Personal Assistance for Seniors Who Are Self-Reliant

REPORT

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Team Size : 4

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1. INTRODUCTION

1.1 Project Overview

In day-to-day life, most people need to take medicines which were not there in the past couple of years and the reason behind this is diseases are increasing in a large amount. So sooner or later many people encounter these diseases. Some diseases are temporary while many are permanent life-threatening diseases. Life-threatening diseases get mixed with the human body in such a way that they can't leave the body ever and they increase in rapid time. The life span of humans became less because of such diseases and to overcome or to live a better life we need to take medicines regularly and also in the large amount. We need to be on the advice of a doctor who tells us to take desired pills in the desired way so that patients face problems like forgetting pills to take at right time and when the Doctor changes the prescription of medicine patients have to remember the new schedule of medicine. This problem of forgetting to take pills at right time, taking the wrong medicines and accidentally taking expired medicine causes health issues for the patient and this leads to suffering from unhealthy life. Our project is to make a software-based helping system, which connects the caretaker of the patient with the patient, to send timely SMS alerts to them at the specified time and with the specified note set by the caretaker. The patient can be duly monitored by the caretaker and hence his/her health can be monitored better with this software

1.2 Purpose

When this proposed solution is set to work, the problem can be reduced, as the caretaker on the other side, set the note of the medicine to be taken and the time at which the patient must be alerted with the note. This software can alert the patient with clear information and hence the patient will not be forgotten to take medicine and will take the medicine at right time. This solution can ultimately help the patients and caretaker to preset the schedule and

he/she also need not remember the time to notify their patients, hence everything goes smoothly.

2. LITERATURE SURVEY

2.1. Existing problem

Elderly people let slip the medications at the correct time and the existing solutions for this problem is setting reminders or using pill boxes, calendars, Personal Assistance. Though the solutions give reminders, the voice commands or assistance given by this system is more efficient.

2.2 References

1. Obaidulla-Al-Mahmud1, Md.Kausar Khan, Rajdeep Roy, and Fakir and Mashuque Alamgir (2020) 'IoT based Smart Health Care Medical Box for Elderly People', International Conference for Emerging Technology, DOI:10.1109/INCET49848.2020.9153994

2. Balakrishnan, L., 2021, May. An Internet of Things (IoT) Based Intelligent Framework for Healthcare–A Survey. In 2021 3rd International Conference on Signal Processing and Communication (ICPSC) (pp. 243-251). IEEE.

3. Alshehri, F. and Muhammad, G., 2020. A comprehensive survey of the Internet of Things (IoT) and AI-based smart healthcare. IEEE Access, 9, pp.3660-3678.

4. Kumar, M.P. and Nelakuditi, U.R., 2019, December. IoT and I2C protocol based Mhealth medication assistive system for elderly

people. In 2019 IEEE 16th India Council International Conference (INDICON) (pp. 1-4). IEEE.
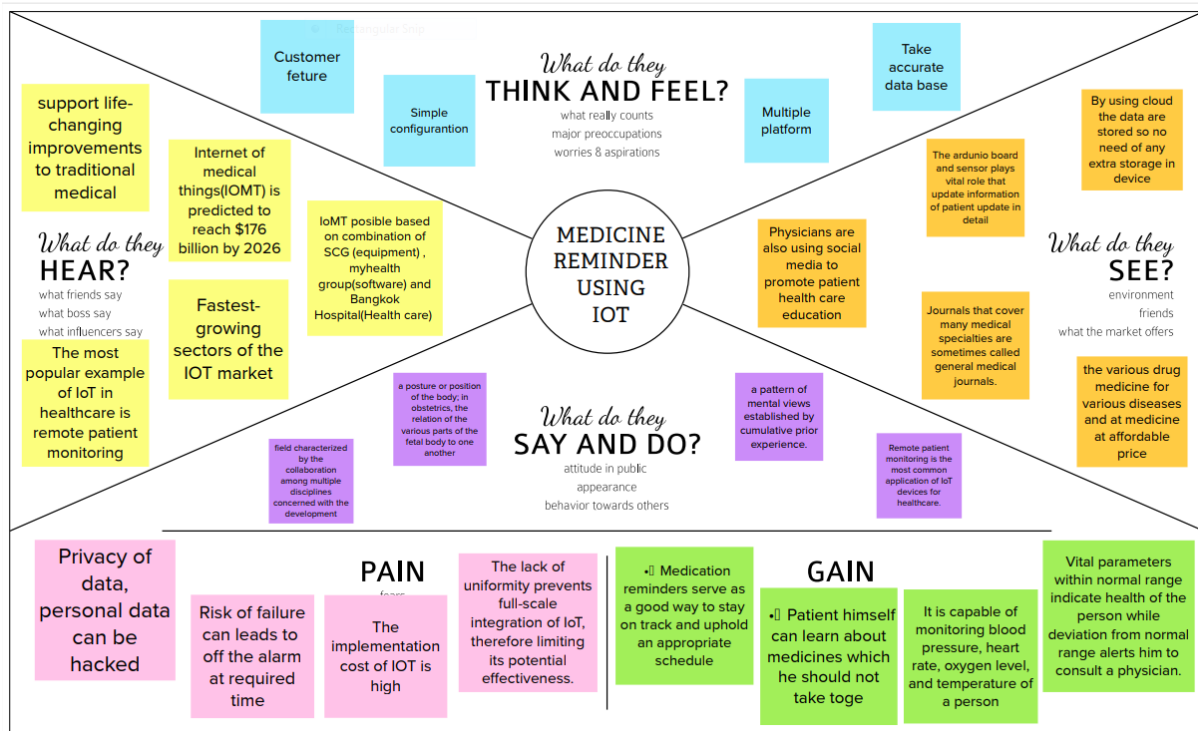
5. Ranjana, P. and Alexander, E., 2018, December. Health alert and medicine remainder using internet of things. In 2018 IEEE International Conference on Computational Intelligence and Computing Research (ICCIC) (pp. 1-4). IEEE.

