**PROJECT REPORT**

**PERSONAL ASSISTANCE FOR SENIORS WHO ARE**

**SELF-RELIANT**

**By team -PNT2022TMID35130**

**ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY**

SEHJAL.V(963319106090)

SHAMINI.J (963319106092)

SNEKA.S (963319106098)

SOWMIYA PRAGASH (963319106103)

**Under the guidance of ,**

Dr. BENISHA R.B ( Faculty Mentor)

Mr. Kumar Juluri ( Industry Mentor)

**TABLE OF CONTENTS**

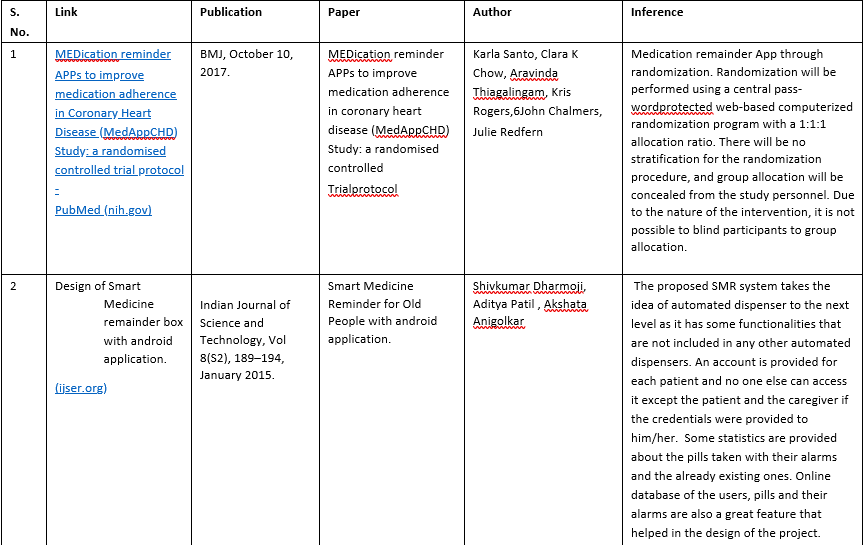
|  |  |  |  |
| --- | --- | --- | --- |
| **S.**  **NO** | | **TITLE** | **PAGE NO** |
| 1. INTRODUCTION | | | |
| 1.1 | | Project Overview | 4 |
| 1.2 | | Purpose | 4 |
| 2. LITERATURE SURVEY | | | |
| 2.1 | | Existing Problem | 5 |
| 2.2 | | References | 6 |
| 2.3 | | Problem Statement Definition | 6 |
| 3. IDEATION & PROPOSED SOLUTION | | | |
| 3.1 | Empathy Map Canvas | | 7 |
| 3.2 | Ideation & Brainstorming | | 7 |
| 3.3 | Proposed Solution | | 8 |
| 3.4 | Proposed Solution Fit | | 8 |
| 4. REQUIREMENT ANALYSIS | | | |
| 4.1 | Functional Requirements | | 10 |
| 4.2 | Non-Functional Requirements | | 10 |
| 5.PROJECT DESIGN | | | |
| 5.1 | Data Flow Diagrams | | 11 |
| 5.2 | Technical & Solution Architecture | | 12 |
| 5.3 | User Stories | | 14 |
| 5.4 | Customer Journey Map | | 14 |
| 6.PROJECT PLANNING & SCHEDULING | | | |
| 6.1 | Sprint Planning & Estimation | | 15 |
| 6.2 | Sprint Delivery Schedule | | 16 |
| 7. CODING & SOLUTIONING  (Explain the features added in the project along with code) | | | |
| 7.1 | Feature 1 | | 17 |
| 7.2 | Feature 2 | | 17 |
| 7.3 | Database Schema (if Applicable) | | 17 |
| 8. TESTING | | | |
| 8.1 | Test Cases | | 18 |
| 8.2 | User Acceptance Metrics | | 18 |
| 9. RESULTS | | | |
| 9.1 | Performance Metrics | | 20 |
| 10. ADVANTAGES AND DISADVANTAGES | | | 20 |
| 11. CONCLUSION | | | 21 |
| 12. FUTURE SCOPE | | | 21 |
| 13. APPENDIX | | | 21 |

