PERSONAL ASSISTANCE FOR SENIORS WHO ARE SELF-RELIANT

A PROJECT REPORT

Submitted By

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In partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

SELVAM COLLEGE OF TECHNOLOGY, NAMAKKAL

A Personal Assistance For Seniors Who Are Self-Reliant

1.INTRODUCTION :

1.1PROJECT OVERVIEW :

The development of the Internet of Things (IoT) has made it possible to realize the dream of a personal assistant for independent elders. They can readily determine their medication/drugs based on their comfort level, including the dosage they should be taking. For additional processing, this data is transmitted back to the cloud. The elderly or patients who are essentially forgetting their usual schedule for taking the medication or drugs that they must take. Therefore, our project is more beneficial for them and all at-risk individuals in order to prevent this kind of activity.

1.2 PURPOSE :

We are all so busy with our daily lives that we forget to take our medicines on time, which can have several ill effects on our health. The Medication Reminder device described here helps in making a simple reminder that allows you to set an alert for the medicines that you need to take. The device gives a voice message at the selected time intervals. The available time intervals are matched with standard dosing times such as 4, 6, 8, 12, 24 and 48 hours for your convenience. The patients can customize the time and name of the medicine accordingly . A perfect time-interval makes this device a better choice amongst other standard reminders.

2. LITERATURE SURVEY :

2.1 EXISTING PROBLEM :

1. Elderly Health Assistance Application using mobile phones:

The goal of their research is to create a mobile phone application that will assist older individuals and their family members in keeping an eye on and monitoring the health of the elderly. This app contains features to track the whereabouts of the elderly, remind them to take their medications, remind them of their doctor appointments, record their medical history, and connect them to a family member or personal doctor in an emergency. 94% of respondents agreed that the application is extremely beneficial and has the potential to function well

based on the experimental findings of the application to the participant and the test with the questionnaire on the potential users. A capability that uses GPS and Google Map API to locate an older mobile phone is also available. When an elderly person gets lost and cannot remember how to go back, they can use this tool. The user's location can be used in this application's feature to find nearby hospitals and pharmacies using a Google Map. To increase elder health information, particularly on harmful conditions, this application may be combined with hardware such as heat sensors, blood pressure sensors, glucose sensors, etc. in the future.

2.Health monitoring and voice assistance featured autonomous elderly care serviced robot:

In this study, a mobile service and assistant robot that is being created for the world's and our nation's burgeoning older population will aid the user in meeting everyday demands and supporting living alone. The mobile robot will be able to respond to voice instructions and act as the user's personal assistant thanks to voice communication assisted by artificial intelligence. Additionally, because to its autonomous mobility, the robot will go to the places that the user specifies and will stand close to them. By offering interface assistance with the screen that will be mounted on the robot, it aims to promote human-robot engagement.

Evarobot is a platform for moving robots. With Evarobot, a mobile robot platform powered by the ROS (Robot Operating System), users may experience autonomous movement by having the robot follow them around their homes. Additionally, speech responses are supplied to the user in response to voice commands that are recognised by the Google Speech API. Yaver and the user might communicate through an interface and voice control. Yaver has been given the ability to carry out the user's positioning requests. The Google speech recognition API was used to correctly recognise speeches and carry out supplied commands. With the aid of task management, Yaver was able to carry out the directives and transition into the new work standby state. Yaver uses a fuzzy-based health anomaly detection system to

examine the wristband's health data. It aims to give the user physical support with the aid of a robotic arm that will be included in later experiments.

3.Monitoring and detecting outliners for Elder’s Life activities in smart home:

In order to enable an old person remain safely in his or her home for a longer period of time without visiting hospitals, they have thought up a technique for monitoring and diagnosing abnormal behaviour of health data collected from a smart home. We go about it by employing statistical methods. A network of wireless sensors is built in an intelligent environment where the proposed technique is used. They make use of actual sensor data that was taken from a smart home where a senior citizen lived alone for a year. The findings of the experiment demonstrate the effectiveness of the statistical test Modified Thompson tau in identifying both typical and aberrant behavioural patterns. The statistical test known as the modified Thompson tau is used. Data that was retrieved from a wireless sensor network was intended to be examined for potential outliers and anomalies. Finding some extremely long stays by older people in a specific location is the goal of identifying these outliers (unusual in normal days). In order to prevent the elderly person from developing chronic diseases, the care system can use the study's data to anticipate and track the elder's health status over time.

