PERSONAL ASSISTANCE FOR SENIORS WHO ARE SELF-RELIANT

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

ADHIYAMAAN COLLEGE OF ENGINEERING

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Submitted by:PNT2022TMID08180

SHREEJA.K(TL)(AC19UEC116)
SOUNDHARYA LAHARI.N(AC19UEC123)
SOWNDHARYAA.N(AC19UEC124)
VANDHANA.M(AC19UEC137)

CONTENT

1.INTRODUCTION

Due to increased life expectancy, declining birth rates, or a combination of the two, the majority of countries are experiencing a shift in the distribution of their population towards older age.

As they get older, the elderly people are less mobile and will need to rely on technology and equipment to assure a higher quality of life.

Nowadays it is noted that most people disregard their health and choose to engage in other activities over taking their medications. Additionally some elders forget to take their medications because they are too preoccupied with their day-to-day activities.

In extreme circumstances, patients take the same medication more than once in prescribed time forgetting their previous consumption. For milder medications, this might not be hazardous, but for more concentrated medications, it might cause additional bodily harm. This is where our medicine Reminder system can be more helpful.

1.1Project Overview

Sometimes elderly people forget to take their medicine at the correct time. They also forget which medicine He / She should take at that particular time. And it is difficult for doctors/caretakers to monitor the patients around the clock. To avoid this problem, this medicine reminder system is developed.

An app is built for the user (caretaker) which enables him to set the desired time and medicine. These details will be stored in the IBM Cloudant DB. If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform.

The device will receive the medicine name and notify the user with voice commands.

1.2 Purpose

The care taker may not be available at all times and the senior may not have strength to reach for help.

To help the senior citizen with their memory loss and to provide assistant for health issues. As they may not be aware of their health issues. If all of the sudden health hazards occur , they won’t have time to process the situation. So, it is important to prevent these situations in advance by using this personal assistance.

2.LITERATURE SURVEY

S.NO	YEAR	AUTHOR	TOPIC	PAPER PUBLISHED
1	2021	Afshaan Sarguroh; Munaf Shaikh; Kashif Khan; Dr . Zainab Mirza	“GoMed: Daily Medicine Reminder Application”	International Journal of Advanced Research in Computer and Communication Engineering Vol. 10, Issue 4, April -2021
2	2019	Juthada Suwanthara; Areena Noinongyao; Sirion Vittayakorn	“WiseMed :medication reminder for seniors”	Institute of electrical and electronics engineers - (2019)
3	2018	Shawn Benedict Kumar; Wei Wei Goh; Sumathi Balakrishnan	“Smart medicine reminder device for the elderly”	Institute of electrical and electronics engineers - (2018)
4	2016	Mayuresh Waykole; Vatsalya Prakash; Himanshu Singh; Nalini N	“Medication reminder and healthcare – an Android application”	Institute of electrical and electronics engineers - (2018)
5	2015	Deepti Ameta; Kalpana Mudaliar; Palak Patel	“Medication reminder and healthcare – an Android application”	Institute of electrical and electronics engineers - (2018).

2.1 Existing Problem

The Medicine reminder system in the existing method reminds in three ways

1. light indicator
2. Buzzer sound
3. Mobile notification

Demerits of Existing Method:

The elderly person may not see the light indication if they are seated far away from the pill box, so a buzzer is included to remind medicine intake time .In case if the buzzer is not audible a mobile notification will appear. But at some exceptions the senior may not even see the mobile notification.

2.2 References

1. Afshaan Sarguroh; Munaf Shaikh; Kashif Khan; Dr . Zainab Mirza., “GoMed: Daily Medicine Reminder Application”. International Journal of Advanced Research in Computer and Communication Engineering Vol. 10, Issue 4, April 2021.
2. Juthada Suwanthara; Areena Noinongyao; Sirion Vittayakorn., “WiseMed :medication reminder for seniors”. Institute of electrical and electronics engineers 2019.
3. Shawn Benedict Kumar; Wei Wei Goh; Sumathi Balakrishnan., “Smart medicine reminder device for the elderly” Institute of electrical and electronics engineers 2018.
4. Mayuresh Waykole; Vatsalya Prakash; Himanshu Singh; Nalini N., “ArduMed - Smart medicine reminder for old people” International Journal of Scientific & Engineering Research, Volume 7, Issue 5, May 2016.

5. Deepti Ameta; Kalpana Mudaliar; Palak Patel., “Medication reminder and healthcare – an Android application” International Journal of Managing Public Sector Information and Communication Technologies (IJMPICT) Vol. 6, No. 2, June 2015.

