

PERSONAL ASSISTANCE FOR SENIORS WHO ARE SELF - RELIANT

TEAM ID : PNT2022TMID07389

Team Members :

Team Leader : SANTHOSH KUMAR P

Team member 1 : RITHIKA G

Team member 2 : MATTA YASWANTH

Team member 3 : NAVEEN

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Chapter - 1

INTRODUCTION

Project overview :

By analyzing the data, an internet of things (IoT) based reminder system has been developed. It is designed to assist the patient who forgets to take medicine. The system consists of an IoT enabled device with mobile application and web application. From both web application and mobile application get the data from user and store it in cloudant DB, those data are stream in IBM watson IoT Platform, get those data which stream in watson IoT platform and the Alarm remainder is done through simulation .

Purpose :

1. Medication reminders serve as a good way to stay on track and uphold an appropriate schedule.
2. It is a strategy for engaging with patients and caregivers to create a complete and accurate medication list.
3. It is designed to assist the patient who forgets to take medicine, patients will no longer have to worry about daily medication.
4. The application will remind when it's time to take medicine.
5. The mobile application is used for keeping the record in medicine details and reminding the schedule of medicine.

Chapter - 2

LITERATURE SURVEY

S.NO	Author	Title	Name of the Journal/ Conference	Volume/ Issue/Year	Merits/ Demerits
1	Constant Companion	A New Personal Assistant for Older Adults	Rev Intell Artif. 2019;33:435–40	23 September 2019	This purpose-built solution is called Constant Companion, a first-of- its-kind personal emergency and companion system that works hands-free with Amazon's Alexa. We invite you to experience how this voice-activated virtual assistant works. It's a revolutionary game changer for the care giving industry and for families who need to monitor and communicate with loved ones that might be more vulnerable.

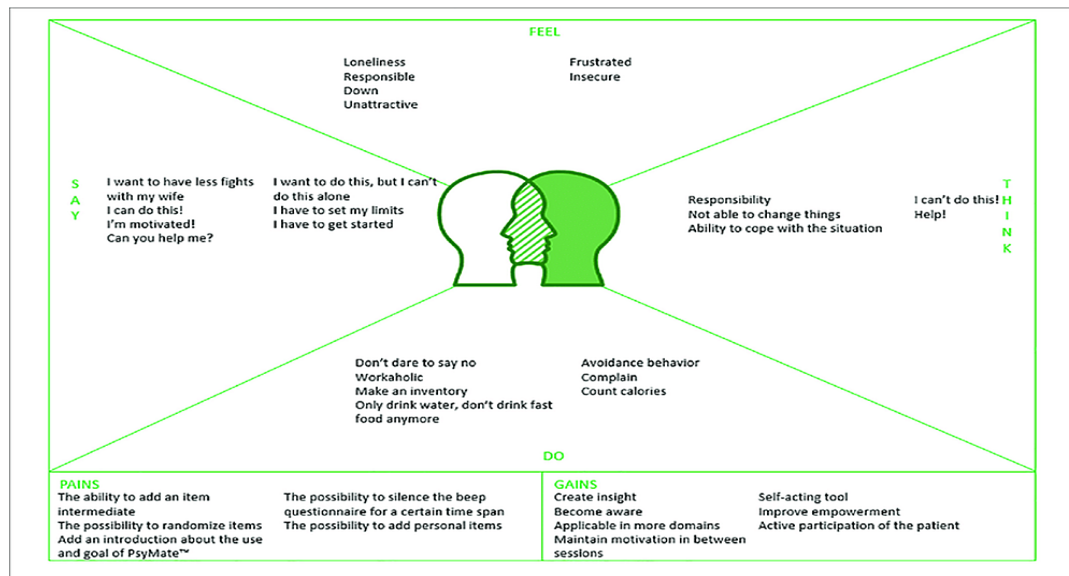
2	ElenaBorelli, GiacomoPaolini,Fran cesco Antoniazzi, Marina Barbiroli	An IoT Solution for Independent Elderly	Published online2019Mar12. doi: 10.3390/s19051258	2019 Mar	a flexible and extensive digital platform for Smart Homes is presented, exploiting the most advanced technologies of the Internet of Things, such as Radio Frequency Identification, wearable electronics, Wireless Sensor Networks, and Artificial Intelligence. Thus, the main novelty of the paper is the system- level description of the platform flexibility allowing the inter operability of different smart devices.
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3	SathishKumar.R, Nivedha.K, Anitha.K, Jayaprakash. D	AN IOT BASED HEALTH CARE SYSTEM FOR ELDERLY PEOPLE	ISSN 2515- 8260	Volume 07, Issue 09, 2020	There is a rising concern in designing options for elders residing in a society with an increased population ageing.
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Chapter - 3

IDEATION & PROPOSED SOLUTION

3.1. Empathy Map Canvas



3.2. Ideation & Brainstorming

Template

Brainstorm & idea prioritization

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.