4.Personal Health Assistance for Elderly People via Smartwatch Based Motion Analysis:

A novel method for a personal health aide for senior citizens using smartwatches is given. An app for the smartwatch that uses an artificial neural net (ANN) analyses the wearer's movement patterns. The ANN highlights daily actions and events that are pertinent to health (EDLs, ADL). The app's system architecture, the method for gathering data, the choice and creation of appropriate data models, and the benefits of ANNs over other identification engines are all explained. The features of the acknowledged ADLs will be used to continually calculate the wearer's wellness,

ensuring a self-determined lifestyle in the familiar environment until very old age. In the event of a determined emergency, these smartwatches enable the establishment of an autonomous speech link to clarify the situation immediately. The wearer's actual steps taken and/or heart rate and pulse are the only things that modern smartwatches can directly measure. Condensed sensor data and appropriate comparisons with data gathered, as well as lessons learned from the past, must be used to draw all other conclusions on the wearer of a smartwatch's welfare and potential health risks. On current commercial smartwatches, EDL and ADL identification based on an ANN provides the essential input for determining the wearer's wellbeing.

The most modern wristwatch operating systems will only now be able to enable smartwatches' durable background operations, which are necessary for the continuous, reliable detection of the EDL and the ADLs outlined (OSs). Even in circumstances of a change in smartwatch models or even a significant OS upgrade, the sensitivity of the particular model will demand a significant retraining.

2.2 REFERENCES :

1.Antihypertensive therapy dosage calculator;Begić E, Mandžuka M, Begić Z, Dobrača A, Hasanbegovic E,2017.

2.Developing the Medication Reminder Mobile Application “Seeb” - Sakineh Saghaeiannejad-Isfahani, Asghar Ehteshami, 2017

3.A medicine reminder application using android-Shivani Sharma, ABES Institute of Technology, Ghaziabad, Uttar Pradesh. Katyayni Tyagi,ABES Institute of Technology, Ghaziabad, Uttar Pradesh.Pooja Shishodia,ABES Institute of Technology, Ghaziabad, Uttar Pradesh,2018

4.Elderly long term care in Indonesia,"-Presentation an Elderly Care, Bappenas, Yogyakarta, Indonesia, 2019.

5.Elderly Care: A Study on Community Care Services in Sleman, DIY, Indonesia, Jean-Francois Grosset , 2020

6.Personal Assistance Device for Independent Senior Citizens/ Patients - A. Yuvaraj K, B. N. Gunasekhar Reddy, C. V. Saritha, 2020

2.3 PROBLEM STATEMENT DEFINITION :

We use gestures in this project to browse images acquired through radiology. Gestures are hand motions used in non-verbal communication. The primary means of interaction between humans and computers nowadays are keyboards and pointing devices like mouse. However, doctors and nurses in intensive care units (ICUs) frequently transfer infections through the use of computer keyboards and mice. Humans are adept at deciphering both body and sign language. This is conceivable because of how vision and synaptic contacts developed throughout the course of brain development.

During a surgical procedure, it is necessary to examine patient specific image data obtained from computed tomography and magnetic resonance imaging

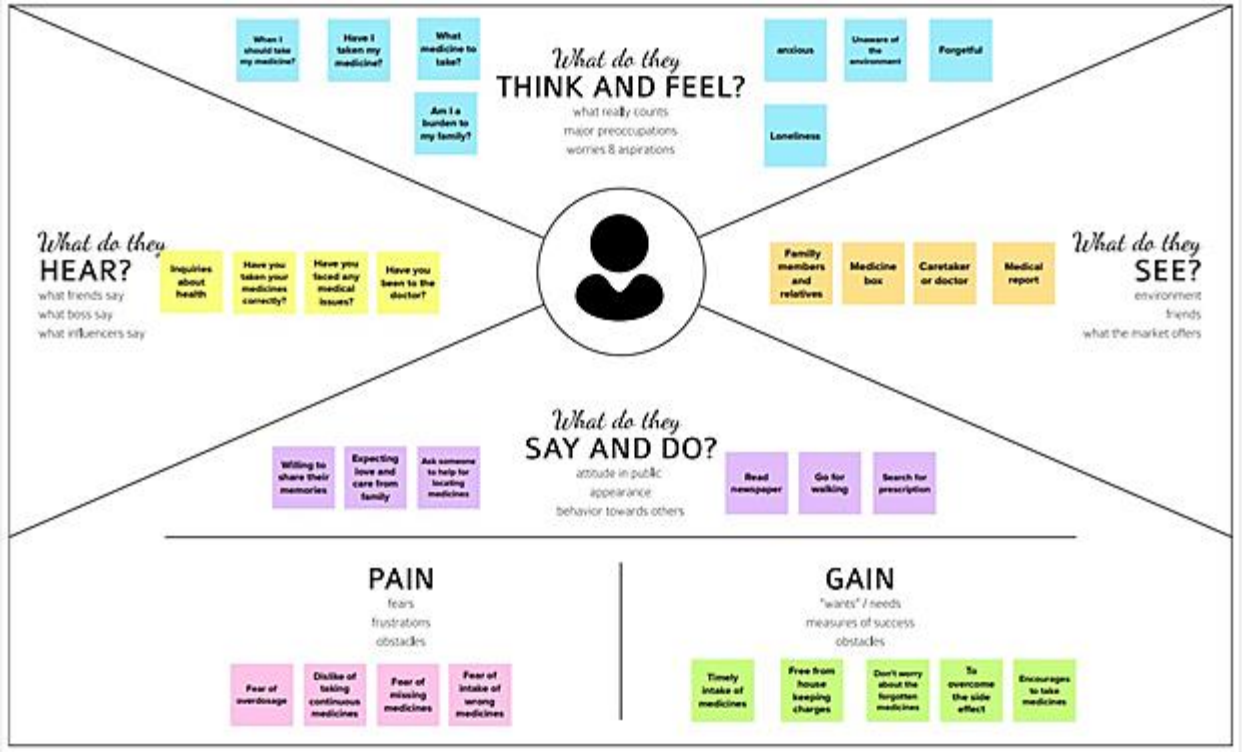
scans using doctor-computer interface that allows medical imaging manipulation while allowing doctors' hands to stay sterile. Traditional approaches to human-computer interaction, however, fall short of offering a productive way to manipulate medical images while supporting users' attention. Gesture-based interaction is a new style of communication made possible by the development of artificial intelligence. Gesture-Based interaction provides an efficient, intuitive, and accurate. Without compromising the quality of the work, gesture-based interaction offers an effective, intuitive, accurate, and safe mode of interaction.

