

PROJECT REPORT FORMAT

IBM – NALAIYATHIRAN

Personal Assistance for Seniors Who Are Self-Reliant



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1. INTRODUCTION

1.1 Project Overview: -

Patient monitoring and management in critical care environments such as the ICU's, SICU's and ANCU's involve estimating the status of the patient and reacting to events that may be life threatening. It is impossible to keep a tab on every patient throughout the day. New solutions are needed in this field to help the doctors and the nursing staff to monitor the patients. A critical element of this is the medicine administration and monitoring. This has been achieved by the patient medicine reminder system. This system is driven by an program that inputs predefined parameters which is processed based on the input variables entered via a user interface device such as the PC. The logic for the processing is built into program to initiate the alert through an audio alarm. Not only does it have an alarm system, but also gives indication when medicine is not taken at the reminder time.



1.2 Purpose: -

In modern society, most of the time people remain busy in their daily life schedule. It is true that they give more preference to their work than taking care of their health. Several diseases like diabetes, blood pressure is nowadays very common. Maintaining daily medication become very difficult for old people. Sometimes younger is faced with the same problem. There are many people in our family who need constant help may it be our elderly people, younger or others. But it is not always possible for us to remind them of their medicine's dosages every time. For this purpose, there needs to be some facility for us which monitoring patient and take care. Nowadays we are all used to living technology-based life. We can use this technology in a way that will be beneficial for us. Cell phones aren't best utilized for calling but now maybe used as an ensemble of embedded sensors that together allow new packages including human services, healthcare, social networks, environmental tracking etc. Today in medical services frameworks, the usage of cell phones is turning into an expanding number of values [1]. IoT may be helpful to monitor real time condition and IoT can be a powerful and effective paradigm to store data collected by sensors devices to the cloud. In our project, the IoT enabled device will control the overall monitoring system. And developed an android application which help patients by reminding medicine in take time and so on.

2. LITERATURE SURVEY

2.1 Existing Problem:

Elderly care services are important to provide in response to the rapid growth of the elderly population. In developing countries like Indonesia, the speed of growth of the elderly population does not simultaneously occur, so the needs for care services vary. This study discusses the emergence of home care services in response to the increase in elderly population. By taking the case of community home care services in Sleman, this study found the pattern and process of the emergence of local initiatives in home care services. This study also revealed an important factor affecting the implementation of community home care services, that is, leadership.