2.3 Problem Statement

Creating a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love. Our main aim is to make a Smart medicine box for those users who regularly take medicines and the prescription of their medicine is very long as it is hard to remember for patients and their caregivers.

3. IDEATION AND PROPOSED SOLUTIONS

3.1 Empathy Map

Empathy map for "Medicine Reminder Using IoT"

What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations

- Customer feture
- Simple configurantion
- Multiple platform
- Take accurate data base

What do they HEAR?
what friends say
what boss say
what influencers say

- support life-changing improvements to traditional medical
- Internet of medical things(IOMT) is predicted to reach $176 billion by 2026
- IoMT posible based on combination of SCG (equipment), myhealth group(software) and Bangkok Hospital(Health care)
- Fastest-growing sectors of the IOT market
- The most popular example of IoT in healthcare is remote patient monitoring

MEDICINE REMINDER USING IOT

- Physicians are also using social media to promote patient health care education
- The ardunio board and sensor plays vital role that update information of patient update in detail
- Journals that cover many medical specialties are sometimes called general medical journals.

What do they SEE?
environment
friends
what the market offers

- By using cloud the data are stored so no need of any extra storage in device
- the various drug medicine for various diseases and at medicine at affordable price

What do they SAY AND DO?
attitude in public
appearance
behavior towards others

- a posture or position of the body; in obstetrics, the relation of the various parts of the fetal body to one another
- field characterized by the collaboration among multiple disciplines concerned with the development
- a pattern of mental views established by cumulative prior experience.
- Remote patient monitoring is the most common application of IoT devices for healthcare.

PAIN fears

- Privacy of data, personal data can be hacked
- Risk of failure can leads to off the alarm at required time
- The implementation cost of IOT is high
- The lack of uniformity prevents full-scale integration of IoT, therefore limiting its potential effectiveness.

GAIN

- Medication reminders serve as a good way to stay on track and uphold an appropriate schedule
- Patient himself can learn about medicines which he should not take toge
- It is capable of monitoring blood pressure, heart rate, oxygen level, and temperature of a person
- Vital parameters within normal range indicate health of the person while deviation from normal range alerts him to consult a physician.

