



KONGUNADU COLLEGE OF ENGINEERING AND



TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**HX 8001-PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY
AND ENTREPRENEURSHIP**

**PERSONAL ASSISTANCE FOR SENIORS WHO ARE
SELF RELIANT**

NALAIYA THIRAN PROJECT REPORT 2022

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CHAPTER 1

INTRODUCTION

For elderly folks, taking regular medications becomes exceedingly challenging. Several members of a family, such as the elderly, require ongoing assistance. However, it is not always easy for us to constantly remind them of their medication quantities. We need a place where we can monitor patients and provide care for them for this reason. In our project, we create an Android app that assists patients by reminding them when their medications are due, among other things.

1.1 PROJECT OVERVIEW

Today, most people can expect to live into their seventies and beyond. According to the UN, the number of people aged 60 or older is projected to grow by 56 % by 2030. IoT is a revolutionary phenomenon that transforms our life entirely as well as aims to revolutionize current healthcare into a more individualized, precautionary and inclusive approach to treatment

1.2 PURPOSE

The goal of a medication reminder system is to assist elderly people in taking care of themselves by reminding them to take their prescriptions on schedule. The medicine reminder system is currently being implemented in many hospitals in western countries by a number of organisations that have themselves started doing so in the healthcare industry. However, many patients, especially elderly patients, either fail to take their medications in the recommended dosage or overdose on them in the mistaken belief that doing so may hasten their recovery. They could worry that the doctor ordered too many pills or not enough of a certain medication.

Our system records the user's prescription information, including the duration of the prescription, the names of the medications, and the timeframes during which they must be taken. After all of this information has been submitted, our system will notify the user by smartphone notification and a physical reminder, at the appropriate time, which medication has to be taken. They will be informed when the allotted period for the medication has expired, and they are only need to take their medications within that time. If correctly implemented, this will significantly reduce medication overdoses brought on by forgetfulness, and patients will also be reminded to take their medications.

CHAPTER 2

LITERATURE SURVEY:

[1] TITLE: Falls Event Detection Based on Triaxial Accelerometry and Barometric Pressure Stephen J. Redmond and Federico Bianchi (2010)

Falls and fall-related injuries are a major contributor to morbidity, disability, and health care usage, especially in the 65+ age group. The prognosis for fall victims might be better if falls incidents could be detected unsupervisedly. Numerous wearable systems for detecting falls based on accelerometry and gyroscopes have been reported in the literature, however patients have unacceptably high false positive rates. This study investigates the use of a barometric pressure sensor in place of an altimeter in such systems to better differentiate between genuine falls and regular daily activities. The data on air pressure and acceleration are recorded and offline analysed by a wearable device attached to the subject's waist. Twenty young, healthy participants are used in the study, and various techniques including simulated falls into mattresses and role-played daily routines are used (12 male and 8 female; age: years). A decision tree classifier with heuristic training is used to categorise suspected falls. The suggested method clearly beat an existing accelerometry-based technique with accuracy, sensitivity, and specificity in the indoor environment of 96.9%, 97.5%, and 96.5%, respectively, with no false positives created throughout extended testing throughout daily activities. In comparison, employing solely accelerometry for the same measures yielded results of 85.3%, 75%, and 91.5%, respectively. The increased specificity of this technology may persuade more senior citizens to utilise falls detectors.

2] TITLE: WiebrenZijlstra and Jochen Klenk evaluated accelerometer-based fall detection algorithms on real-world falls (2012)

Falling still ranks as one of the top causes of sickness and mortality among the elderly, despite substantial protective efforts. Real-time fall detection and immediate notification to a telecare facility may enable the provision of rapid medical assistance, increasing the elderly's sense of security and reducing some of the negative impacts of falls. Several techniques have been developed to automatically detect falls using inertial sensors. Even while authors of earlier publications said that their algorithms had great specificity (SP) and sensitivity (SE), they often only tested their algorithms on simulated falls performed by healthy volunteers. Authors have collected acceleration data during a number of real falls among a patient group with a high fall-risk as part of the SensAction-AAL European study. The current work compares the performance of thirteen known fall-detection algorithms against a database of 29 real falls. According to our knowledge, this is the first thorough examination of fall detection algorithms compared to actual falls. The authors found that the thirteen algorithms had an SP average of (meanstd) 83.0%30.3% (maximum value = 98%). The findings from the simulation of falls showed that the SE was substantially lower (SE = 57.0%27.3%, maximum value = 82.8%). The factors that affect how effectively the described algorithms work when applied to real-world falls are further discussed. These findings emphasise the need of testing fall-detection algorithms in real-world settings to develop more reliable and well-liked automatic warning systems. The current results also support the idea that a substantial, publicly available database of real falls might, in theory, give a better understanding of the fall process as well as the knowledge necessary to construct and test a high-performance fall detector.

[3] TITLE: Detecting Falls Using Body-Worn Sensors Jorunn L. Helbostad and Lorenzo Chiari (2013)

Falls among senior citizens remain an important public health concern. Body-worn sensors are needed to better understand the underlying kinematics and mechanics of falls. The goal of this systematic review is to gather, collect, and critically analyse information from published studies as well as the features of these investigations (fall documentation and technical characteristics). Methods: When looking for papers on fall detection with body-worn sensors, public electronic literature databases yielded 96 entries (33 journal articles, 60 conference proceedings, and 3 project reports). This information was released between 1998 and 2012. Separate assessments of these papers were undertaken by two objective expert reviewers. Using a custom designed data form, data was obtained and analysed with SPSS (SPSS Inc., Chicago, IL, USA). Results: The main findings were that there were surprisingly few recordings of real falls and that the methodology and documentation methods (study, fall reporting, and technological characteristics) used in the research did not coincide. The majority of articles identified the absence of a generally acknowledged fall definition as a methodological problem. The many sensor varieties and their technical specifications change greatly between test. Conclusion: It was discovered that studies using body-worn sensors for fall detection lacked methodological coherence. There is currently a lack of published evidence-based support for commercially available fall detection systems. A worldwide research group consensus is needed to address fundamental issues such event verification, the development of standards for fall reporting, and the construction of a common fall definition.