2.2 References: -

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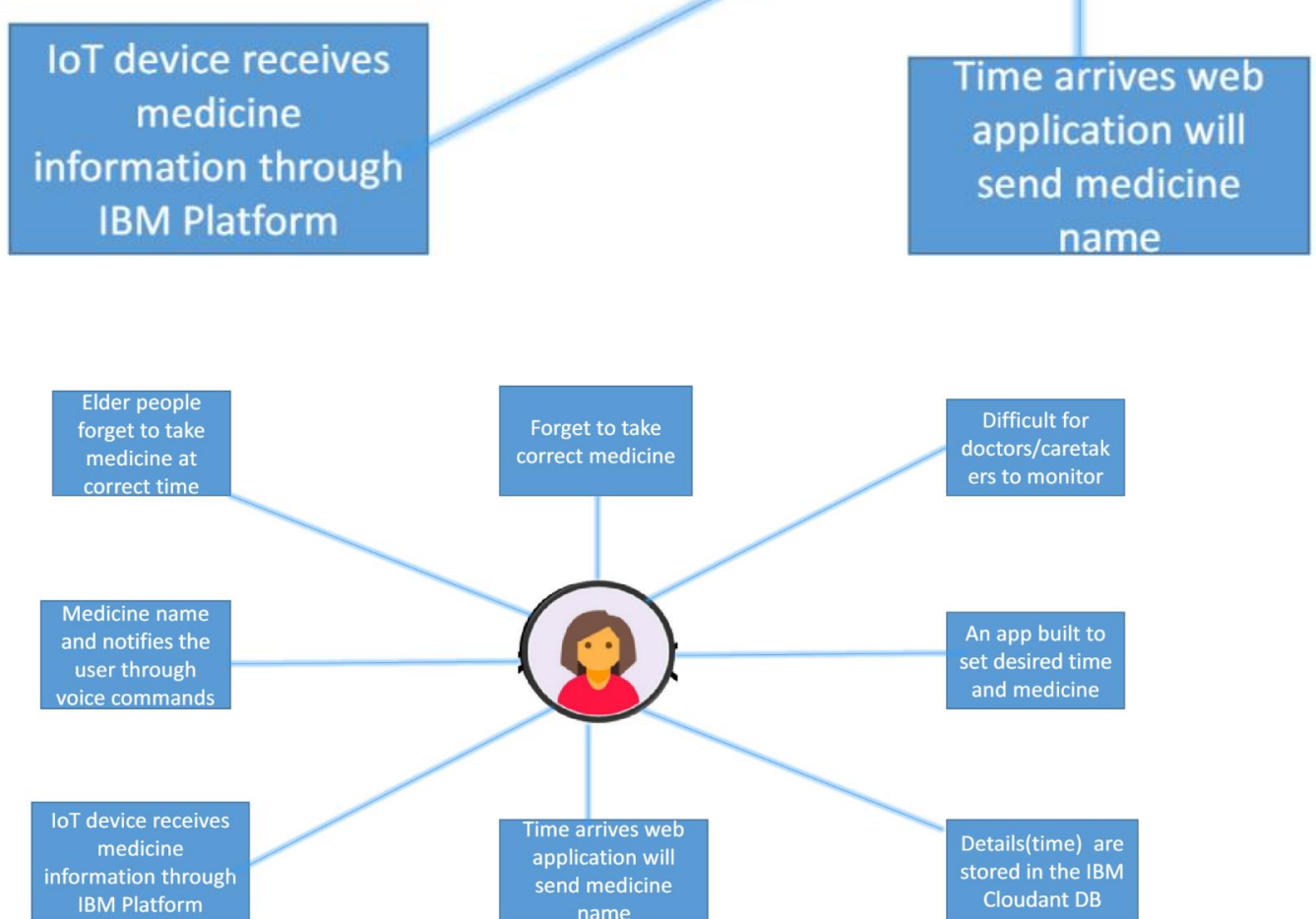
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10. S. S. Al-majeed.HomeTelehealth by Internet of Things (IoT).pp. 609–613, 2015.

2.3 Problem Statement Definition: -

Medication therapy is a strong instrument for therapy received through the health setting, especially in medication area. Error in medication administration has produced different problems and they cost billions of dollars every year. Regarding mobile phone extensions, we developed a local medication reminder mobile application called “Seeb” as a suitable solution for decreasing medication errors for Iranians.

This application was designed for the appropriate medication administration including time and dosages through: recording patient and medication data; scheduling patients’ medication; and reporting medication administration on progress. Nowadays, using smart phones and mobile applications are increased dramatically, so developing mobile applications in health services (especially selfcare) can create the desired effect in the community. Although there are various medication reminder mobile applications, a native mobile application is essential that is developed on the basis of the specialists’ ideas in this field. In addition to remind the medication administration time and dose, “Seeb” reports the analysis of the patient medication administration, as well as displaying suitable picture of the medication and its administration method when reminded of medication use. Existence of these functions in the medication reminder mobile application prevents medication errors by patients and increases medication adherence. Undoubtedly, “Seeb” can play an important role in patient health improvement with the suitable reminder of the medication administration by user friendly interfaces, data processing, correct calculation of formulas and appropriate responds, the display of the medication pictures and descriptions.

Therefore, we suggest that health care providers increase patients’ awareness and introduce them medication reminder mobile applications to promote these applications utilization and to improve medication adherence as well as decreasing medication errors.

