3: Define your problem statement**
 - Text: "What problem are you trying to solve? What problem is a new idea to the problem? The call to the team to solve the problem."
 - Link: [View the presentation](#)
 - Section: **Key topics of brainstorming**
 - 1. **Teamwork**
 - 1.1. Collaborate with seniors and seniors
 - 1.2. Collaborate with seniors and seniors
 - 2. **For the good**
 - 2.1. Collaborate with seniors and seniors
 - 2.2. Collaborate with seniors and seniors
 - 3. **For the good**
 - 3.1. Collaborate with seniors and seniors
 - 3.2. Collaborate with seniors and seniors

Bottom Navigation Bar:

- 1. **Home**
- 2. **Teamwork**
- 3. **For the good**
- 4. **For the good**

Step-2: Brainstorm, Idea Listing and Grouping

Brainstorm

Write down a big idea that excites you most that addresses your problem statement.

[Learn more](#)

Ayesha Parvez Alam

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Mahalakshmi

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Suruthika M

Cost must not be high.

Give knowledge about better health.

Must be change in the customer life.

Cost must not be high.

Give knowledge about better health.

Must be change in the customer life.

Cost must not be high.

Give knowledge about better health.

Must be change in the customer life.

Divya T

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Group Ideas

Take some sharing your ideas with other existing similar or related ideas and give your ideas all study with your team groups, give each other a feedback that how the ideas is better than the other ideas, the internet is an excellent tool to connect with groups.

[Learn more](#)

Notification Types

Connected to enable her not to forget.

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Alert reminders to family.

Alerts of medical machines.

Connected to enable her not to forget.

Alert reminders to family.

Alerts of medical machines.

Working

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Must be connected to the internet.

Features

Can be connected to the internet.

Can be connected to the internet.

Can be connected to the internet.

Can be connected to the internet.

Can be connected to the internet.

Can be connected to the internet.

Can be connected to the internet.

Can be connected to the internet.

Can be connected to the internet.

Step-3: Idea Prioritization



Reference: <https://app.mural.co/invitation/mural/personalassistanceiot1556/1666700857296?sender=u8992ea2eef9e41f418d89588&key=9fd928ee-0182-4d60-b956-fb9a162c69c3>

3.3 Proposed Solution

Problem Statement (Problem to be solved)

Senior citizens are dependent, sick and weak in terms of health economical, physical and psychological phenomena which leads to several medical problems. Sometimes they forget to take their medicine at correct time. They also forget which medicine they should take at that particular time. Then it becomes difficult for doctors/caretakers to monitor the patients around the clock.

Idea / Solution description

An app is build for the user that 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 the voice commands.

Novelty / Uniqueness

A user friendly app which sends users medication and refill remainders, provides drug interaction warnings, and helps care takers manage prescriptions for patients. It will send health tips in daily manner.

Social Impact / Customer Satisfaction

The user can know their health status from anywhere at anytime. They don't need to visit hospital which saves their time. Patients get the help they need at correct time , no one needs to worry about them.

Business Model (Revenue Model)

Through our web application the revenue can be made in the form of pop-up advertisements, overlays ads from third party services. Subscriptions/premium feature can be used to gain revenue from this application

Scalability of the Solution

Less time will be consumed. The application will have some feature that help the user to know more details about their medicine. The user can easily set their medicine time at any location. It keeps track for the medicine that means how much medicine they have to take that can be fixed in the application.

3.4 Problem Solution Fit

CUSTOMER SEGMENT (S)

Senior Citizens who are self-reliant, ☒ Doctors and caretakers who need to help their patients and families.

JOB-TO-BE-DONE/PROBLEMS

To provide medicines at the correct time to the patients. Able to remember the amount of medicine remains. It should provide the databases correctly and clearly, which consists of the user name, time at which the medicines should be taken and the name of the medicines

TRIGGERS

The problem of forgetting to take medicine on time and unable to remember the amount of medicine remains triggers the users to act. If anyone using these in their house and feels free and enjoying their life, then by seeing them other neighbours will also use this application

EMOTIONS: BEFORE / AFTER

Before using this application, the senior citizens feel as a burden to their families, caretakers. They need to be pampered every time for which they are dependent on other persons. After using this application, they feel independent, happy and enjoying their own company. They is no more burden on their families and their caretakers also becomes out of stress.

AVAILABLE SOLUTIONS

This app will remind the medicine time to the user with an alarm and alert sound. It has the feature of providing daily health tips to the users. High chances of collapsing the data at server side because of that wrong notification will go to different users.

BEHAVIOUR

The users first update the system with medicine name, time to take and the amount of medicines in pack into the device. Make changes regularly after the doctor visits and checkups. Make sure the voice quality is working properly and correctly sounding the medicine name.

CHANNELS OF BEHAVIOUR

ONLINE

Through online, the caretakers can easily get the location, medicine timing and other health related notification of the patients. By online, the can also change the medicine details by connecting to the server inside the application

OFFLINE

From the offline mood, the caretakers can use the data stored in the device to maintain the health table of the patients. ☒ Stored information can also be used by the senior citizens to check their health without anyone helps. They can know about their health by itself.

PROBLEM ROOT CAUSE

The real reason of this problem is forgetting problem of the senior citizens i.e. they can't remember their medicines timing. They even forget which medicine to take, when to take, how much to consume. It becomes difficult to doctors/caretakers to monitor these patients

YOUR SOLUTION

To build a reliable app that can address all the users need while being secure ensuring efficient functioning. ☒ Senior citizen who are illiterate or lost the ability to read can find this will easy. ☒ Medicine amount tracker also implemented to get notified when the medicine get finished.

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR-1

User Registration Registration through Gmail. Registration with Mobile number.

FR-2

User Confirmation Confirmation via Email. Confirmation via OTP.

FR-3

User Profile Filling The profile page after logging in.

FR-4

Access cloud service Access the cloud service with correct login and IOT credentials. Store the details in database. Retrieve needed information for the users operation.

FR-5

IOT Configuration Fine tuning the IOT device based on reference. Access the cloud DB via device, manage the request and response effectively.

FR-6

Users Medical Information In the app, Enter your medicine details with date Then set the time in the app for alarm remainder.

4.2 Non-Functional requirements

NFR-1

Usability The system should be user-friendly for the user.

The system allows the user to perform the tasks easily, effectively and efficiently. It alerts the users through voice commands.

NFR-2

Security Assuring all the data are inside the system or database protected from malware attacks. The login information should not be accessed by any other users than the respective user.

NFR-3

Reliability It is highly reliable since, it uses trusted cloud services like IBM. The user data will be updated and examine certain period of time.

NFR-4

Performance Performance measurements include: Quality and efficiency of Senior care. Give Effective services. Disparities in performance care outcomes. It works without any connection interruption. Response Time and Net Processing Time is fast.

NFR-5

Availability The system will be available up to 90% of time. It will be available in the form of mobile app and can be used by any registered user from any place. Additional features will be added in the next version.

5. PROJECT DESIGN

5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

5.2 Solution & Technical 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: Find the best tech solution to solve existing business problems. Describe the structure, characteristics, behaviour, and other aspects of the software to project stakeholders. Define features, development phases, and solution requirements. Provide specifications according to which the solution is defined, managed and delivered.

5.3 User Stories

USN-1

As a user, I can register for the application by entering my email, password, and confirming my password.

USN-2

As a user, I will receive confirmation email once I have registered for the applications.

USN-3

As a user, I can register for the application through my mobile number.

USN-4

As a user, I can register for the application through Gmail.

USN-5

As a user, I can log into the application by entering email & password or OTP Confirmation.

USN-6

As a user, They need to submit their prescription report through mobile application.

USN-7

As a user, They should submit their medical report through mobile app.