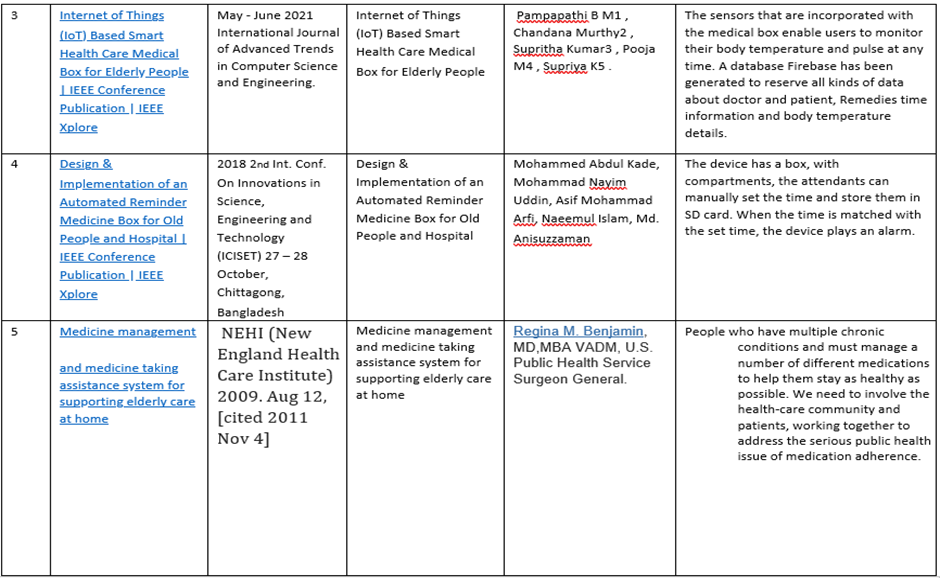
1. **INTRODUCTION**
   1. **Project Overview**

* An app is built for the user (caretaker) which enables him to set the desired time and medicine. These details will be stored in the IBM Cloudant DB.
* If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform.
* The device will receive the medicine name and notify the user with voice commands.
  1. **Purpose**
* Sometimes elderly people forget to take their medicine at the correct time.
* They also forget which medicine He / She should take at that particular time.
* And it is difficult for doctors/caretakers to monitor the patients around the clock. To avoid this problem, this medicine reminder system is developed.
* An app is built for the user (caretaker) which enables him to set the desired time and medicine. These details will be stored in the IBM Cloudant DB.
* If the medicine time arrives the web application will send the medicine name to the IoT Device through the IBM IoT platform.
* The device will receive the medicine name and notify the user with voice commands.

**2. LITERATURE SURVEY**

**2.1 Existing Problem**



****

**2.2 References:**

[1] Santo, K., Chow, C. K., Thiagalingam, A., Rogers, K., Chalmers, J., & Redfern, J. (2017). MEDication reminder APPs to improve medication Adherence in Coronary Heart Disease (MedApp-CHD) Study: a randomised controlled trial protocol. BMJ open, 7(10), e017540.

[2] Waykole, M., Prakash, V., & Nalini, N. H. S. (2016). Ardumed-smart medicine reminder for old people. Int J Sci Eng Res, 7, 650-654.

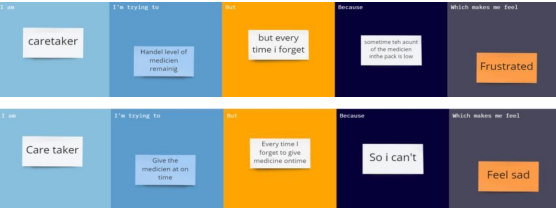
[3] Al-Mahmud, O., Khan, K., Roy, R., & Alamgir, F. M. (2020, June). Internet of things (IoT) based smart health care medical box for elderly people. In 2020 International Conference for Emerging Technology (INCET) (pp. 1-6). IEEE.

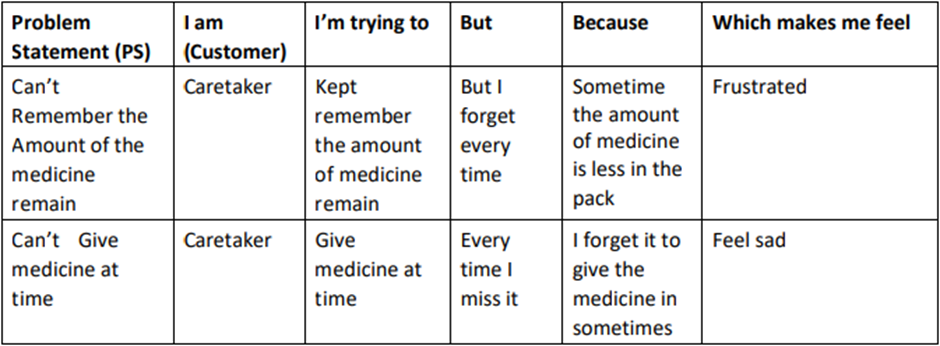
[4] Kader, M. A., Uddin, M. N., Arfi, A. M., Islam, N., & Anisuzzaman, M. (2018, October). Design & implementation of an automated reminder medicine box for old people and hospitals. In 2018 International conference on innovations in science, engineering, and technology (ICISET) (pp. 390-394). IEEE.