[4] TITLE: Triaxial Acceleration-Based Low-Power Fall Detection Algorithm Based On Barometric Pressure Wang Changhong and Narayanan Michael (2014)

This study proposes a low-power fall detection method based on triaxial accelerometry and barometric pressure data. The application dynamically alters an accelerometer's sample rate and manages data flow between sensors and a controller in order to save electricity. The simulation results show that the suggested fall detection algorithm's sensitivity and specificity are both over 96% when applied to a previously gathered dataset made up of 20 adolescent actors performing a combination of simulated falls and activities of daily life. This is true even with a 10.9% reduction in power consumption.

[5] TITLE: Gravitational Search Algorithm for EEG Signal Peak Detection: Feature Selection and Classifier Parameter Estimation Adam Asrul and Mokhtar Norrima (2014)

Peak identification is a critical stage in the study of electroencephalography (EEG) data because peaks may represent important brain functions. Peak point identification can be carried out in the time, frequency, time-frequency, or nonlinear domains. The major objective of this study is to identify the important peak features in the time domain. Gravitational search algorithm (GSA) and particle swarm optimization are two feature selection strategies that can assist with this (PSO). The primary focus of this study is the GSA approach, a novel computational intelligence algorithm. GSA makes it possible to estimate the classifier's parameters and select its peak features at the same time. The key peak features of the peak identification method, with an average test accuracy of 77.74%, were determined based on the experimental results.

[6] TITLE: Optimizing Smartphone Battery Life to Increase Compliance with Remote Healthcare Systems SuneilNyamathi and Jo-Ann Eastwood (2015)

Remote health monitoring is a method to minimise the financial burden brought on by unhealthy lifestyles and ageing populations (RHM). A significant challenge for many systems, especially those that make use of smartphone technology, is increased adherence to medical regimens recommended by doctors. The authors of this study offer a technique to enhance smartphone battery consumption and look into the effect of smartphone battery lifespan on compliance in order to boost users' adherence to remote monitoring systems. The WANDA-CVD RHM method is used by authors in the Women's Heart Health Study for individuals who are at risk for cardiovascular disease. Battery longevity was extended by an average of 192% using the battery optimization strategy, which also resulted in a 53% improvement in study compliance. In order to assist RHM systems that detect physical activity, technologies like WANDA-CVD may be used to increase the battery life of smartphones.

[7] TITLE: Fall Detection And Classification Of Activities Of Daily Living Using Power-Efficient Interrupt-Driven Algorithms, KokKiong Tan and Jian Yuan (2015).

The health of elderly adults who fall considerably worsens. The likelihood of returning to an independent life while lowering the risk of complications and mortality may be considerably increased with immediate support. Automatic fall detectors are practical devices that may alert loved ones and caregivers to potentially fatal circumstances. Since typical accelerometer-based fall studies focus on accuracy, the bulk of algorithms will be implemented in microcontroller units (MCUs) with sluggish processing rates and random-access memory. Additionally, a fall detector's ideal battery life is many weeks or months. This paper presents a fall detection system and a daily living activity categorization method using a wrist-worn wearable device. Both methods are simple to implement on an 8-bit MCU and use little power. The authors implement an interrupt-driven technique using a modern digital micro electro mechanical systems accelerometer that allows interrupts and data buffering. The approach is very different from conventional algorithms, which must carefully examine and analyse each item of data gathered at high frequencies. A host MCU may analyse far less data when using the interrupt-driven approach and only perform processing in response to an interruption from the accelerometer or timer.

2.1 EXISTING PROBLEM

It is crucial to make it possible for fragile patients and elderly people at risk to remain in their own homes or adeptness for assisted living. For this reason, many web and mobile applications have been developed to solve this issue. Many companies have created prototype AI Robots to study to measure the vital signs such as heart rate, heart rate variance and answer health related questions of an individual. Though many the seniors are non-techs, it will be challenge for them to familiarized with the applications.

2.2 REFERENCES

- "Feature selection and classifier parameter estimation for EEG signal peak identification using gravity search algorithm," 4th International Conference on Artificial Intelligence with Applications in Engineering and Technology, Adam A, Mokhtar N, Mubin M, Ibrahim Z, Tumari MZ, Shapiai MI (2014). (pp. 103-108).
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- Improving compliance in remote healthcare systems by smartphone battery optimization is a topic covered by Alshurafa N, Eastwood JA, Nyamathi S, Liu JJ, Xu W, Ghasemzadeh H, Pourhomayoun M, and Sarrafzadeh M (2014) in IEEE Journal of Biomedical and Health Informatics, 19(1):57-63.
- Obstacle avoidance embedded system for a smart wheelchair with a multimodal navigation interface, Amberlay Ruz-Serrano, Miriam C. Reyes-Fernández, Rubén Posada-Gómez, Albino Martnez-Sibaja, and Alberto A. Aguilar-Lasserre (2014), 11th International Conference on Electrical Engineering, Computing Science, and Automatic Control (CCE).
- A practical obstacle detection and avoidance system was discussed in Badal S, Sai Ravela, Bruce A. Draper, and Allen Hanson's 1995 paper presented at the Conference on Applications of Computer Vision (10.1109/ACV.1994.341294).

2.3 PROBLEM STATEMENT DEFINITION



Fig:2.3.1

This Picture describes the problem statement of our project. It says about the retired persons difficulties in taking correct medicines in correct time. As they are elderly people they can't able to remember what medicines to be taken at what time. So they can't able to maintain their health condition normally. And they feel very frustrated.

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community. Empathy maps can be used whenever you find a need to immerse yourself in a user's environment.

Everyone would add at least one sticky to every section. You might ask questions, such as:

- What would the user be thinking and/or feeling? What are some of their worries and aspirations?
- What would their friends, colleagues, and boss be likely to say while the user is using our product? What would the user hear in these scenarios?
- What would the user see while using our product in their environment?
- What might the user be saying and/or doing while using our product? How would that change in a public or private setting?
- What are some of the user's pain points or fears when using our product?
- What gains might the user experience when using our product?



Fig:3.1.1

This picture describes our project empathy map. This template has been taken from mural app. In this template we describe what the customer thinks and feels about our project. And it describes what the customer hears about this project in the society. And it also describes the pain and gain of the project.