6 PROJECT PLANNING & SCHEDULING

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	10
Sprint-1	Login	USN-2	As a user, I can login to the application by entering email & password.	10
Sprint- 2	Dashboard	USN-3	As a user, I able to access the functions that I can perform.	8
Sprint-2	Add medicine and prescription	USN-4	As a user, I should be add medicine and prescription.	8
Sprint-2	Schedule	USN-5	I can schedule user according to their registration.	4
Sprint-3	IBM Watson IOT device creation	USN-3,2	Creating the IBM iot device.	7
Sprint-3	Text to speech service	USN-1,2	Converting text to speech and remind the medicines using IBM text to speech service.	7
Sprint-3	Working flow for using node red	USN-2,5	Creating medicine remainder form using node red platform.	6
Sprint-4	MIT app inventor	USN-1,2	Developing app by using MIT app inventor.	10
Sprint-4	Alarm remainder	USN-2,3	Alarm remainder based on time period.	10

6.1 Sprint Planning & Estimation

1.	Preparation phase	Access the resources(course s) in project dashboard. Access the guided project workspace. Create Github account and collaborate with project repository in project workspace. Laptop/computers setup according to the prerequisites for each technology track.	Ayesha Parvez Alam Mahalaksh mi S Divya T Suruthika M	It refers to done the listed activities in the preparation phase and done prerequisites, registration environment setup.
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2.	Ideation phase	Literature survey on the selected project & information gathering. Preparation of empathy map canvas to capture the user pains & gains, Prepare list of problem statements. List the ideas by organizing the brain storming session and prioritize the top 3 ideas based on the feasibility & importance	Ayesha Parvez Alam Mahalakshmi S Divya T Suruthika M	The activities in ideation phase refers to when gathering the idea for project information and picturize in the empathy map referring the literature survey & brain storming the ideas for the project.
3	Project design phase-1			
3.1	Proposed solution	Preparation of proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution.	Ayesha Parvez Alam Divya T Suruthika M	The solution for the project is prepared as a standard document structure from team members.

3.2	Problem Solution Fit	Preparation of problem solution fit	Ayesha Parvez Alam Divya T Mahalakshmi S	Prepared problem is analysed and make effective solutions for the problem.
3.3	Solution Architecture	Prepare a architecture for solution.	Ayesha Parvez alam Divya T Mahalakshmi S Suruthika M	Suitable block diagram template used to prepare solution architecture
4	PROJECT DESIGN PHASE-2			
4.1	Requirement Analysis	Prepare the functional requirement and non-functional requirement.	Ayesha Parvez Alam Mahalakshmi S	Listing of functional and non-functional requirements of projects.
4.2	Customer Journey	Preparation of customer journey maps to understand the user interactions & experiences with the application(entry to exit)	Divya T Mahalakshmi S	Customer Journey map prepared by suitable template by team members.

4.3	Data Flow Diagrams	Prepare a data flow diagram for project	Ayesha Parvez Alam Mahalakshmi S Suruthika M	Use suitable data flow diagram rules and standards to prepare DFD .
4.4	Technology Architecture	Prepare technology architecture of the solution	Divya T Mahalakshmi S Suruthika M	We created architecture diagram and technologies used for this project.
5	Project Planning Phase			
5.1	Milestone & Tasks	Prepare milestone and activity list	Divya T Mahalakshmi S	When project begins then it is expected that project related activities must be initiated .In project planning, series of milestones must be established.
5.2	Sprint Schedules	Prepare sprint delivery plan	Ayesha Parvez Alam Divya T Mahalakshmi S	In this, product backlog , sprint schedule for

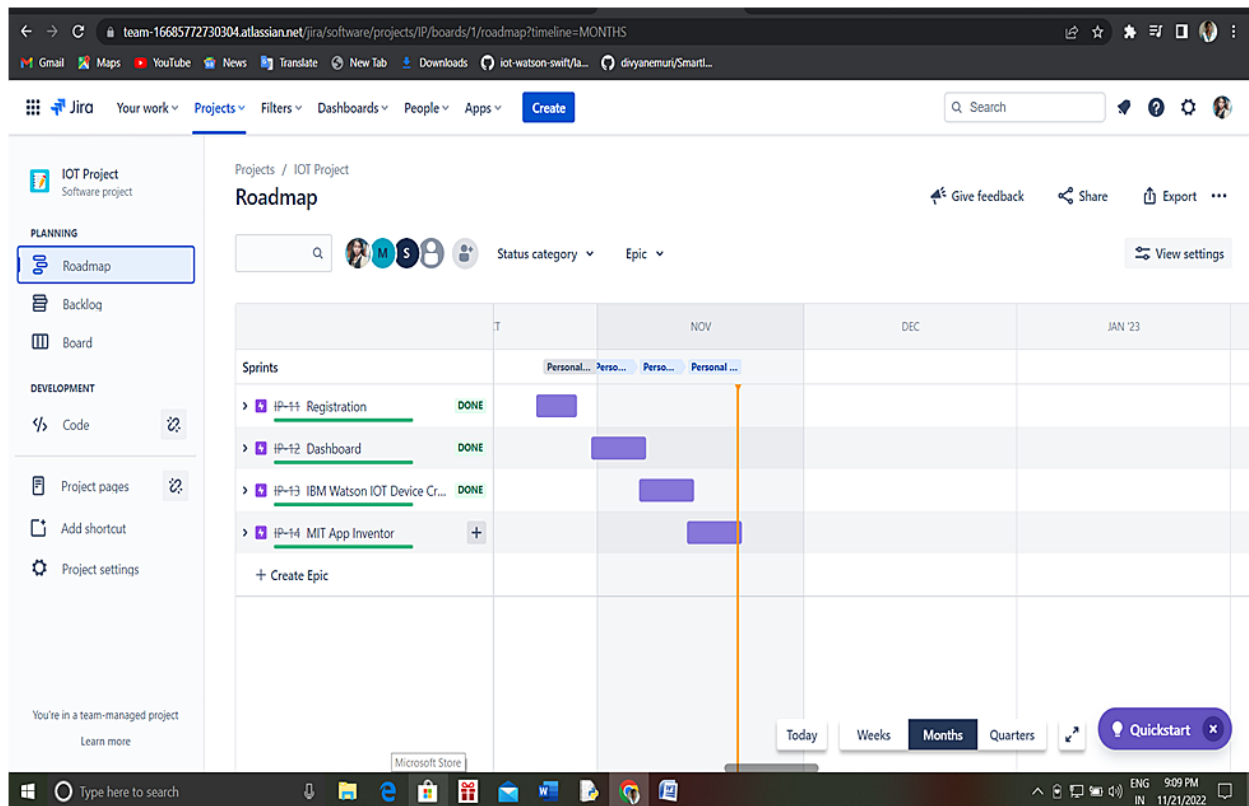
				the project are estimate d.
6	Project Development Phase			In this, we are going to develop & submit the developed code by testing it.
6.1	Coding and Solutioning	Sprint-1 Delivery: Develop the code , test and push it to GitHub.	Ayesha Parvez Alam Mahalaksh mi S Divya T Suruthika M	
6.2	Acceptance Testing	Sprint-2 Delivery : Develop the code , test and push it to GitHub. Sprint-3 Delivery: Develop the code , test and push it to GitHub.	Ayesha Parvez Alam Mahalaksh mi S Divya T Suruthika M	
6.3	Performance Testing	Sprint-4 Delivery: Develop the code , test and push it to GitHub.	Ayesha Parvez Alam Mahalaksh mi S Divya T Suruthika M	