It has been suggested that surgeons can communicate with medical image viewers while performing surgery using a vision-based hand gesture recognition system. This system analyses the hand motions of the real-time user and converts them into the proper commands that are subsequently used to manipulate radiological images. The suggested model is first trained using pictures of various hand gestures, such as hands holding the numerals 1, 2, 3, and 4. A builtin web camera is used to record real-time photos, which are then matched with training images of hand movements and the corresponding activities. According to the hand gesture directions, it is permitted to resize, blur, and flip the radiological photographs. In order to maintain sterility and ensure patient safety in the operating room, the vision-based hand gesture system does away with direct physical touch between the surgeon and the computer interfaces.

3. IDEATION & PROPOSED SOLUTION:

3.1. EMPATHY MAP CANVAS:

Empathy Map Canvas: An empathy map is a simple, easy-to-digest visual that captures knowledge about a user’s behaviours and attitudes. It is a useful tool to 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 challenge.



3.2. IDEATION & BRAINSTORMING:

3.3. PROPOSED SOLUTION:

S NO	PARAMETER	DESCRIPTION
1.	Problem Statement	To design a medicine reminder system based on IoT technology.
2.	Idea / Solution description	An app is built for the user (caretaker) which enables him/her to set the desired time to take the medicine.

3.	Novelty / Uniqueness	The details of the medicines 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.
4.	Social Impact / Customer Satisfaction	This project would help the patients life much more easier and help in taking care of their health properly .
5.	Business Model (Revenue	It can be sold as an open-source service to
	Model)	all the hospitals as non-profitable work.
6.	Scalability of the Solution	The model could also be extended to other real-world classifying problems for patients to track the appointments.

PROBLEM SOLUTION FIT:

Project Title: Personal Assistance for Seniors who are Self-Reliant - Solution Fit Template Project Design Phase-I Team ID: PNT2022TMID43813

4.REQUIREMENT ANALYSIS:

a. FUNCTIONAL REQUIREMENT:

FR NO	FUNCTIONAL REQUIREMENT	SUB REQUIREMENT (stroy/sub-task)
FR 1	User Registration	Register via Email.
FR 2	Authorization	Get authorize notification once get completed with your registration.

FR 3	Data Management	All data will be kept in the cloud and accessible when needed.
FR 4	Acknowledge	Stored data are inside the cloud platform using app and user can get acknowledgement about it.
FR 5	Input Data	Database storing for healthcare data about patient.
FR- 6	Output Data	Alert / Warning to take medicine.

