KONGUNADU COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

HX 8001-PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

Personal Assistance for Seniors Who Are Self-Reliant

NALAIYA THIRAN PROJECT REPORT 2022

Submitted by

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Team ID: PNT2022TMID13442

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INTRODUCTION

PROJECT OVERVIEW:

Today, most people can expect to live into their seventies and beyond. According to the UN, the no.of people aged 60 or older is projected to grow by 56 % by 2030.

IoT is a revolutionary phenomenon that transforms our life entirely as well as aims to revolutionize current healthcare into a more individualized, precautionary and inclusive approach to treatment.

Challenges faced by Elderly People -
- Medicine Reminders
- Daily Routines
- Loss of short-term memory

PURPOSE:

Sometimes elderly people forget to take their medicine at the correct time.
- They also forget which medicine He / She should take at that finical time.
- Moreover, 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 and their caretakers 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.

LITERATURE SURVEY

EXISTING PROBLEM :

It is crucial to make it possible for fragile patients and elderly people at risk to remain in their own homes or adeptness for assisted living. For this reason, many web and mobile applications have been developed to solve this issue. Many companies have created prototype AI Robots to study to measure the vital signs such as heart rate, heart rate variance and answer health related questions of an individual. Though many the seniors are non-techs, it will be challenge for them to familiarized with the applications.

Exciting Solutions:

References:

https://www.onlinedoctor.com/best-medicine-reminder-apps/

https://www.arrowhitech.com/medication-tracking-and-reminder-app-development/

https://www.frontiersin.org/articles/10.3389/frobt.2020.00071/full#T6

Problem Statement Definition:

➢ A medicine reminder app designed for people who frequently forget to take their medications. You may also keep track of your appointments. Its parental feature distinguishes it from other apps on the market, allowing you to keep track of and remotely assist your loved ones who find it difficult to utilize such an app with their reminders.
➢ CUSTOMER PROBLEM STATEMENT:
➢ >> I am Ashok,
➢ Age-48
➢ I have low sugar and high blood pressure.
➢ >> I am trying to:
➢ remind to take injectable glucagon for low sugar And enalapril, lisinopril, perindopril and ramipril for high bp
➢ >>But : lifestyle challenges, patient incompatibility, forgetting of medicine use, and nonexpert advice.
➢ >>Because:
➢ Due to patient Forgot, it will risk health of patient .

IDEATION & PROPOSED SOLUTION

EMPATHY MAP :

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes.

It is a useful tool to helps 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.

IDEATION & BRAINSTORMING:
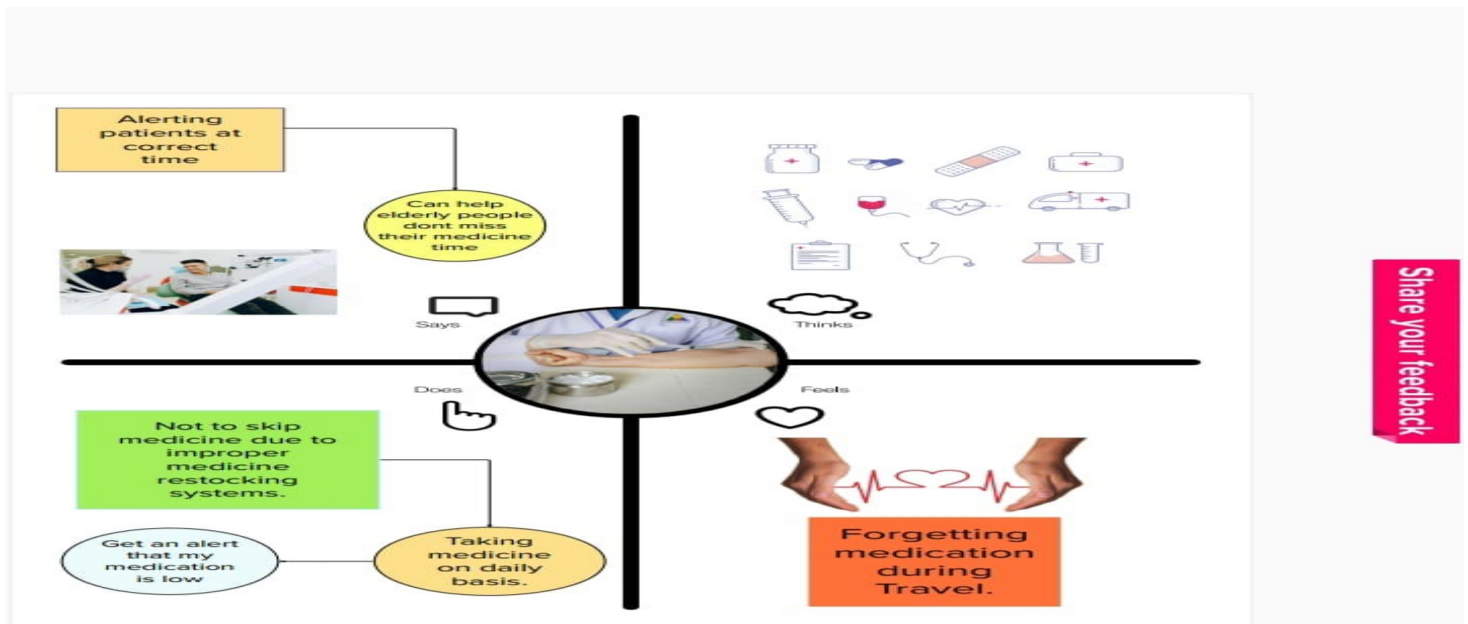
1.Selecting the Problem Statement:
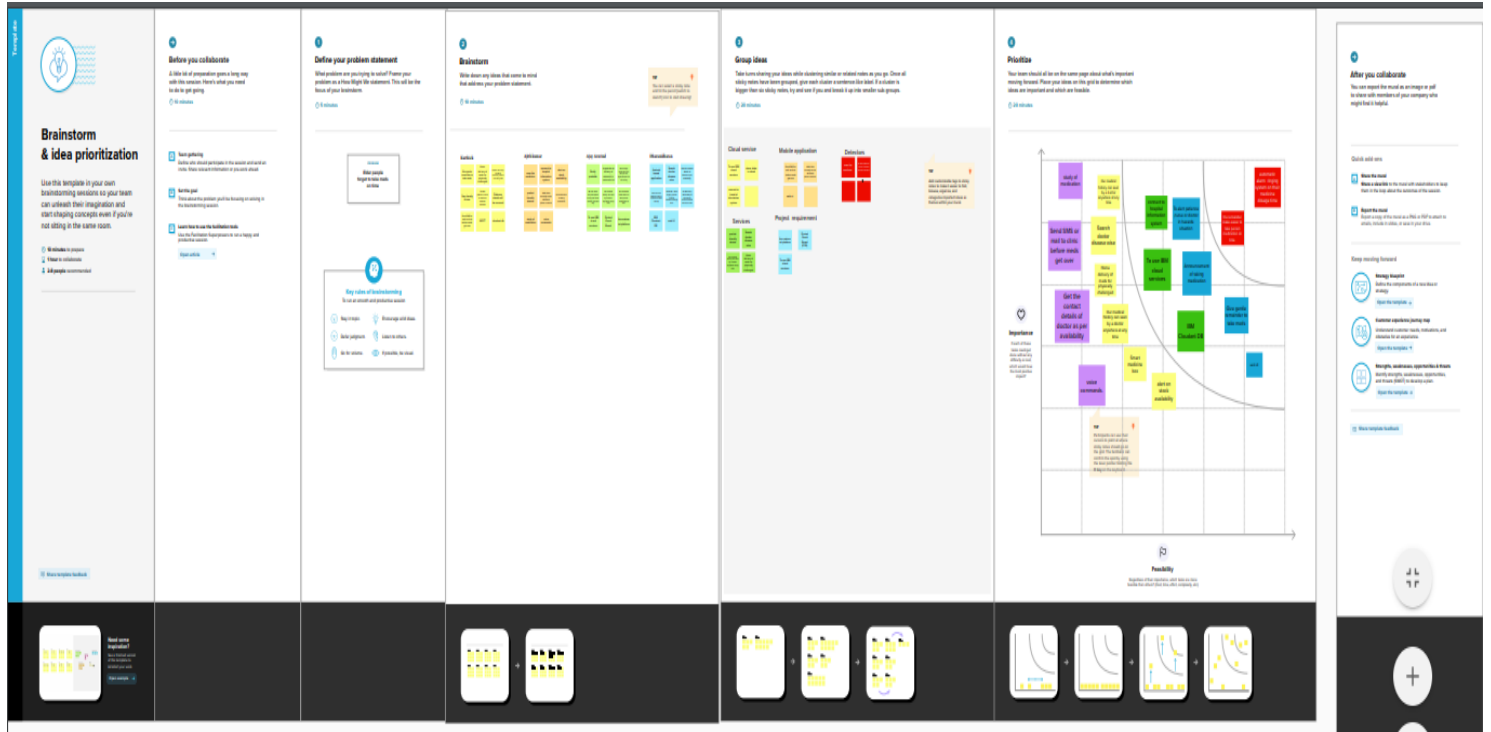
2. Idea Grouping:

3.Idea Prioritization:

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.
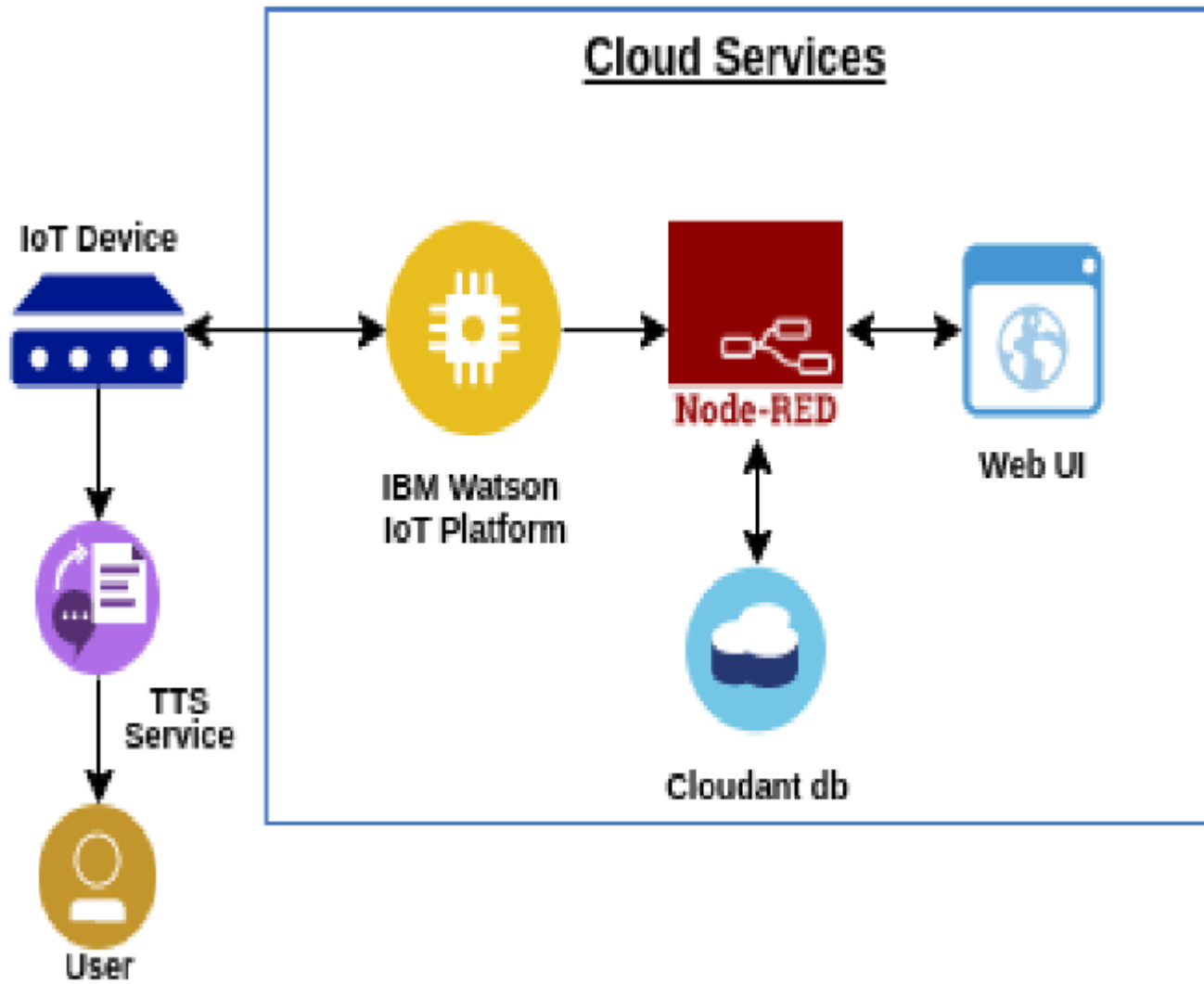
🕐 **20 minutes**

Importance

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

- Automatic medicine order — Online Services
- Secure Database — Cloud Services
- Cloud Storage of Details — Cloud Services
- web development — Online Services
- Medicine Dispenser — Hardware Services
- Connecting with their family members through online — Cloud Services
- Sharing of their data with caretakers — Marketing
- Proper Emergency Notifications — Alerts
- Voice Assistance — Assistance
- Medicine Reminder — Primary Services
- Linking with Sensors to monitor — Hardware Services
- Increasing their Social Circles — Social Services
- Direct Emergency call services — Alerts
- Prior Registration for checkups — Online Services
- providing affordable services — Primary Services
- Providing Availability, location and navigation details of medicine and nearby medical shops — Cloud Services | Online Services
- Assisting in Daily routines — Assistance
- Nutrition Assistance — Assistance
- 24/7 Monitoring — Primary Services
- User friendly assistance — Primary Services | Assistance
- Updating the patient's health timely — Online Services

Feasibility

Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

PROPOSED SOLUTION:

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	• Elderly people occasionally fail to take their • medications at the right time. • Seniors frequently forget which medicine should • take at that particular time and need to be • dependent on other persons which makes them • feel more reliable on others. It is challenging for medical professionals to • keep on eyeon patient round-the-clock.
2.	Idea / Solution description	To avoid the above problem mentioned above, the medicine remainder system is developed. 1. For the user (caretaker), a web application is created that allows him to choose the preferred time and medication. 2. The IBM Cloud securely stores and protects all of the customer's or user's information. 3. If the medication's due time approaches, the web application will use the IBM IoT platform to send the medication's name to the IoT device. 4. The device will receive the medicine name and notify the user with voice commands.
3.	Novelty / Uniqueness	● Automatic Pre-order alerts are sent, when the supply of the prescribed medication is about to run out. The user/subscriber's family & doctor have access to the medicine intake records. ● Backup option is available, if the data or record is deleted . ● The user receives the precise voice notifications at the right time.

4.	Social Impact / Customer Satisfaction	Our system promotes safe and independent living which makes them more self-reliable and healthier cared-for individuals.
		Our system's emphasis on transparency in care makes sure that families feel involved in the delivery of care and allays their worries.
		From anywhere in the world, family members may check on a loved one's wellbeing.
5.	Business Model (Revenue Model)	• Our proposed product will be a Subscriber Service which is very affordable. • Proper updates in the application according to trends and customer convenience which makes high Customer Retention. • Proper upkeep of privacy policies that enhances customers' trust.
6.	Scalability of the Solution	The proposed application is more convenient to use in both Android and ios based systems.
		The user can customize the timing of the intakes and update his medical records.
		This solution is provided with Cloud storage with needed space.
		Extra storage space can be provided with the subscription.