6.2 Sprint Delivery Schedule

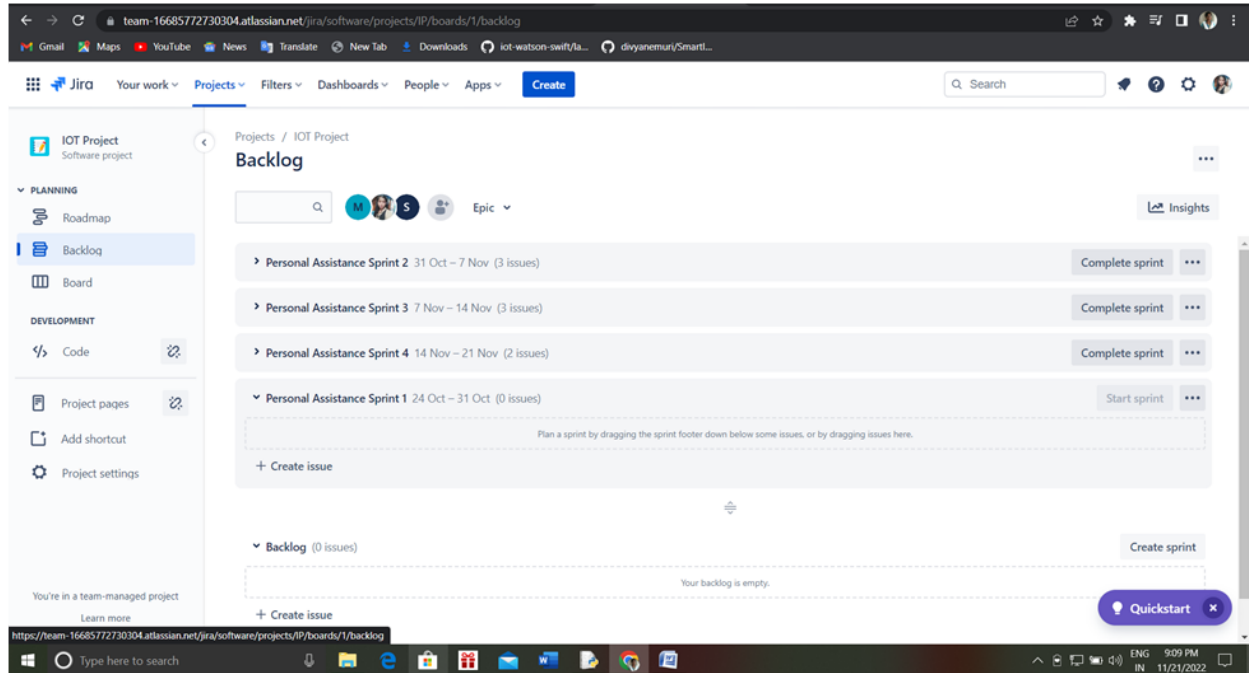
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	10
Sprint-1	Login	USN-2	As a user, I can login to the application by entering email & password.	10
Sprint- 2	Dashboard	USN-3	As a user, I able to access the functions that I can perform.	8
Sprint-2	Add medicine and prescription	USN-4	As a user, I should be add medicine and prescription.	8
Sprint-2	Schedule	USN-5	I can schedule user according to their registration.	4
Sprint-3	IBM Watson IOT device creation	USN-3,2	Creating the IBM iot device.	7
Sprint-3	Text to speech service	USN-1,2	Converting text to speech and remind the medicines using IBM text to speech service.	7
Sprint-3	Working flow for using node red	USN-2,5	Creating medicine remainder form using node red platform.	6
Sprint-4	MIT app inventor	USN-1,2	Developing app by using MIT app inventor.	10
Sprint-4	Alarm remainder	USN-2,3	Alarm remainder based on time period.	10

6.3 Reports From JIRA

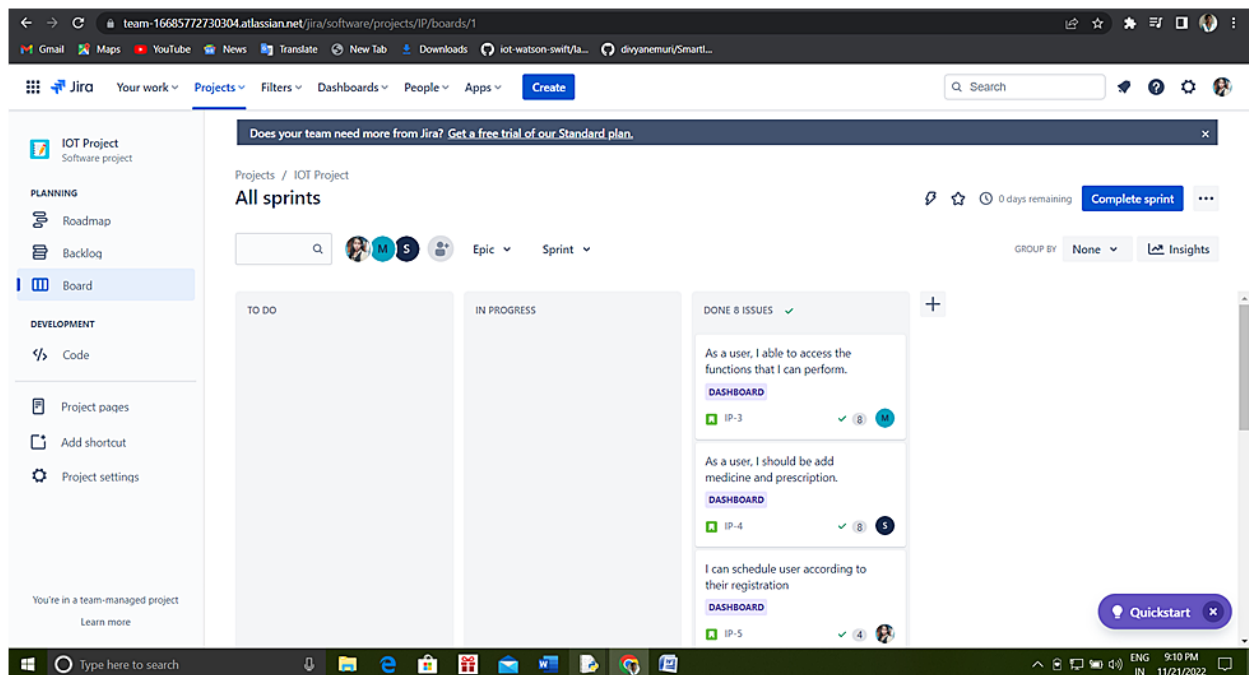
ROAD MAP :



BACKLOG :