10 minutes to prepare
1 hour to collaborate
3-10 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

- 1. **Team gathering**
Check in and should participate in the session and not on their phone. (Share network information or pre-work ahead)
- 2. **Set the goal**
Share about the problem you'll be focusing on solving in the brainstorming session.
- 3. **Learn how to use the facilitation tools**
Use the Facilitation Statements to run a happy and productive session.

Open article

Define your problem statement

What problem are you trying to solve? Frame your problem as a **How Might We** statement. This will be the focus of your brainstorm.

5 minutes

Problem:

Old people who are hard get remember and soft, sometimes they don't want to do the 8 exercises.

Key rules of brainstorming

To run a successful and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- One idea at a time.
- If possible, say aloud.

3.3. Proposed Solution

S. No.	Parameter	Description
	Problem Statement (Problem to be solved)	Aged people sometimes forget to take their medicine at the correct time, or might forget which medicine should be taken at which time. This makes it difficult for the doctors/caretakers to monitor the patients properly around the clock.
	Idea / Solution description	To design a medicine reminder system, which is an application built for the user/caretaker, which enables them to set the actual time and medicine. When it is time to take the medicine.
	Novelty / Uniqueness	The proposed model continuously monitors the patient and produces reports on their medicine intake data, while also using this available data to alert the user using Voice Commands, ensuring an efficient reminder method.
	Social Impact / Customer Satisfaction	Encourages proper medicine intake for the elderly patients, thus ensuring them a good and a healthy life.
	Business Model (Revenue Model)	The low cost requirement for designing this proposed model makes it more reliable and user friendly. This makes the model more practical for widespread use in hospitals and homes for efficient medicine intake.
	Scalability of the Solution	With efficient usage of IBM cloud, this proposed model will be able to handle a large number of user data. This makes a huge number of users to easily access and efficiently use

3.4. Problem Solution fit:

PROBLEM SOLUTION FIT				Team ID: PNT2022TMD07389 & Project Title : Personal Assistance for Seniors Who Are Self-Reliant			
Define CS, define CC	1. CUSTOMER SEGMENT(S) <small>Who is your customer?</small> <small>working person/family adults</small> <div>Elderly people</div>	6. CUSTOMER CONSTRAINTS <small>What constraints prevent your customer from taking action on their challenge?</small> <small>time</small> <div>Only can used in emergency time</div>	5. AVAILABLE SOLUTIONS <small>What solutions exist to solve the problem?</small> <small>What other ideas can you think of?</small> <div>Many applications can help to monitor the activities each and</div>	Explore AS, differentiate			
	2. JOBS-TO-BE-DONE/PROBLEMS <small>What are the jobs-to-be-done?</small> <div>Monitor the device at any difficult time</div>	9. PROBLEM ROOT CAUSE <small>What is the real reason that this problem exists?</small> <div>Tracking our daily routine life monitoring for seniors</div>	7. BEHAVIOUR <small>What is the behaviour that you want to change?</small> <small>What is the behaviour that you want to keep?</small> <div>1. Reminders of medical appointments and medication 2. Remote monitoring of vital signs of patients</div>				
Focus on J&P, explore BE, understand RC	3. TRIGGERS <small>What triggers your customer's problem?</small> <div>Hopeless and Treating people social impact</div>	10. YOUR SOLUTION <small>How does your solution work?</small> <small>How does your solution work for your customer?</small> <div>Monitoring crops and form vehicles</div>	8. CHANNELS of BEHAVIOUR <small>How will your customer reach your solution?</small> <small>What is the channel that you want to use?</small> <div>Who can live in age-friendly environments and at the same time take care of their health using technology</div>	Explore CH, differentiate			
4. EMOTIONS: BEFORE/AFTER <small>How do customers feel when they face a problem or a job and afterwards?</small> <small>What is the emotion that you want to change?</small> <div>More fear in emergency situation</div>	<div>Monitoring crops and form vehicles</div>	<div>Elderly living treatment that can track and record critical details for patients in emergencies</div>					
Identify strong TR&EM							

Chapter - 4

REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form in the application.
FR-2	User Confirmation	Confirmation within application.
FR-3	Internet Connectivity	Users should have a stable internet connection to access the app.
FR-4	Data management	All the data are managed & manipulated using the cloud.
FR-5	User Input management	All the user's data are gotten with the help of a text field in the dashboard in the app.
FR-6	Acknowledgement	All the data are stored in the cloud via the app and acknowledgment will be given to the user.