[5] Yamamoto, Y., Huang, R., & Ma, J. (2010, November). Medicine management and medicine taking assistance system for supporting elderly care at home. In 2010 2nd International Symposium on Aware Computing (pp. 31-37). IEEE

**2.3 Problem Statement Definition**

Customer Problem Statement:

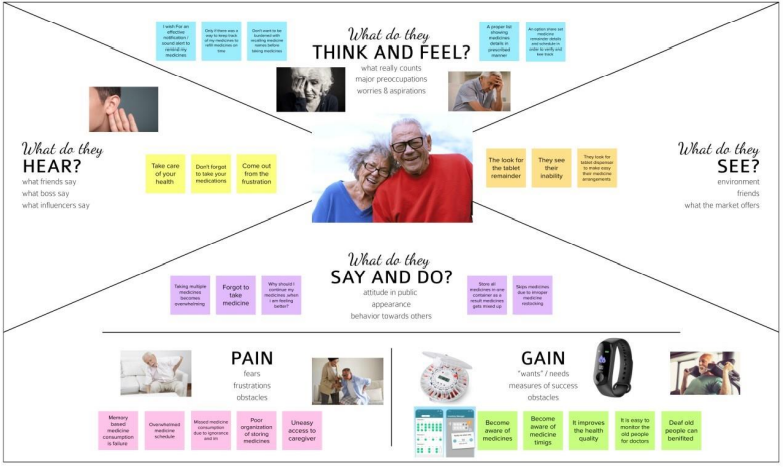


****

**3. IDEATION & PROPOSED SOLUTION**

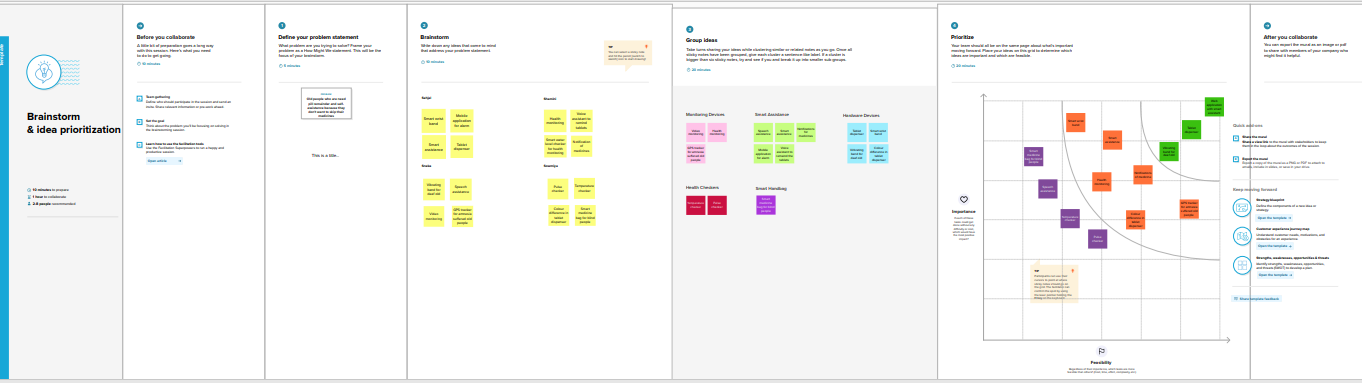
**3.1 Empathy Map Canvas:**

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 challenges.