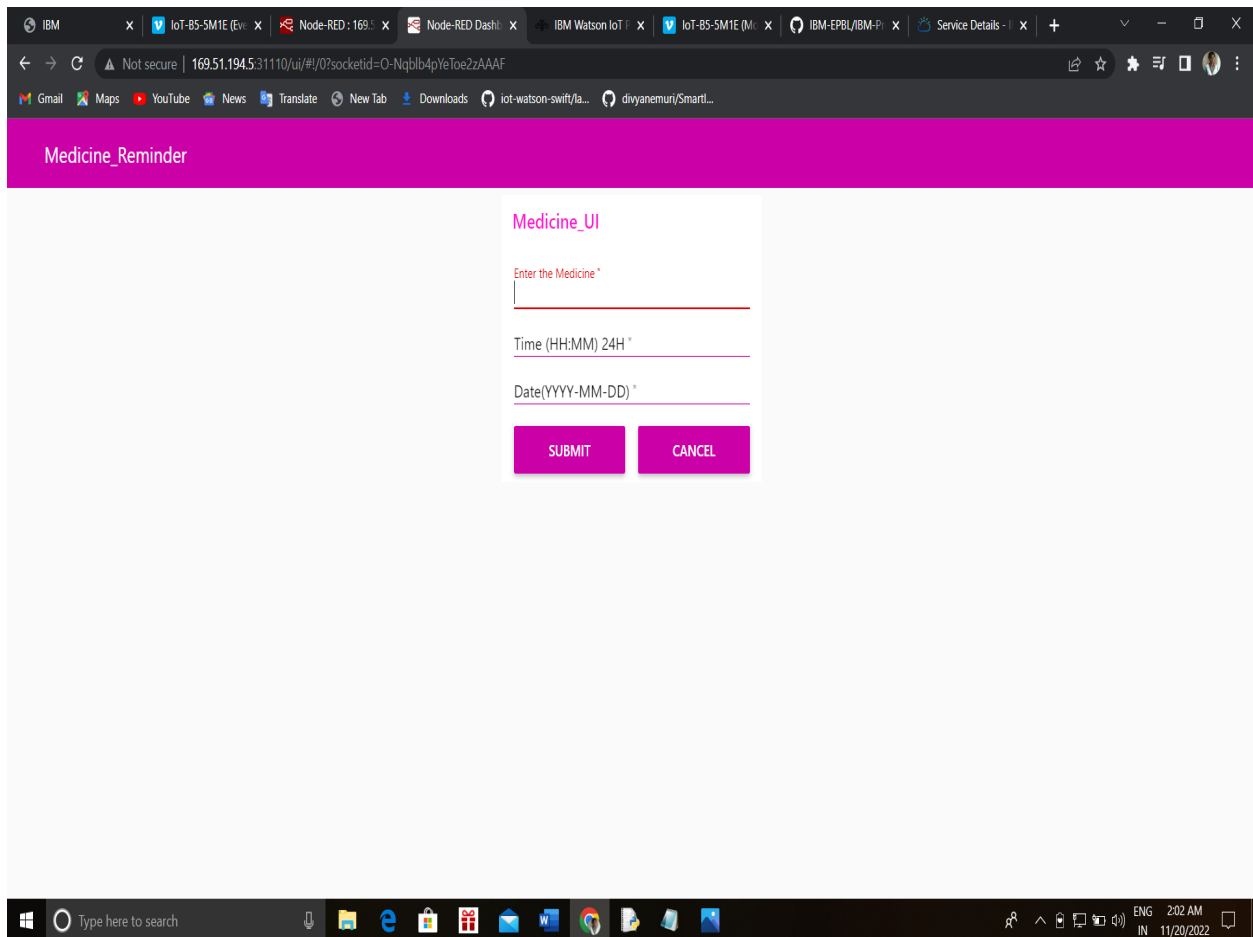
BOARD :



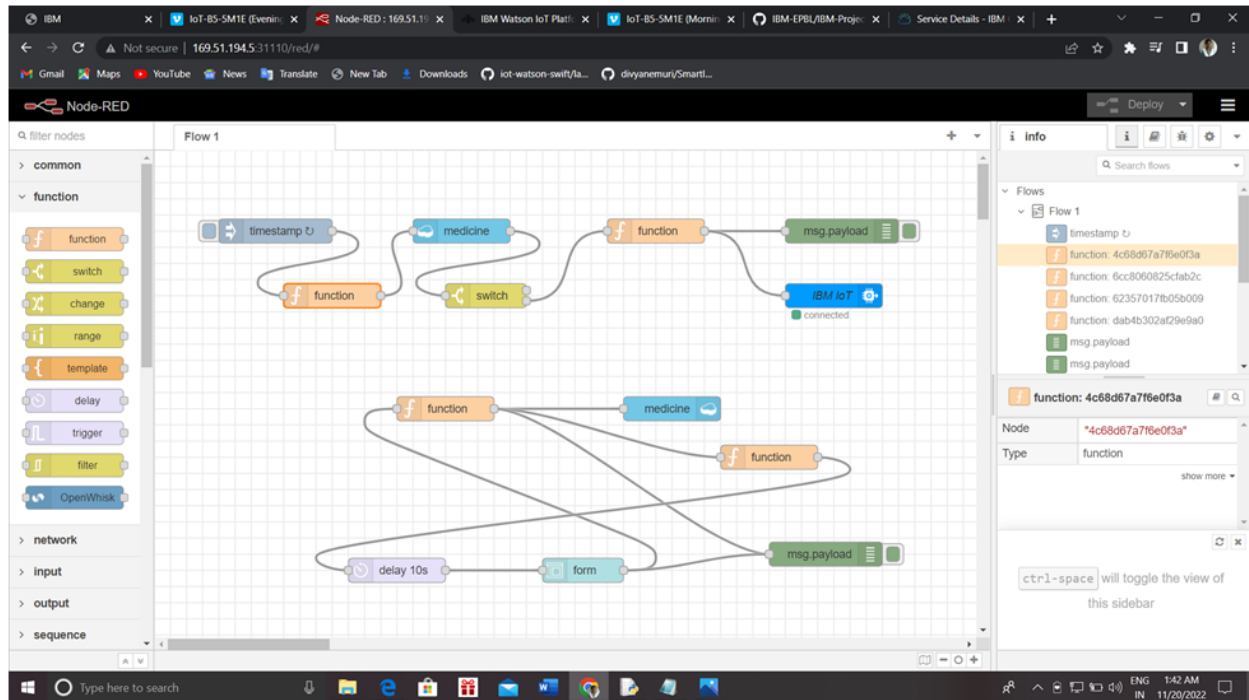
7.CODING & SOLUTIONING :

7.1 Feature 1: NODE-RED

Web UI to enter medicine name,date and time for reminder :



Node-red flow connections :



Signup Page using Node-Red:

The screenshot shows a web browser displaying a signup page titled 'Medicine_Reminder'. The page has a pink header bar. The main content area is white and contains a form titled 'Medicine_UI'. The form has the following fields and buttons:

- Enter the Medicine *
- Paracetamol
- Time (HHMM) 24H *
- 3:45
- Date(YYYY-MM-DD) *
- 2022-11-03
- SUBMIT
- CANCEL

Cloudbant DB :

Node-RED: 169.51.194.5 | Node-RED Dashboard | Service Details - IBM Cloud | Cloudant Dashboard - data | IBM Watson IoT Platform | IBM

0c67f85a-45b7-42b8-b8cc-5f14a6c1b59b-bluemix.cloudant.com/dashboard.html#database/medicine/_all_docs

Gmail | Maps | YouTube | News | Translate | New Tab | Downloads | iot-watson-swift/fa... | divyanemuri/Smart...

medicine

Document ID

Options | {} JSON | Create Document

All Documents

Query

Permissions

Changes

Design Documents

	id	key	value
<input type="checkbox"/>	2022-11-03 3:45	2022-11-03 3:45	{"rev": "1-393a924925b0cac73def2a1da56c8..."}
<input type="checkbox"/>	2022-11-20 10:00	2022-11-20 10:00	{"rev": "1-f4eaabbd1ecf076b2e21b1c1e543f1..."}

Showing document 1 - 2. Documents per page: 20

The user will be notified to take medicine when the time arrives :

IBM Watson IoT Platform

512219104003@smartinternz.com ID: 4wba1k

Browse

Action

Device Types

Interfaces

Add Device

Device ID

Status

Device Type

Class ID

Date Added

Descriptive Location

7094657

Connected

Personal_Assistance

Device

Nov 10, 2022 12:44 PM

→ ...