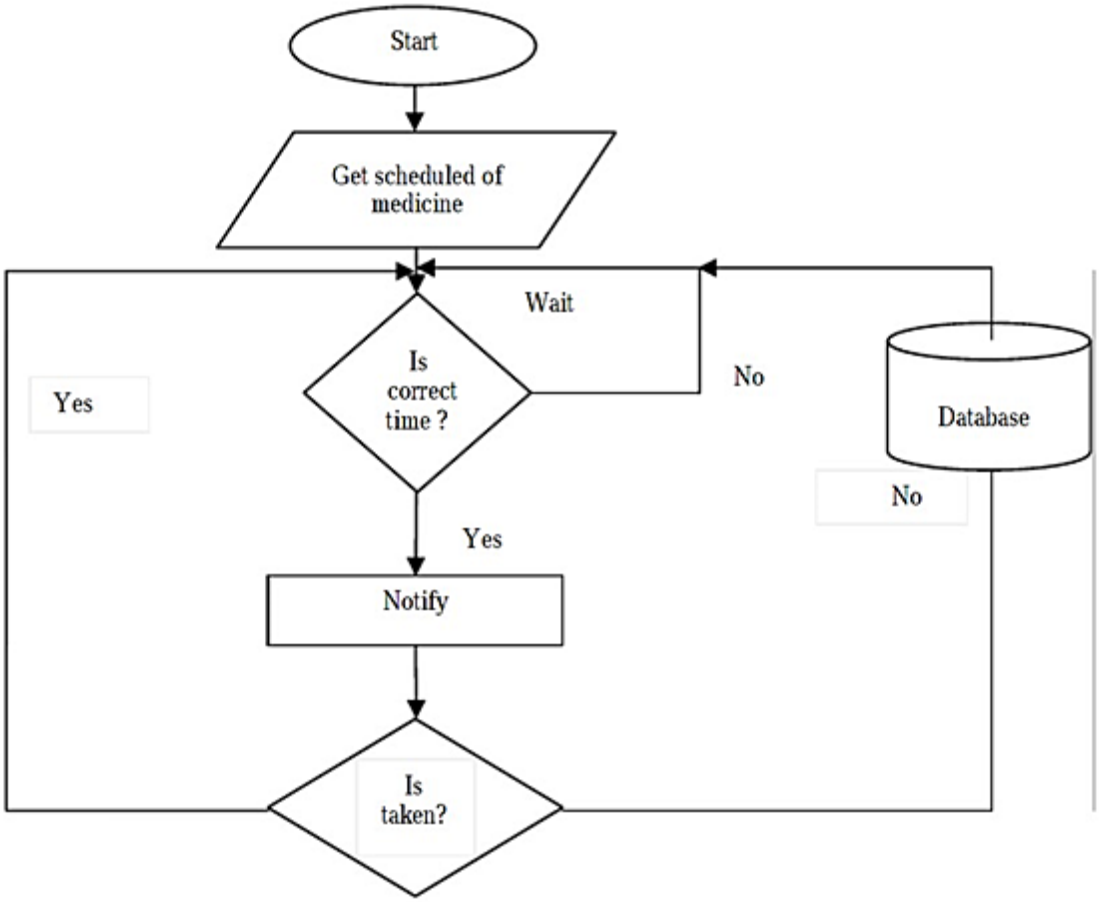
b. **NON-FUNCTIONAL REQUIREMENTS:**

FR NO.	**NON FUNCTIONAL REQUIREMENT**	**DESCRIPTION**
NFR 1	Usability	Application is user-friendly, making it simple for caregivers to understand the patient's status.
NFR 2	Security	Patient data are stored in the secured cloud based platform.
NFR 3	Reliability	All data will be kept in the cloud and accessible when needed.

NFR 4	Performance	The application fulfils the iot principles, resulting in high performance and patient rest to take their medication on schedule.
NFR 5	Availability	As the data stored in the cloud it can be available and monitored at any time.
NFR 6	Scalability	It capacity is very scalable, making it easy to use as well as accommodating more users.

5.PROJECT DESIGN:

5.1. DATA FLOW DIAGRAM:



5.2. SOLUTION AND TECHNICAL ARCHITECTURE:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

i. An app is built for the user (caretaker) which enables him to set the desired time and medicine which those details will be stored in the IBM Cloudant

DB.

ii. If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform by voice alarm.