Mural Link:- Empathy map mural link

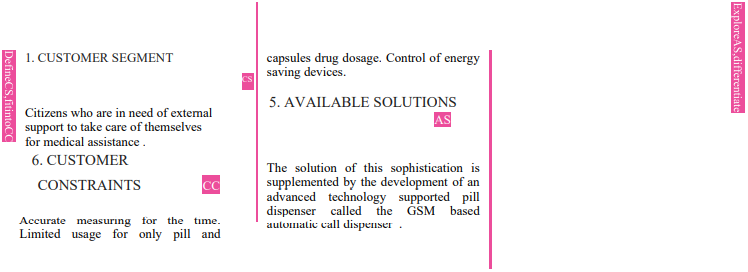
**3.2 Brainstorming**

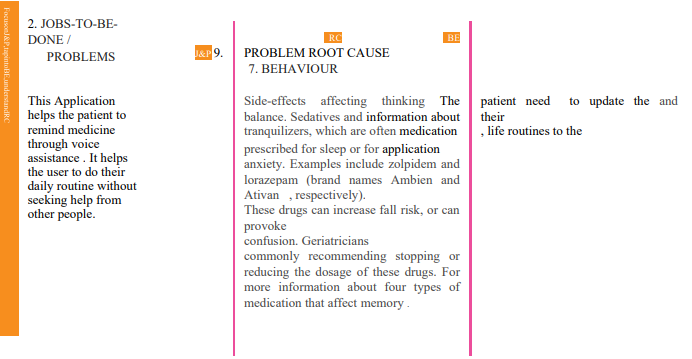


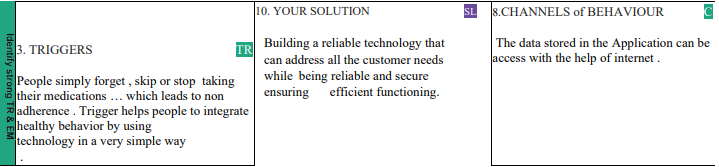
**3.3 Proposed Solution**

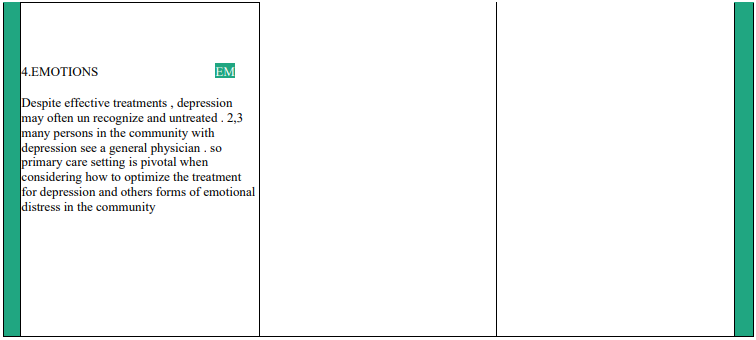
|  |  |  |
| --- | --- | --- |
| S.No | Parameter | Description |
| 1. | Problem Statement (Problem to be solved) | Old people who are need pill remainder and self-assistance because they don't want to skip their medicines |
| 2. | Idea / Solution description | Create a web application which remind the tablets name and time & Create a smart watch which can be able to ring an alarm and vibrate on time |
| 3. | Novelty / Uniqueness | Deaf people can easily remind the tablet time with the vibration in the smart watch |
| 4. | Social Impact / Customer Satisfaction | Customers are satisfied y when they intake their medications on time and they feel healthy |
| 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 and they can easily set their medication time in the web application |

**3.4 Problem Solution Fit**









**4. REQUIREMENT ANALYSIS**

**4.1 Functional Requirements:**

Following are the functional requirements of the proposed solution.

|  |  |  |
| --- | --- | --- |
| **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 | Access the cloud service with correct credentials Store the details in the database Retrieve needed information for the user’s operation |
| FR-4 | IOT configuration | Fine Tuning the IOT device based on preference Access the Cloud DB via device Manage the request and response effectively |