2.3 Problem Statement Definition

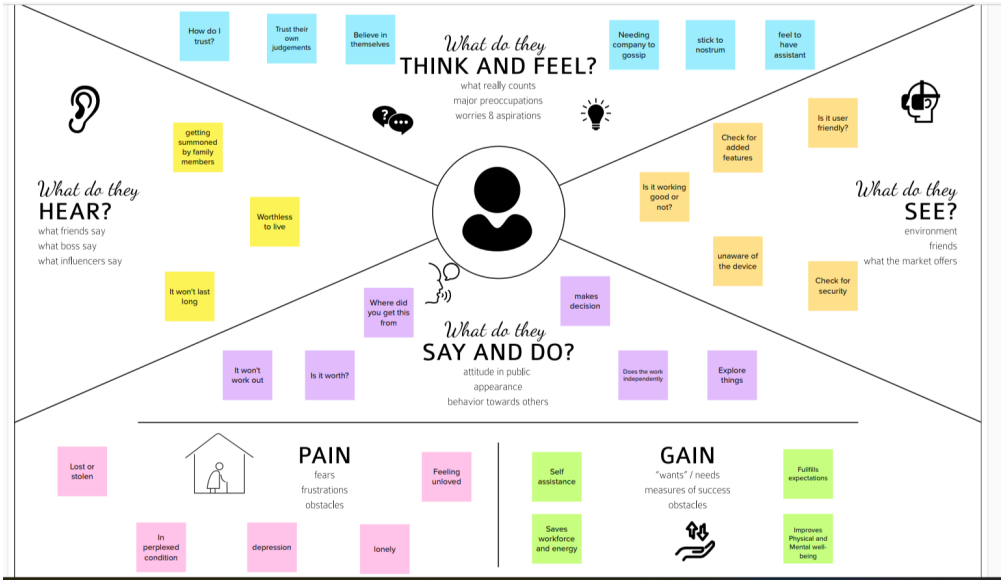
Senior citizens suffer with health issues and due to their old age they forget to take their medicine on time so, introduce an personal assistance for seniors who are self reliant by making an medicinal reminder.

3.IDEATION & PROPOSED SOLUTION

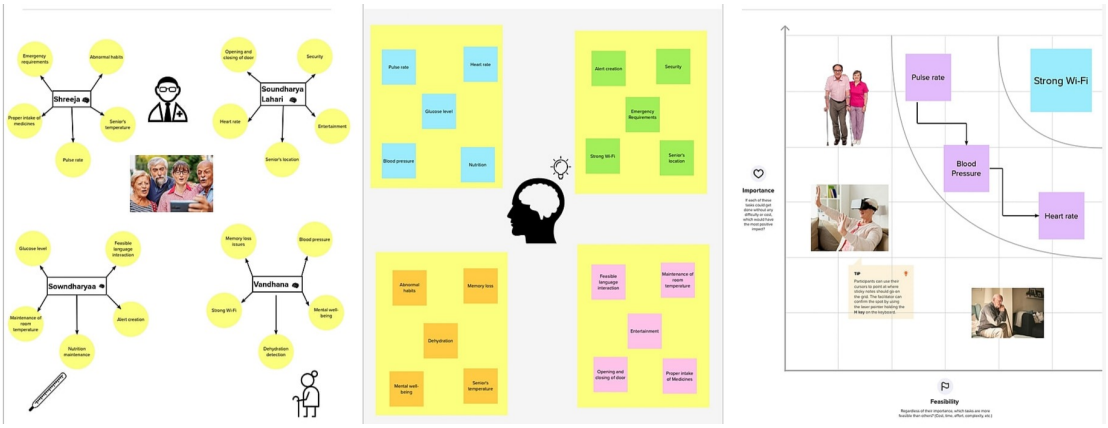
Ideation is the creative process of generating new ideas, which can be accomplished through a variety of ideation techniques, such as brainstorming and Empathy Map.

Proposed Solution means the technical solution to be provided by the Implementation agency in response to the requirements and the objectives of the Project.