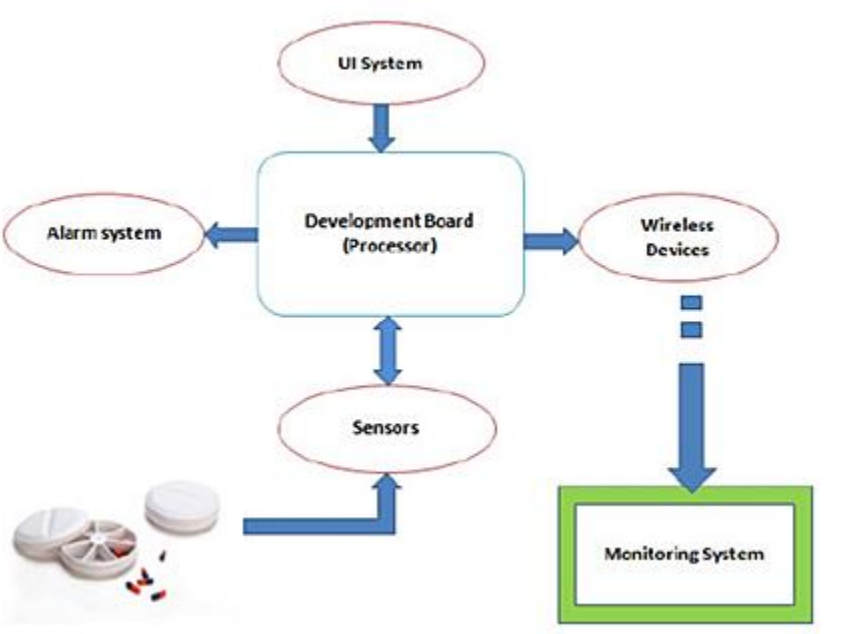


Figure 1: Architecture of Personal monitoring system for medicine

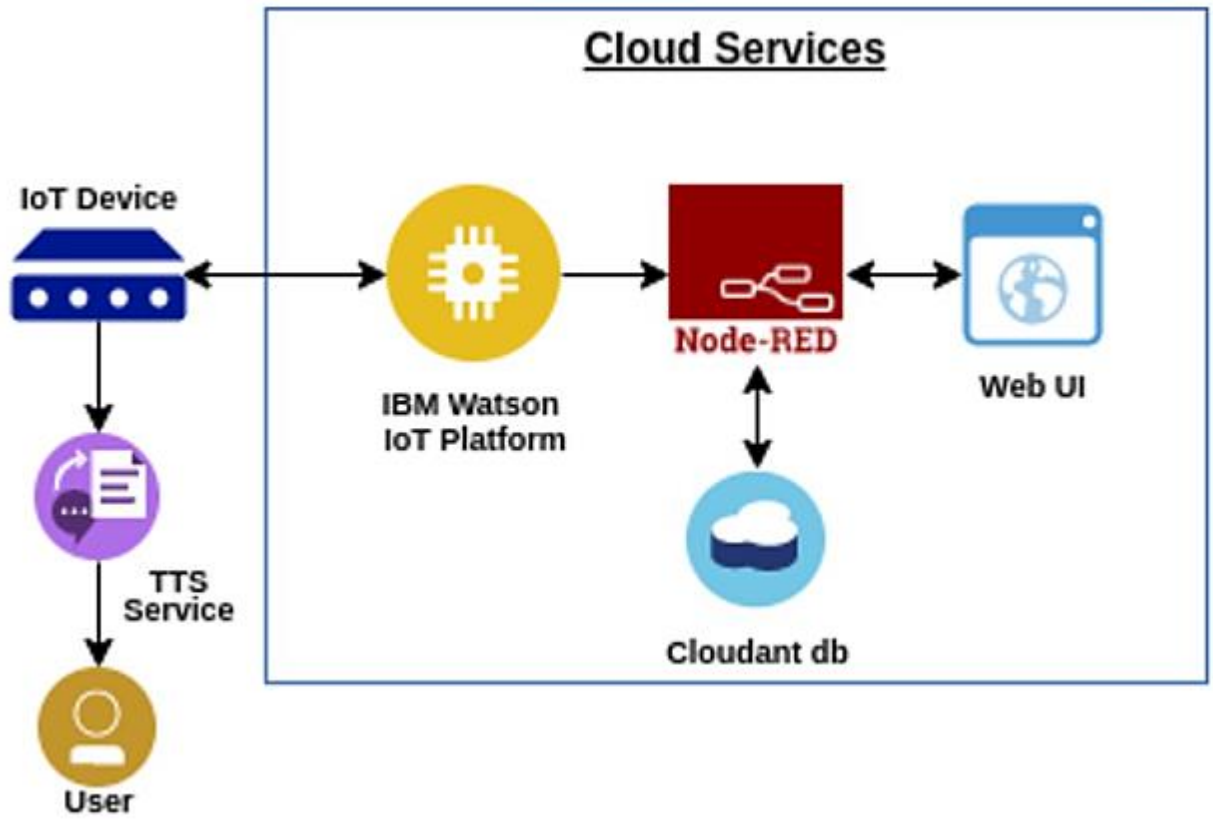


Figure 2: Technical Architecture of the voice patient diary application

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 for alerting to take medicine through Medicine remainder system.	10	High	Jayavarshini V
Sprint 1		USN-2	As a user, I can Activate and Deactivate the alarm	10	High	Jayavarshini V
Sprint 2	Voice Assistant	USN-3	As a user once I set the alarm it will alert us voice assistant.	10	High	Guru Prakash G
Sprint 2		USN-4	It will tell us the time and name of the medicine once the time has set.	10	High	Pavithra M

Sprint 3	Cloudant DB	USN-6	For storing the details of medicine reminder for which Cloud DB is used	5	low	Pavithra M
Sprint 3		USN-7	As a user, I can store the name of the medicine with timing.	10	High	Samson Jayakumar k
Sprint 4	User Friendly Application	USN-8	Our app will be companion for the senior citizen to consumes the medicines on time.	5	Low	Guru Prakash G
		USN-9	As a user, one needs to set the medicine and time as per the instruction given by the user. The voice assistant will help to take medicines on time for senior citizens.	10	High	

6.2. **Sprint Delivery Schedule:**

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	8 Days	29 Oct 2022	5 Oct 2022	20	4 Oct 2022
Sprint-2	10	8 Days	07 Nov 2022	14 Nov 2022	10	13 Nov 2022
Sprint-3	20	8 Days	16 Nov 2022	23 Nov 2022	20	23 Nov 2022
Sprint-4	10	8 Days	23 Nov 2022	30 Nov 2022	10	30 Nov 2022

6.3. **Reports From JIRA:**

PAFSWASR-1:

[PAFSWASR-1] ***Login page*** *Created: 13/Nov/22 Updated: 13/Nov/22 Resolved: 13/Nov/22*

Status:	Done
Project:	Personal assistance for seniors wo are self-reliant
Components:	HTML,CSS,Javascript
Affects versions:	5.0

Fix versions:	5.0		
Type:	Task	**Priority:**	Medium
Reporter:	Jayavarshini V	**Assignee:**	Guru Prakash G
Resolution:	Done	**Votes:**	0
Labels:	None		
Remaining Estimate:	3 hours		
Time Spent:	21 hours		
Original estimate:	1 days		
Rank:	1		
Sprint:	Sprint 1		

PAFSWASR-2:

[PAFSWASR-2] create a node red dashboard Created: 13/Nov/22 Updated: 13/Nov/22 Resolved: 13/Nov/22			
Status:	Done		
Project:	Personal assistance for seniors wo are self-reliant		
Type:	Task	**Priority:**	Medium

Reporter:	Jayavarshini V	**Assignee:**	Pavithra M
Resolution:	Done	**Votes:**	0
Labels:	None		
Remaining Estimate:	5 hours		
Time Spent:	28 hours		
Original estimate:	2 days		
Rank:	2		

Sprint:	Sprint 2

PAFSWASR-3:

[PAFSWASR-3] Create an app in MIT App Inventor for entering the details

Created: 18/Nov/22 Updated: 18/Nov/22

Status:	Done		
Project:	Personal assistance for seniors who are self-reliant		
Components:	MIT App Inventor		
Affects versions:	None		
Fix versions:	None		
Type:	Task	**Priority:**	Medium
Reporter:	Pavithra.M	**Assignee:**	Samson Jayakumar K
Resolution:	Done	**Votes:**	0

Labels:	None
Remainin g Estimate:	4 hours
Time Spent:	15 hours
Origina l estimate:	1 day
Rank:	2
Sprint:	Sprint-3

PAFSWASR-4:

[PAFSWASR-4] Simulation of device for medicine remainder
Created: 18/Nov/22
Updated: 18/Nov/22

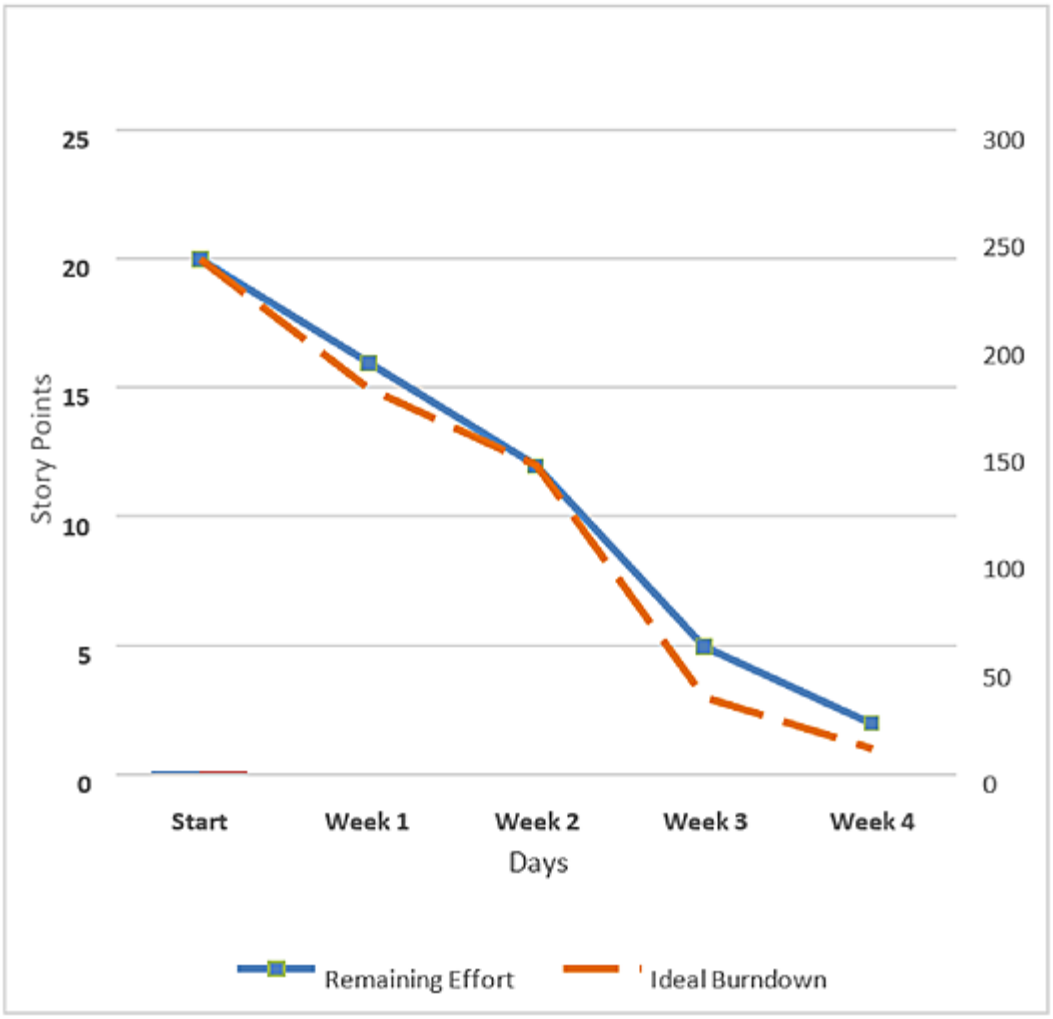
Status:	Done
Project:	Personal assistance for seniors wo are self-reliant
Components:	Wokwi Simulator