3.2 Ideation & Brainstorming

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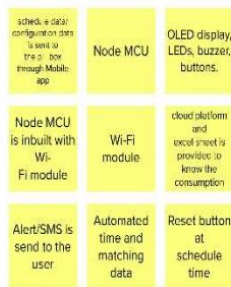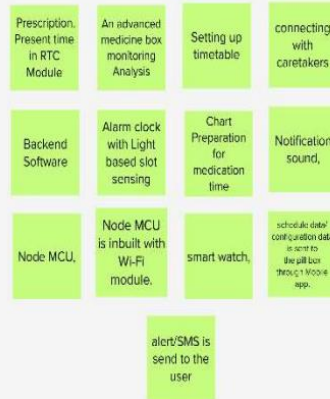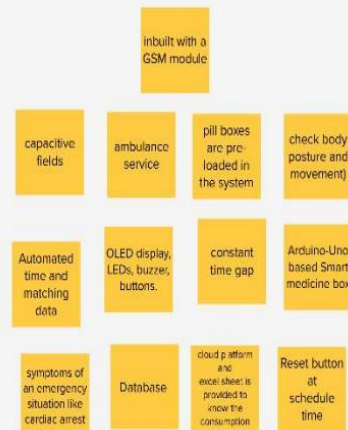
3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to besolved)	Now a days elders were facing many health issues, to overcome that they must take their regular scheduled medicine routine. By nature, as they become elder, they were forgetting to take their medicine on time. To overcome this problem medicine remainder app is created for the remembrance of medicine.
2.	Idea / Solution description	To overcome this problem, a web application is created with detailed information about the medicine and when the patient wants to take (time) the medicine. It can be notified by an alarm and vibration.
3.	Novelty / Uniqueness	Uniqueness in this project is, both the deaf and dump people can also be notified by the means of vibration so that they can also be benefited.
4.	Social Impact / Customer Satisfaction	All design decisions may be assessed and reevaluated using these personas, keeping the user and their perspective in mind
5.	Business Model (Revenue Model)	Through our web application the revenue can be made in the form of pop-up advertisements,overlay ads from third party services.
6.	Scalability of the Solution	Large number of people can be supplied with the wearable devices to ensure their safety andthey can easily set their medication time in the web application

3.4 Problem Solution Fit

1. CUSTOMER SEGMENT(S) — C

Citizens who are in need of external support to take care of themselves for medical assistance .

6. CUSTOMER CONSTRAINTS

Accurate measuring for the time. Limited usage for only pill and capsules drug dosage. Control of energy saving devices.

5. AVAILABLE SOLUTIONS

The solution of this sophistication is supplemented by the development of an advanced technology supported pill dispenser called the GSM based automatic call dispenser

2. JOBS-TO-BE-DONE / PROBLEMS

This Application helps the patient to remind medicine through voice assistance . It helps the user to do their daily routine without seeking help from other people.

9. PROBLEM ROOT CAUSE — RC

Side-effects affecting thinking and balance. Sedatives and tranquilizers, which are often prescribed for sleep or for anxiety. Examples include zolpidem and lorazepam (brand names Ambien and Ativan , respectively).

7. BEHAVIOUR — BE

The patient need to update the information about their medication application

3. TRIGGERS — TR

People simply forget , skip or stop taking their medications, which leads to non adherence . Trigger helps people to integrate healthy behavior by using technology in a very simple way

10. YOUR SOLUTION — SL

Building a reliable technology that can address all the customer needs while being reliable and secure ensures efficient functioning.

8. CHANNELS of BEHAVIOUR — CH

The data stored in the access with the application can be help of internet

4. EMOTIONS: BEFORE / AFTER — EM

Despite effective treatments , depression may often be unrecognized and untreated . 2,3 many persons in the community with depression see a general physician . so primary care setting is pivotal when considering how to optimize the treatment for depression and others forms of emotional distress in the community

4. REQUIREMENT ANALYSIS

4.1 Functional Requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Access Cloud services	Accessing the cloud service with correct credentials. Storing the details in the cloud database.
FR-4	IOT configuration	Fine Tuning the IOT device based Cloud DB access via device. Manage the data request and response effectively

4.2 Non-Functional Requirements

| FR No.	Non-Functional Requirement	Description
NFR1	Usability	App can be used by anyone who has knowledge about applications and computers.
NFR2	Security	For security, TFA is enabled and biometrics are also added for user safety.
NFR3	Reliability	Highly reliable since, It uses

		trusted and authentic cloud services like IBM
NFR4	Performance	Performance is better compared to other market products.
NFR5	Availability	Available on mobile app.
NFR6	Scalability	Using Cloud services, makes the scalability higher the using traditional locally stored database.