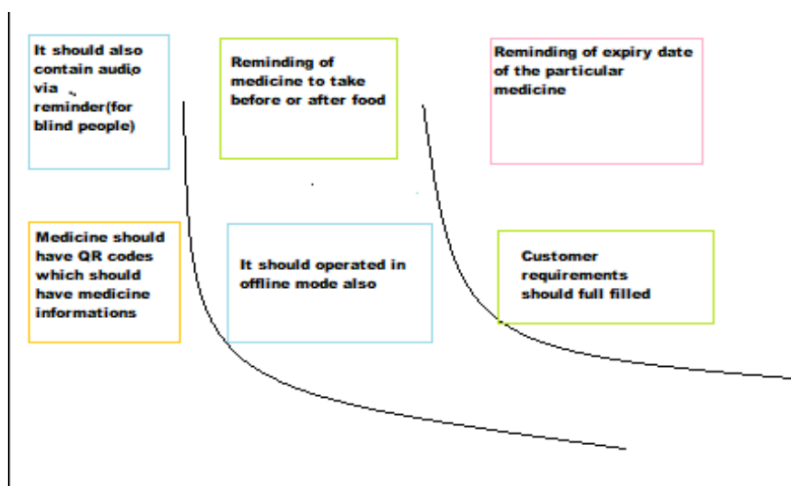


3.2 Ideation & Brainstorming:-

GROUP IDEAS

- >It should be implemented in smart watches or other wearable devices.
- >Set medication reminders once and it should be up to date.
- >Medicine name,Strength,dose should be displayed.
- >It should operated in offline mode also
- >Application should alert to refill the medicine

PRIORITIZE



3.3 Proposed Solution:-

This proposed system aims at connecting the patients with a medicine reminder application. Here we introduce a smart medicine reminder system based on IoT. The proposed scheme was particularly created for the Android platform. For our system, we implement a reminder system which provides an alarm when it is time for taking medicine. Along with that, there is an android application where the user can set their medicine time. In the application, there will some feature that help the user to know more details about their medicine. It keeps track for the medicine which means how much medicine they have to take they can be fixed in the application. The device setup consists of an IoT enabled pill box having multiple compartments, each having a lid to open, and an IR sensor attached to it. The system of pill box includes of IR sensors for observance and reported the state of medication, that frequently checks whether the medicine is taken or not. Whenever the medication is loaded into the pillbox it'll be updated the medicine data and saved in database. The Arduino device fetching real time data and send it to the application

3.4 Problem Solution Fit:-

Uniqueness:-

A User Interface is simple for users to understand. We can use the application anywhere anytime. This app is user friendly that reminds users to take their medications, warns about drug interactions, and assists caregivers in managing prescriptions for loved ones.

Business will grow if the app get user friendly, so that app should be created to be like user friendly. The model you select will depend on your target market, business objectives, and the resources you already have available.

The app also has feature that give SMS to caretaker if the medicine has taken on time by patient. It keeps track of the medications, allowing the user to adjust how much medication to take within the application.

Social Impact / Customer Satisfaction:-

This project aims to give reminder to the elder patient when he forgets to take medicine. The suggested plan was specifically designed for the Android operating system. We use a reminder system in this project, which gives an alarm when medicine taken time arrives. Additionally, the user can set their medication time using an android application. There will be some features in the application that allow the user to learn more specifics about their medication. It keeps track of the medications, allowing the user to adjust how much medication to take within the application.

Business Model (Revenue Model):-

This application is accessible by everyone . It is free. Business will grow if the app get user friendly, so that app should be created to be like user friendly. The model you select will depend on your target market, business objectives, and the resources you already have available

Scalability of the Solution :-

This application helps users to take their medication on time and help them to not forget the dosage. The app also has feature that give SMS to caretaker if the medicine has taken on time by patient. It keeps track of the medications, allowing the user to adjust how much medication to take within the application.

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)
Online		
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
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.