SOLUTION ARCHITECTURE:

PROBLEM SOLUTION FIT:

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS Who is your customer? i.e. working parents of 0-5 y.o. kids Elderly people who need personal assistance	6. CUSTOMER CONSTRAINTS CC What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices. • Memory loss/ Alzheimer • Fear of intakes of medicine continuously. • Usage of digital devices • Physical Condition • Unfamiliar with smartphone applications	5. AVAILABLE SOLUTIONS AS Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking • Monitoring by a person which is not possible by all the times.	Explore AS, differentiate
Focus on J&P, tap into BE, understand RC	2. JOBS-TO-BE-DONE / PROBLEMS J&P Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides. • Elderly folks occasionally fail to take their medications at the right time and need to dependent on other persons. • It is challenging for medical professionals to keep an eye on patients round-the-clock. • It is difficult for them to track their medical records and intakes.	9. PROBLEM ROOT CAUSE RC What is the real reason that this problem exists? What is the back story behind the need to do this job? • Due to aging, Elders lose their memory capacity and they can't able to remember their medicine intakes time • Some elders may fall into Alzheimer who needs extra care for their medicine records and daily routines.	7. BEHAVIOUR BE What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace) • Safe and independent care for themselves • Customizing their own needs and activities. • Maintenance of their medicine intakes in cloud database. • Reduce the burden on families of dispensing drugs to the elderly.	Focus on J&P, tap into BE, understand RC

REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENTS:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**User Registration**	Registration of Data through webUI.
FR-2	**User Confirmation**	Confirmation of given Data as in specified format
FR-3	**Internet Connectivity**	Users should have a stable internet connection to access the app
FR-4	**Data management**	In the app's dashboard, a text box is used to collect all of the user's data.
FR-5	**User Input management**	A text field in the app's dashboard is used to collect all of the user's data.
FR-6	**Acknowledgement**	Through the app, all of the data are kept in the cloud, and the user will receive acknowledgement.
FR-7	**User output management**	The user can access their stored database through web application.

NON-FUNCTIONAL REQUIREMENTS:

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The app is made user friendly so that it will very smooth and easy to handle.
NFR-2	**Security**	The collected data is stored in IBM Cloudant DB and it is properly secured.
NFR-3	**Reliability**	The user's data will be trustworthy and private because it is stored on the IBM cloud.
NFR-4	**Performance**	The app uses virtual sensors; thus, it will have great accuracy and performance and provide faster access of data
NFR-5	**Availability**	Users can always access the app because data stored in the cloud is always accessible. It also has additional benefits for subscribers.
NFR-6	**Scalability**	It can be linked to any number of devices and support any number of users.

PROJECT DESIGN

DATA FLOW DIAGRAM:

CUSTOMER JOURNEY MAP:
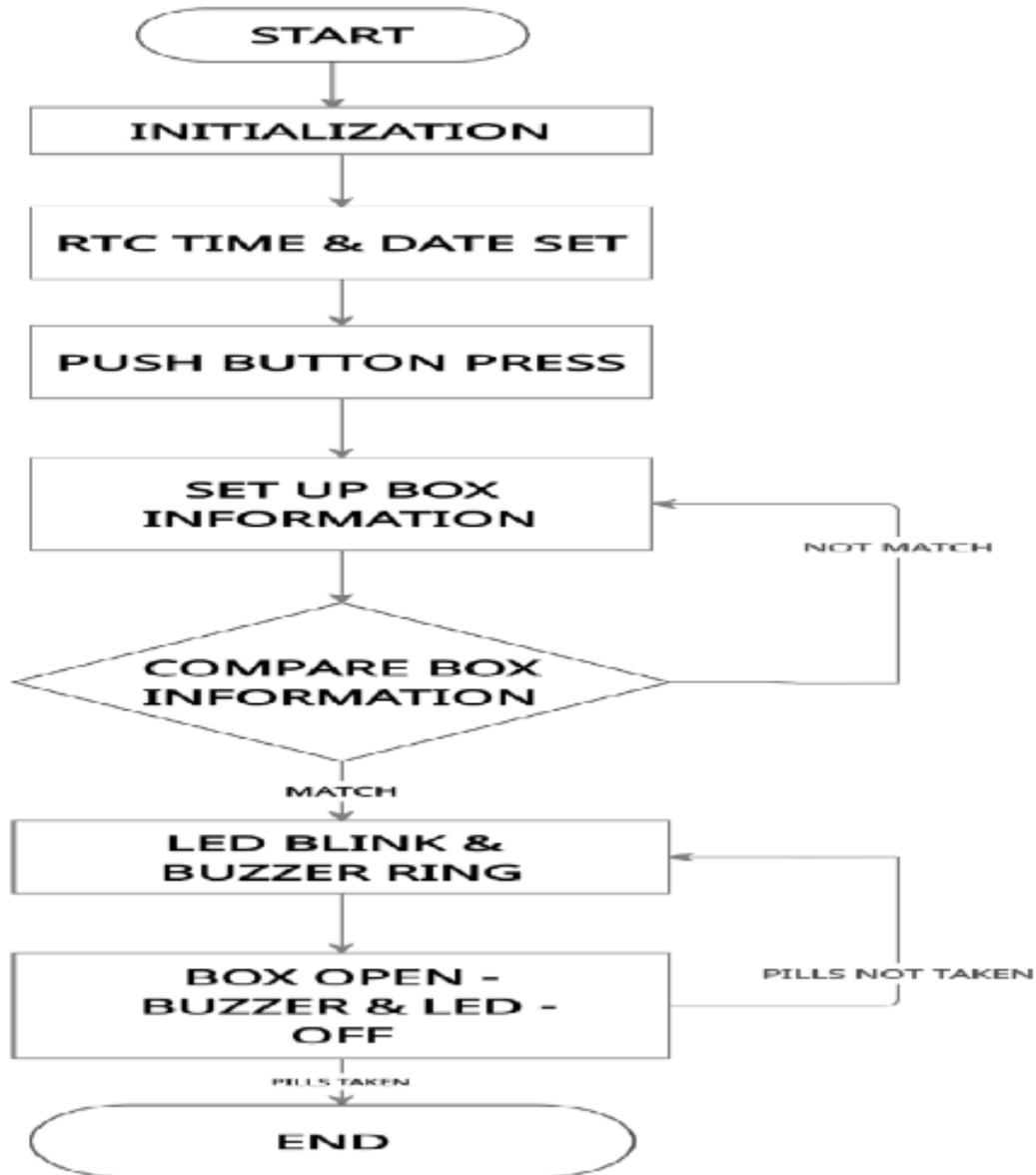

SCENARIO: MEDICINE REMINDER ON TIME	Entice — How does someone initially become aware of this process?	Enter — What do people experience as they begin the process?	Engage — In the core moments in the process, what happens?	Exit — What do people typically experience as the process finishes?	Extend — What happens after the experience is over?
Steps — What does the person (or group) typically experience?	Viewing online Ad's and social media; Conducting awareness campaign	They can experience a wonderful assistant; Work load can be reduced	An electronic device is manufactured by using all required inputs; Devices are tested in certain stages	Senior citizens could get a perfect assistant in their final stage; Developed version of devices	Senior citizens gain more advantage
Interactions — What interactions do they have at each step along the way? People: Who do they see or talk to? Places: Where are they? Things: What digital touchpoints or physical objects would they use?	They see mostly their families and neighbours and they talk with them more; Choose the correct and comfortable Environment	They can feel free and Happiness; They can feel free from loneliness	Digital devices are created and manufactured; Digital devices which help in knowing their health issues; Electronic objects are seen by senior citizens; Whereas electronic devices helps them to complete their work on time	At the existing state senior citizens see a new world in their life time; People's use to talk about the achievement	They interact with others in every places; So that they feel like heaven in their home
Goals & motivations — At each step, what is a person's primary goal or motivation? ("Help me..." or "Help me avoid...")	(sticky notes)	(sticky notes)	Help me feel good about this device; Help me make use most of it; Help me confident about what I'm doing	Help me feel independent; Help me feel peace with it	(sticky notes)
Positive moments — What steps does a typical person find enjoyable, productive, fun, motivating, delightful, or exciting?	They understanding learning never stop; You will have plenty to contribute; Maintaining good health is easier than ever before; They are those who brings you best in you not stress in you	At this beginning they can feel more happy and think to forgive all; They feel happy and fulfilled	They get more gain in their project; There will less amount of loss in their overall graph	They feel they are fulfilled and completed their responsibilities; Senior citizens enjoys this project	This is very exciting device project; It is more delightful
Negative moments — What steps does a typical person find frustrating, confusing, angering, costly, or time-consuming?	Communication difficulties; Inadequate Rest; Emotional issues; Discomfort and Physical Pain	At first, they feel anxious; Having trouble in sleeping; Initially, they lose their temper; Feeling dismayed; They feel nervous and able to think they get changed and giving up on stake	Poor self-Esteem	Unhealthy behavior; Leads to depression	Leads to mental illness; Changes in daily activities and behaviors
Areas of opportunity — How might we make each step better? What ideas do we have? What have others suggested?	Assist with house work or yard work; Help with transportation; Gardening; Walking and Exercising	Can improve the upgraded version; Others suggested to spread more awareness about this project; They get more opportunity	They should engage themselves in a high level improving manner	(sticky notes)	Project gets more popular in all countries

USER STORIES:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance standard	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by using the app url.	I can access my account / dashboard.	High	Sprint-1
		USN-2	As a user,I access the app url from any device	I can access dashboard from any device.	Medium	Sprint-1
		USN-1	As a user, I can enter the data in the given format	I can only the data in the given format	Medium	Sprint-1
	Dashboard	USN-2	In the dashboard section, the user able to enter the medicine name and their timing schedule	I can access the data	High	Sprint-1
Customer (Web user)	Registration	USN-3	As a customer, I can register and access the application through app URL	I can enter the data required	High	Sprint-2
Customer Care Executive	Storage	USN-5	As a customer care executive, I visit and check the status	I can login into cloud database	Medium	Sprint-3
Administrator	Storage	USN-8	As an Administrator, I can login into cloud accounts and have control over them	I can login into cloud storage account	High	Sprint-4
	Notification	USN-13	As an Administrator, I can access the user's database	I can access the user accounts and data	Medium	Sprint-4

SOLUTION & TECHNICAL ARCHITECTURE:

Architecture:
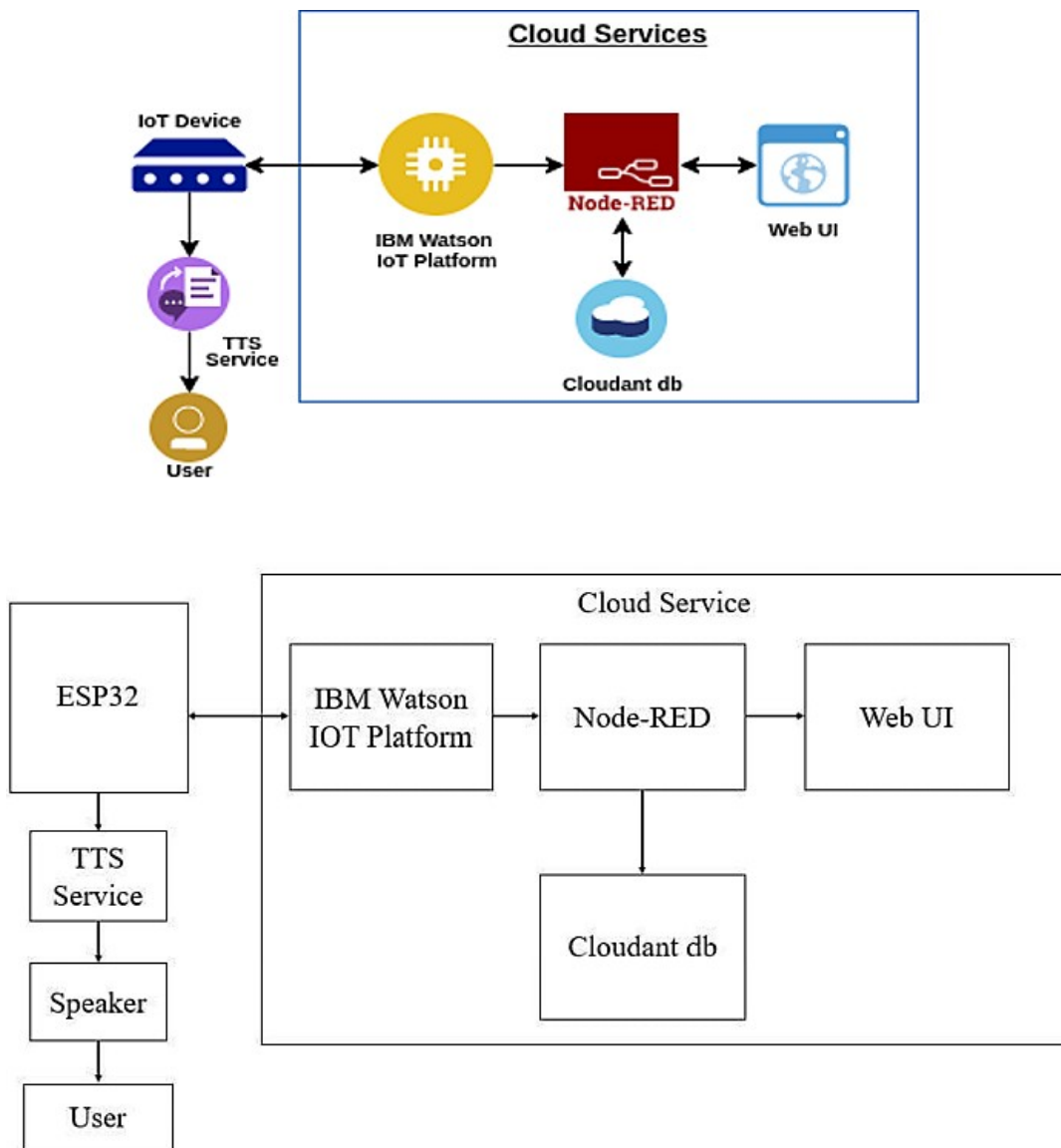
Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI or Mobile application.	Node Red UI
2.	Application Logic-1	Web UI app or Mobile app to enter the user details and medicine details.	Python
3.	Application Logic-2	Getting the medicine details from the database	IBM Watson TTS service
4.	Application Logic-3	Text to Speech service is provided and also access the Speech to Text feature.	IBM Watson Assistant
5.	Cloud Database	The User login credentials and the medicine details such as time and dosage are updated.	IBM Cloudant
6.	File Storage	API key, user medicine reports, login credentials, IOT credentials, previous medicine records.	IBM Block Storage
7.	External API-1	To locate the IOT device to be monitored 24/7 and records the data properly.	IBM GeolocationAPI
8.	External API-2	The user interface for the login credentials.	Username& Password API.
9.	Infrastructure (Server / Cloud)	Act as a host for the server and the application.	Cloud Foundry

Application features:

| S.No	Characteristics	Description	Technology
1.	User Interface	To develop the application interface forthe user.	Node Red Dashboard UI
2.	Security Implementations	Major surety to the users': Personal data, login credentials,previous data records.	SHA-256, Encryption, OWASP.
3.	Scalable Architecture	To the maximum extent the databasecan be scaled in the IBM database.	IBM Auto Scaling
4.	Availability	24/7 services and ensure the app is trustworthy and data is viewed anytime without any loss in information.	IBM Cloud Load Balancer
5.	Performance	Easily scalable design so the performance of the application is very inevery instances and the allows the maximum number of users at a time.	IBM Instance