5. PROJECT DESIGN

5.1 Data Flow Diagrams
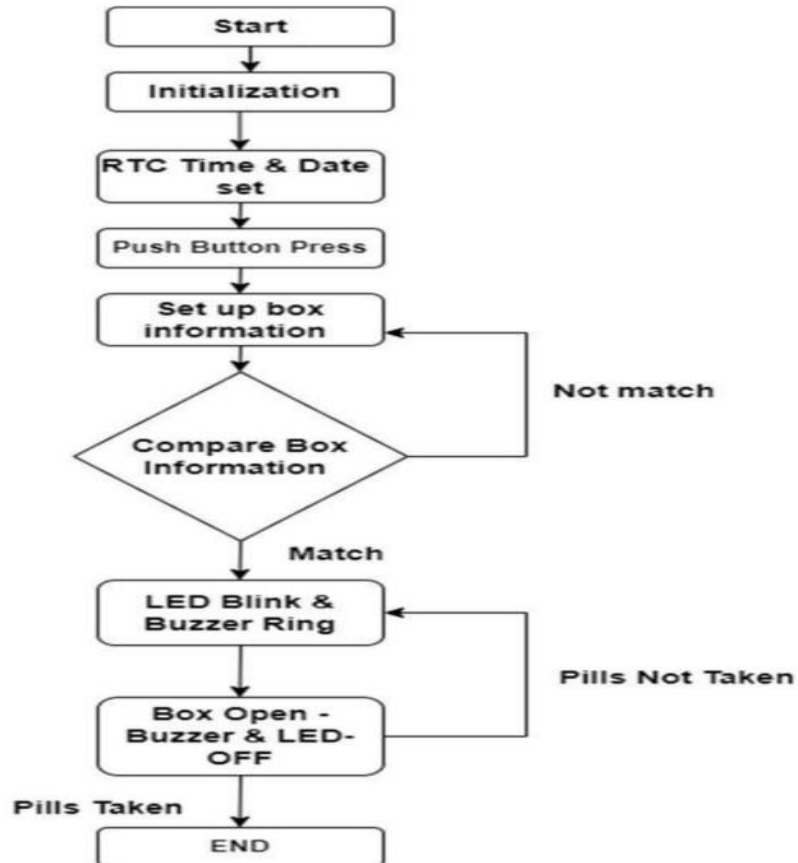
5.2 Solution & Technical Architecture
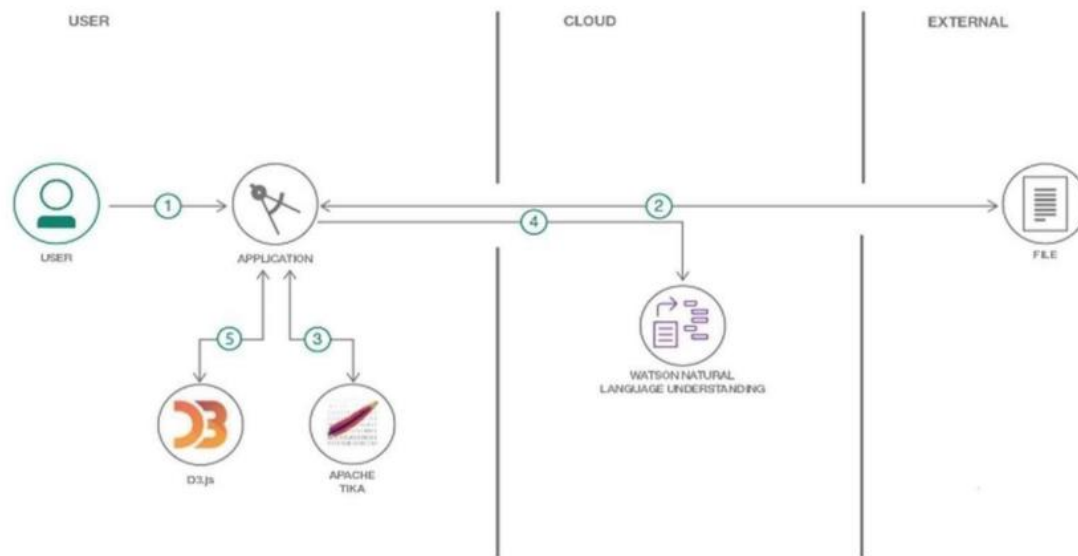
5.3 User Stories

User Type	Functional Requirement(Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Senior citizen	Caretaker	USN-1	As a user, I want to take Medicines on time and monitor my health	I want to Take Medicines On time	High	Sprint-1
Alzheimer patient	Smart medicine box	USN-2	As a user, I want to take my tablets on time by voice command	I want to take my tablets on time by voice command	High	Sprint-1
Mentally idled patient	Caretaker	USN-3	As a user, my patient needs to take medicines on time and monitoring the activity	My patient needs to take medicines on time	Medium	Sprint-2
Coma patient	Caretaker	USN-4	As a user, my patient medication time and prescription should load in database for upcoming week	My patient medication time and prescription should be in database list	Low	Sprint-4
Disablet Patient	Smart medicine box	USN-5	As a user, I need to take my medicine in nearby places with light notification	I need to take my medicine in nearby places with light notification	Medium	Sprint-3