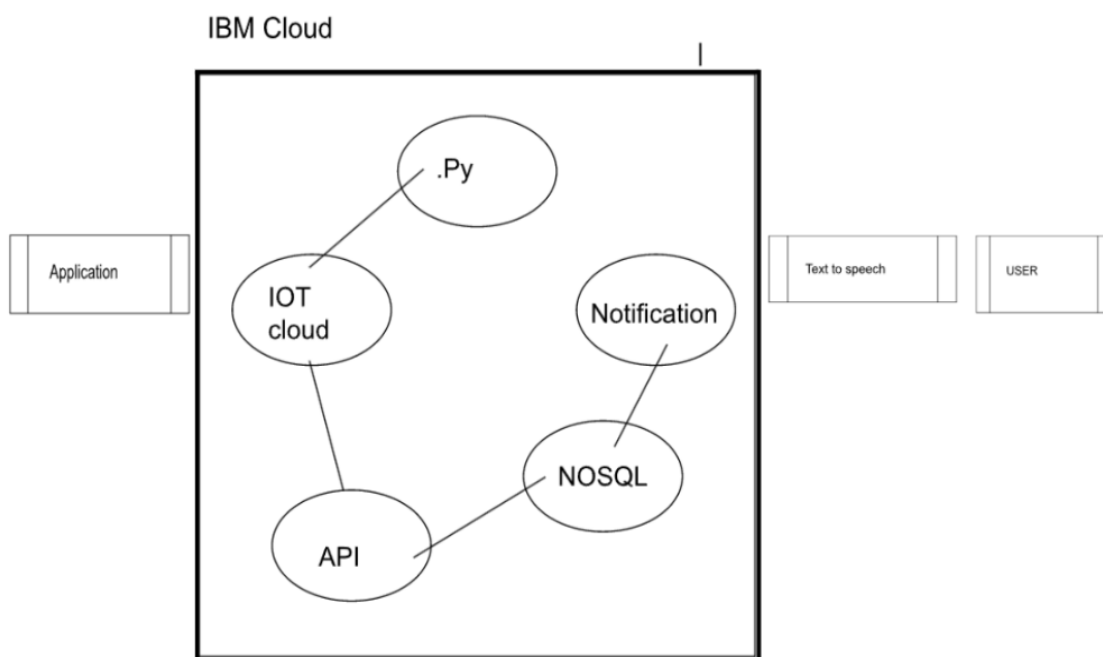
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The app will be very user friendly.It can be easily understand by the senior citizen
NFR-2	Security	For security, TFA is enabled and biometrics are also added for user safety
NFR-3	Reliability	Highly reliable since, It uses Trusted cloud services like IBM
NFR-4	Performance	The performance will be upto the mark as assured
NFR-5	Availability	Available on mobile app and web version
NFR-6	Scalability	Using cloud and high end database it can be expanded to next level