Identity

Device Information

Recent Events

State

Logs

×

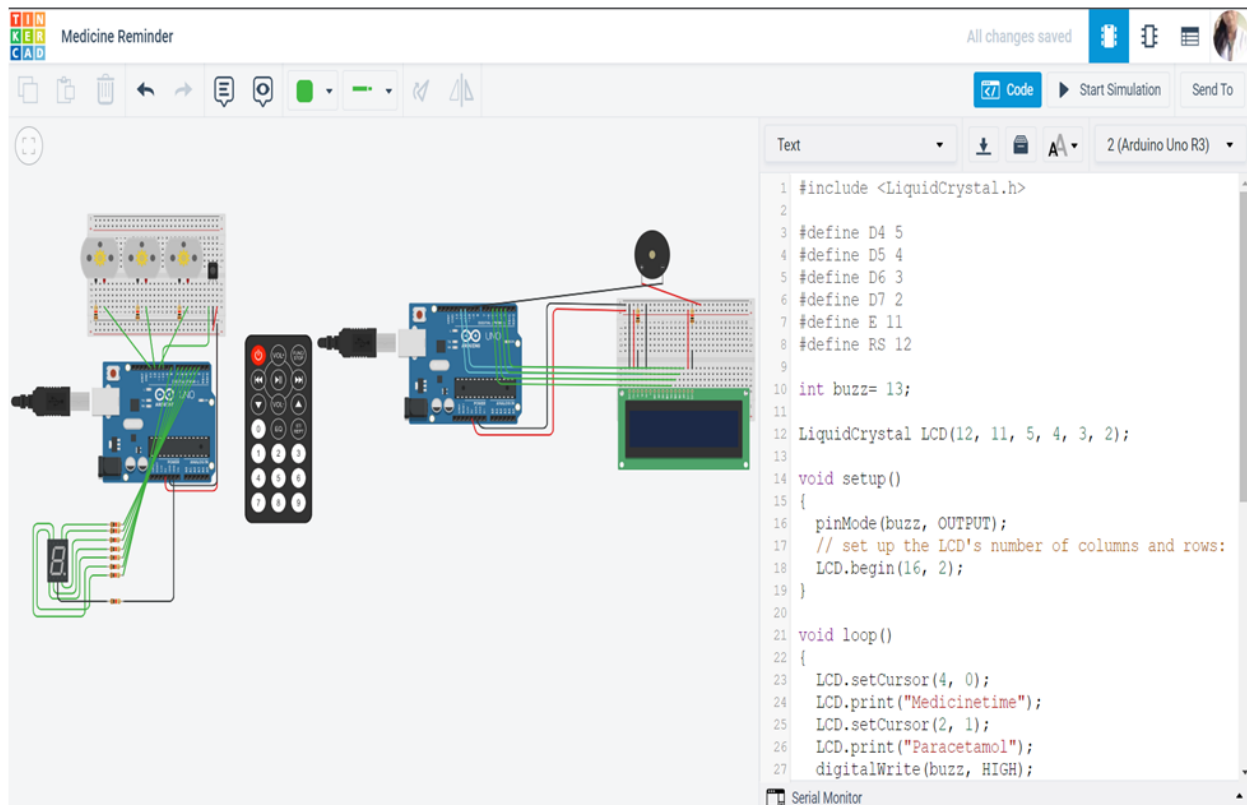
The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event_1	{"Medicine":"Paracetamol"}	json	a few seconds ago
event_1	{"Medicine":"Paracetamol"}	json	a few seconds ago
event_1	{"Medicine":"Paracetamol"}	json	a few seconds ago
event_1	{"Medicine":"Paracetamol"}	json	a few seconds ago
event_1	{"Medicine":"Paracetamol"}	json	a few seconds ago

1 Simulation running

7.2 Feature 2

A IOT device using an arduino which notifies the user when the medicine time arrives. The device consists of arduino which used for connecting with ibm cloud to publish and subscribe data. The buzzer will ring and the medicine show on the LCD screen.

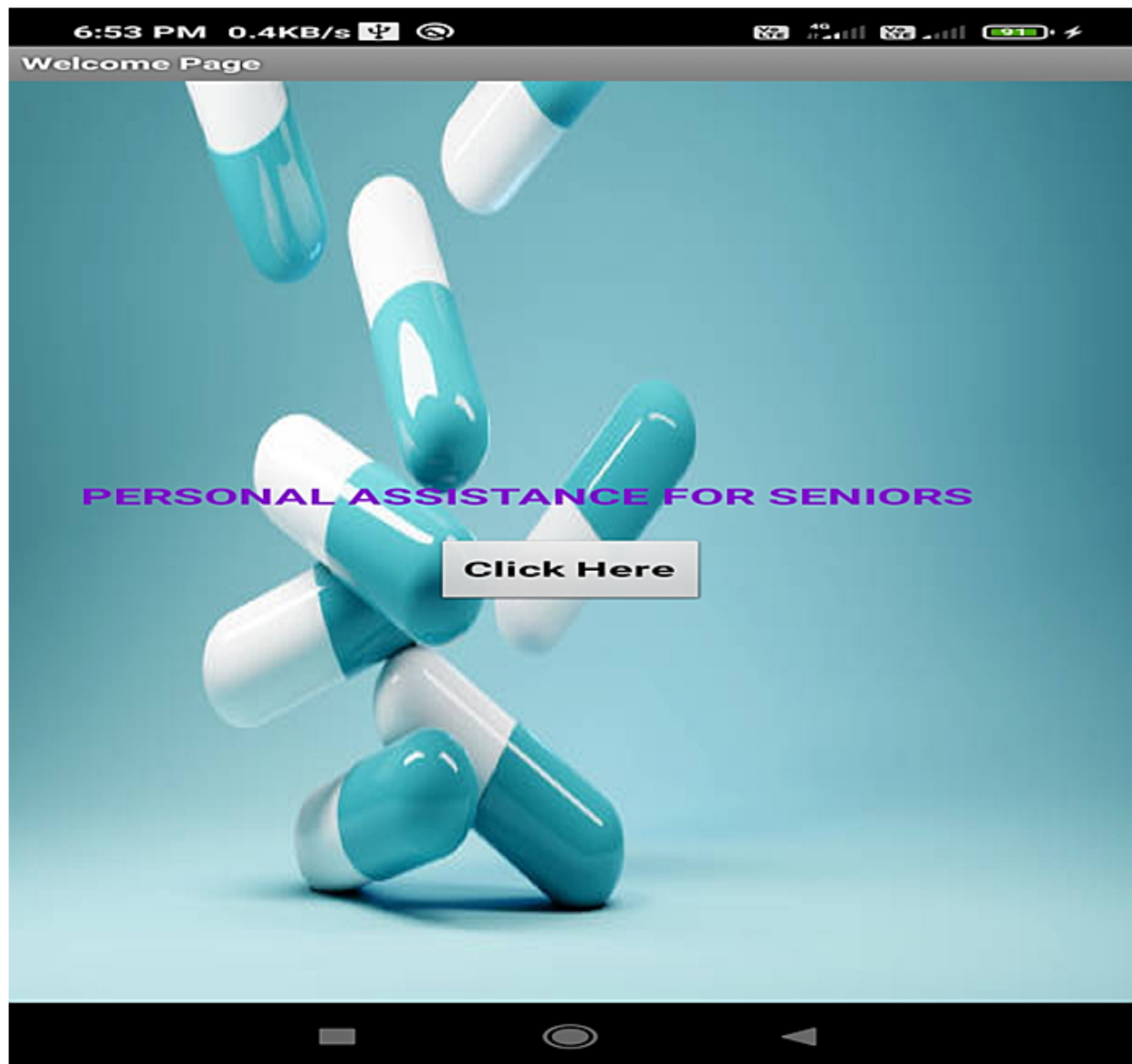


The user can enter the medicine name, date and time which is stored in cloudant db and node red check in cloudant database if any medicine has to be taken, it issues a command to IOT device through IBM IoT Watson platform. When time arrives it shows medicine displayed on the lcd and buzzer will ring.

MIT App Inventor:

An app is designed by using the open source environment MIP app inventor platform.

Home page:




Signin page:


6:53 PM 30.1KB/s VoLTE 4G VoLTE 91

Signin/Signup

Signin/signup Form

Enter your username

 maha
...