# 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	Registration	USN-1	As a user, I can register for the application by entering my email, and password, and confirming user password.	4	High	Aravindan .B
Sprint-1	Sign up	USN-2	As a user, I can sign up by giving the details	4	High	Ganesh kumar.A
Sprint-1	Authentication	USN-3	As a user, I can register for the application	4	Medium	Ganesh kumar.A Aravindan .B
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High	Adhithyan .S
Sprint-2	Dashboard	USN-5	As a user, I need to be able to view the functions that I can perform	4	High	Harish .D
Sprint-2	Add medicine	USN-1	As a user, I should be able to add medicine names	1 0	High	Ganesh Kumar.A Adhithyan .S
Sprint-2	Add prescriptions	USN-2	As a user, I can add the prescriptions	1 0	Medium	Aravindan .B
Sprint-2	Schedule	USN-3,1	I should be able to schedule as a user	6	Low	Harish .D
Sprint-2	Medicines, prescription	USN-1,4	As a user I can view the medicines and prescription	7	Medium	GANESH KUMAR.A
Sprint-3	IBM Watson IOT device creation	USN-5,2	Creating the IBM IOT device	7	High	ARAVINDAN.B GANESH KUMAR.A
Sprint-3	Text to speech service	USN-1,4	Converting text to speech and remind the medicines using IBM text to speech service.	6	High	ADHITHYAN.S HARISH.D
Sprint-3	Workflow for IOT using node red.	USN-2,3,5	Creating medicine remainder form using node red.	7	High	ARAVINDAN.B GANESH KUMAR.A HARISH.D ADHITHYAN.S
Sprint 4	MIT app inventor	USN-1,4	Application using MIT app	7	High	ARAVINDAN.B GANESH KUMAR.A
Sprint 4	Alarm remainder	USN 2,3,5	Alarm remainder based on medication time	6	High	ADHITHYAN.S HARISH.D

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	5 Days	28 october 2022	1 November 2022	20	1 Nov 2022
Sprint-2	20	5 Days	2 November 2022	6 November 2022	20	6 Nov 2022
Sprint-3	20	5 Days	7 November 2022	11 November 2022	20	11 Nov 2022
Sprint-4	20	5 Days	12 November 2022	16 November 2022	20	16 Nov 2022

6.3 REPORTS FROM JIRA
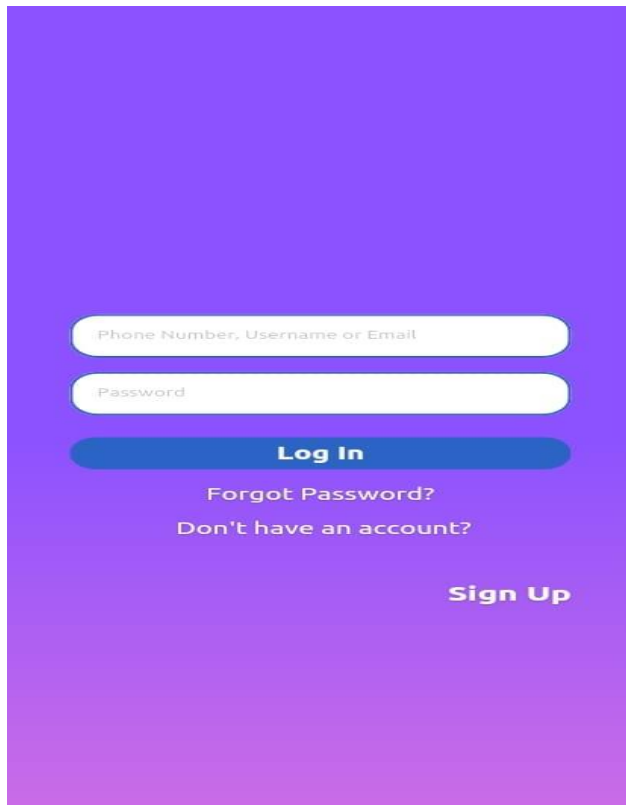
Burndown chart
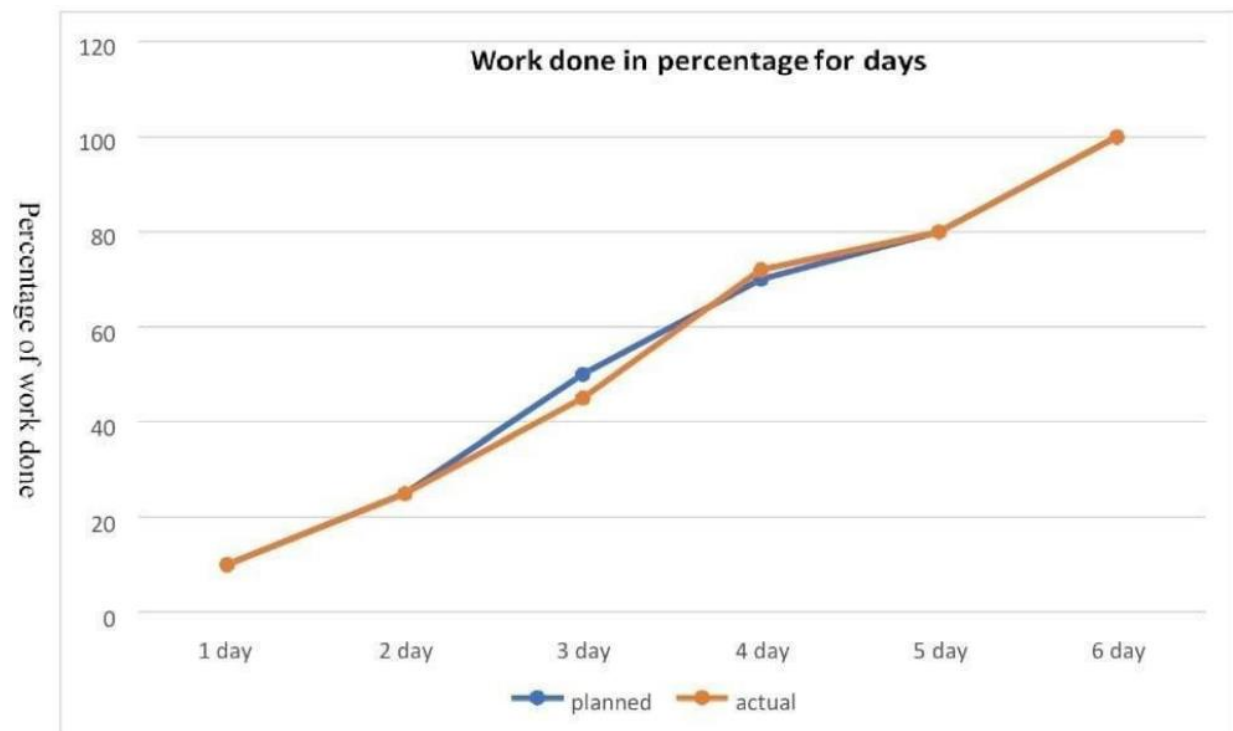
7. CODING & SOLUTIONING
(Explain the features added in the project along with code)