5. PROJECT DESIGN

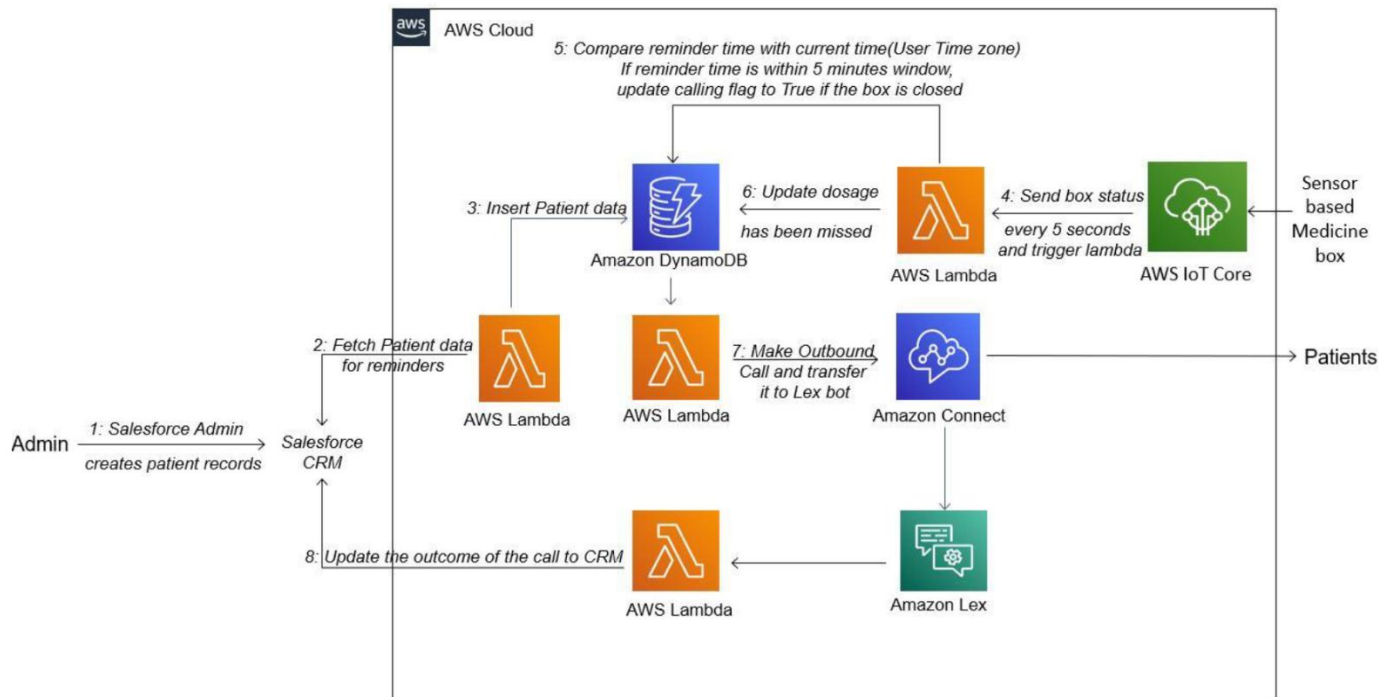
5.1 Data Flow Diagrams: -

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2 Solution Architecture Diagram: -



5.3 User Stories: -

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Registration	USN-1	As a user, I can register application by entering my email ,password.	I can access my account dashboard	High	Sprint-1
		USN-2	As a user, I will receive Confirmation email once I have registered for the application	I can receive successful message	High	Sprint-1
	Login	USN-3	As a user, I can log into the application by entering email &password	I can access into my Profile and view my dashboard	High	Sprint-1
	Dashboard	USN-4	As a user, I can login using my credentials and it will direct it to my dashboard	I can view and access what are the features are provided in dashboard	High	Sprint-1
Customer (Web user)		USN-5	As a user, I can login using my credentials and it will direct it to my dashboard	I can view and access what are the features are provided in dashboard	High	Sprint -1
Customer Care Executive	Query	USN-6	As a user had an any query about the given requirements	I can view a query and rectify the given query	Medium	Sprint-2

Administrato		Login	USN-7	As a admin ,have credentials using that they can login	They can view and modify the data in database	Mediu m	Sprint-2
		View	USN-8	As a admin I can view medicine information	View and modify	High	Sprint-1
		Modify	USN-9	As a admin I can modify the medicine information.	Modify only if there is a false information/	Mediu m	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