3.2 IDEATION & BRAINSTORMING

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A principal difference between ideation and brainstorming is that ideation is commonly more thought of as being an individual pursuit, while brainstorming is almost always a group activity. Brainstorming is usually conducted by getting a group of people together to come up with either general new ideas or ideas for solving a specific problem or dealing with a specific situation.

For example, a major corporation that recently learned it is the object of a major law suit may want to gather together top executives for a brainstorming session on how to publicly respond to the lawsuit being filed.

Participants in a brainstorming session are encouraged to freely toss out whatever ideas may occur to them. The thinking is that by generating a large number of ideas, the brainstorming group is likely to come up with a suitable solution for whatever issue they are addressing.

The lines between ideation and brainstorming have become a bit more blurred with the development of several brainstorming software programs, such as Bright idea and Idea wake. These software programs are designed to encourage employees of companies to generate new ideas for improving the companies' operations and, ultimately, bottom-line profitability.

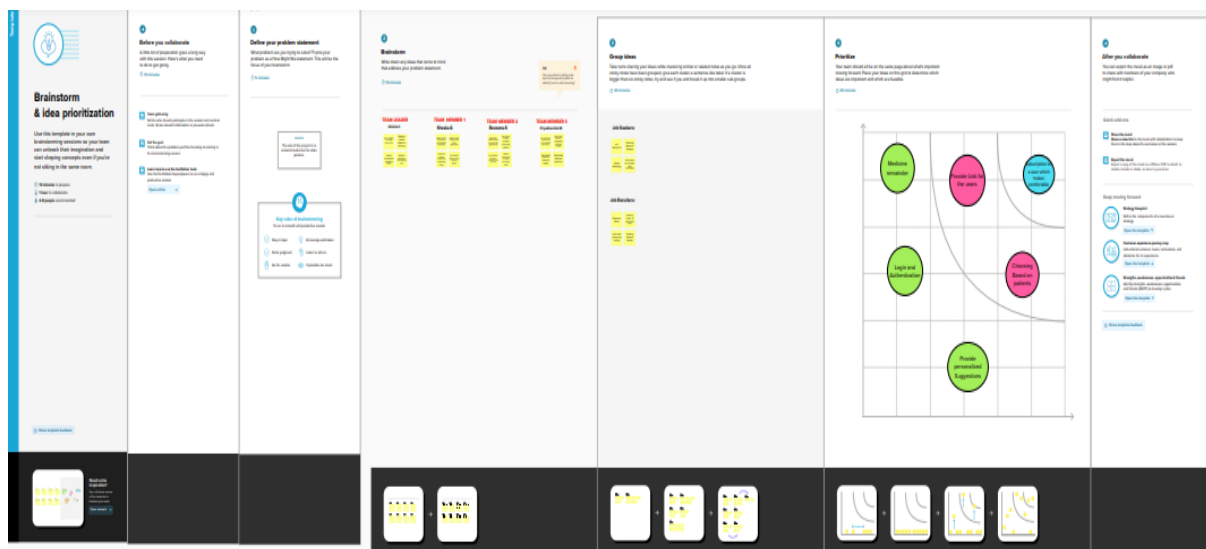


Fig.3.2.1

This figure represents the brainstorming and ideation prioritization of our project. It includes the idea of our project. And what should be done in the project. The graph represents which one should be given high priority.

3.3 PROPOSED SOLUTION

Software, hardware, other goods or equipment, as well as any necessary services (such as any installation, implementation, training, maintenance, and support services) are collectively referred to as the Proposed Solution in order to accomplish the outcome specified by the Vendor in its Proposal.

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Medicine remainder system helps the elder persons to take the medicines in correct time and it remains which medicine to be taken at which time.
2.	Idea / Solution description	The idea for this project is basically it contains buzzer to remind the medicines in correct time.
3.	Novelty / Uniqueness	The uniqueness of this project is, it maintains good relationship between the closed ones and can maintain their health properly.
4.	Social Impact / Customer Satisfaction	It helps many of the users to take care of their closer elder persons who are far away from them.
5.	Business Model (Revenue Model)	In business model it provides high revenue with low investment.
6.	Scalability of the Solution	It is user-friendly product and it remains for longer period. It helps to maintain good health condition

Fig:3.3.1

This figure represents six parameters. The first parameter is problem statement. It describes the problem faced by the senior people and how the problem can be solved. The second parameter is idea and solution description. It contains buzzer to remaind the medicines in correct time. Third one is novelty. It describes the uniqueness of the project.

And the fourth parameter is social impact and customer satisfaction. Business model is the fifth parameter. and the last parameter described here is scalability of the solution.

3.4 PROBLEM SOLUTION FIT

The Problem-Solution is a tool for entrepreneurs, marketers, and corporate innovators that helps to find ideas with higher odds of solution adoption, minimise time spent on solution testing, and gain a better understanding of the existing situation. Such information is generally acquired "on the fly," following rounds of revisions and consumer interviews, but it is critical to your success. This canvas contains everything you need to find patterns and realise what would work and why, based on the ideas of learn startup, and user experience design. Simply be where your consumers are and address a genuine need, whether it's the same problem done differently or something new presented in a familiar way.

In this project these are the needs for that.