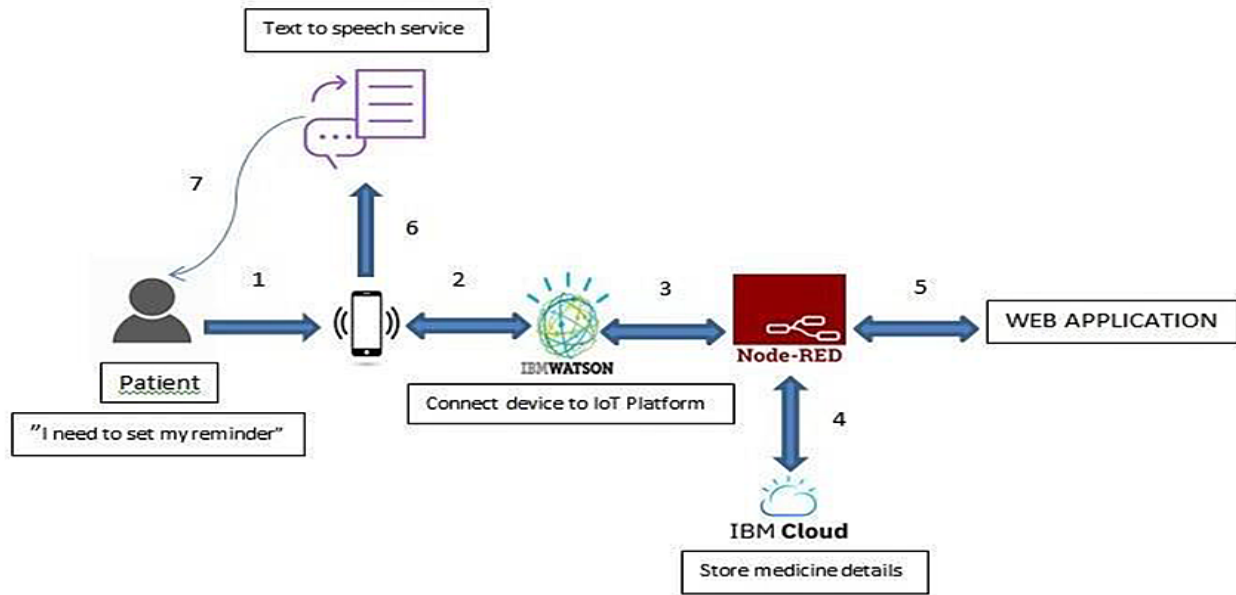
4.2 Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The app is made with a simple UI, so the elders can easily use the app.
NFR-2	Security	All the data are stored in the IBM cloudant DB, so the user's data will be secured.
NFR-3	Reliability	As the data are stored in the IBM cloud, the user's data will be reliable and confidential.
NFR-4	Performance	As the app uses virtual sensors, so the accuracy and performance will be high.
NFR-5	Availability	The data stored in the cloud is available for all the time, So the users can avail the app all the time.
NFR-6	Scalability	Even though the users count increases, the app will be more scalable.

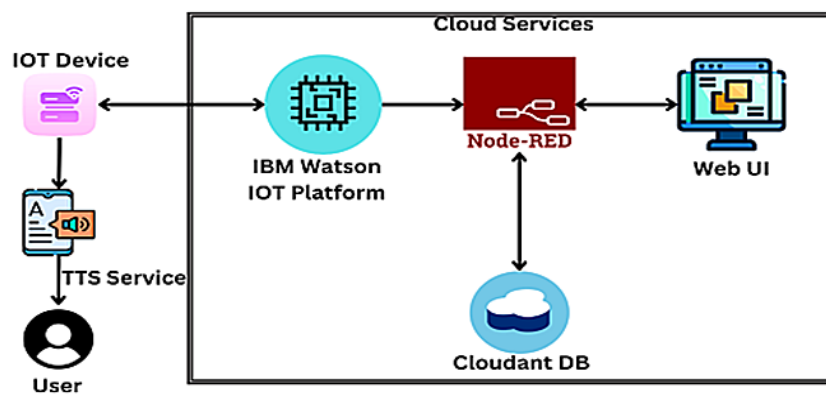
Chapter - 5

PROJECT DESIGN

5.1 Data Flow Diagrams



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 (citizen)	Registration	USN-1	As a user, I can register for the application by confirming OTP and access manually	I can access my account.	High	Sprint-1
Customer (Doctor)	User Requirements	USN-2	As a user, I want to monitor patients heartbeat 24/7.	I can receive Confirmation email & click confirm.	High	Sprint-1
Customer (Care takers)	Confirmations	USN-3	As a user, I can register and confirm through e-mail OTP.	I can register & access the dashboard with Face book Login.	Low	Sprint-2
Customer (Elderly people)	Payment options	USN-4	As a user, I can pay through Cash on Delivery or else with Credit/Debit card.	I can register or pay through login Dashboard.	Medium	Sprint-1
Administrator	Dashboard	USN-5	As a user, I can log into the application by entering the mail and password.	I want to access customer Health and save the Data 24/7.	High	Sprint-1