7.1 Feature 1(Login page has been created to may security stronger).

7.2 Feature 2(If password has been forgot, it can be changed with help of forgot password.)
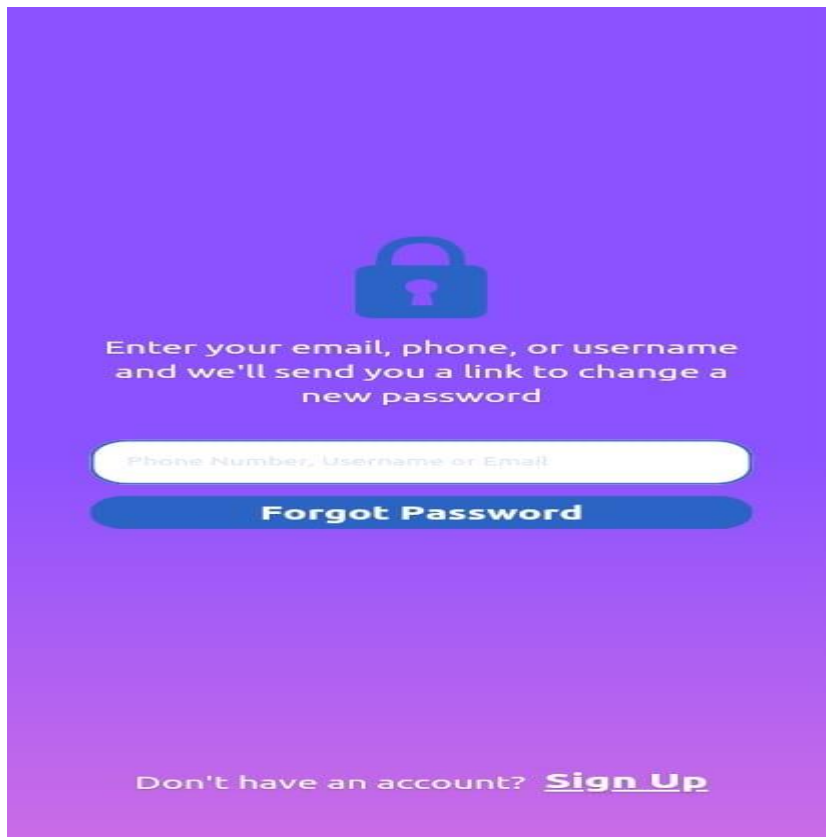
7.3 Feature 3(The Details page has been created to save the users details in database system).