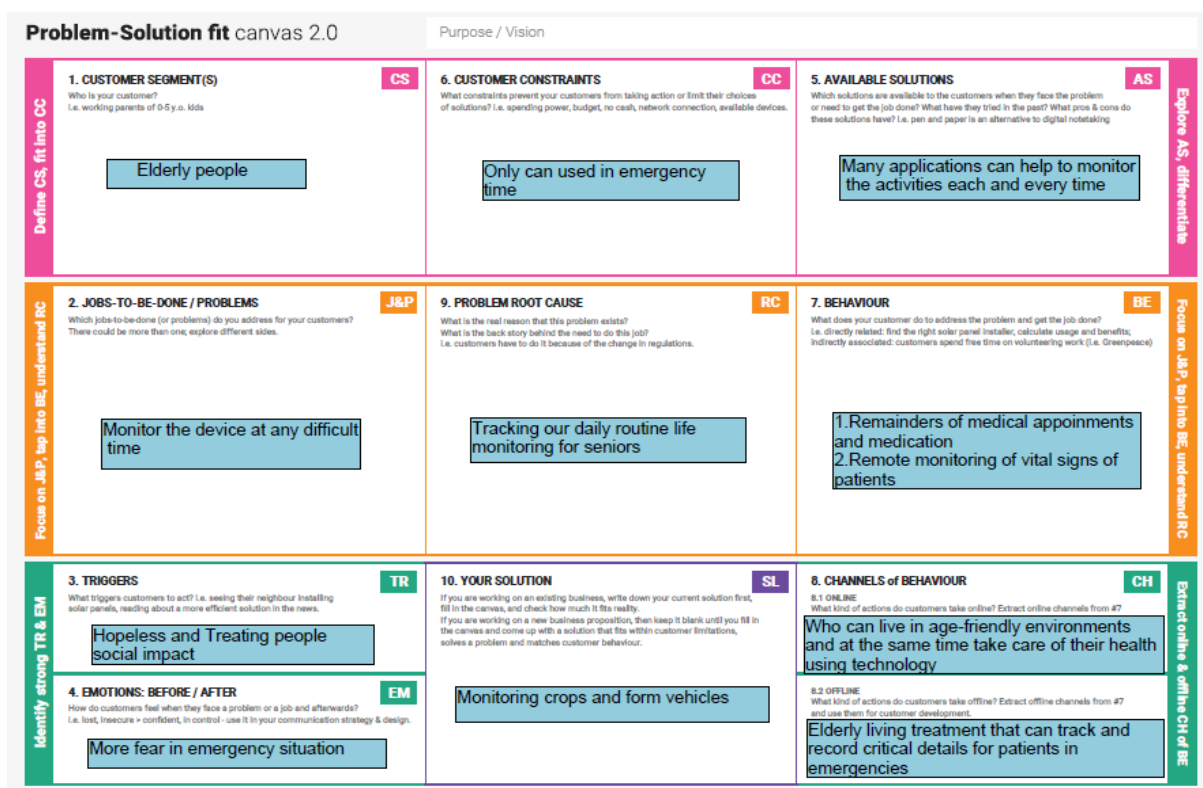


Fig:3.4.1

This picture describes the problem solution fit of the project. It includes customer segments, customer constraints, it describes the root cause of the problem and it gives the available solutions for the problems.

CHAPTER 4

REQUIREMENT ANALYSIS

Requirements analysis, also called requirements engineering, is the process of determining user expectations for a new or modified product. These features, called requirements, must be quantifiable, relevant and detailed. In software engineering, such requirements are often called functional specifications.

Requirements analysis is an important aspect of project management. Requirements analysis involves frequent communication with system users to determine specific feature expectations, resolution of conflict or ambiguity in requirements as demanded by the various users or groups of users, avoidance of feature creep and documentation of all aspects of the project development process from start to finish. Energy should be directed towards ensuring that the final system or product conforms to client needs rather than attempting to mold user expectations to fit the requirements.

Requirements analysis is a team effort that demands a combination of hardware, software and human factors engineering expertise as well as skills in dealing with people.

The purpose of the Requirements Analysis Phase is to transform the needs and high-level requirements specified in earlier phases into unambiguous (measurable and testable), traceable, complete, consistent, and stakeholder-approved requirements.

4.1 FUNCTIONAL REQUIREMENTS

Functional requirements may involve calculations, technical details, data manipulation and processing, and other specific functionality that define what a system is supposed to accomplish. Behavioural requirements describe all the cases where the system uses the functional requirements, these are captured in use cases.

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Device Registration	Registration through phone number Registration through OTP
FR-2	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-3	User Confirmation	Confirmation via Email Confirmation via OTP
FR-4	Medication Registration	Registration through Patient Name Medication Details
FR-5	Medication Alert	Alert through Message Alert through buzzer Alert through Alarm
FR-6	Stock Alert	Alert through Message

Fig:4.1.1

This figure describes the functional requirements of the project. In this, it shows that what are all the functions required for doing the project. In this we required six functions such as User Registration, Device Registration, User Confirmation, Medication Registration, Medication Alert And the Stock Alert.

4.2 NON-FUNCTIONAL REQUIREMENTS

In systems engineering and requirements engineering, a non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours. They are contrasted with functional requirements that define specific behaviour or functions. The plan for implementing functional requirements is detailed in the system design.

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

S.NO.	NON-FUNCTIONAL REQUIREMENT	DESCRIPTION
1.	Usability	The system offers efficiency for data backup. The system will track every mistake as well as keep a log of it.
2.	Security	The system needs the patient to recognize herself or himself using the phone. Any users who make use of the system. Need to hold a logon ID and password.
3.	Reliability	Reliability specifies how likely the system or its element would run without a failure for a given period of time under predefined conditions. Traditionally this probability is expressed in percentage.
4.	Performance	The system provide acknowledgement in just one second once the patients information is checked. The system need to support at least 1000 peoples at once. The user interface acknowledges within 5 sec.
5.	Availability	The system is available all the time.
6.	Scalability	Scalability assesses the highest workloads under which the system will still meet the performance requirement. There are two ways to enable your system scale as the workloads get higher; horizontal and vertical scaling.

Table:4.2.1

This figure describes the non-functional requirements of the project. Ther are six Non-functional requirements such as Usability, Security, Reliability, Availability, Performance and scalability.

CHAPTER 5

PROJECT DESIGN

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 can be manual, automated, or a combination of both. It shows how data enters and leaves the system, what changes the information, and where data is stored.

The objective of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communication tool between a system analyst and any person who plays a part in the order that acts as a starting point for redesigning a system. The DFD is also called as a data flow graph or bubble chart.

A set of parallel lines shows a place for the collection of data items. A data store indicates that the data is stored which can be used at a later stage or by the other processes in a different order. The data store can have an element or group of elements. The DFD may be used to perform a system or software at any level of abstraction. DFDs may be partitioned into levels that represent increasing information flow and functional detail. Then the system is decomposed and described as a DFD with multiple bubbles. Parts of the system represented by each of these bubbles are then decomposed and documented as more and more detailed DFDs.