Chapter - 6

PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story/ Task	Story points	Priority	Team Members
Sprint 1	Set Alarm	USN-1	As a user,I can set an alarm to alerting a medicine throughmedicine remainder system	10	High	Santhosh Kumar
Sprint 1		USN-2	As a user, I can Activateand Deactivate the alarm	10	High	Matta Yashwanth
Sprint 2	Notification	USN-3	As a user once I can the setthe alarm then I gets the notification	10	High	Rithika
Sprint 2		USN-4	As a user, If I requires this system then a notification will be sent into his device.	10	High	Naveen
Sprint 3	Medication Detail	USN-5	As a user, I have multiple medications each day, I can put each pill in the box for thecorresponding day.	10	High	Matta Yashwanth

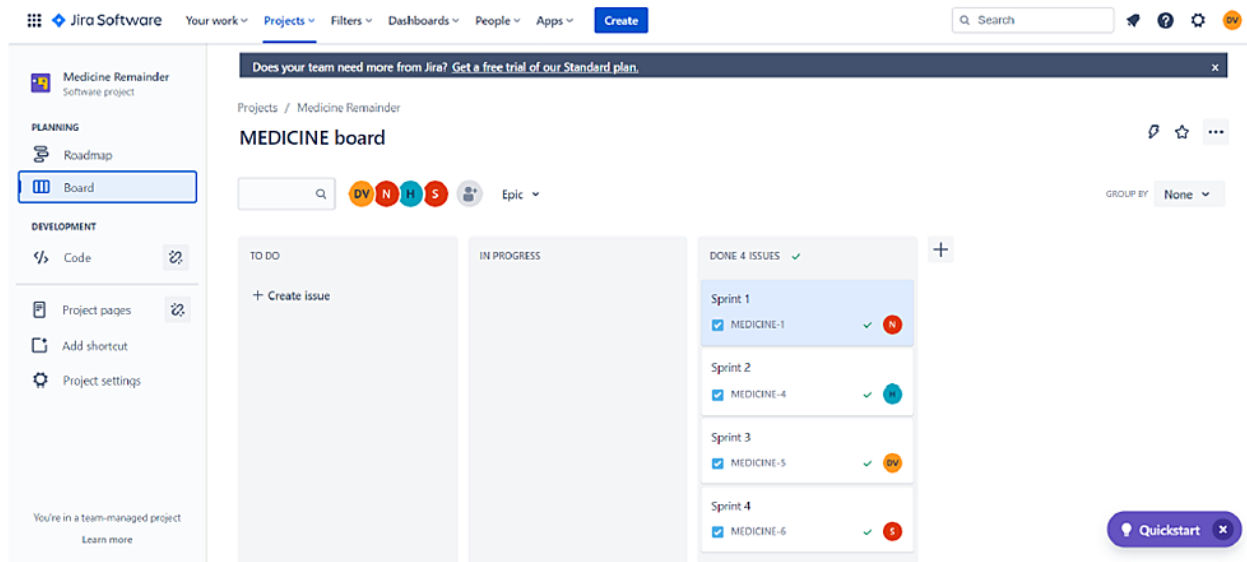
Sprint 3		USN-6	As a user, between setting an alarm and using a pillbox, I'll be able to stay on top of your medications and not miss a dose.	5	low	Naveen, Santhosh Kumar, Rithika
Sprint 3		USN-7	As a user, I can store the name of the medicine with its description	10	High	Santhosh Kumar, Rithika, Matta Yashwanth
Sprint 4	GPS Tracking	USN-8	As a user, they can also help large hospitals and clinics manage their inventory more effectively	5	Low	Naveen, Matta Yashwanth, Rithika
	Sensor	USN-9	As a user, they used for keeping the record in medicine details the reminding the schedule of medicine. We have used the	10	High	Santhosh Kumar, Matta Yashwanth, Naveen

			IoT enabled Arduino device for monitoring the System.			
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6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint StartDate	Sprint EndDate (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint 1	20	8 days	29-10-2022	5-11-2022	20	4-11-2022
Sprint 2	10	8 days	7-11-2022	14-11-2022	10	13-11-2022
Sprint 3	20	8 days	16-11-2022	23-11-2022	20	23-11-2022
Sprint 4	10	8 days	23-11-2022	30-11-2022	10	30-11-2022

6.3 Reports from JIRA



Chapter - 7

CODING & SOLUTIONING

7.1. Feature 1

Node-Red

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.