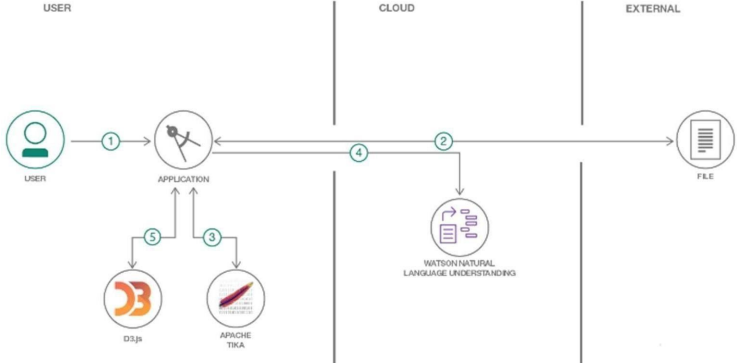
**4.2 Non-functional Requirements:**

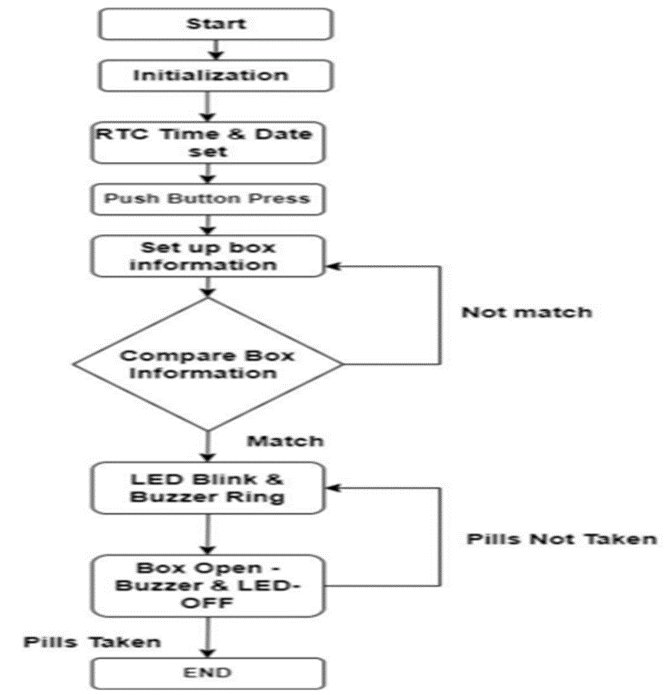
Following are the non-functional requirements of the proposed solution.

|  |  |  |
| --- | --- | --- |
| **FR**  **No.** | **Non-Functional Requirement** | **Description** |
| NFR-1 | Usability | App can be used by anyone who has operational knowledge about internet and computer. |
| NFR-2 | Security | For security, TFA is enabled and biometrics are also added for user safety. |
| NFR-3 | Reliability | Highly reliable since, It uses Trusted cloud services like IBM |
| NFR-4 | Performance | Performance is better compared to other market products. |
| NFR-5 | Availability | Available on mobile app. Web version is getting ready for next release. |
| NFR-6 | Scalability | Using Cloud services, makes the scalability higher the using traditional database. |