5.1 DATA FLOW DIAGRAMS

The basic operation of the medication rest and monitoring system is illustrated in a flow chart, which also details the scheduling and administration of medications. Data will be retained in the cloud regardless of whether the patient adheres to the timetable or not. The patient's record will be analysed using the recorded data, and subsequent prescriptions will be given in accordance with it.

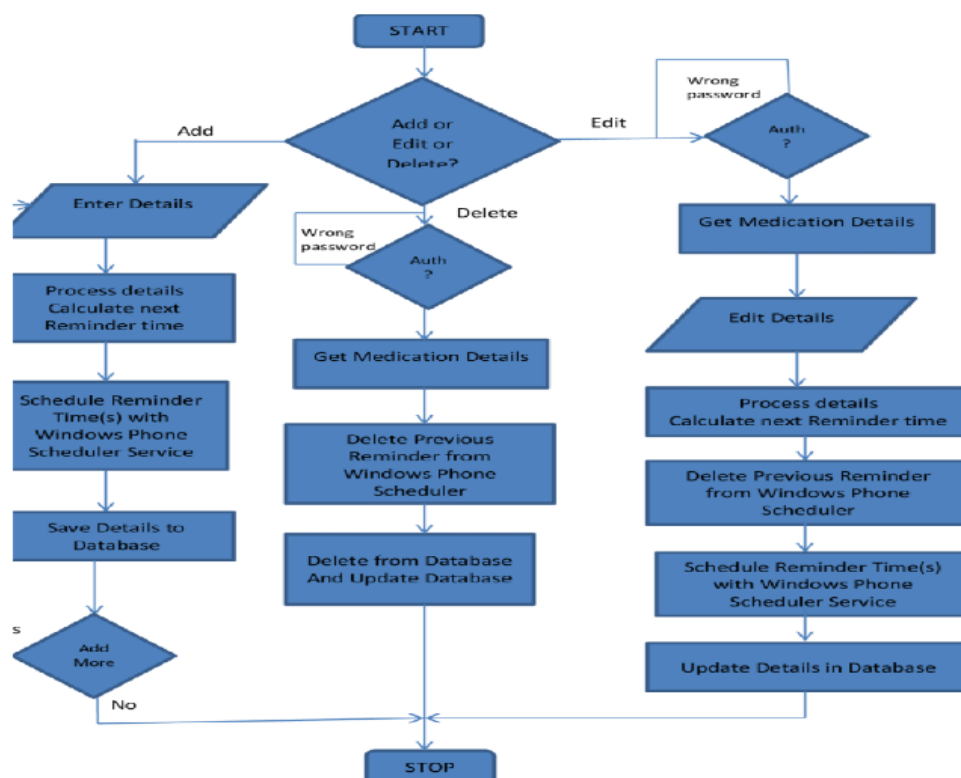


Fig:5.1.1

This figure shows the data flow diagram. It shows from the start process to the End process. First start the process. Next to the start block it has add or edit or delete block. If it is add, we should enter the details and the details of next remainder time calculation. We should schedule the times with windows phone scheduling service. Then save the details to the data base. Then stop the process.

If we want to edit, then go to edit and get the medication details. Then further process same as in add process. Atlast the details should be updated in the database.

If we want to delete, then go to delete condition and get the details of medications which is to be deleted and do the further process. Then finally it should be updated in database. Then stop the process.

5.2 SOLUTION AND TECHNICAL ARCHITECTURE

Solution Architects are most similar to project managers, ensuring that all parties, including stakeholders, are on the same page and moving in the right direction at all stages. Technical architects manage all activities leading to the successful implementation of a new application. They propose a combination of building blocks that provides the best possible fix. This process is very detail-oriented and serves as a connecting piece between enterprise architecture and technical architecture. It also requires a breadth of knowledge in the technical and business inner workings of the company.

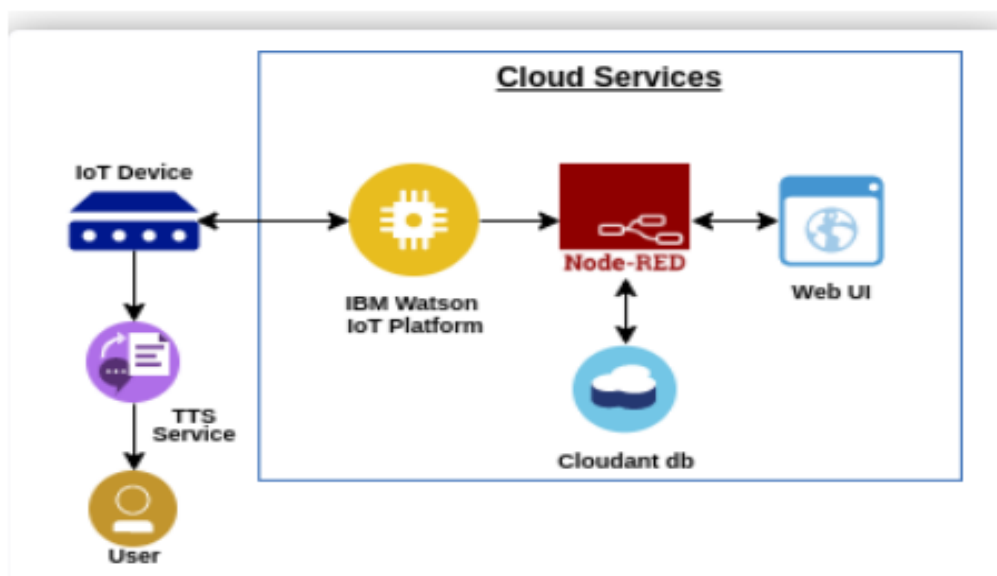


Fig:5.2.1

This figure shows the solution architecture diagram. In this it shows the platforms which are all used for this project. It also shows the connections of all platform.

5.3 USER STORIES

A user story is the smallest unit of work in an agile framework. It's an end goal, not a feature, expressed from the software user's perspective.

A user story is an informal, general explanation of a software feature written from the perspective of the end user or customer.