 Manage passwords

Signin

SignUp

< GIF Settings Gx ...

q¹ w² e³ r⁴ t⁵ y⁶ u⁷ i⁸ o⁹ p⁰

a s d f g h j k l

↑ z x c v b n m ↵

?123 , . English ✓

■ ● ◀

Medicine detail entering page:

6:53 PM 0.1KB/s 4G 93%

Reminderpage

ENTER THE MEDICINE DETAILS

Medicine Name

paracetamol

Medicine Time

2 times a day

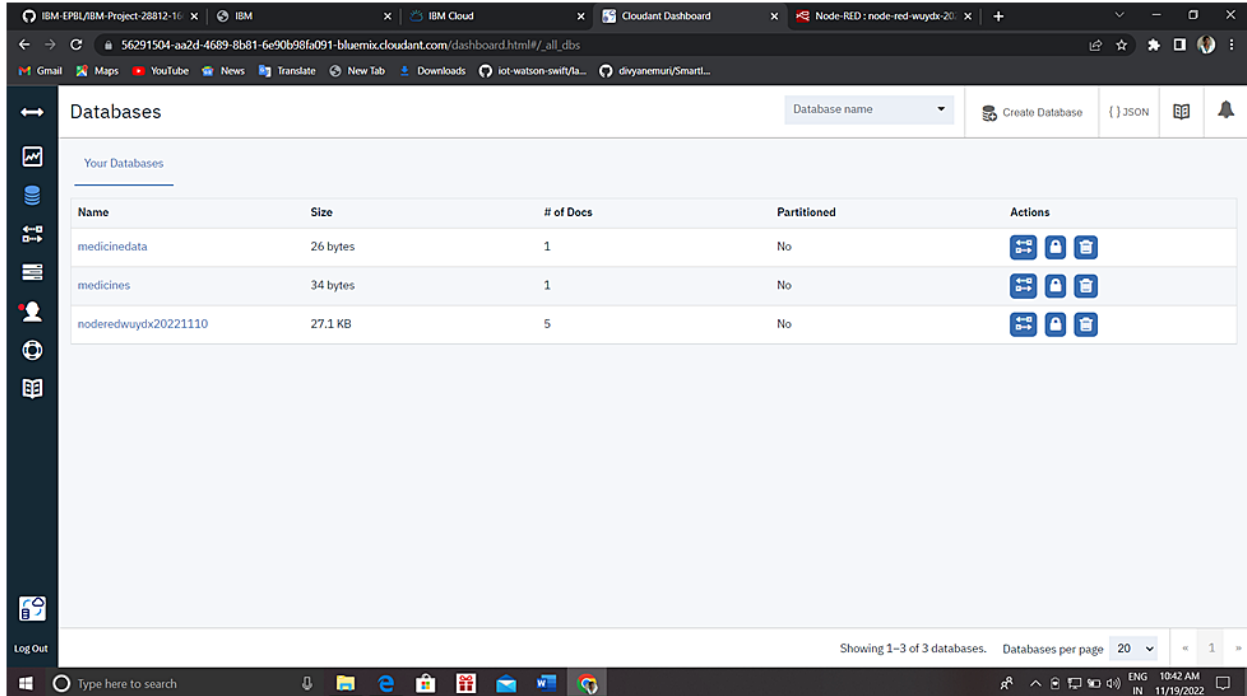
Continue for alarm

Alarm setting page:



Dtbase Schema:

Create a Database in Cloudant DB:

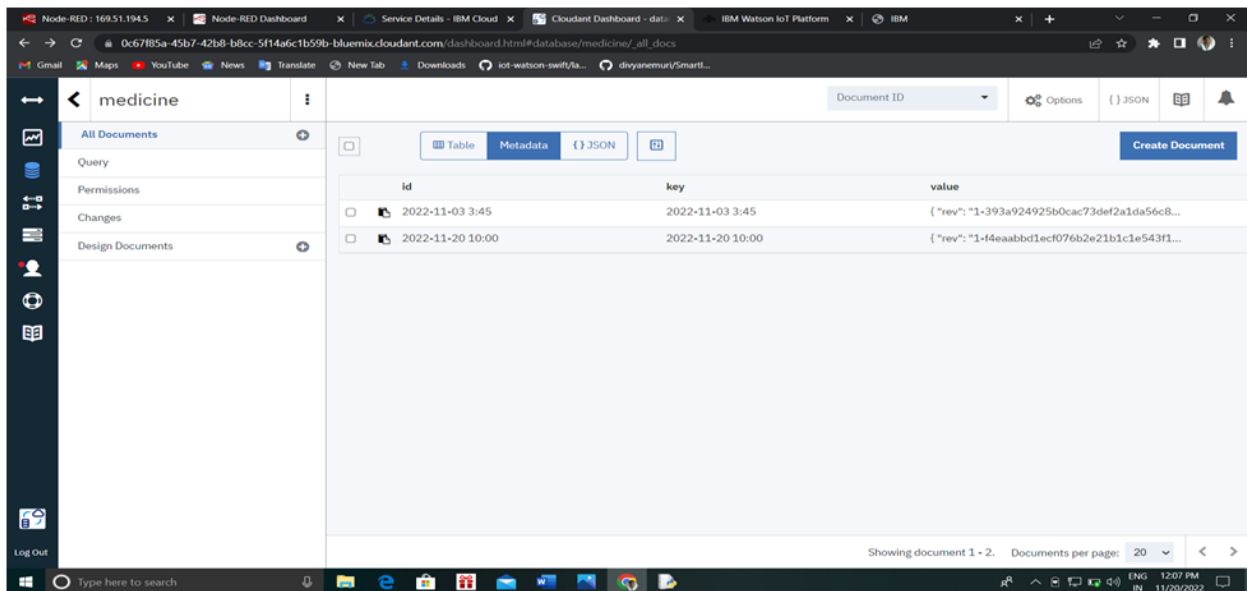


The screenshot shows the Cloudbant Databases dashboard. The top navigation bar includes a search bar, a 'Database name' dropdown, a 'Create Database' button, and a 'JSON' icon. The main content area is titled 'Your Databases' and displays a table with the following data:

Name	Size	# of Docs	Partitioned	Actions
medicinedata	26 bytes	1	No	[Icons for edit, delete, and other actions]
medicines	34 bytes	1	No	[Icons for edit, delete, and other actions]
noderedwuydx20221110	27.1 KB	5	No	[Icons for edit, delete, and other actions]

At the bottom of the dashboard, it says 'Showing 1-3 of 3 databases. Databases per page: 20'.

Node-Red Data Stored in Cloudant-DB:



The screenshot shows the Cloudbant Databases dashboard for the 'medicine' database. The top navigation bar includes a search bar, a 'Document ID' dropdown, an 'Options' button, a 'JSON' icon, and a 'Create Document' button. The main content area is titled 'All Documents' and displays a table with the following data:

Id	key	value
2022-11-03 3:45	2022-11-03 3:45	{ "rev": "1-393a924925b0cac73def2a1da56c8..." }
2022-11-20 10:00	2022-11-20 10:00	{ "rev": "1-f4eaabbd1ecf076b2e21b1c1e543f1..." }

At the bottom of the dashboard, it says 'Showing document 1 - 2. Documents per page: 20'.