8. TESTING

8.1 Test Cases

SECTION	TOTAL CASES	NOT TESTED	FAIL	PASS
Overall Process	6	0	0	6
Client Side	51	0	0	51
Security and User Information Protection	7	0	0	7
Exception Report	11	0	0	11
Report Output	7	0	0	7
Version Control and Update	1	0	0	1
Adaptation	1	0	0	1

8.2 User Acceptance Testing

SECTION	SATISFIED	DISSATISFIED	NO COMMENTS	SCORE
Use-Easiness	7	1	1	10

Reliability	8	1	1	10
Security	8	2	0	10
Availability	3	2	5	10
Performance	9	0	1	10
Scalability	5	2	3	10
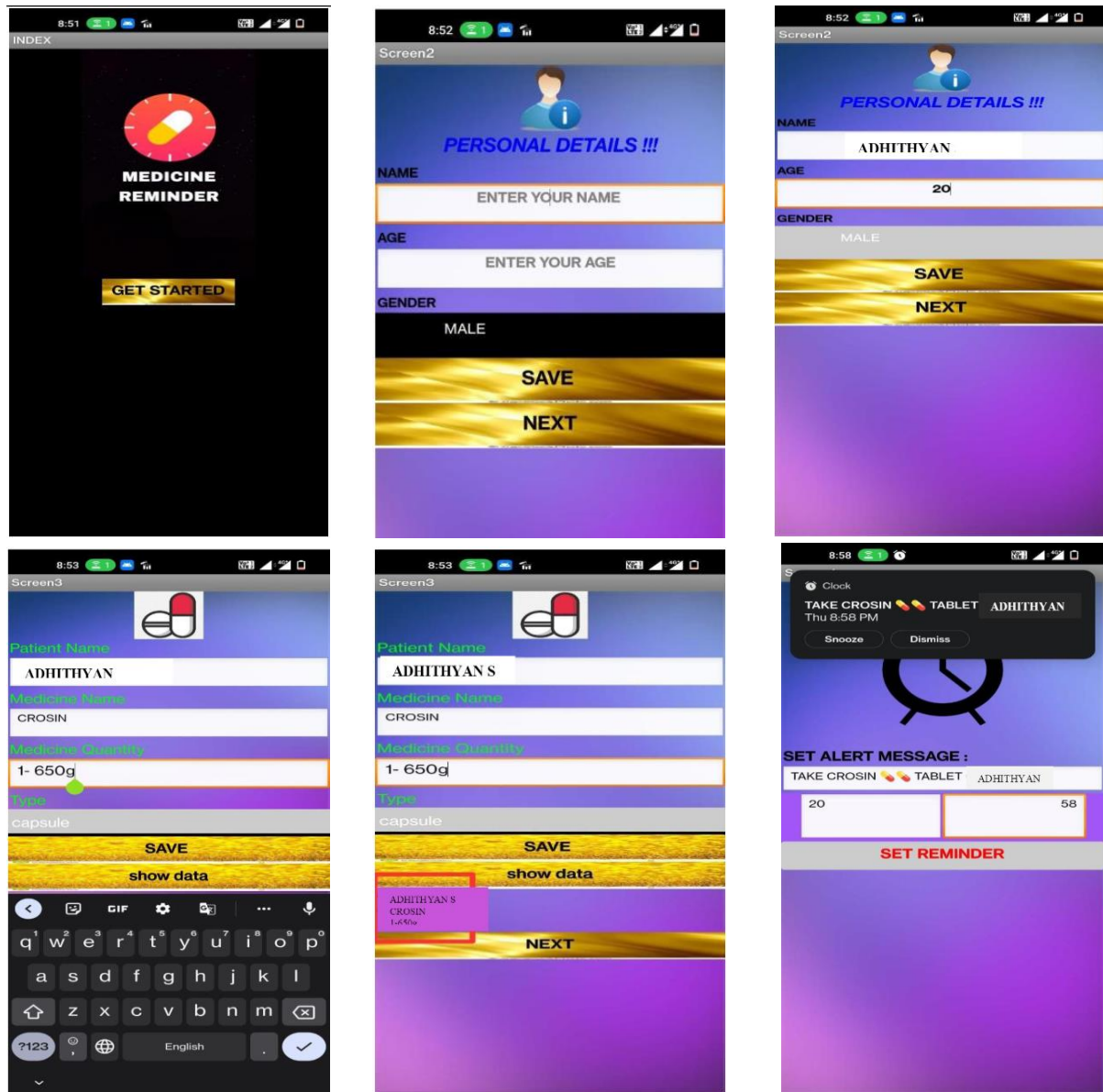
8. RESULTS