**5. PROJECT DESIGN**

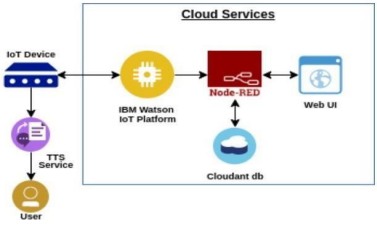
**5.1 Data Flow Diagrams :**



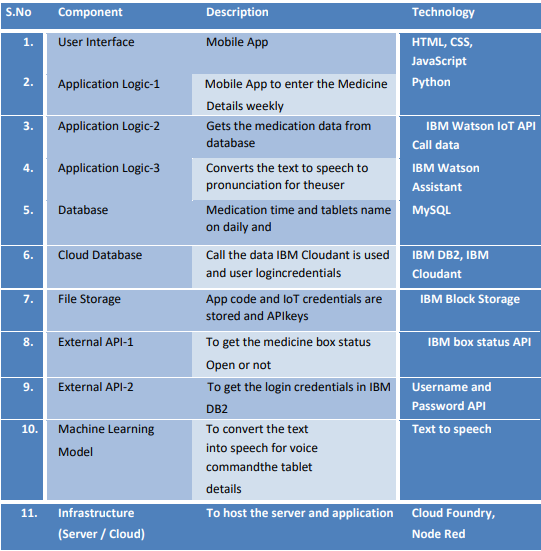
****

**5.2 Technical And Solution Architecture**

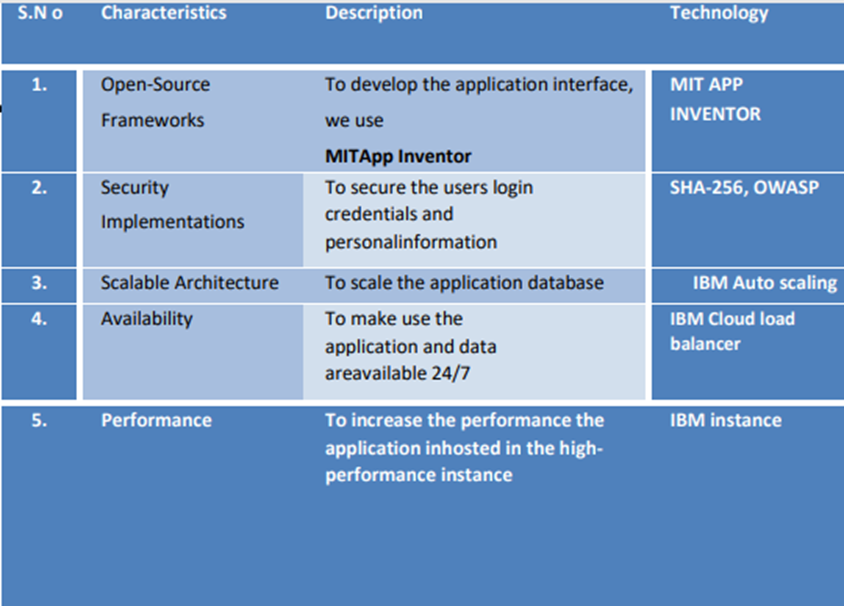
**Technical Architecture :**

****

**Table-1: Components & Technologies :**



**Table-2: Application Characteristics :**

****

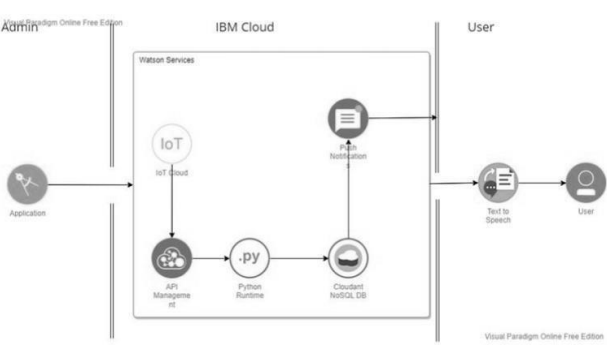
**Solution Architecture:**

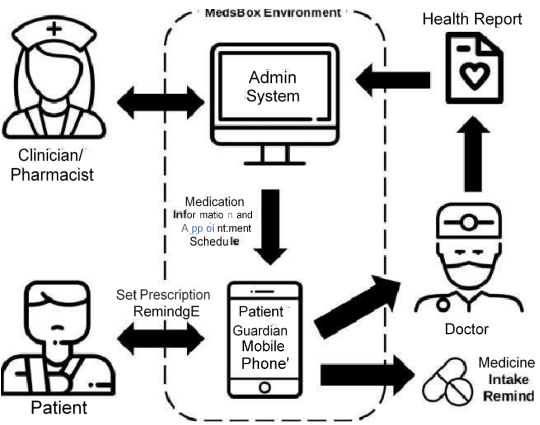
• Old people who are need pill remainder and self-assistance because they don't want to skip their medicines.

• Create a web application which remind the tablets name and time & Create a smart watch which can be able to ring an alarm and vibrate on time.

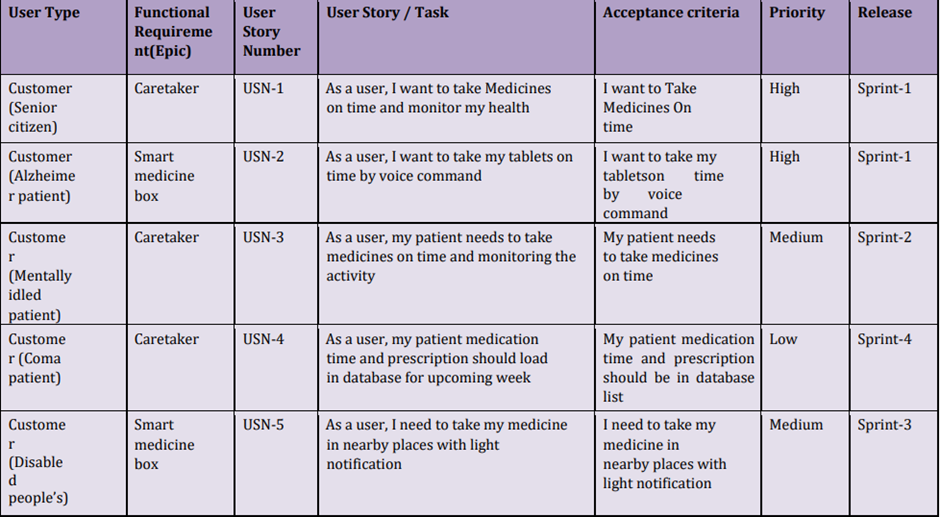
• It reminds the medication time through alarm and vibrations.