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming

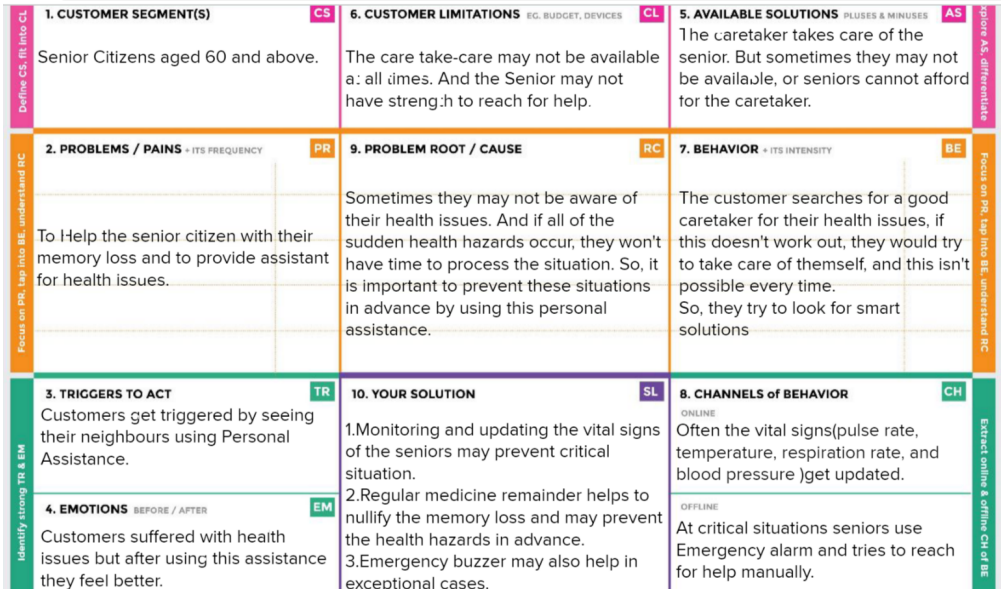


3.3 Proposed Solution

The project aims at building an application that provides information about the medicine Reminder for Seniors by monitoring their Health condition cautiously. Location and Pulse rate of Seniors should be and stored in the Database. Emergency Alerts are sent using the notification service for Doctor and Care taker.

S.No	Parameter	Description
1	Problem statement (problem to be solved)	During old age Seniors may face Memory loss and Health issues, so they may not be able to take care of themselves. It leads to chain of issues.
2	Idea / Solution description	The smart Alert present in the Mobile can rescue the Seniors from situation getting worsen.
3	Novelty / Uniqueness	In this smart dual alert application, there is a Medicine reminder as well as Emergency Notification alert for the Doctor and Care taker.
4	Social Impact / Customer Satisfaction	This provides them with the confidence that Seniors may lead a smoother life with this support.
5	Business Model (financial Benefit)	This feature in the mobile urges the society to buy the Mobile Phone
6	Scalability of Solution	It gives secured feeling for their children’s that their parents are safe

3.4 Problem Solution fit



4.REQUIREMENT ANALYSIS

Requirements analysis encompasses those tasks that go into determining the needs or conditions to meet for a new or altered product or project, taking account of the possibly. conflicting requirements of the various stakeholders, analyzing, documenting, validating and managing software or system.

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login Id	Login Credentials
FR-4	User Dashboard	History of medicines
FR-5	Medicine Reminder (Time, medicine Name)	Speaker must be connected

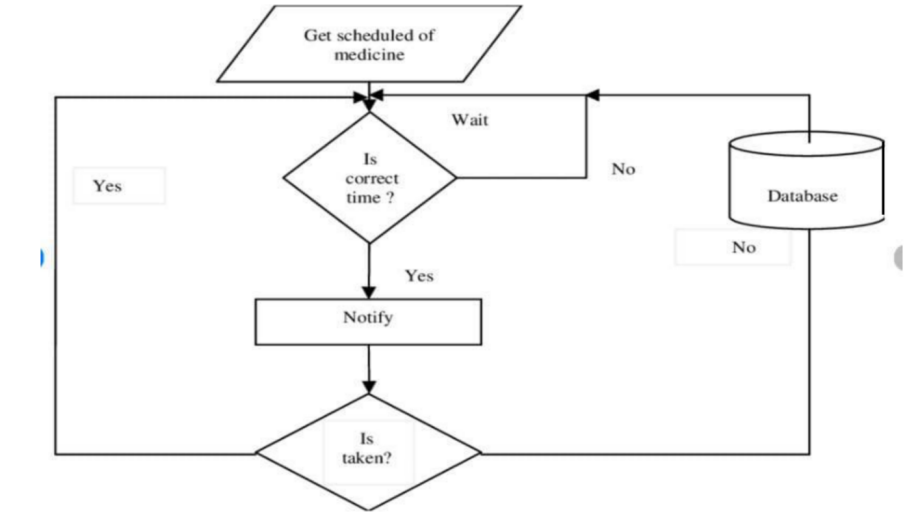
4.2 Non-Functional requirements

NFR No.	Non Functional Requirement	Description
NFR-1	Usability	The system should be easy to install and simple to use
NFR-2	Security	The system should authenticate user.
NFR-3	Reliability	The system should perform the intended tasks for a specific time
NFR-4	Performance	The system should perform well under different conditions
NFR-5	Availability	The system should be available all the time when required
NFR-6	Scalability	The system should be able to add new features