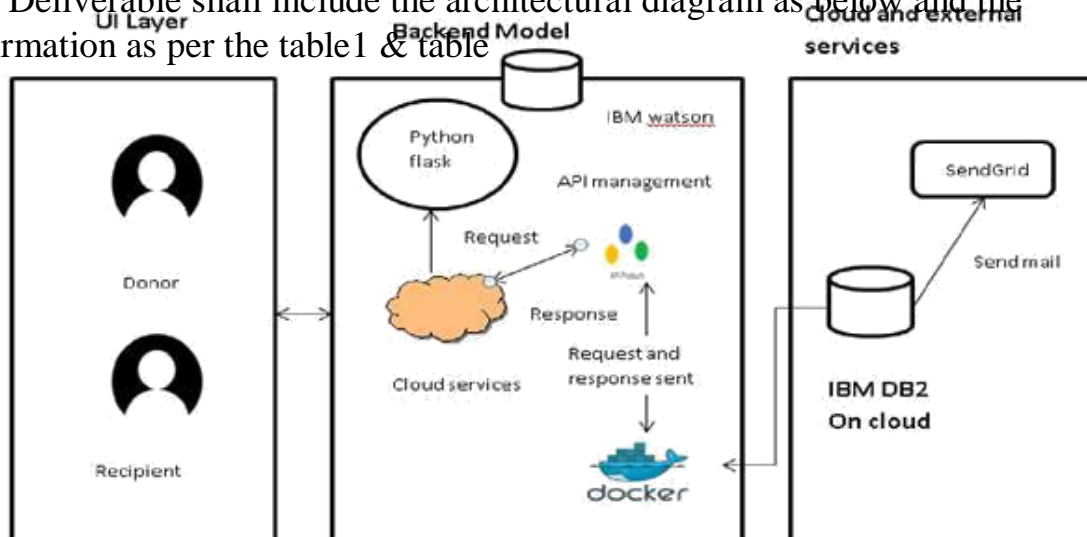
6.1 Sprint Planning

Sprints are the backbone of any good Agile development team. And the better prepared you are before a sprint, the more likely you are to hit your goals. Spring planning helps to refocus attention, minimize surprises, and (hopefully) guarantee better code gets shipped. The main event during agile methodology is the sprint, the stage where ideas turn into innovation and valuable products come to life. On one hand, agile sprints can be highly effective and collaborative. At the same time, they can be chaotic and inefficient if they lack proper planning and guidance. And for this reason, making a sprint schedule is one of the most important things you can do to ensure that your efforts are successful.

We categorized the sprint as 4 phases for creating the application

- Sprint 1 is about creating the login page and the register page.
- Sprint 2 is about sending the confirmation mail to the users during registration.
- Sprint 3 is about as a user, can log into application by entering email and password.
- Sprint 4 is about as user, can register and add their medications and dosage details for getting reminders.

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table



Guidelines:

1. Include all the processes (As an application logic / Technology Block)
2. Provide infrastructural demarcation (Local / Cloud)
3. Indicate external interfaces (third party API's etc.)
4. Indicate Data Storage components / services
5. Indicate interface to machine learning models (if applicable)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user register and login. See the UI.	HTML, CSS, Python Flask
2.	Data maintenance	Store , maintain ,retrieve the user's details.	MYSQL
3.	Chatbot	Clarify user queries.	IBM Watson service
4.	Confirmation Email	Sending the confirmation email to users they have registered successfully.	SendGrid

5.	Cloud Database	Cloud database to store plasma information and View Plasma information.	IBM DB2
6.	File Storage	File storage requirements	IBM Block Storage
7.	Infrastructure (Server / Cloud)	To deploy the application on Local System	Kubernetes

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Python Flask frameworks is used.	Python Flask
2.	Security Implementations	Mandatory Control(MAC) and kubernetes is used.	SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	3-Tier Architecture is used.	Web server-HTML,CSS Application Server-Python Flask Database Server-IBM DB2
4.	Availability	Using Load Balancer to distribute network traffic across Servers.	IBM Load Balancer
5.	Performance	User Friendly UI. Request and Response is faster.	IBM Content Delivery Network

6.2 Sprint Estimation and Delivery Schedule:

A sprint estimation shows how much effort a series of tasks require. It's based on assumptions, requirements, and dependencies of a project.

The Benefits of Agile Estimation



Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	KAMALAK KANNAN GOKULRAJ ARAM
Sprint-1	Registration	USN-2	As a user, I will receive confirmation email once I have registered for	1	High	DHARANI

		the application		RICHDEV
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Sprint-2	Database	USN-3	Join the application to IBM db-2	2	Low	GOKULRAJ ARAM
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	1	High	DHARANID HAR
Sprint-2	Dashboard	USN-4	As a user, I can register and make request for plasma donation.	2	High	RICHDEV

Project Tracker, Velocity & Burndown Chart

Sprint	Total Story Points	Durat ion	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	Nov 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	7 Nov 2022	Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	Nov 2022	20	19 Nov 2022

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{\textit{sprint duration}}{\textit{velocity}} = \frac{20}{10} = 2$$

7. CODING & SOLUTIONING

7.1 SendGrid

SendGrid is a cloud-based SMTP provider that allows you to send email without having to maintain email servers. SendGrid manages all of the technical details, from scaling the infrastructure to ISP outreach and reputation monitoring to whitelist services and real time analytics.







SendGrid provides two ways to send email: through our SMTP relay or through our Web API. SendGrid provides client libraries in many languages. This is the preferred way to integrate with SendGrid. If you choose to use SendGrid without a client library, the Web API is recommended in most cases as it is faster, provides some benefit with encoding, and tends to be easier to use. SMTP provides many features by default, but is harder to setup.