json code:

```
[{"id":"25e80d5f7eabd726","type":"tab","label":"Flow 6","disabled":false,"info":"","env":[]},{ "id":"5f4d0ada73cc55c1","type":"inject","z":"25e80d5f7eabd726","name":":",
```

```

    "props":[{"p":"payload._id","v":"","vt":"date"},{"p":"topic","vt":"str"}],"repeat":1
    "crontab":"","once":false,"on
    ceDelay":0.1,"topic":"","x":110,"y":60,"wires":[{"9c8adefc6d1779c4"}]},{id:"9c8a
    defc6d1779c4","type":"function","z":"25e80d5f7eabd726","name":"","func":"var d=
    new Date();\nvar utc=d.getTime() + (d.getTimezoneOffset() * 60000);\nvar
    offset=5.5;\nnewDate = new Date(utc + (3600000*offset));\nvar
    n=newDate.toISOString()\nvar date = n.slice(0,10)\nvar time =
    n.slice(11,16)\nnglobal.set('time',time)\nmsg.payload=date+' '+time\nreturn
    msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":180,"y":200,"wire
    s":[{"8f7d76639d5f94dd"}]},{
    "id":"8f7d76639d5f94dd","type":"cloudant
    in","z":"25e80d5f7eabd726","name":"","cloudant":"f42e6b50.00d088","database":"m
    edicinedata","service":"nodered-fsysl-2022--cloudant-1667109493143-
    42012","search":"_id_","design":"","index":"","x":330,"y":60,"wires":[{"2fb55de1616
    98808"}]},{id:"2fb55de161
    698808","type":"switch","z":"25e80d5f7eabd726","name":"","property":"payload","p
    ropertyType":"msg","rules":[{"
    "t":"null"},{"t":"else"}],"checkall":"true","repair":false,"outputs":2,"x":410,"y":180,"
    wires":[{"f95865b1d9e1b711"}
    ,["551edaf7fb9ec70d"]]},{"id":"551edaf7fb9ec70d","type":"function","z":"25e80d5f7
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    msg.payload={\"medicine\":msg.payload.medicine}\nnglobal.set(\"medicine\",msg.pay
    load.medicine);\nreturn
    msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":620,"y":180,"wire
    s":[{"1e02d85ab74e642c","10
    2f967d15928f52"}]},{id:"1e02d85ab74e642c","type":"debug","z":"25e80d5f7eabd
    726","name":"","active":true,"t
    osidebar":true,"console":false,"tostatus":false,"complete":"payload","targetType":"ms
    g","statusVal":"","statusType":
    "auto","x":930,"y":160,"wires":[]},{id:"102f967d15928f52","type":"ibmiot
    out","z":"25e80d5f7eabd726","authentication":"apiKey","apiKey":"25ef956a0233318
    9","outputType":"cmd","devic
    eId":"b11m3edeviceid","deviceType":"b11m3edevicetype","eventCommandType":"c
    ommand","format":"String","data":"medicinedata","qos":0,"name":"IBM
    IoT","service":"registered","x":940,"y":220,"wires":[]},{id:"6da02a687e43c04b","t
  
```

```

type":"function","z":"25e80d5f
7eabd726","name":"Function to store the data in Cloudant","func":"var
d=msg.payload.date\nvar t=msg.payload.time\nmsg.payload={\n  \"medicine\":
msg.payload.medicine,\n  \"_id\":d+\" \" +t\n}\nreturn
msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":250,"y":340,"wires":[["7b0e41295a320ce5","d7
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out","z":"25e80d5f7eabd726","name":"","cloudant":"f42e6b50.00d088","database":"
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549c2fa8a3","type":"function"
,"z":"25e80d5f7eabd726","name":"Function to clear the
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\n  \"medicine\":\"\",
\n  \"time\":\" \"\n}\nreturn
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"id":"a7adca4476f505c9","type":"delay","z":"25e80d5f7eabd726","name":"","pauseT
ype":"delay","timeout":"14","t
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ndomUnits":"seconds","drop":false,"allowrate":false,"outputs":1,"x":180,"y":460,"wi
res":[["66b58e943da6e910"]]}
,{"id":"75bc24f14acaa667","type":"debug","z":"25e80d5f7eabd726","name":"","activ
e":true,"tosidebar":true,"conso
le":false,"tostatus":false,"complete":"payload","targetType":"msg","statusVal":"","stat
usType":"auto","x":690,"y":42
0,"wires":[]},{"id":"66b58e943da6e910","type":"ui_form","z":"25e80d5f7eabd726","
name":"","label":"","group":"b
82da486.9fc8d8","order":0,"width":0,"height":0,"options":[{"label":"Medicine","valu
e":"medicine","type":"text","r
equired":true,"rows":null},{"label":"Date","value":"date","type":"date","required":tru
e,"rows":null},{"label":"Time"
,"value":"time","type":"time","required":true,"rows":null}], "formValue":{"medicine":
"", "date":"","time":""}, "paylo
ad":"","submit":"submit","cancel":"cancel","topic":"topic","topicType":"msg","splitL