PROJECT PLANNING & SCHEDULING

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	C Karthick
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	C Karthick, M Ajay Aravinth, R Ajith Kumar, S A Dharanidharan
Sprint-2	Node-RED	USN-3	To create application to feed the medicine details	2	High	C Karthick, S A Dharanidharan
Sprint-3	Web UI	USN-4	To Create Dashboard to view the updates	2	Medium	C Karthick, S A Dharanidharan
Sprint-4	Output	USN-5	Provide TTS service and final Result	1	High	C Karthick, M Ajay Aravinth, R Ajith Kumar, S A Dharanidharan

Burndown Chart:
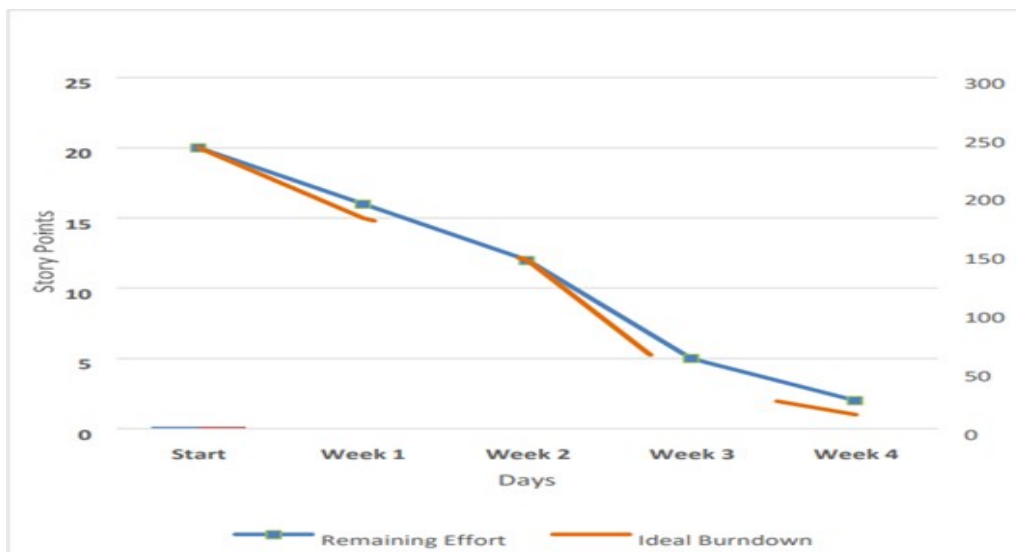
Velocity:

The team's average velocity (AV) per loop unit (story

points per day)AV=(Sprint

duration)/velocity=20/7=2.85

Milestone and Activity list:

MS No.	Milestone Title	Phase Description	Milestone Description	Activity	Duration
MS-1	Project Start	Preparation Phase	create repository in the GitHub, Assign the task	Completed	1 week
MS-2	Project Requirements	Project Design Phase-I, Project Design Phase-II, Project Planning Phase	Completing the task of each phase by gathering information's	Completed	8 weeks
MS-3	Sprint-1	Development Phase	IBM Watson	Notstarted	1week
MS-4	Sprint-2	Development Phase	Node-RED	Notstarted	1 week
MS-5	Sprint-3	Development Phase	Web-UI	Notstarted	1 week
MS-6	Sprint-4	Development Phase	Desired Output	Notstarted	1 week

SPRINT DELIVERY SCHEDULE:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	31 Oct 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	19	07 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	07 Nov 2022

JIRA REPORTS:

CODING & SOLUTION:

(Explain the features added in the project along with code)

FEATURE 1:

NODE RED FLOW:

> ➤ Node-RED is a flow-based programming tool, or developed by IBM's Emerging Technology Services team and now a part of the OpenJS Foundation.Flow-based programming is a way of describing an application's conduct as a network of black-boxes, or "nodes" as they are called inNode-RED. Each node has a well-defined purpose; it is given some data, it does something withthat data and then it passes that data on. The network handles the flow of data between the nodes.

> ➤ **Supports browser-based flow editing** making it user friendly, accessible and visual. It is built on Node. js, which is a none-blocking, lightweight I/O model, making it lightweight and efficient. Flows created in Node-RED are stored using JSON, and can imported and exported and shared with ease.

> ➤ Node-RED consists of a Node.js based runtime that you point a web browser at to accessthe flow editor. Within the browser you create your application by dragging nodes from your palette into a workspace and start to wire them together. With a single click, the application is deployed back to the runtime where it is run.The palette of nodes can be easily extended by installing new nodes created by the profession and the flows you create can be easily shared as JSON files.

Node Flows:

Flow to get the user input from Node Red Dashboard UI
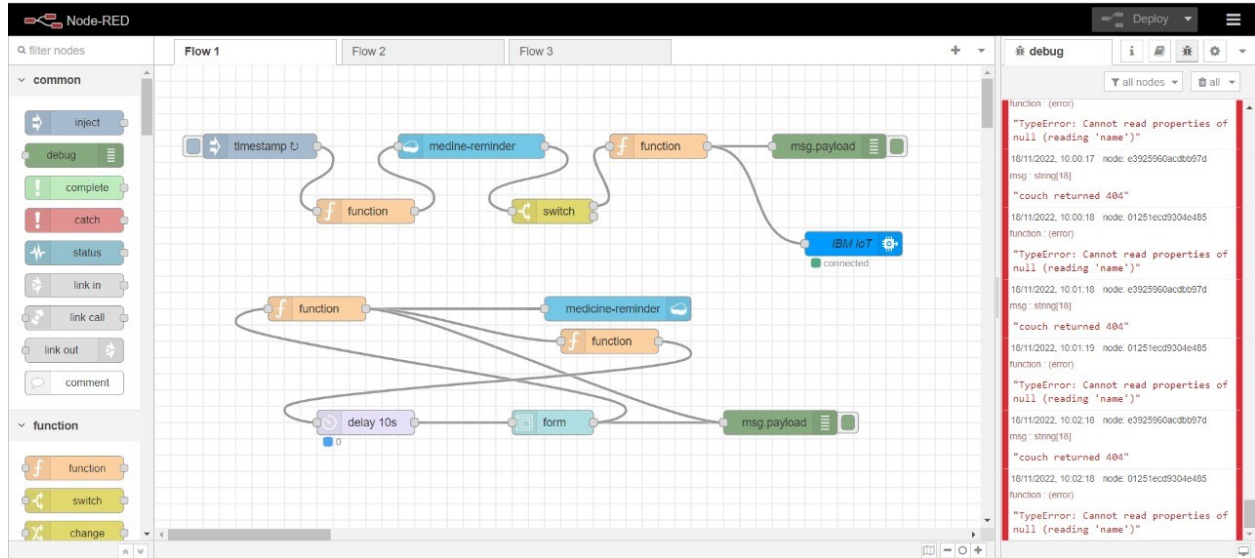
Flow to get the time and compare it with the time stored in the database:
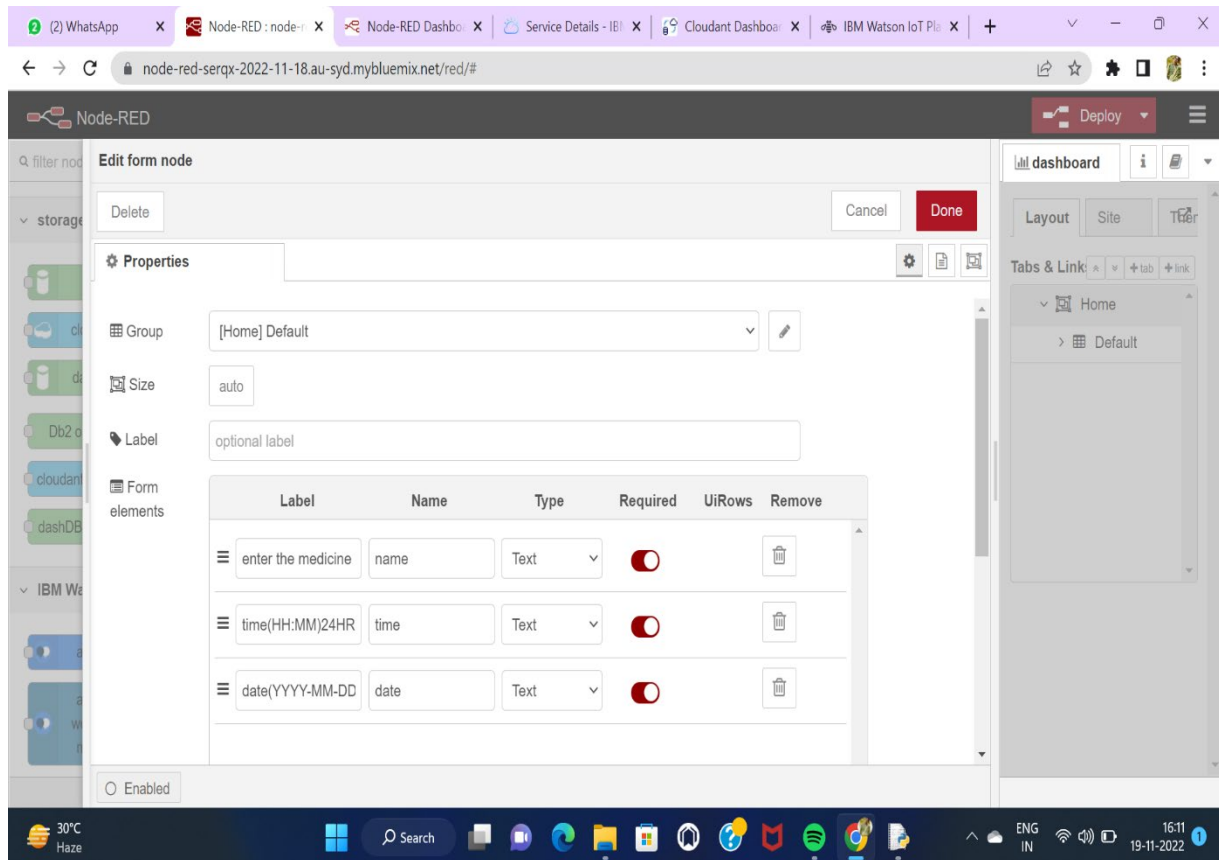
FEATURE 2:

CLOUDANT DB:

"Easy to use distributed, NoSQL database"

A fully managed, distributed database optimized for heavy workloads and fast-growingweb and mobile apps, IBM Cloudant is usable as an IBM Cloud® service with a 99.99% SLA. Cloudant elastically scales throughput and storage, and its API and retort protocols are well- matched with Apache CouchDB for hybrid or multi cloud architectures.

Features:

Elasticity

The demands of an underlying business application require the ability to add and subtract nodes, which is a feature of actual physical machines or virtual machines. Such an ability is called Elasticity. In order to prevent any downtime, the addition and subtraction of nodes should happen on the fly in response to the demand.

Scalability

For the database to increase its performance whenever necessary, the elasticity must scale out in a linear manner. If a throughput of 200,000 transactions can be handled by two nodes, then 400,000 transactions could be handled by four nodes. Therefore, a spike in demand could be easily managed. During the fluctuation of demand, large volumes of data have to be processed in almost the same amount of time required by small volumes of data. Doing so will facilitate the successful meeting of service level agreements.

High availability

Depending on the industry, businesses can be losing thousands or even millions of dollars for one minute of downtime. Therefore, uptime or increased availability is critical to such businesses. By piggybacking an infrastructure provided by a cloud provider, cloud databases are able to claim high availability. It is also designed to ease redundancy and data distribution.

Easy data distribution

In a cloud application, the underlying database is able to read and write from any node that belongs to the cloud database. The distribution of data and computing resources across vast geographic zones is one of the unique abilities of the cloud providers.

Redundancy

In case the primary copies of data are destroyed, then the redundant copies will serve as backup. They can be stored across vast geographic regions and could also be stored on different racks within a server data center. Therefore, high availability is one of the big advantages of cloud database with distributed and redundant copies.

Data type support

Cloud based databases are able to accept all key data formats as they offer such flexible and dynamic schemas. They also include structured, semi-structured and unstructured data types, but a relational database management system can only handle structured data.

Manageability

Vendors provide the set of tools required to carry out routine administrative operations. A simple web browser is sufficient to access these tools. Therefore, it facilitates easy manageability.

Reduced cost

Other features of cloud databases such as scalability and elasticity help reduce their cost with a pay-with-the-go model. A traditional RDBMS can be highly complex and expensive for cloud implementation due to their inability to scale. Implementation of database in a cloud requires a cost structure that is capable of horizontal scalability regardless of the size of the machine and volume of data that has to be managed. 29

CLOUDANT DB:
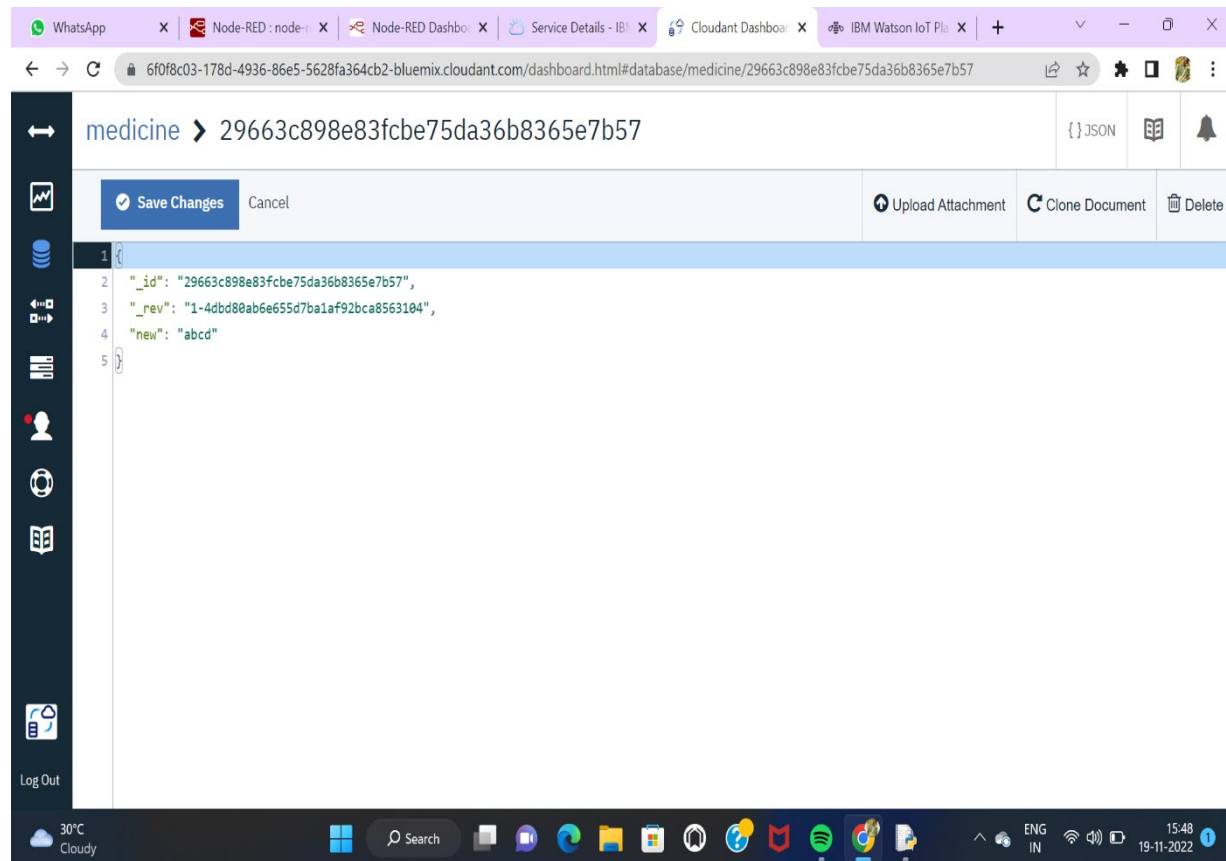
FEATURE 3:
IBM IoT PLATFORM:

IBM Watson™ IoT Platform is a fully managed, cloud-hosted service that makes it simple to derive value from Internet of Things (IoT) devices.Simply register and connect your device, be it a sensor, a gateway, or something else, to Watson IoT Platform and start sending data securely up to the cloud using the open, lightweight MQTT messaging protocol. You can set upand manage your devices using your online dashboard or our secure APIs, so that your apps canaccess and use your live and historic data.