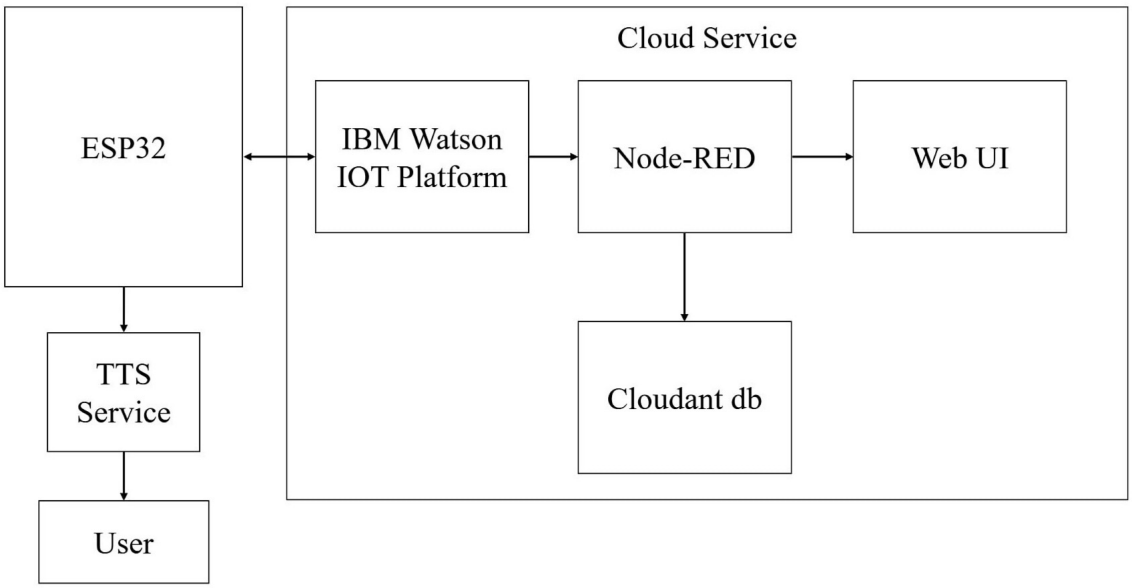
5.PROJECT DESIGN

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



5.3 User Stories

User Type	Functional 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, 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 Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-6	As a user, I can login into dashboard and search the access account and receive mail			
Customer (Web user)	Login	UI	As a user, I need to create an account by providing all the necessary information (e.g.name, password, mobile, email, address)		High	Sprint-1
Customer Care Executive	Registration	UX	As a customer, I need register for the care executive for the application	I can register and access the account	High	Sprint-1
Administrator	Confirmation		As a customer, confirmation mail once registered for the web user.		High	Sprint-1

6.PROJECT PLANNING & SCHEDULING

Project planning is a discipline addressing how to complete a project in a certain timeframe, usually with defined stages and designated resources. One view of project planning divides the activity into these steps:

- setting measurable objectives
- identifying deliverables
- scheduling
- planning tasks

Project scheduling consists of assigning start and end dates to individual tasks and allocating appropriate resources within an estimated budget. This is what allows you to make sure the team can complete their tasks on time. It only focuses on the tasks, their deadlines and project dependencies.