```

```

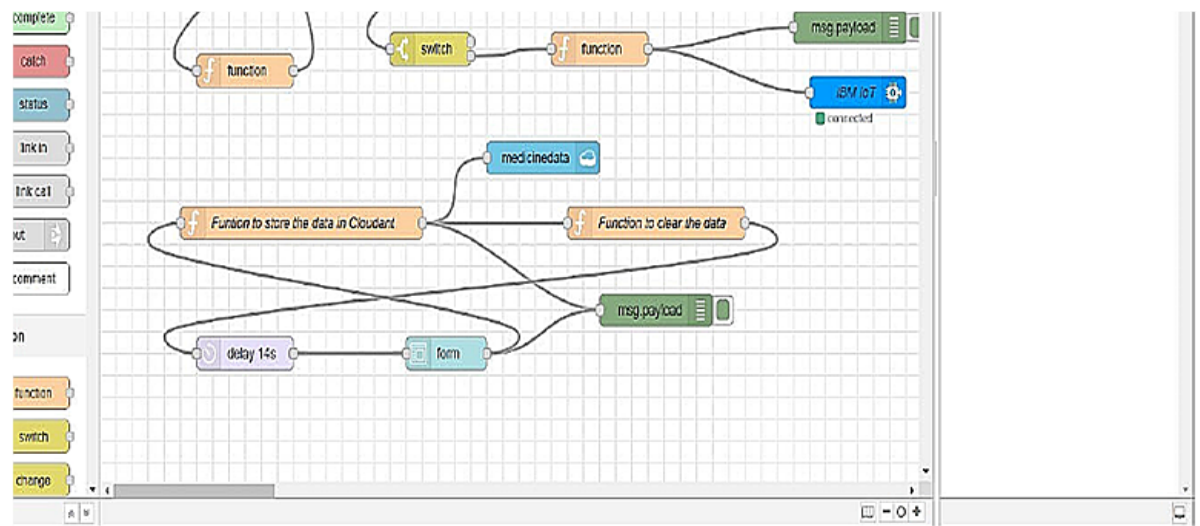
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in","z":"25e80d5f7eabd726","name":"","url":"/medicineData","method":"get","uploa
d":false,"swaggerDoc":"","x":1
50,"y":580,"wires":[["ae52acd6228730ed"]]},{"id":"2a94d9f317579855","type":"http
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y":560,"wires":[]},{"id":"ae52
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yload={\"medicine\":global.ge t(\"medicine\")}\nreturn
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,"y":640,"wires":[["cff980ca5
7cbe343"]]},{"id":"cff980ca57cbe343","type":"function","z":"25e80d5f7eabd726","n
ame":"","func":"var d=msg.payload.date\nvar
t=msg.payload.time\n\nmsg.payload={\n  \"medicine\": msg.payload.medicine,\n
\"_id\":d+\" \"+t\n}\nreturn
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42012","payonly":true,"operation":"insert","x":630,"y":720,"wires":[]},{"id":"8de27
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z":"25e80d5f7eabd726","name":"","active":true,"tosidebar":true,"console":false,"tost
atus":false,"complete":false,"
statusVal":"","statusType":"auto","x":550,"y":820,"wires":[]},{"id":"f95865b1d9e1b7
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80d5f7eabd726","name":"","func":"msg.payload={}\n\nglobal.set(\"medicine\",msg.pa

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```

yload);\nreturn
msg;","outputs":1,"noerr":0,"initialize":"","finalize":"","libs":[],"x":620,"y":80,"wires
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d38f62c6ee14bluemix.cloudantnosqldb.appdomain.cloud","name":"My Cloudant
account"},{"id":"25ef956a02333189","type":"ibmiot","name":"api","keepalive":"60",
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```



7.2. Feature 2

MIT App inventor

MIT App Inventor is an online platform designed to teach computational thinking concepts through development of mobile applications. Students create applications by dragging and dropping components into a design

The screenshot displays the MIT App Inventor web interface. At the top, a navigation bar contains links for 'Projects', 'Overview', 'Build', 'Settings', 'Help', 'My Projects', 'View Trash', 'Guide', 'Report an Issue', 'English', and 'eharshavkalya@gmail.com'. Below this, a green header bar features the 'Medicine_Reminder' title and buttons for 'Screen2', 'Add Screen...', 'Restore Screens', 'Publish to Gallery', 'Designer', and 'Blocks'. The main workspace is divided into three sections: 'Blocks' on the left, 'Viewer' in the center, and 'Media' at the bottom. The 'Blocks' palette lists various components under categories like Control, Logic, Math, Text, Lists, Extensions, Colors, Variables, and Procedures. The 'Viewer' area shows a visual programming logic with several event-driven blocks: a 'when Button2 Click' block leading to 'open another screen' (screenName: Screen3); a 'when Clock1 Timer' block leading to 'set Web1 Uri to' (http://node-red-xzfb-2022-11-04.au-syd.mybluem...); and a 'when Button1 Click' block leading to a complex sequence of 'set Web1 Uri to', 'join', 'Text', 'join', '&date=', 'Text', 'join', '&time=', 'Text', 'call Web1 Get', 'call NoAlert ShowAlert notice', and 'Saved'. The 'Media' section at the bottom includes a 'Show Warnings' button. The interface is designed for creating mobile applications using a visual programming paradigm.

↔

⏪

medicinedata

⋮

Document ID

⌵

Options

{ } JSON

📖

🔔

All Documents

+

Query

Permissions

Changes

Design Documents

+

Table

Metadata

{ } JSON

📄

Create Document

	_id	medicine
<input type="checkbox"/>	18/11/2022 10:47 AM	ishaq
<input type="checkbox"/>	2022-11-13 17:13	acetaminophen
<input type="checkbox"/>	2022-11-13 17:33	Paracetamol
<input type="checkbox"/>	2022-11-13 18:32	Insulin
<input type="checkbox"/>	2022-11-13 19:40	Glipizide
<input type="checkbox"/>	2022-11-16 23:09	Metformin
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Chapter - 8

TESTING

8.1 User Acceptance Testing

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the project-personal assistance for seniors who are self reliant at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved.

Resoluti on	Severi ty 1	Severi ty 2	Severi ty 3	Severi ty 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