Web API

- The Web API has some advantages over SMTP:
- If your ISP blocks all outbound mail ports and your only option is HTTP.
- If there is high latency between your site and ours, the Web API might be quicker since it does not require as many messages between the client and server.
- If you do not control the application environment and cannot install and configure an SMTP library.
- If you build a library to send email, developing against a web API provides quicker development.

SMTP Relay

- If you are integrating SendGrid with an existing application, setting up the application to use our SMTP relay is easiest, as it only requires modifying SMTP configuration.
- Change your SMTP username and password to your SendGrid credentials.
- Set the server host name to smtp.sendgrid.net
- Use ports 25 or 587 for plain/TLS connections and port 465 for SSL connections.

Databases				Database name	Create Database	{ } JSON	
Your Databases							
Name	Size	# of Docs	Partitioned	Actions			
nodered	29.5 KB	4	No	  			
tablet	2 bytes	1	No	  			
Showing 1–2 of 2 databases. Databases per page 20							

Code:

```
import os
from dotenv import load_dotenv

load_dotenv()
from sendgrid import SendGridAPIClient
from sendgrid.helpers.mail import Mail

def sendmail(usermail,subject,content):
    message =
Mail(from_email='gokulap@student.tce.edu',to_emails=usermail,subject=subject,html_content='<strong> {} </strong>'.format(content))
    try:
        sg = SendGridAPIClient(os.getenv('SENDGRID_API_KEY'))
        response = sg.send(message)
        print(response.status_code)
        print(response.body)
        print(response.headers)
    except Exception as e:
        print(e.message)
```

7.2 Database Schema

Name	Size	# of Docs	Partitioned	Actions
nodered	29.5 KB	4	No	
tablet	2 bytes	1	No	

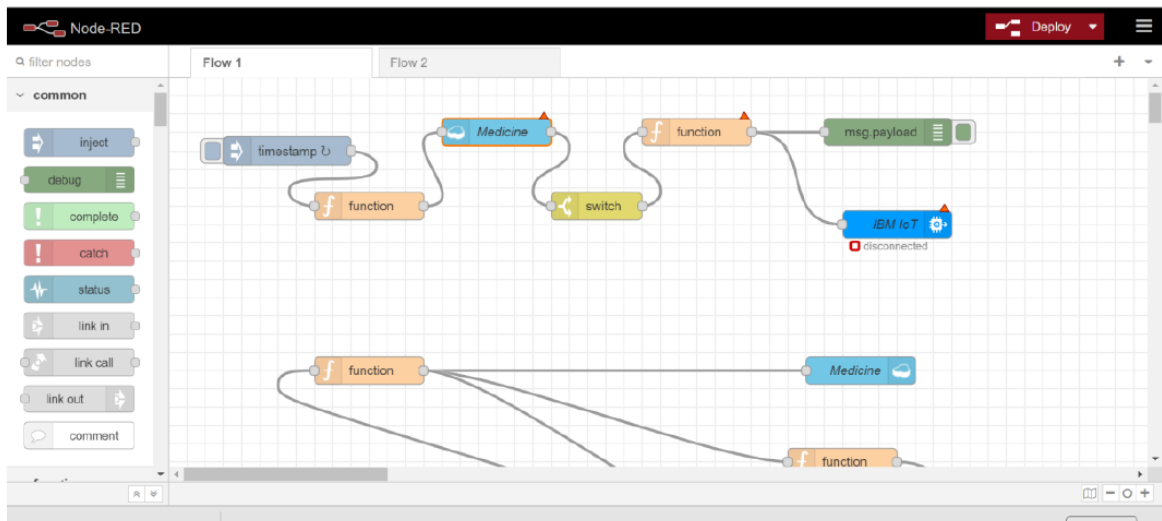
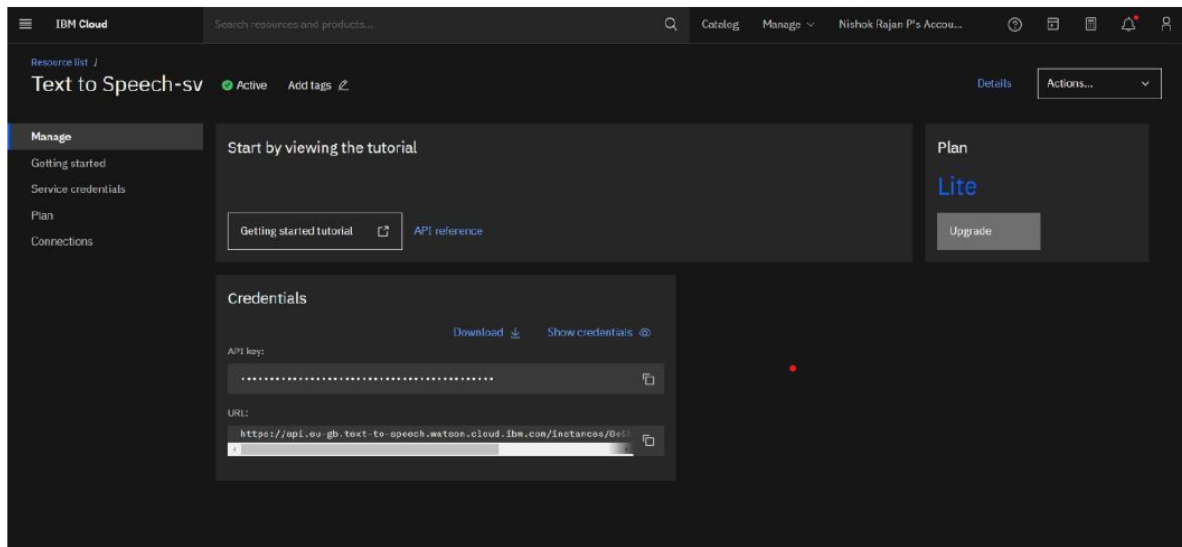
Showing 1–2 of 2 databases. Databases per page 20 « 1 »