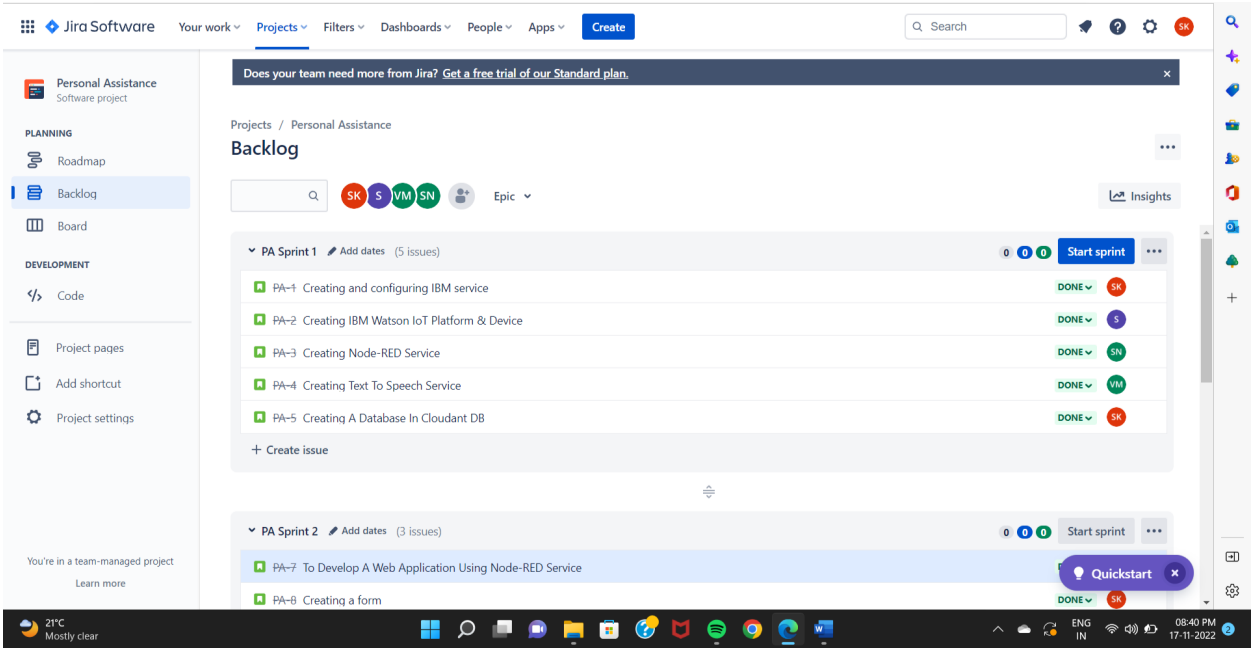
6.1 Sprint Planning & Estimation

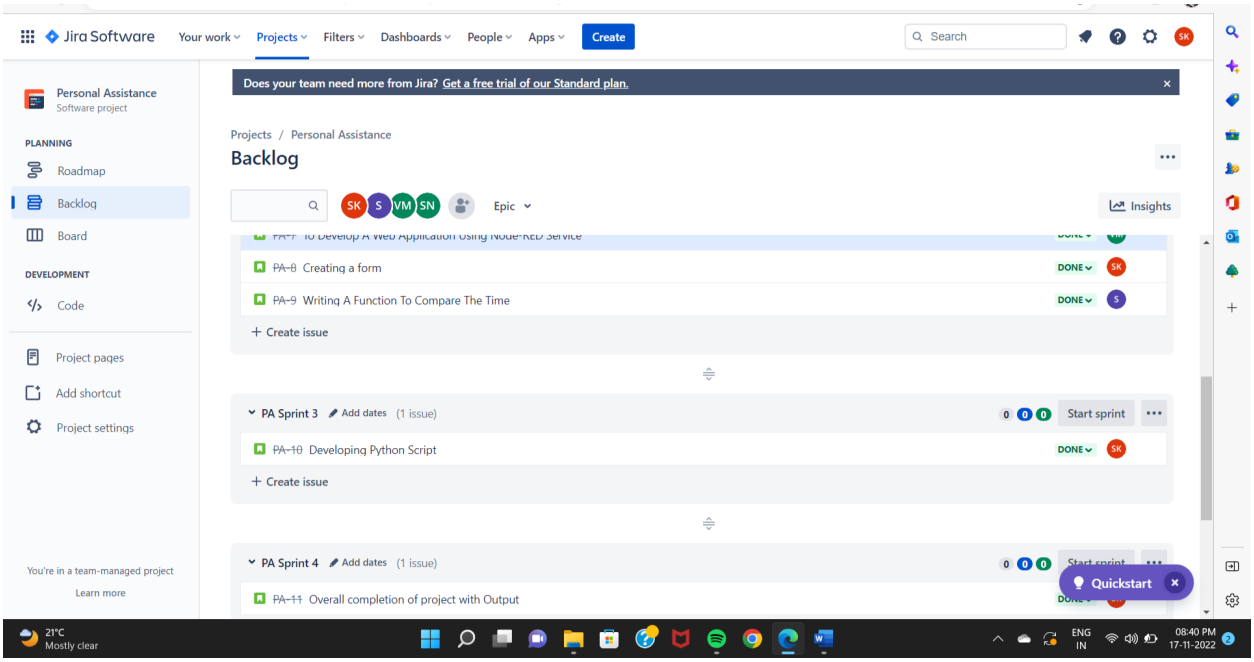
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Shreeja.K
Sprint-1	IBM Watson	USN-2	To Create IOT device (ESP32) under IBM Watson and setting IBM Watson IoT platform for ESP32 and develop Python code to interface	1	High	Shreeja.K, Soundharya Lahari.N
Sprint-2	Node-RED	USN-3	To create application to feed the medicine details	2	High	Shreeja.K, Vandhana.M
Sprint-3	Web UI	USN-4	To Create Dashboard to view the updates	2	Medium	Shreeja.K, Sowndharyaa.N
Sprint-4	Output	USN-5	Provide TTS service and final Result	1	High	Shreeja.K, Soundharya Lahari.N, Vandhana.M, Sowndharyaa.N

6.2 Sprint Delivery Schedule

Sprint	Functional Requirement (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, password, and confirming my password.	2	High	Shreeja.K
Sprint-1	IBM Watson	USN-2	To Create IOT device (ESP32) under IBM Watson and setting IBM Watson IoT platform for ESP32 and develop Python code to interface	1	High	Shreeja.K, Soundharya Lahari.N
Sprint-2	Node-RED	USN-3	To create application to feed the medicine details	2	High	Shreeja.K, Vandhana.M
Sprint-3	Web UI	USN-4	To Create Dashboard to view the updates	2	Medium	Shreeja.K, Sowndharyaa.N
Sprint-4	Output	USN-5	Provide TTS service and final Result	1	High	Shreeja.K, Soundharya Lahari.N, Vandhana.M, Sowndharyaa.N