**Solution Architecture Diagram :**

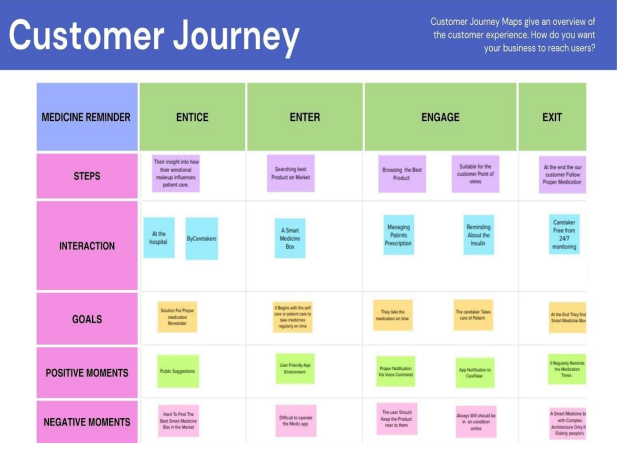
****

****

**5.3 User Stories**

****

**5.4 Customer Journey Map**



**6. PROJECT PLANNING & SHEDULING**

**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 through medicine remainder system | 10 | | High | Sehjal.V Shamini.J Sowmiya Pragash  Sneka.S | |
| Sprint 1 | |  | USN-2 | As a user, I can Activate and Deactivate the alarm | 10 | | High | Sehjal.V Shamini.J Sowmiya Pragash  Sneka.S | |
| Sprint 2 | | Notification | USN-3 | As a user once I can the set the alarm then I gets the notification | 10 | | High | Sehjal.V Shamini.J Sowmiya Pragash  Sneka.S | |
| Sprint 2 | |  | USN-4 | As a user, If I requires this system then a notification will be sent into his device. | 10 | | High | Sehjal.V Shamini.J Sowmiya Pragash  Sneka.S | |
| Sprint 3 | | Medication Detail | USN-5 | As a user, I have multiple medications each day, I can put each pill in the box for the corresponding day. | 10 | | High | Sehjal.V Shamini.J Sowmiya Pragash  Sneka.S | |
| 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 | Sehjal.V Shamini.J Sowmiya Pragash  Sneka.S | |
| Sprint 3 |  | | USN-7 | As a user, I can store the name of the medicine with its description | 10 | High | | | Sehjal.V Shamini.J Sowmiya Pragash Sneka.S |
| Sprint 4 | GPS Tracking | | USN-8 | As a user, they can also help large hospitals and clinics manage their inventory more effectively | 5 | Low | | | Sehjal.V Shamini.J Sowmiya Pragash Sneka.S |
|  | 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 IoT enabled Arduino device for monitoring the System. | 10 | High | | | Sehjal.V Shamini.J Sowmiya Pragash Sneka.S |

**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 | 29-10-2022 | 5-11-2022 | 20 | 4-11-2022 |
| Sprint 2 | 10 | 8 days | 07-11-2022 | 14-11-2022 | 10 | 13-11-2022 |
| Sprint 3 | 20 | 8 days | 16-112022 | 23-112022 | 20 | 23-11-2022 |
| Sprint 4 | 10 | 8 days | 23-112022 | 30-112022 | 10 | 30-11-2022 |

**7. CODING & SOLUTIONING**

**7.1 Feature 1**

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

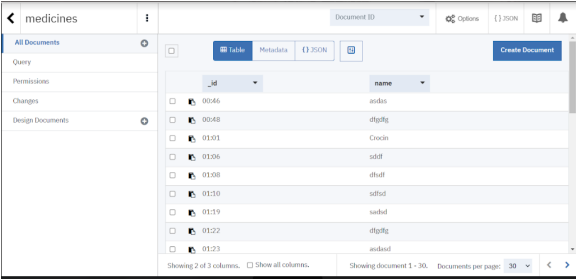


**7.2 Feature 2**

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



**7.3 Database Schema**

The project includes a cloud database system. 