1. Creating IBM Watson IoT Platform and device:

Device ID	Status	Device Type	Class ID	Date Added
8421	Disconnected	NodeMCU	Device	30 Oct 2022 18:12

Items per page 50 | 1–1 of 1 item 1 of 1 page < 1 >

3. Creating Text to Speech Service:



ADVANTAGES & DISADVANTAGES

Advantages

- ***Speed***

This website is fast and offers great accuracy as compared to manual registered keeping.

- ***Maintenance***

Less maintenance is required

- ***User Friendly***

It is very easy to use and understand. It is easily workable and accessible for everyone.

- ***Fast Results***

It would help you to provide medicine assistance easily depending upon the dosage.

Disadvantages

- ***Internet***

It would require an internet connection for the working of the website.

- ***Auto- Verification***

It cannot automatically verify the genuine users.

10. CONCLUSION

This project aims to give reminder to the elder patient when he forgets to take medicine. We use a reminder system in this project, which gives an alarm when medicine taken time arrives.

Additionally, the user can set their medication time using the application. There will be some features in the application that allow the user to learn more specifics about their medication. It keeps track of the medications, allowing the user to adjust how much medication to take within the application.

11. FUTURE SCOPE

Medicine Assistance Application can be developed to further improve user accessibility via integrating this application with various social networks application program interfaces (APIs). Consequently, users can login and sign up using various social networks. This can allow the user to directly connect with their doctors as well.

User interface (UI) can be improved in future to accommodate global audience by supporting different languages across countries. Data scraping can be done from different social networks and can be shown in the Medicine Information Feeds. Appointments can be synchronized with Google and Outlook calendars for the ease of users.

Doctors and Patients Stories feature aims to create a sense of belonging to the community. Patients will be able to view and share personal experiences about their experiences of medicine assistance which contributed to their improved health and lives.

We hypothesise that a more efficient experience will help the user look forward to his/her medicine assistance.

12. APPENDIX

- *GitHub and Source code Link - <https://github.com/IBM-EPBL/IBM-Project-26672-1660032833>*