6.3 Reports from JIRA



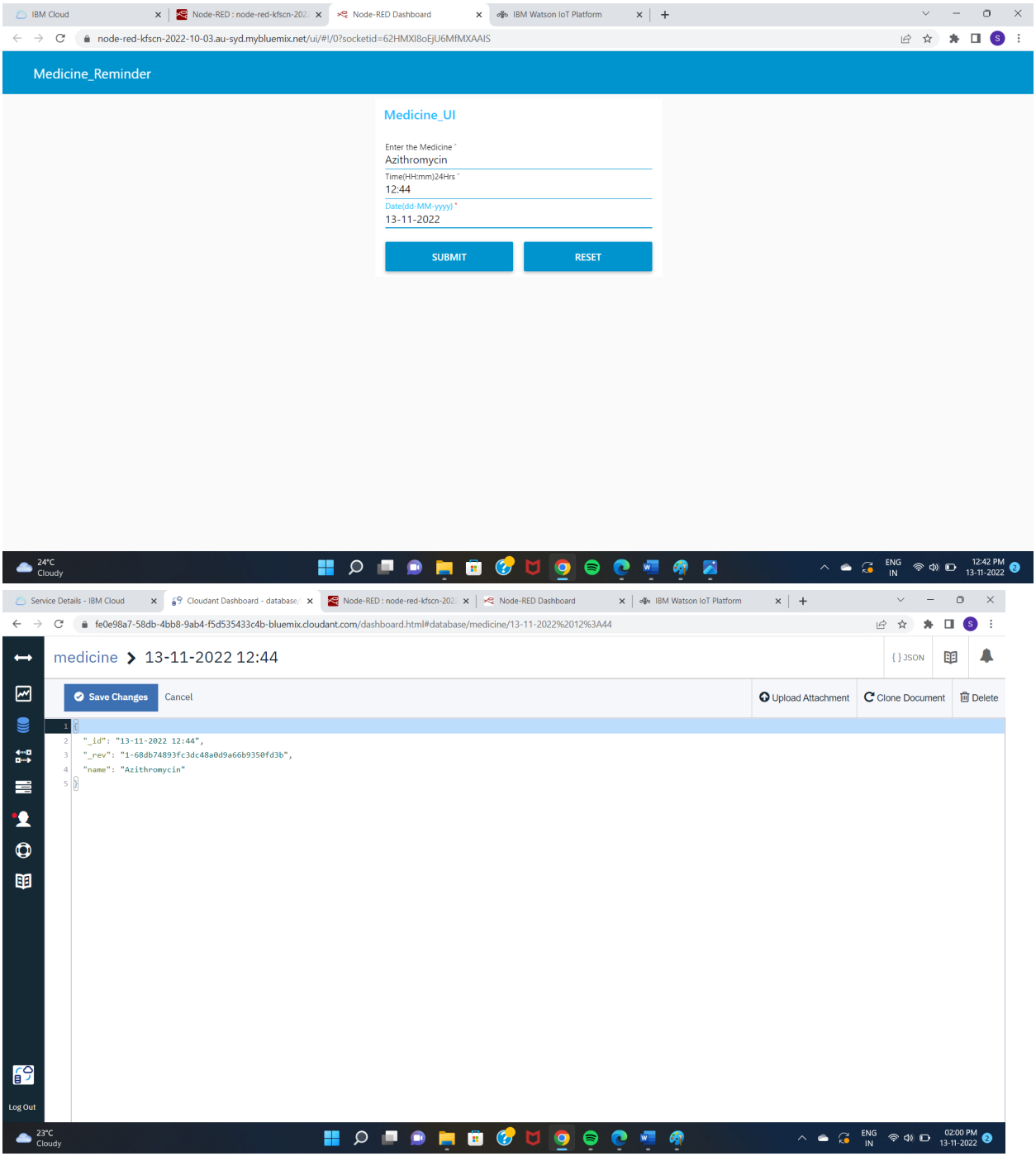


7. CODING & SOLUTIONING

The idea behind a term like solutioning is that it seeks to structure the problem solving process so that it is consistent, repeatable, and generates optimal results. It is also called as problem solving or critical thinking.