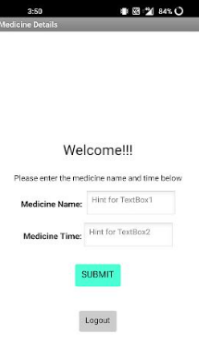
**8. TESTING**

**8.1 Test Cases**

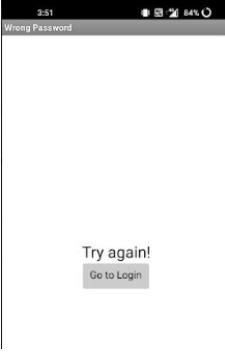
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test case** | **Precondition** | **Test steps** | **Test data** | **Expected result** |
| Verify login with valid credentials | User should have a network connection | 1. Launch URL  2. Enter valid username.  3. Enter valid password.  4. Click on the “Login” button. | Username: Navya Password: 12345 | Users should be able to login successfully. |
| Verify login with invalid credentials | User should have a network connection | 1. Launch URL  2. Enter valid username.  3. Enter invalid password.  4. Click on the “Login” button. | Username: Navya Password: Navya123 | Users should not be able to login. |
| Update the medicine name with the time. | User should have a network connection | 1. Enter valid medicine name. 2. Enter the time when the medicine has to be consumed.  3. Click on the “Submit”button. | Medicine Name: Cetirizine Medicine Time: 20.00 | Users should be able to update it successfully. |

**8.2 User Acceptance Testing**

Login page testing



Incorrect login attempt



Medicine page testing



**9. RESULTS**

**9.1 Performance Metrics**

|  |  |  |
| --- | --- | --- |
| **S. NO** | **Parameter** | **Performance** |
| 1. | Response Time | 0.2s (Average of 10 trials) |
| 2. | Workload | 500 users ( Calculated based on Cloud Space) |
| 3. | Revenue | Individual users and pharmaceutical industries. |
| 4. | Efficiency | Simple and straightforward workflow, which makes the process efficient. |
| 5. | Down Time | Almost no down time due to IBM Cloud enabled solution. |

**10. ADVANTAGES**

* Help the elderly people to take their medicine at the correct time.
* Avoid personal assistants or caretakers needed for medically sick people.
* Cost efficient.
* Can store multiple data and many notifications can be generated.
* Since it includes voice assistance, even blind people can use our device.
* Minimizes the human work and effort
* Saves time and effort
* Good for personal safety and security
* Useful in traffic and other tracking or monitoring systems
* Beneficial for the healthcare industry
* Improved security in homes and offices
* Reduced use of many electronic devices as one device does the job of a lot of other devices

**DISADVANTAGES**

* Makes people lethargic and makes them dependent always on others.
* Requires a stable internet connection.
* Increased privacy concerns
* Increased unemployment rates
* Highly dependent on the internet
* Lack of mental and physical activity by humans leading to health issues
* Complex system for maintenance
* Lack of security
* Absence of international standards for better communication

**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.

**12. Future Scope**

The project can be further developed by bringing into the feature of informing the medicine name during the notification. The voice assistance which is given can be customized by adding the user's voice or the caretaker’s voice. Further the mobile application can update medicines by taking voice commands as an input from the user.

**13. APPENDIX**

**Source Code:**

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

#include <PubSubClient.h>//library for MQtt

#include "SoundData.h"

#include "XT\_DAC\_Audio.h"

XT\_Wav\_Class Sound("voice\_command.wav");

XT\_DAC\_Audio\_Class DacAudio(2,0);

uint32\_t DemoCounter=0;

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

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

#define ORG "ut4tn5"//IBM ORGANITION ID

#define DEVICE\_TYPE "Arduino"//Device type mentioned in ibm watson IOT Platform

#define DEVICE\_ID "nitish123"//Device ID mentioned in ibm watson IOT Platform

#define TOKEN "123456789" //Token

String data3;

float h, t;

//-------- 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/test/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

**//-----------------------------------------**

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);

delay(10);

Serial.println();

wificonnect();

mqttconnect();

}

void loop()// Recursive Function

{

delay(1000);

if (!client.loop()) {

mqttconnect();

}

}

/\*.....................................retrieving to Cloud...............................\*/

void mqttconnect() {

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 = 0; i < payloadLength; i++) {

//Serial.print((char)payload[i]);

data3 += (char)payload[i];

}

Serial.println("data: "+ data3);

if(data3=="announce")

{

Serial.println(data3);

for(int i=0;i<5;i++){

DacAudio.FillBuffer();

if(Sound.Playing==false)

DacAudio.Play(&Sound);

Serial.println(DemoCounter++);

}

}

else

{

pass;

}

data3="";

}

Github link :

Project demo link :