Affects versions:	None		
Fix versions:	None		
Type:	Task	**Priority:**	Medium
Reporter:	Jayavarshini V	**Assignee:**	Guru Prakash G
Resolution:	Done	**Votes:**	0
Labels:	None		

Remainin g Estimate:	2 hours
Time Spent:	20 hours
Origina l estimate:	22 hours
Attachments:	Sprint-4.pdf

Rank:	1
Sprint:	Sprint-4

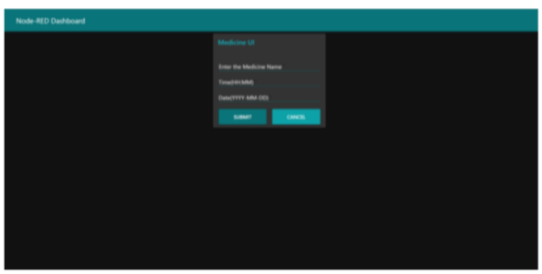
Burn Down Chart:



7.CODING & SOLUTIONING:

7.1. Feature 1

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



7.2. Feature 2

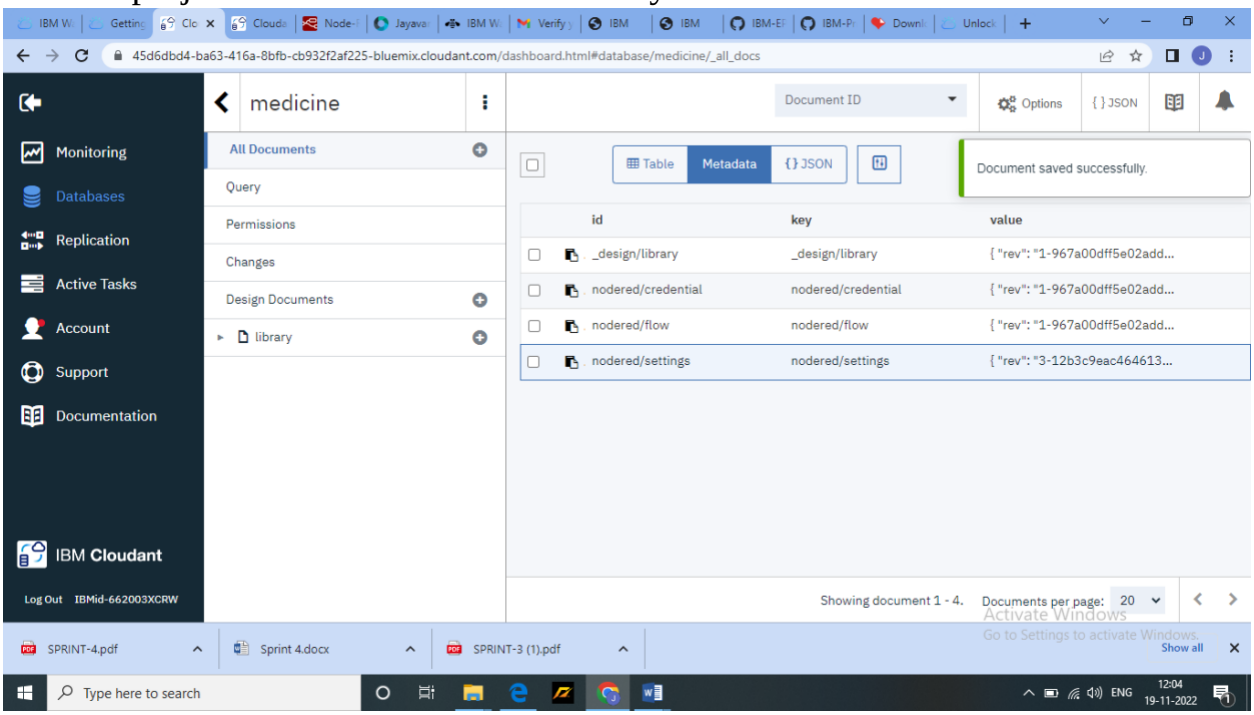
The application also has the feature of uploading medicine names in the cloud.