Node-RED: 169.51.194.5 x Service Details - IBM Cloud x Cloudant Dashboard - data... x IBM Watson IoT Platform x IBM x IBM-EPBL/IBM-Project-268 x

0c67f85a-45b7-42b8-b8cc-5f14a6c1b59b-bluemix.cloudant.com/dashboard.html#database/medicine/2022-11-03%203:45

medicine > 2022-11-03 3:45

Save Changes Cancel Upload Attachment Clone Document Delete

```
1 {
2   "_id": "2022-11-03 3:45",
3   "_rev": "1-393a924925b0cac73def2a1da56c828a",
4   "name": "Paracetamol"
5 }
```

Log Out

Type here to search

ENG 2:22 PM 11/20/2022

Node-RED: 169.51.194.5 x Service Details - IBM Cloud x Cloudant Dashboard - data... x IBM Watson IoT Platform x IBM x IBM-EPBL/IBM-Project-268 x

0c67f85a-45b7-42b8-b8cc-5f14a6c1b59b-bluemix.cloudant.com/dashboard.html#database/medicine/2022-11-20%2010:00

medicine > 2022-11-20 10:00

Save Changes Cancel Upload Attachment Clone Document Delete

```
1 {
2   "_id": "2022-11-20 10:00",
3   "_rev": "1-f4eaabbd1ecf076b2e21b1c1e543f103",
4   "name": "Acelock"
5 }
```

Log Out

Type here to search

ENG 2:22 PM 11/20/2022

TESTING

8.1 Test Cases

	A	B	C	D	E	F	G	
1					Date	19-Nov-22		
2					Team ID	PNT2022TMD40129		
3					Project Name	Project - Personal Assistance for		
4					Maximum Marks	4 marks		
5	Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	
6	LoginPage_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button		1.Enter URL and clickgo 2.Clickon My Account dropdown button 3.Verifylogin/Singup popup displayed or not	https://drive.google.com/file/d/1bm7ZPcwAgD4gVGGMAjdcWSowq5GRD0o/view?usp=drivesdk	Login/Sign
7	LoginPage_TC_OO2	UI	Home Page	Verifythe UI elements in Login/Signup popup		1.Enter URL and clickgo 2.Clickon My Account dropdown button 3.Verifylogin/Singup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer?Create account link e.Last password?Recovery password link	https://drive.google.com/file/d/1bm7ZPcwAgD4gVGGMAjdcWSowq5GRD0o/view?usp=drivesdk	Application element a.email id b.password c.Login button d.New customer link e.Last password
8	LoginPage_TC_OO3	Functional	Home page	Verify user is able to loginto application with Valid credentials		1.Enter URL(https://shopenzer.com/)and clickgo 2.Clickon My Account dropdown button 3.Enter Valid username/emailin Email text box 4.Enter validpassword in password text box	Username:suruthika password:1234	User show account

< > | Medicine Reminder Test scenarios +

Search

- 1 Verify user is able to see login page
- 2 Verify user is able to loginto application or not?
- 3 Verify user is able to navigate to create your account page?
- 4 Verify user is able to recovery password
- 5 Veriify login page elements

- 1 Verify user is able to search by entering keywords in search box
- 2 Verify user is able to see suggestions based on keyword entered in search box
- 3 Verify user is able to see related auto suggestions displaying based on keyword entered in search box
- 4 Verify user is able to see no matches found message when no results are matching with entered keyword
- 5 Verify user is able to see seach detailed page when nothing entered in textbox

8.2 User Acceptance Test

The purpose of this document is to briefly explain the test coverage and open issues of the Personal Assistance for seniors who Are Self-Reliant project at the time of the release to User Acceptance Testing (UAT).

1. 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	8	1	2	2	30
Duplicate	1	0	2	0	2
External	1	3	0	1	3
Fixed	9	1	1	18	25
Not Reproduced	0	0	1	0	2
Skipped	1	1	1	1	1
Won't Fix	0	5	2	0	7
Totals	20	10	9	22	70

2. Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	6	0	0	6
Client Application	47	0	0	47
Security	2	0	0	2
Outsource Shipping	2	0	0	2
Exception Reporting	7	0	0	7
Final ReportOutput	4	0	0	4
Version Control	1	0	0	1

Results

Performance Metrics

NFT - Risk Assessment								
S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Volumen Changes	Risk Score
1	Personal Assistance for Seniors Who Are Self-Reliant	New	Low	Moderate	Moderate	Low	>5 to 10%	ORANGE
NFT - Detailed Test Plan								
S.No	Project Overview	NFT Test approach	Assumptions/Dependencies/Risks		Approvals/SignOff			
1	Medicine Reminder Web-UI	Stress	App Crash/ Developer team/ Site Down		Approved			
2	Medicine Reminder Web-UI	Endurance	App Crash/ Site Down		Approved			
3	Medicine Reminder Web-UI	Load	Server Crash/ Developer team/ Server Down		Approved			
End Of Test Report								
S.No	Project Overview	NFT Test approach	NFR - Met	Test Outcome	GO/NO-GO decision	Recommendations	Identified Defects (Detected/Closed/Open)	Approvals/SignOff
1	Medicine Reminder Web-UI	Stress	Performance	CPU -01	GO	High Performance server	Closed	Approved
2	Medicine Reminder Web-UI	Load	Scalability	DB Storage - 01	NO-GO	MongoDB Instance for free	Closed	Approved
3	Medicine Reminder Web-UI	Endurance	Connectivity	Connection	GO	High Performance	Closed	Approved

ADVANTAGES & DISADVANTAGES

Advantages:

- Make your medical facility's offer more attractive
- Minimising losses by being able to arrange new patients in place of denied appointments
- Additional features of medical reminder programs, e.g. cancellation of visits via SMS
- Automate marketing and organizational activities
- Offload phone lines
- Great marketing tool
- Minimizing the number of irrevoked medical visits
- It will get the notifications through SMS also.
- It will provide the information about the medicine timings.
- The scheduled appointment with the doctor with the contact details including visiting.
- time, venue and availability at different hospitals in case the appointment is missed at the scheduled place.
- The new appointment will be set accordingly.

Disadvantages:

- costs associated with running an IT system.
- the need for training in the operation of the new programme.
- possibility of technical problems.
- Need a reliable internet or telecommunication service provider to make the system operate optimally.
- Need additional skill to operate the monitoring and reminder system.
- Can-not cope with the issues of neglect from parent or other person who take care of the child.
- Need more time for administrator or hospital staff to enter and maintain data.

CONCLUSION

Conclusion and future frameworks have Many Medication Reminder Systems have been developed on different platforms. Many of these systems require special hardware devices to remind the patients about the medicine in-take timings. Purchasing new hardware devices becomes costly and more time and money consuming. So in the given work an attempt has been made to implement a system which is economical, easily accessible and improves medication adherence. Medication non-adherence reduces the effectiveness of a treatment and imposes a financial burden on health care systems . The patients will get the schedule of medicine in-take time with medicine description, starting and ending date of medicine, notification through message or voice mail, automatic alarm ringing system and navigation system. The scheduled reminder will not suggest any kind of medicine which is not prescribed by the doctor that will assure the safety of the patient.

three associated reviews have found strong, consistent evidence to support the use of all reminder systems for all patients in any outpatient setting for increasing attendance, cancellation or rescheduling. There is additional evidence that 'reminder plus', which provides additional information over and above date, time and location of the appointment, may be more effective than simple reminders at reducing non-attendance, particularly at first appointments. However, there is a need for high-quality studies investigating the differential influence of providing additional information as part of the reminder system in different contexts (first compared with follow-up appointment, the use of loss- compared with gain-framed messages and orientation information for facilitating attendance behaviours).

- the timing of reminders, between 1 and 7 days prior to the scheduled appointment, has no effect on attendance
- a substantial number of reminders may not be received by patients
- reminders promote cancellation of appointments
- patients find difficulty with cancelling appointments because of structural factors affecting reminder systems (e.g. busy telephone line, nobody answers the telephone).

This leads to the conclusion that, unless patients indicate otherwise, all patients should receive a reminder or 'reminder plus' that actively encourages patients who are unable to attend to cancel their appointment and to reschedule if further appointments are required. The reminder should be sent around 3 days in advance of the appointment as timing of a reminder, between 1 and 7 days prior to the scheduled appointment, has no effect on patient attendance behaviour. This will allow sufficient time for patient cancellation and health service reallocation of the appointment to another patient or allow the clinician to undertake care-related administrative tasks. The patients will get the schedule of medicine intake time with medicine description, starting and ending date of medicine, notification through message or voice mail, automatic alarm ringing system and navigation system. The scheduled reminder will not suggest any kind of medicine which is not prescribed by the doctor that will assure the safety of the patient and also will avoid wrong dosages. The patients can also search doctors disease wise (depending upon the specialization of the doctor). which provides easy searching facility to the users and saves the time. Doctors can view all the fixed appointments along with date and time, which he fixed and through this he can make new appointment schedules. We plan to focus on improving the overall performance of the system. Also, interaction between patients and doctors through video calling and secure prescription will be focused upon. Some more ways to achieve medication adherence will be focused.