S.NO	Parameter	Performance
1.	Response Time	0.2s(Average of 10 trials)
2.	Workload	500 users(Calculated based on database count)

3.	Revenue	Individual users and pharamacetical Industries.
4.	Efficiency	Simple and Easy workflow, which makes the process efficient and user friendly.
5.	Down Time	Almost no down time due to IBM cloud enabled solution and NODE RED Software.

9.1 Performance Metrics

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES

- The software can help people set free from remembering the medication time and names.
- It helps the caretaker to determine the medication time, which can be variable sometimes, depending upon the patient's severity.
- The software is very user-friendly; the need not install any external app by the patient, economic for the caretaker too.
- The single software can be used by the caretaker for managing multiple patients at the same place.
- The details of the time scheduled, and patients' intake is stored in the database for future reference easily.
- The overall stress of patients and caretakers is reduced and maintained under control by the software.

DISADVANTAGES

- The The software currently can only alert the patient to take medicine, we cannot ensure whether they have taken it or not.
- software currently can only alert people with SMS, it cannot make phone calls to help the illiterate.

11. CONCLUSION

The project offers the elderly or medically sick people a personal assistant which reminds them of the medicines to be consumed at the particular time. Skipping tablets may lead to serious problems if the person has a severe illness and this can be avoided. Since the cloud is integrated with the mobile application, numerous data can be fed into the database and notifications can be generated. The mobile application developed is highly customisable by the user and easy to use. With this solution, the problem can attain an economic and easily usable way to overcome the difficulties faced by senior citizens. Thus, the result of our system provides fast curing of patient health by using our advantageous system.

12. FUTURE SCOPE

- The system can be enhanced with a smart watch or health devices so that the health conditions can be continuously connected with the hospitals, and doctors to supervise and help them during emergencies.
- The system can relate to hardware product that stores and automatically opens the container and alerts with a voice message
- The system can further relate to the medical shop so that the hardware system automatically senses the tablet counts and alerts the medical shop to deliver the medicine.

13. Appendix

Source Code

```python
from pymongo import MongoClient

import json

import pytz

IST = pytz.timezone('Asia/Chennai')

client = MongoClient(

'mongodb+srv://pancham:pancham@niggaballs.tjmtx.mongodb.net/myFirstDatabase?retryWrites=true&w=majority')

db = client['medicine_schedule']

scheduledb = db['schedule']

def add_medicine(email, object: dict):

document = scheduledb.find_one({'_id': email.lower()})

medicine = object['medicine_name']

del object['medicine_name']

medicines = document['medicines']

medicines[medicine] = object

update = {'$set': {'medicines': medicines}}

scheduledb.update_one({'_id': email.lower()}, update)

def edit_medicine(email, old_medicine_name, new_medicine_name):

document = scheduledb.find_one({'_id': email.lower()})

new = str(document).replace(old_medicine_name, new_medicine_name)

new = new.replace("'", '"')

new = json.loads(new)

scheduledb.replace_one(document, new)

def fetch_user_schedule(day, user=None):
```

```python
document = scheduledb.find_one({'_id': user.lower()})

medicines = document['medicines']

med_dates = []

for medicine in medicines:

    med_dates.append([medicine, medicines[medicine]['start_date'], medicines[medicine]['end_date']])

today_meds = {}

for med_date in med_dates:

    if day < med_date[2]:

        today_meds[med_date[0]] = medicines[med_date[0]]['dose_time'][:-3]

    else:

        pass

return today_meds

def no_data_check(user):

    document = scheduledb.find_one({"_id":user.lower()})

    medicines = document['medicines']

    if not medicines:

        return True

    else:

        return False

def card(medicine:str, time):

    card_html = f"""<div class="flex flex-col card rounded-lg my-5 p-3 shadow-md">

    <p class="text-gray-800 my-3">{medicine.title()}</p>

    <div class="flex">

    <div class="bg-primary-blue-light text-white p-1 rounded-lg flex">

    <i class="fas mt-1.5 mx-1 fa-clock"></i>

    <p class="mt-1 font-medium">{time}</p>

    </div>
```

</div>

</div>"""

return card_html

Content	Link
GitHub	**https://github.com/IBM-EPBL/IBM-Project-42095-1660649475**
Project Demonstration Video	