7.3. Feature 3

The application also has the feature of registering username in the database and forgot password feature.

7.4. Feature 4

The project includes a cloud database system.



8. TESTING:

8.1 USER ACCEPTANCE TESTING

1.Purpose of Document

The main Purpose of UAT is to validate end to end business flow. It does not focus on cosmetic errors, spelling mistakes or system testing. User Acceptance Testing is carried out in a separate testing environment with production-like data setup. It is kind of black box testing where two or more end-users will be involved.

UAT is performed by :

1. Client
2. End users

2.Defect Analysis

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	4	3	2	1	10
Duplicate	1	0	3	0	4
External	2	2	1	1	6
Fixed	4	3	5	19	31
Not Reproduced	1	0	1	1	3
Skipped	0	0	1	1	2

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

2.Test Case Analysis:

Section	Total Cases	Not Tested	Fail	Pass
Login Page	5	0	0	5
Node Red Dashboard	32	0	0	32
IBM Watson IOT platform	2	0	0	2
MIT App Inventor	3	0	0	3

9. RESULTS:

9.1.PERFORMANCE METRICS

These metrics are used to track and measure the effectiveness and profitability of various projects. Each stage of the project is tracked and measured against the goals that the project set out to achieve. The data compiled from the metrics can be used to plan future projects and gives insight on how to make projects more efficient.

10.ADVANTAGES AND DISADVANTAGES:

The following are some benefits of using personal assistance for seniors who are self-Reliant : (i) Simple to use: The technique permits the user to understand the application easily and use efficiently. (ii) Quick response: Helps the patient in knowing about the medicine time and gives a remainder in a very right time .(iii) Efficient: Receive reminders to take your medications you can get timely reminders for taking your medicine regularly.(iv) Monitoring: Establish personal objectives to enhance your health. You can monitor and evaluate your health state over time with MIRS., (v)Accessible: Healthcare data storage you can store your lab results and vital signs online for future reference. And access them from anywhere.(vi)Security: Provides Security for your health information your personal health information is protected by SSL encryption, and will not be redistributed or resold.(vii)Independent : It helps one to be independent from caretakers .

The following are some disadvantage of using personal assistance for seniors who are self-Reliant :(i)Reschedule: Does not encourage patients who cannot attend or who no longer want to go to cancel or reschedule. (ii)Connectivity: A few patients may not get the reminder in time because of connectivity. (iii)Records: It's possible that patients' mobile numbers were entered improperly in their patient records or that those patients' phone numbers changed while the trial was ongoing.(iv)Internet: Internet connectivity is needed .(v)Many receivers may contact the outpatient services, claiming they were unaware of the appointments listed in the reminder message due to the occurrence of inaccurate mobile phone numbers. This value might have been bigger, but the beneficiaries might not have done anything. Another problem with SMS is the high frequency with which customers switch their mobile phone and/or mobile telephone service.

11.CONCLUSION:

Current project work has been undertaken to implement a framework based on web innovation which could discuss through the internet for patient health checking and for providing assistance to elderly people due to the continually growing usage of the internet at this time. This paper describes the design and functionality of a low-power Atmega328 microcontroller-based, ESP8266-based, IOT-based completely personal assistance device. In this illustration, an accelerometer is used to track the patient's movement while a heartbeat sensor module provides the patient's pulse to the microcontroller, which then sends this information to the everything

communicate producer to display the values over an ESP8266 Wi-Fi conference. During emergency conditions, a warning may be posted online.

12.FUTURE SCOPES:

In the current project we have implemented the project that can medication reminder device described here helps in making a simple reminder that allows you to set an alert for the medicines that you need to take. The device gives a voice message at the selected time intervals.
In the future, we hope to improve the model with the characteristics listed below. If the model indicates that it's time for your tablet, we will mark it and tell that "I haven my tablet" and it will get noted daily from that we can grab a monthly review regarding in taken of the tablets.
By doing this, we can get a helper to check on whether our treatment was administered properly at the time.

13.APPENDIX:

Source Code

Medicine.py

```
import time import sys
import ibmiotf.device
import ibmiotf.api import
ibmiotf.application import
random

# Provide your IBM Watson Device
Credentials organization = "861bbm"
deviceType = "NodeMCU" deviceId = "12345"
authMethod = "use-token-auth" authToken =
4kwp0w(gd-jBjW_S@1


# Initialize GPIO def myCommandCallback(cmd):
print("Command received: %s" % cmd.data['command'])
name = cmd.data['command'] print("Take medicine :" +
name)
```

```
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()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10
times deviceCli.connect()

while True:
   # Get Sensor Data from DHT11
   deviceCli.commandCallback = myCommandCallback #
   Disconnect the device and application from the cloud
   deviceCli.disconnect()
```

Flow


```
[{"id":"2ae7837034fb271f","type":"tab","label":"Flow
1","disabled":false,"info":"","env":[]},{"id":"184f964d.dd02ea","type":"tab","label":"Medicine","disabled
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