The purpose of a user story is to articulate how a piece of work will deliver a particular value back to the customer. Note that "customers" don't have to be external end users in the traditional sense, they can also be internal customers or colleagues within your organization who depend on your team.

User stories are a few sentences in simple language that outline the desired outcome. They don't go into detail. Requirements are added later, once agreed upon by the team.

UserType	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance standard	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by using the app url.	I can access my account / dashboard.	High	Sprint-1
		USN-2	As a user, I access the app url from any device	I can access dashboard from any device.	Medium	Sprint-1
		USN-1	As a user, I can enter the data in the given format	I can only the data in the givenformat	Medium	Sprint-1
	Dashboard	USN-2	In the dashboard section, the user able to enter the medicine name and their timing schedule	I can access thedata	High	Sprint-1
Customer (Web user)	Registration	USN-3	As a customer, I can register and access the application through app URL	I can enter thedata required	High	Sprint-2
Customer Care Executive	Storage	USN-5	As a customer care executive, I visit and check the status	I can login intocloud database	Medium	Sprint-3

Administr- ator	Storage	USN-8	As an Administrator, I can login into cloud accounts and have control over them	I can login into cloud storage account	High	Sprint-4
	Notification	USN-13	As an Administrator, I can access the user's database	I can access the user accounts and data	Medium	Sprint-4

Table:5.3.1

CHAPTER 6

PROJECT PLANNING & SCHEDULING

Planning - Planning pertains to the process of creating a plan of which materials and resources will be required to fulfil incoming and forecasted demand. This step is crucial to ensure that you have enough materials and resource capacity available to produce your orders on time. This component pertains to the 'what' and 'how' of any project: what exactly needs to be achieved and how it will be accomplished.

Scheduling - Scheduling pertains to establishing the timing of the use of specific resources of that organization. In production, scheduling involves developing schedules for workers, equipment, and materials. It reflects on the 'when' of a project, by assigning the appropriate resources to get the production plan completed within a period of time. Creating optimized production schedules ensures that your facility is able to reduce costs, increase productivity, and deliver goods to customers on time.

6.1 SPRINT PLANNING AND ESTIMATION

Planning: In Sprint Planning, the team decides what it will build in the upcoming Sprint and how they will build it. The team commits to the Sprint goal after breaking down user stories into tasks and doing task-level estimation. Sprint Planning is done by the Product Owner, Scrum Master, and the Team. In Scrum, every project is broken into time blocks called sprints, usually 2-4 weeks long. A sprint planning meeting is when the team (including the Scrum Master, Scrum Product Manager, and Scrum Team) meets to determine which backlog items will be handled in the next sprint.

Estimation: In Scrum Projects, Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

Product Owner ensures that the prioritized User Stories are clear, can be subjected to estimation, and they are brought to the beginning of the Product Backlog.

As the Scrum Team in total is responsible for the delivery of the product increment, care would be taken to select the User Stories for the Sprint based on the size of the Product Increment and the effort required for the same.

The size of the Product Increment is estimated in terms of User Story Points. Once the size is determined, the effort is estimated by means of the past data, i.e., effort per User Story Point called Productivity.

6.2 SPRINT DELIVERY SCHEDULE

Since sprints take place over a fixed period of time, it's critical to avoid wasting time during planning and development. And this is precisely where sprint scheduling enters the equation.

In case you're unfamiliar, a sprint schedule is a document that outlines sprint planning from end to end. It's one of the first steps in the agile sprint planning process—and something that requires adequate research, planning, and communication.

Teams often run into trouble when they create more than few schedules. This can create conflict and derail projects midway through their cycles. To ensure things stay on track, one schedule makes sense.

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	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Table:6.2.1

This table describes the sprint start dates and end date. It also includes the story points and the sprint release date.

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

6.3 REPORTS FROM JIRA FILES

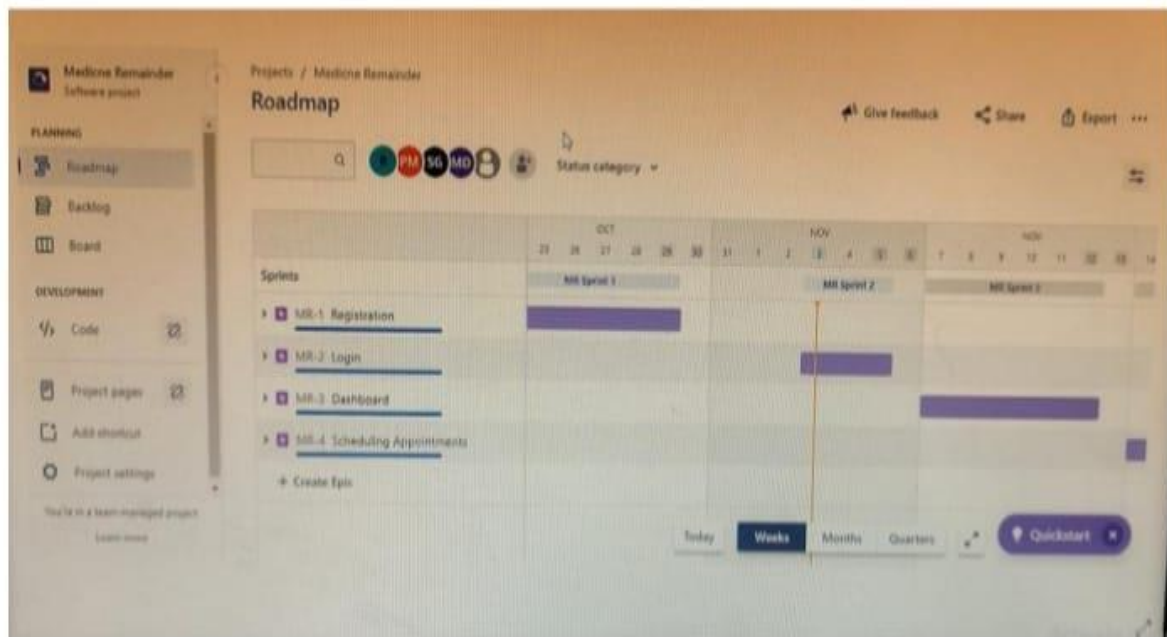


Fig:6.3.1

This figure shows the reports in the Jira Software. It includes four Sprints which is to be done.