API:

Several APIs are usable for developing code for devices, gateways, and covering that connect to IBM Watson™ IoT Platform.The HTTP APIs are protected by HTTP basic authentication. When you generate an API key by using the dashboard, you are presented with akey and an authentication token. Each Watson IoT Platform organization is identified by a 6-character organization ID which is required in the host name for any HTTP API call.

MQTT:

You can connect applications, devices, and gateways to IBM Watson™ IoT Platform by using the 2MQTT protocol. You can also use the HTTP REST API to connect devices to Watson IoT Platform.MQTT is an open standard that is managed by the OASIS standards organization and external recognized by ISO and is the primary protocol that devices and applications use to convey with Platform Service.MQTT is a publish and subscribe messaging transport protocol that is designed for the efficient exchange of real-time data between sensor and mobile devices.

MQTT runs over TCP/IP, and while it is possible to code directly to TCP/IP, you can also choose to use a library that handles the details of the MQTT protocol for you. A wide range of MQTT client libraries are usable. IBM contributes to the growth and support of several client libraries, including the ones that are usable at the following sites:

- MQTT profession wiki
- Eclipse Paho project

SDK:

The SDKs are open source and licensed under the Eclipse Public License, they power IBM'sservice monitoring and drive hundreds of thousands of automated tests every day.

Usable SDKs:

- C
- Java
- Node.js
- Python

IBM WATSON IOT PLATFORM:

Python Script:

To receive receive data from node-red by using IBM Watson IoT platform

```python
import json
import wiotp.sdk.device
import time
import random
myConfig = {
 "identity": {
 "orgId": "4sqv1g",
 "typeId": "IOT",
 "deviceId": "26102002"
 },
 "auth": {
 "token": "621319106034"
 }
}
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()
for i in range(0,20):
 tablet=["Paracetamol","Aspirine","Dolo 650","Insulin","Vicks"]
 medicinetime=[12.00,1.00,2.00,3.00,5.00,18.00,20.00,7.00]
 name = "ajth"
 medicine=random.choice(tablet)
```

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```python
medicinetime=random.choice(medicinetime)
mydata = {'Patient Name': name, 'Medicine Name': medicine, 'Time': medicinetime}
client.publishEvent("MEDICINE REMINDER", "json", data=mydata, qos=0, onPublish=None)
print("Data published to IBM IOT platform :", mydata)
time.sleep(5)
client.disconnect()
```

FEATURE 4:
TTS SERVICE:

IBM Watson Text to Speech is an API cloud service that enables you to convert written text into natural-sounding audio in a mixture of languages and voices within an existing application or within Watson Assistant. Give your brand a voice and improve customer undergo and appointment by interacting with users in their native language. Increase handiness for userswith different abilities, provide audio options to avoid distracted driving, or automate customer service interactions to get rid of hold times.

The IBM Watson™ Text to Speech service provides APIs that use IBM's speech-synthesis content to synthesize text into natural-sounding speech in a mixed bag of languages, dialects, and voices. The service supports at least one male or female voice, sometimes both, for each language. The audio is streamed back to the client with minimal delay.For speech synthesis, theservice supports a synchronous HTTP Representational State Transfer (REST) interface and a WebSocket interface. Both port support plain text and SSML input. SSML is an XML-based markup language that provides text notation for speech-synthesis applications. The WebSocket interface also supports the SSML element and word timings.

Benefits:
● Improve user undergo
Help all customers comprehend your message by translating written text to audio.

● Boost contact firmness
Solve customer issues faster by providing key data in their native language.

● Protect your data
Enjoy the protection of IBM's world-class data governance practices.

● Run it anywhere
Support global languages and deploy on-premises or on any cloud.

PLATFORM:
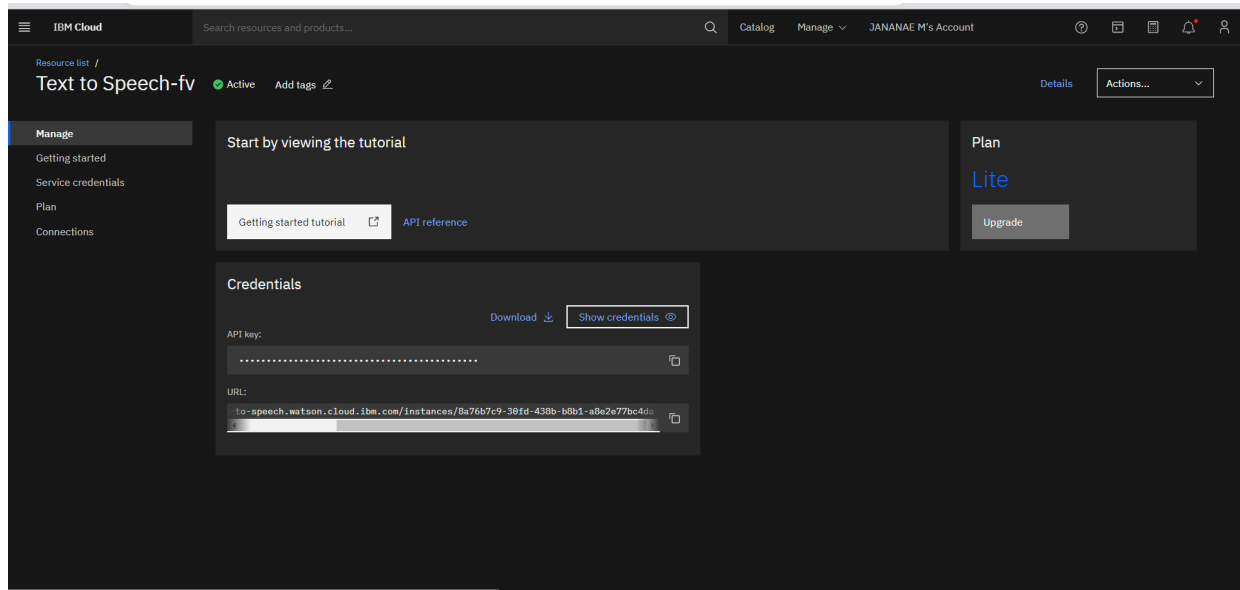
PYTHON SCRIPT:

```
from ibm_watson import TextToSpeechV1
from ibm_cloud_sdk_core.authenticators import IAMAuthenticatorfrom
playsound import playsound
from playsound import playsound

authenticator = IAMAuthenticator('mc6GkVtcmmR8o5UlAk5-jhyvsmieCN8nhJ-
Xc7awmRly')
text_to_speech = TextToSpeechV1(authenticator=authenticator)

text_to_speech.set_service_url('https://api.au-syd.text-to-
speech.watson.cloud.ibm.com/instances/8a76b7c9-30fd-438b-b8b1-a8e2e77bc4da')

with open('Medicine Remainder.wav', 'wb') as audio_file:
    audio_file.write(
        text_to_speech.synthesize(
            'Remainder : It is Time to Take your Medicine',
            voice='en-US_AllisonV3Voice',
            accept='audio/wav'
        ).get_result().content)
playsound('Medicine Remainder.wav')
```

TESTING

TEST CASES:

- Verify whether user is able to access the URL
- Verify if User input is stored in the cloud
- Verify if it reminds the medicine intake to the user
- Verify if it gives voice notice
- Verify whether the patient has taken the medicine or not

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_001	UI	Home Page	Verify whether user is able to access the URL	APP URL	https://node-red-duces-2022-10-24.eu-svd.mybluemix.net/ui/#!0?socketid=o5eKwuGv55 fmKBsqAACR	URL	Able to access the URL	failed to access in mobile	Fail	Wrong Browser selected	NO	101	SARATHI R
LoginPage_TC_002	UI	Home Page	Verify whether user is able to access the URL	APP URL	https://node-red-aiisr-2022-10-26.eu-gb.mybluemix.net/ui/#!0?socketid=mhrxpKeClKo JtXQlvbAABI	URL	Now User able to access the URL	Able to access in mobile	Pass	Able to access in Chrome and Edge	YES		MERCY EUNICE C
LoginPage_TC_003	Functional	Home page	User can enter the data in specified format	APP URL	User has to enter the data in specified format	URL	enter a data in specified format only	specified input is not received	Fail	Specify the User formats	NO	110	JANANAE M
LoginPage_TC_004	Functional	Home page	User can enter the data in any format	APP URL	User can enter the data in specified format	Time(HH:MM); DATE(YYYY-MM-DD);	User can enter the data in specified format now	Input received properly	Pass	Format specified	YES		THIYAGARAJAN M
Cloud_Storage_TC_005	Functional	Cloud	Verify if User input is stored in the cloud	CLOUD	1.User is able to access the URL 2.User has to enter the data and click the SUBMIT button 3.Data to be stored in cloud	MEDICINE NAME: Time(HH:MM): DATE(YYYY-MM-DD):	User inputs has to be stored in cloud	Failed to storing the inputs	Fail	Cloud not connected properly	YES	111	MERCY EUNICE C
Cloud_Storage_TC_006	Functional	Cloud	Verify if User input is stored in the cloud	CLOUD	1.User is able to access the URL 2.User has to enter the data and click the SUBMIT button 3.Data to be stored in cloud	MEDICINE NAME: Time(HH:MM): DATE(YYYY-MM-DD):	User inputs has to be stored in cloud	Inputs are stored in the cloud	Pass	Cloud connected properly	YES		THIYAGARAJAN M
Output_TC_007	Functional	Iot device	Verify if it reminds the medicine intake to the user	IOT device	Comparing the real time and medicine intake time	Real time and medicine intake time	Gives True when both times match	Null	Fail	Check the input	YES	113	JANANAE M
Output_TC_007	Functional	Iot device	Verify if it reminds the medicine intake to the user	IOT device	Comparing the real time and medicine intake time	Real time and medicine intake time	Gives True when both times match	TRUE	Fail	verified	Yes		SARATHI R
TTS_TC_008	Functional	Iot device	Verify if it gives voice notifications	IOT device and TTS	When True it gives a voice notifications	Voice notifications	Voice notifications	Voice notifications service didn't work	Fail	In program, commands are as object instead of string	NO	121	MERCY EUNICE C
TTS_TC_009	Functional	Iot device	Verify if it gives voice notifications	IOT device and TTS	When True it gives a voice notifications	Voice notifications	Voice notifications	Voice notifications arrived	Pass	New string functions were added	YES		JANANAE M
ACK_TC_010	Functional	URL	Verify whether the patient has taken the medicine or not	IOT device	The TAKEN button has been included	The status of the medicine intake	The User clicks the TAKEN button to show that medicine has been taken	Button is unfunctional	Fail	Error occurs due to failure of call and connect function of the 'taken " button'	NO	132	THIYAGARAJAN M
ACK_TC_011	Functional	URL	Verify whether the patient has taken the medicine or not	Iot device	The TAKEN button has been included	The status of the medicine intake	The User clicks the TAKEN button to show that medicine has been taken	The Taken status is updated in the cloud	Pass	The status of the medicine intake is updated in the cloud	Yes		SARATHI R

USER ACCEPTANCE TESTING:

Defect Analysis:

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	8	4	2	1	15
Duplicate	2	0	3	0	5
External	3	1	0	1	5
Fixed	9	2	4	10	25
Not Reproduced	0	0	0	0	0
Skipped	0	0	2	1	3
Won't Fix	0	2	1	1	4
Totals	22	9	12	14	57

Test Case Analysis:

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

RESULTS

PERFORMANCE METRICS:

			NFT - Risk					
S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Volume Changes	Risk Score	Justification
1	Personal Assistance For Seniors who are Self-Reliant	Existing	Low	Moderate	No Changes	Causes delay in runtime	>10 to 30%	ORANGE	As we have seen the changes, it adds the setup time

			NFT - Detailed				
			S.No	Project Overview	NFT Test approach	Assumptions/Dependencies/ Risks	Approvals/SignOff
			1	Personal Assistance For Seniors who are Self-Reliant	LOAD	Requirment of Advanced versions in Software Improved Speed Testing	SignOff

			End Of Test				
S.No	Project Overview	NFT Test approach	NFR - Met	Test Outcome	GO/NO-GO decision	Recommendations	Identified Defects (Detected/Closed/Open)	Approvals/SignOff
1	Providing Assistance to Seniors by developing a Software application to remind their medicine intake time	LOAD	MET	Able to Support in Other Platforms	GO	To have advanced versions in browsers	Closed	Approval

ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- It is user friendly for elders.

- It can be accessed through an url link.

- The user can set the reminder anywhere anytime through the app url.

- The user medicine name and time are stored in cloud with reference id.

- The user gets notified with the voice command to take the medicine at therequested time.

- This makes the elders more sovereign.

- All the data is stored securely in the cloudant DB and can be viewed anytime.

- There is authentic Security and Privacy all the time.

DISADVANTAGES:

- The user has to manually enter the data in requested form for each day.

- It requires internet connectivity all the time.

- The user cannot access the cloud storage only the Admin can access.

- Regular updates on medicine data should be given.

CONCLUSION

Thus the project **Personal Assistance for Senors who are Self-Reliant** hasadvantage

for Seniors to remind them to take their medicines at the right time.

It includes **TTS Service** ,an AI tool from IBM which notifies the user to take medicine.In

 technical aspect , it is structured with many platforms like **IoT, NODE RED,**

CLOUDANT DB, WATSON ASSISTANT. These applied science are helpful in makingthe

world a better place to cherish and live.

FUTURE SCOPE

The future scope of this project is to deploy on various platforms. This canalso be added with special features to assist the Seniors in their daily life. Its future is dependent on the emerging applied science and the needs.Many hardware have been introduced in order to ease the intake ofmedicine in the life of Senior Citizens.These devices will notify the user about the medicine intake as well as poop out the respective pills at respective time.The growth of these efficient hardware devices is till in progress and will tend to be the future assistants for the elderly.

APPENDIX

Python Script:

To receive receive data from node-red by using IBM Watson IoT platform

```
import json
import wiotp.sdk.device
import time
import random
myConfig = {
 "identity": {
 "orgId": "4sqv1g",
 "typeId": "IOT",
 "deviceId": "26102002"
 },
 "auth": {
 "token": "621319106034"
 }
}
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()
for i in range(0,20):
 tablet=["Paracetamol","Aspirine","Dolo 650","Insulin","Vicks"]
 medicinetime=[12.00,1.00,2.00,3.00,5.00,18.00,20.00,7.00]
 name = "ajth"
 medicine=random.choice(tablet)
 medicinetime=random.choice(medicinetime)
 mydata = {'Patient Name': name, 'Medicine Name': medicine, 'Time': medicinetime}
 client.publishEvent("MEDICINE REMINDER", "json", data=mydata, qos=0, onPublish=None)
 print("Data published to IBM IOT platform :", mydata)
 time.sleep(5)
client.disconnect()
```

Gitgub Link:
IBM-EPBL/**IBM-Project-2935-1658487067**

PROJECT DEMO LINK:

https://youtu.be/UOemYySZQV0