3. 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	2	0	0	2
Client Application	2	0	0	2
Security	1	0	0	1

Chapter - 9

RESULTS

9.1 Performance Metrics

NFT - Risk Assessment							
Scope/feature	Functional Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Volume Changes	Risk Score	Justification
New	Low	Moderate	Moderate	Low	>10 to 30%	GREEN	As we had made this project in
							MERN stack With industry Mentor Approval
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	Load	Server Crash/ Developer team/ Server Down	Approved			
End Of Test Report							
FT Test approach	NFR - Met	Test Outcome	GO/NO-GO decision	Recommendations	Identified Defects (Detected/Closed/Open)	Approvals/SignOff	
Stress	Performance	CPU -01	GO	High Performance Barefly Cloud server	Closed	Approved	

Chapter - 10

ADVANTAGES & DISADVANTAGES

Advantages :

1. **Remote monitoring:** Real-time remote monitoring via connected IoT devices and smart alerts can diagnose illnesses, treat diseases and save lives in case of a medical emergency.
2. **Prevention:** Smart sensors analyze health conditions, lifestyle choices and the environment and recommend preventative measures, which will reduce the occurrence of diseases and acute states.
3. **Reduction of healthcare costs:** IoT reduces costly visits to doctors and hospital admissions and makes testing more affordable.
4. **Medical data accessibility:** Accessibility of electronic medical records allow patients to receive quality care and help healthcare providers make the right medical decisions and prevent complications.
5. **Improved treatment management:** IoT devices help track the

administration of drugs and the response to the treatment and reduce medical error.

6. **Improved healthcare management:** Using IoT devices, healthcare authorities can get valuable information about equipment and staff

Disadvantages:

1. **Security and privacy:** Security and privacy remain a major concern deterring users from using IoT technology for medical purposes, as health monitoring solution have the potential to be breached or hacked. The leak of sensitive information about the patient's health and location and meddling with sensor data can have grave consequences, which would counter the benefits of IoT.
2. **Risk of failure:** Failure or bugs in the hardware or even power failure can impact the performance of sensors and connected equipment placing healthcare operations at risk. In addition, skipping a scheduled software update may be even more hazardous than skipping a doctor checkup.
3. **Integration:** There's no consensus regarding IoT protocols and standards, so devices produced by different manufacturers may not work well together.

The lack of uniformity prevents full-scale integration of IoT, therefore limiting its potential effectiveness.

4. **Cost:** While IoT promises to reduce the cost of healthcare in the long-term, the cost of its implementation in hospitals and staff training is quite high.

Chapter - 11

Conclusion

It is an advanced digital era, we can also opt for expert agencies without thinking much about the distance. For example, suppose we stay in the European region. In that case, we can look for a healthcare app development company in the USA or a healthcare mobile app development firm in other states.

IoT is already practicing most of these technologies to assist healthcare in developing, and this development will proceed. Promptly than later, healthcare and the Internet of Things will become intertwined, ultimately modifying how we approach our healthcare.

Chapter - 12

FUTURE SCOPE

IoT has a lot of potentials and it's not only in healthcare. In future challenges of IoT in healthcare, many companies are working on new ways to solve the challenges with the help of this technology to help our medical world.

It can reach every patient from all over the world and connect doctors with patients. There is no denying that IoT has already made a huge impact and is only set to grow further.

It is a matter of time before the future use of IoT in healthcare medical industry will be run mostly by IoT technology and will be treating patients in less time and low cost of treatment.

Chapter - 13

APPENDIX

Source Code :