CHAPTER 7

CODING AND SOLUTIONING

7.1 FEATURE 1

NODE RED FLOW:

Node-RED is a flow-based programming tool, or developed by IBM's Emerging Technology Services team and now a part of the Open JS Foundation. Flow-based programming is a way of describing an application's conduct as a network of black-boxes, or "nodes" as they are called in Node-RED. Each node has a well-defined purpose; it is given some data, it does something with that data and then it passes that data on. The network handles the flow of data between the nodes.

Supports browser-based flow editing making it user friendly, accessible and visual. It is built on Node.js, which is a non-blocking, lightweight I/O model, making it lightweight and efficient. Flows created in Node-RED are stored using JSON, and can be imported and exported and shared with ease.

Node-RED consists of a Node.js based runtime that you point a web browser at to access the flow editor. Within the browser you create your application by dragging nodes from your palette into a workspace and start to wire them together. With a single click, the application is deployed back to the runtime where it is run. The palette of nodes can be easily extended by installing new nodes created by the profession and the flows you create can be easily shared as JSON files.

Node Flows:

Flow to get the user input from Node Red Dashboard UI

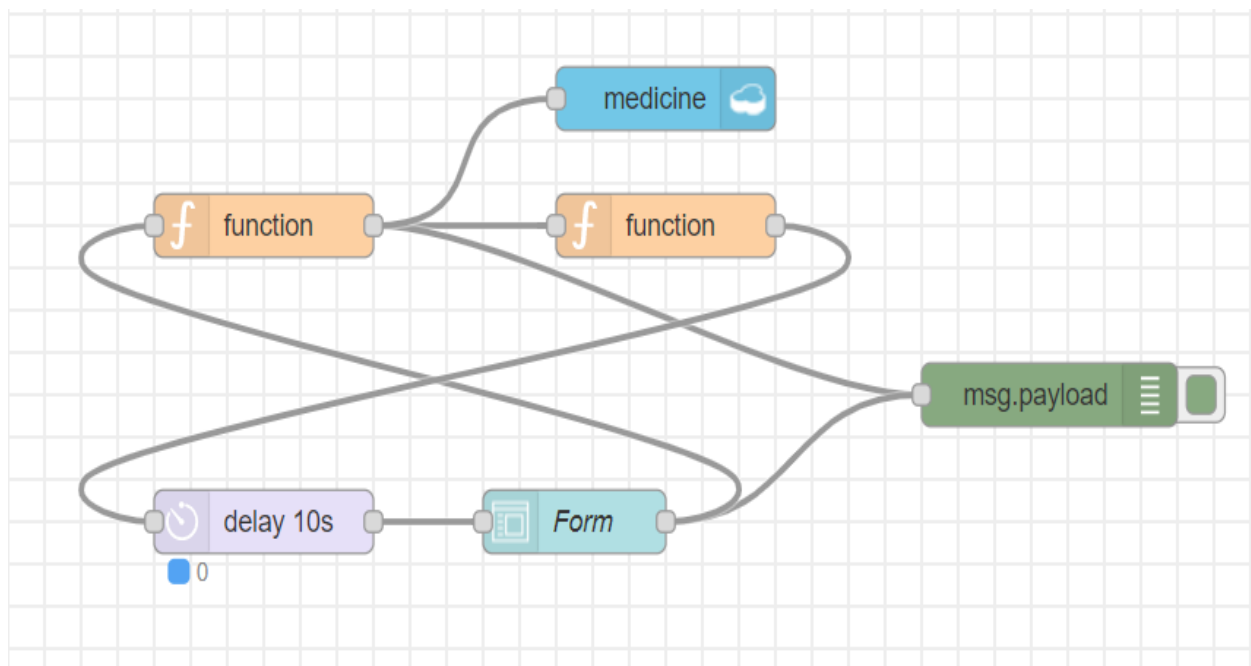


Fig:7.1.1

This figure shows the node red flows and connections. Here we are creating a form.

Flow to get the time and compare it with the time stored in the database:

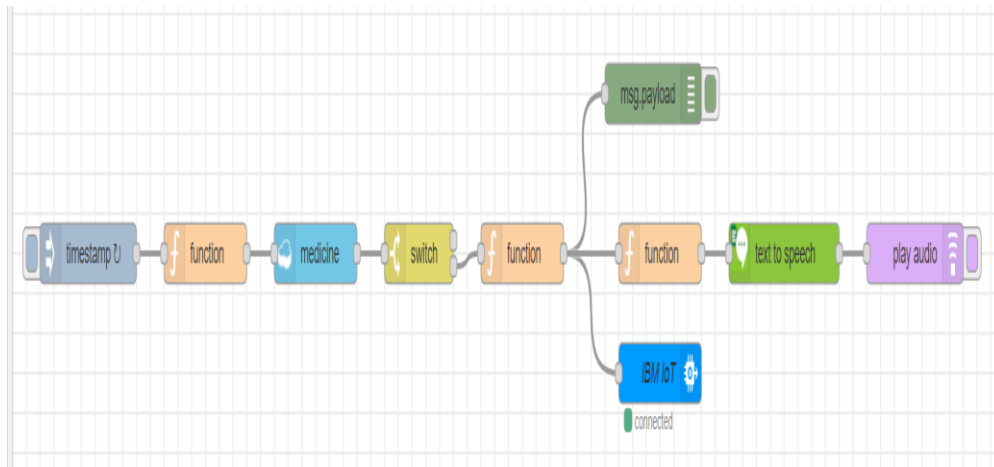


Fig:7.1.2

This figure shows node red flow connections to get the time and compare it with the time stored in the database. This node red flow connection include text to speech node to record the audio messages.

7.2 FEATURE 2

CLOUDANT DB:

IBM Cloudant is a fully managed distributed database with a 99.99% SLA that is suitable as an IBM Cloud® service for high workloads and quickly expanding online and mobile apps. For hybrid or multi-cloud systems, Cloudant's API and response protocols are well-matched with Apache CouchDB, and it elastically increases throughput

Features:

Elasticity

Ability to add and remove nodes is a need of an underlying business application and is a feature of both real physical computers and virtual machines. The term "elasticity" refers to such a trait. The installation and removal of nodes should take place instantly in response to demand to avoid any downtime.