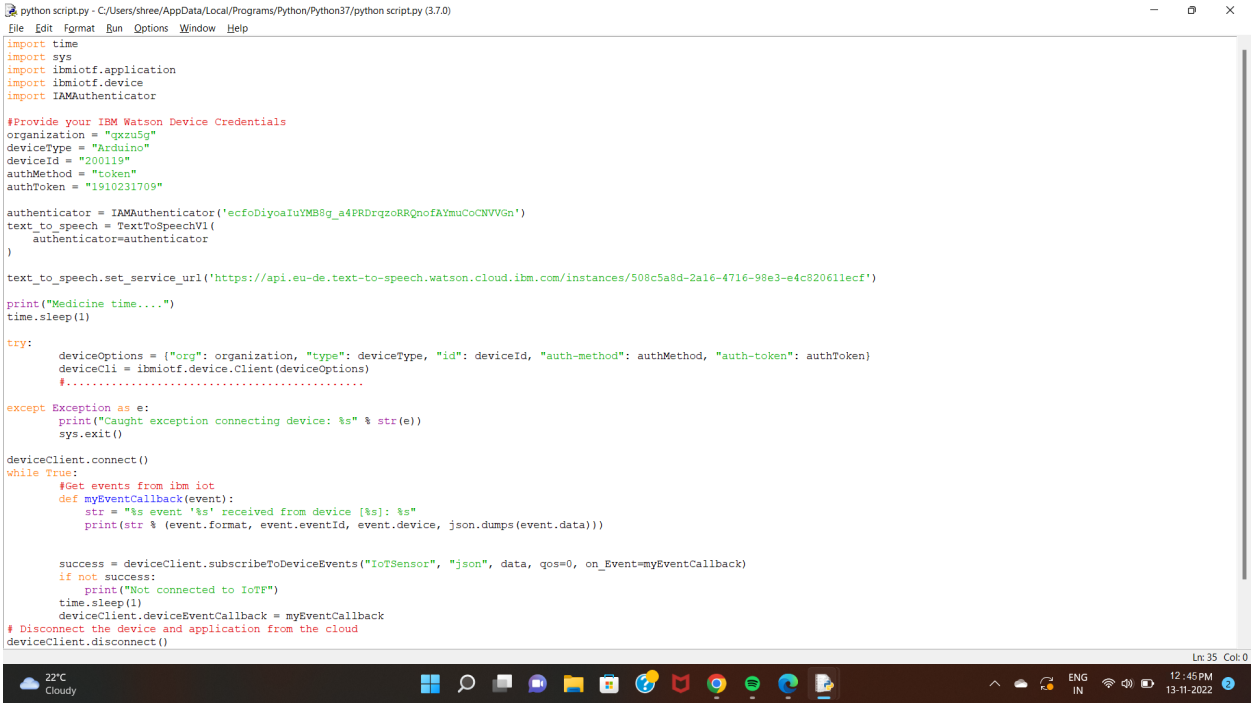
7.1 Feature 1

The second feature is that our project have cloudant db, in which we can store the medicine names of our choice according to the time and it is updatable whenever we require to change in the form which we have created as web UI. This makes it so reliable for medicine reminding the needed medicines on different days.



7.2 Feature 2

In our device there is a feature called tts service which is text to speech that helps to read aloud the name of the medicine at particular time. This feature helps the elder even when he/she is far away as this is loud enough. It never lets him/her forget to take medicine as loud sound reminder is reasonable than a notification which can be forgotten.



8.TESTING

A test report is an organized summary of testing objectives, activities, and results. It is created and used to help testing team, and developers understand product quality and decide whether a product, feature, or a defect resolution is on track for release.

9. RESULT

Input: Medicine Name, Time and Date

Processing: Comparing the Real time with Feeded Time

Output: Medicine name through voice command (TTS)

10. ADVANTAGES & DISADVANTAGES

Advantages:

- It is easy for seniors to take the wrong medicine or even skip doses. Medicine reminder prevent this from happening. There is nothing senior has to read or figure out. They simply need to take the pills as per the name read by TTS service.
- By giving your loved one a medicine reminder, you are also giving them greater health and independence. It helps them age in place with the right tools to help them stay safe and healthy.
- Apart from not missing your dose , it is also good for old and debilitating patients who have forgetfulness.
- There is a regular routine for medicinal intake which leads to better health.

Disadvantage:

The cost of this project is expensive since there is TTS service and usage of cloudant db

11. CONCLUSION

Consumption of medicine is ranked as one of the most important issues of elderly that has to be tackled. In this case, the IoT-Based Smart Medicine Reminder Device has been developed to help the elderly in remembering to consume their medicines without assistance from anyone around them.

Patient finds it very difficult to keep track of their medication especially if it involves intake of pills on daily basis due to several reasons such as heavy workload, forgetfulness, and alterations in day-to-day behavior can also have a significant result on whether patients remember to take their prescribed medications.

The expected outcome of the proposed IoT-Based Smart Medicine Reminder Device was also explained in detail to what a user can expect from the proposed device.

12. 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 reminder system based on data stored in cloudant db along with voice command using TTS service.

In future, efforts can be made to improve the accuracy of the medicine reminder and add more features to it

13. APPENDIX

1. Afshaan Sarguroh; Munaf Shaikh; Kashif Khan; Dr . Zainab Mirza., “GoMed: Daily Medicine Reminder Application”. International Journal of Advanced Research in Computer and Communication Engineering Vol. 10, Issue 4, April 2021.

2. Juthada Suwanthara; Areena Noinongyao; Sirion Vittayakorn., “WiseMed :medication reminder for seniors”. Institute of electrical and electronics engineers 2019.

3. Shawn Benedict Kumar; Wei Wei Goh; Sumathi Balakrishnan., “Smart medicine reminder device for the elderly” Institute of electrical and electronics engineers 2018.

4. Mayuresh Waykole; Vatsalya Prakash; Himanshu Singh; Nalini N., “ArduMed - Smart medicine reminder for old people” International Journal of Scientific & Engineering Research, Volume 7, Issue 5, May 2016.

5. Deepti Ameta; Kalpana Mudaliar; Palak Patel., “Medication reminder and healthcare – an Android application” International Journal of Managing Public Sector Information and Communication Technologies (IJMPICT) Vol. 6, No. 2, June 2015.