```
#include <WiFi.h> //library for wifi
```

```

#include <PubSubClient.h>//library for MQTT
#include <LiquidCrystal_I2C.h>
#include "DHT.h"// Library for dht11
#define DHTPIN 15    // what pin we're connected to
#define DHTTYPE DHT11 // define type of sensor DHT 11
#define LED 2

DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin
and typr of dht connected

void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);

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

#define ORG "64yf7x"//IBM ORGANITION ID
#define DEVICE_TYPE "b11m3edevicetype"//Device type mentioned in
ibm watson IOT Platform
#define DEVICE_ID "b11m3edeviceid"//Device ID mentioned in ibm
watson IOT
Platform
#define TOKEN "-&EMtr7l-v-Gz2G))e"
//Token String data3=""; int buzz= 13;

//----- Customise the above values ----- char server[] = ORG
".messaging.internetofthings.ibmcloud.com";// Server Name char
publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of

```

```
event perform and format in which data to be send char subscribetopic[]  
= "iot-2/cmd/command/fmt/String";// cmd REPRESENT command  
type AND COMMAND IS TEST OF FORMAT STRING
```

```
char authMethod[] = "use-token-auth";// authentication  
method char token[] = TOKEN;
```

```
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client  
id
```

```
LiquidCrystal_I2C lcd(0x27,32,2);
```

```
//-----
```

```
WiFiClient wifiClient; // creating the instance for wificlient
```

```
PubSubClient client(server, 1883, callback ,wifiClient); //calling the  
predefined client id by passing parameter like server id,portand  
wificredential
```

```
void setup()// configureing the ESP32
```

```
{
```

```
    Serial.begin(115200);
```

```
    dht.begin();
```

```
    pinMode(buzz, OUTPUT);
```

```
    pinMode(LED,OUTPUT);
```

```
    delay(10);
```

```
    Serial.println();
```

```
    wificonnect();
```

```
    mqttconnect();  
}
```

```
void loop()// Recursive Function
```

```
{  
    if (!client.loop()) {
```

```
        mqttcon  
        nect();  
    }
```

```
}
```

```
/*.....retrieving to Cloud.....*/
```

```
void PublishData(float temp, float humid) {
```

```
    mqttconnect();//function call for connecting to ibm
```

```
} void
```

```
mqttconnec
```

```
t() {
```

```
    if (!client.connected()) {
```

```
        Serial.print("Reconnecting client to ");
```

```
        Serial.println(server);
```

```
        while (!client.connect(clientId, authMethod, token)) {
```

```
            Serial.print(".");
```

```

        delay(500);
    }

    initManagedDevice();

    Serial.println();
} } void wificonnect() //function defination
for wificonnect {

    Serial.println();

    Serial.print("Connecting to ");

    WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to
    establish the connection

    while (WiFi.status() != WL_CONNECTED) {
        delay(500);

        Serial.print(".");
    }

    Serial.println("");

    Serial.println("WiFi connected");

    Serial.println("IP address: ");

    Serial.println(WiFi.localIP());
}

void initManagedDevice() {

    if (client.subscribe(subscribetopic)) {

        Serial.println((subscribetopic));

        Serial.println("subscribe to cmd OK");

    } else {

```



```
    Serial.println("subscribe to cmd FAILED");  
  }  
}
```

```
void callback(char* subscribetopic, byte* payload, unsigned int  
payloadLength) {
```

```
    Serial.print("callback invoked for topic: ");  
    Serial.println(subscribetopic);  
    for (int i = 13; i < payloadLength-2; i++) {  
        //Serial.print((char)payload[i]);  
        data3 += (char)payload[i];  
    }
```

```
    Serial.println("Medicine Name: "+ data3);  
    if(data3 != "")  
    {  
        lcd.init();
```

```
        lcd.print(data3);  
        digitalWrite(LED,HIGH);  
        tone(buzz, 100, 1000);  
        delay(2000);  
        digitalWrite(LED,LOW);
```

```
noTone(buzz);  
delay(1000);  
  
}  
else  
{  
digitalWrite(LED,LOW);  
  
}  
dat  
a3  
="  
";  
}
```

GitHub & Project Demo Link :

GitHub Link:

<https://github.com/IBM-EPBL/IBM-Project-28074-1660106411>

Demo Link:

-

https://drive.google.com/file/d/1dZC2d8iObY9prQejtr_uD702gTy5BBL3/view?usp=share_link