FUTURE SCOPE

Currently there are many medication reminder systems which are operable manually. Due to manual work, the available system becomes more time consuming. So in the given work, an attempt has been made to implement fully automatic medication. The accuracy of character recognition is more important. So accuracy of characters needs to improve by adding probability to each character. The proposed system will only set the reminders in the built-in calendar application of the mobile. This reminder reminds user about their medicine in-take schedule. The system which we are implementing will also give the reminder about doctor's next appointment. It will also tell the user of the end of the medicines. The scheduled reminder will not suggest any kind of medicine, dose of remindersystem charecter recogniton. This is achived with the help of artificial neural network. neural network is very effective to decipher a charecter

of any language. The accuracy of character recognition is more important. So accuracy of characters needs to improve by adding probability to each character.

The proposed system will only set the reminders in the built-in calendar application of the mobile. This reminder reminds user about their medicine in-take schedule. The system which we are implementing will also give the reminder about doctor's next appointment. It will also tell the user of the end of the medicines. The scheduled reminder will not suggest any kind of

medicine, dose of medicine, etc.

In future, efforts can be made to improve the accuracy of the character recognition. Also the facility of adding names & dose of the medicine will be included in the remainder.

Appendix

Source Code

Node-Red:

```
var d = new.Date();
var utc = d.getTime() + (d.getTimezoneOffset() * 60000);
var offset = 5.5;
newDate = new Date(utc + (3600000*offset))
var n = newDate.toISOString()
var date = n.slice(0,10)
var time = n.slice(11,16)
global.set('time',time)
msg.payload = date+""+time
return msg;
```

Arduino Connection:

```
#include <LiquidCrystal.h>
```

```
#define D4 5
#define D5 4
#define D6 3
#define D7 2
#define E 11
#define RS 12
```

```
int buzz= 13;
```

```
LiquidCrystal LCD(12, 11, 5, 4, 3, 2);
```

```
void setup()
{
  pinMode(buzz, OUTPUT);
  // set up the LCD's number of columns and rows:
  LCD.begin(16, 2);
}
```

```
void loop()
{
  LCD.setCursor(4, 0);
  LCD.print("Medicinetime");
  LCD.setCursor(2, 1);
  LCD.print("Paracetamol");
  digitalWrite(buzz, HIGH);
  delay(2000);
  digitalWrite(buzz, LOW);
  LCD.clear();
  delay(5000);
  LCD.setCursor(4,0);
  LCD.print("Medicinetime");
  LCD.setCursor(2, 1);
  LCD.print("Acelock");
  digitalWrite(buzz, HIGH);
  delay(2000);
  digitalWrite(buzz, LOW);
  LCD.clear();
  delay(5000);
  LCD.setCursor(4, 0);
  LCD.print("Medicinetime");
```

```
LCD.setCursor(2, 1);  
LCD.print("Sinarest");  
digitalWrite(buzz, HIGH);  
delay(2000);  
digitalWrite(buzz, LOW);  
LCD.clear();  
delay(8000);  
}
```

```
#include <IRremote.h>
```

```
int a=2,b=3,c=4,d=5,e=6,f=7,g=8;
```

```
int redLed = 13;  
int yellowLed = 12;  
int greenLed = 11;  
int sensorValue = 0;  
int RECV_PIN = 10;
```

```
IRrecv irrecv(RECV_PIN);  
decode_results results;
```

```
void setup()  
{  
  //Set Led Pins  
  pinMode(redLed, OUTPUT);  
  pinMode(yellowLed, OUTPUT);  
  pinMode(greenLed, OUTPUT);
```

```
pinMode(a, OUTPUT);
pinMode(b, OUTPUT);
pinMode(c, OUTPUT);
pinMode(d, OUTPUT);
pinMode(e, OUTPUT);
pinMode(f, OUTPUT);
pinMode(g, OUTPUT);
```

```
//Enable serial usage and IR signal in
Serial.begin(9600);
Serial.println("Enabling IRin");
irrecv.enableIRin();
Serial.println("Enabled IRin");
}
```

```
void disp_on_7seg(bool a_,bool b_,bool c_,bool d_,bool e_,bool f_,bool g_){
    digitalWrite(a,a_);
    digitalWrite(b,b_);
    digitalWrite(c,c_);
    digitalWrite(d,d_);
    digitalWrite(e,e_);
    digitalWrite(f,f_);
    digitalWrite(g,g_);
}
```

```
void disp_7seg(int num){
    switch(num){
        case 1: disp_on_7seg(0,1,1,0,0,0,0);break;
        case 2: disp_on_7seg(1,1,0,1,1,0,1);break;
```



```

case 3: disp_on_7seg(1,1,1,1,0,0,1);break;
case 4: disp_on_7seg(0,1,1,0,0,1,1);break;
case 5: disp_on_7seg(1,0,1,1,0,1,1);break;
case 6: disp_on_7seg(1,0,1,1,1,1,1);break;
case 7: disp_on_7seg(1,1,1,0,0,0,0);break;
case 8: disp_on_7seg(1,1,1,1,1,1,1);break;
case 9: disp_on_7seg(1,1,1,1,0,1,1);break;
}delay(1000);
}

```

```

void loop()
{
  int no_pills=2;
  //disp_7seg(no_pills);
  if (irrecv.decode(&results))
  {
    //irrecv.decode(&results) returns true if anything is recieved, and stores
    info in variable results
    unsigned int value = results.value; //Get the value of results as an
    unsigned int, so we can use switch case
    Serial.println(value);
    switch (value)
    {
      case 2295:
        digitalWrite(redLed, 1);
        delay(1000);
        digitalWrite(redLed, 0);
        disp_7seg(no_pills);
        break;
      case 34935:
        digitalWrite(yellowLed, 1);

```

```
    delay(1000);  
    digitalWrite(yellowLed, 0);  
    disp_7seg(no_pills);  
    break;  
case 18615:  
    digitalWrite(greenLed, 1);  
    delay(1000);  
    digitalWrite(greenLed, 0);  
    disp_7seg(no_pills);  
    break;  
}
```

```
    irrecv.resume(); // Receive the next value  
}  
}
```

Python code:

```
import json
import time
import wiotp.sdk.device
import random

myConfig = {
    "identity":{
        "orgId": "4wba1k",
        "typeId" : "Personal_Assistance",
        "deviceId":"7094657"
    },
    "auth":{
        "token":"ayemahadivsuru"
    }
}

client = wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect()
for i in range(0,20):
    tablet=["Paracetamol","Aspirine","Azithral","Asthalin","Sinarest"]
    medicinetime=[12.00,1.00,2.00,3.00,5.00,18.00,20.00,7.00]
    name="keer"
    medicine=random.choice(tablet)
    medicinetime=random.choice(medicinetime)
    mydata ={'Patient Name':name, 'Medicine Name':medicine,
```

```
'Time':medicinetime}
```

```
client.publishEvent("IoTSensor","json",data=mydata,qos=0,onPublish=None)  
    print("Data published to IBM IOT platform :", mydata)  
    time.sleep(5)  
    client.disconnect()
```

Links:

Github link :

<https://github.com/IBM-EPBL/IBM-Project-28812-1660117049>

Demo video link :

<https://youtu.be/5vhhwiUbeoQ>