Source Code:

```
import time

import sys
```

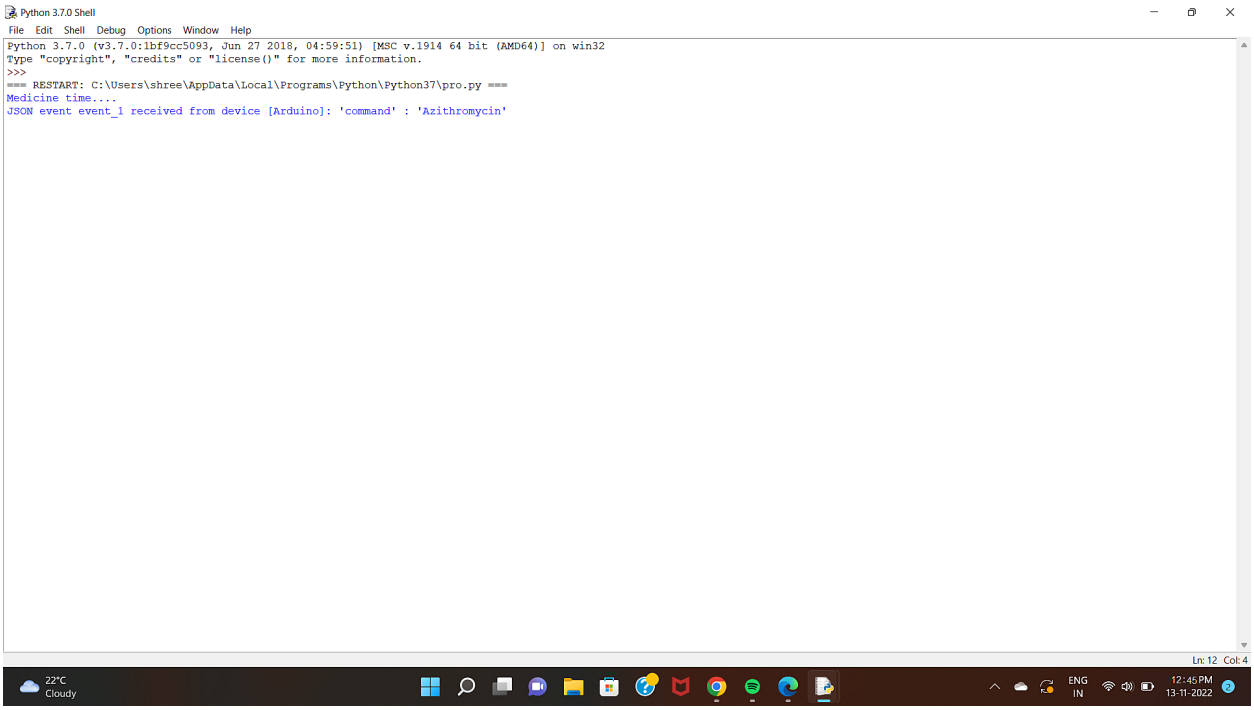
```
import ibmiotf.application

import ibmiotf.device

import IAMAuthenticator


#Provide your IBM Watson Device Credentials

organization = "qxzu5g"

deviceType = "Arduino"

deviceId = "200119"

authMethod = "token"

authToken = "1910231709"


authenticator = IAMAuthenticator('ecfoDiyoaIuYMB8g_a4PRDrqzoRRQnofAYmuCoCNVVGn')

text_to_speech = TextToSpeechV1(

    authenticator=authenticator

)


text_to_speech.set_service_url('https://api.eu-de.text-to-
speech.watson.cloud.ibm.com/instances/508c5a8d-2a16-4716-98e3-e4c820611ecf')


print("Medicine time....")

time.sleep(1)


try:
```

```
        deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod, "auth-token": authToken}

        deviceCli = ibmiotf.device.Client(deviceOptions)

        #.....................................


except Exception as e:

        print("Caught exception connecting device: %s" % str(e))

        sys.exit()


deviceClient.connect()

while True:

    #Get events from ibm iot

    def myEventCallback(event):

        str = "%s event '%s' received from device [%s]: %s"

        print(str % (event.format, event.eventId, event.device, json.dumps(event.data)))




    success = deviceClient.subscribeToDeviceEvents("IoTSensor", "json", data, qos=0, on_Event=myEventCallback)

    if not success:

        print("Not connected to IoTF")

    time.sleep(1)

    deviceClient.deviceEventCallback = myEventCallback
```

 # Disconnect the device and application from the cloud

deviceClient.disconnect()

output:



Thus Medicine Name would be given as voice alert with the help of TTS Service.

GitHub & Project Demo Link

GitHub : IBM-EPBL/IBM-Project-17877-1659676887: Personal Assistance for Seniors Who Are Self-Reliant (github.com)

Project Demo Link:
https://drive.google.com/file/d/1DAIvv_w8tf05X1pR_nJGADe5Pr0IYQ7l/view?usp=drivesdk