Scalability

The elasticity must scale out linearly for the database to be able to boost performance as needed. If two nodes can handle 200,000 transactions per throughput, then four nodes can handle 400,000 transactions per throughput. Consequently, a sudden increase in demand might be readily handled. Large amounts of data must be handled in roughly the same amount of time as tiny volumes of data during fluctuations in demand. By doing this, service level agreements will be more easily met.

High availability

Depending on the sector, a minute of downtime can cost a corporation thousands or even millions of dollars. Uptime or greater availability is therefore essential to such enterprises. Cloud databases can claim high availability by riding on top of a cloud provider's infrastructure. Additionally, it is intended to make redundancy and data dissemination easier.

Easy data distribution

The underlying database may read and write data from any cloud database node in a cloud application. One of the distinctive capabilities of the cloud providers is the deployment of data and computing resources across enormous geographic regions.

Redundancy

The redundant copies will act as a backup if the primary copies of the data are lost or damaged. They may be kept on various racks inside a server data centre or may be kept over broad geographic areas. As a result, one of the key benefits of a cloud database with dispersed and multiple copies is high availability.

Data type support

Due to their flexible and dynamic schemas, cloud-based databases can accept all major data types. A relational database management system can only handle structured data, albeit they also include unstructured, semi-structured, and structured data types.

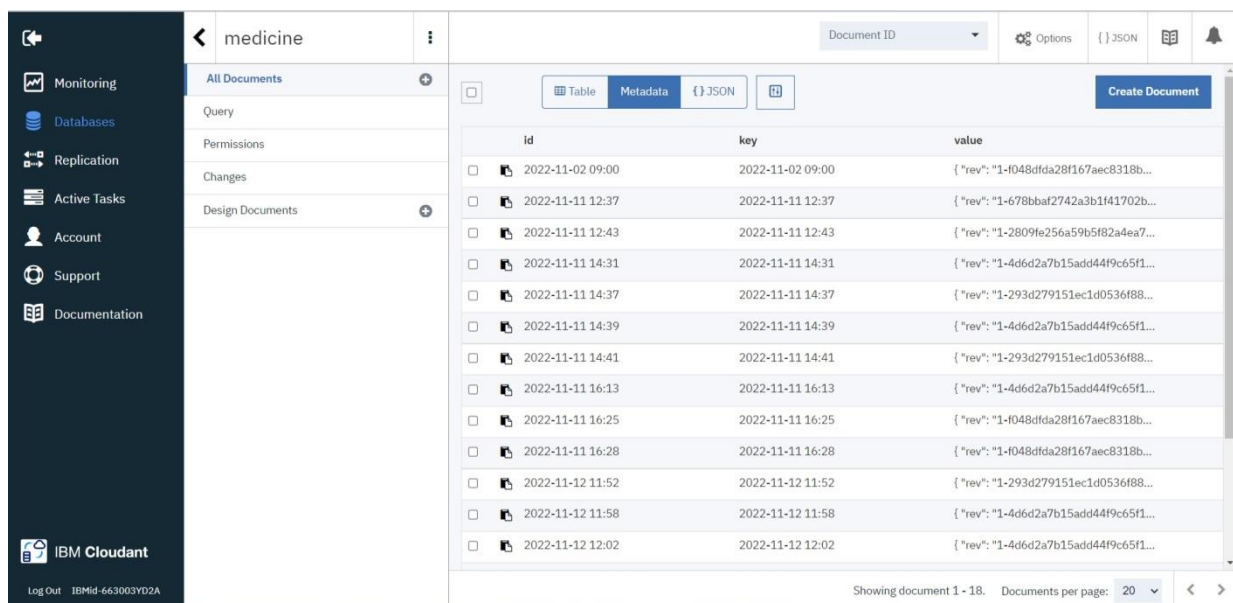
Manageability

The tools needed to do standard administrative tasks are provided by vendors. You only need a basic web browser to access these tools. It allows simple management as a result.

Reduced cost

With a pay-as-you-go basis, other characteristics of cloud databases including scalability and flexibility assist lower their cost. Due to their inability to scale, conventional RDBMSs may be extremely complicated and expensive to install in the cloud. No matter the size of the machine or the amount of data that has to be maintained, implementing a database in the cloud requires a cost structure that can scale horizontally.

CLOUDANT DB:



id	key	value
2022-11-02 09:00	2022-11-02 09:00	{ "rev": "1-f048dfda28f167aec8318b..." }
2022-11-11 12:37	2022-11-11 12:37	{ "rev": "1-678bbaf2742a3b1f41702b..." }
2022-11-11 12:43	2022-11-11 12:43	{ "rev": "1-2809fe256a59b5f82a4ea7..." }
2022-11-11 14:31	2022-11-11 14:31	{ "rev": "1-4d6d2a7b15add44f9c65f1..." }
2022-11-11 14:37	2022-11-11 14:37	{ "rev": "1-293d279151ec1d0536f88..." }
2022-11-11 14:39	2022-11-11 14:39	{ "rev": "1-4d6d2a7b15add44f9c65f1..." }
2022-11-11 14:41	2022-11-11 14:41	{ "rev": "1-293d279151ec1d0536f88..." }
2022-11-11 16:13	2022-11-11 16:13	{ "rev": "1-4d6d2a7b15add44f9c65f1..." }
2022-11-11 16:25	2022-11-11 16:25	{ "rev": "1-f048dfda28f167aec8318b..." }
2022-11-11 16:28	2022-11-11 16:28	{ "rev": "1-f048dfda28f167aec8318b..." }
2022-11-12 11:52	2022-11-12 11:52	{ "rev": "1-293d279151ec1d0536f88..." }
2022-11-12 11:58	2022-11-12 11:58	{ "rev": "1-4d6d2a7b15add44f9c65f1..." }
2022-11-12 12:02	2022-11-12 12:02	{ "rev": "1-4d6d2a7b15add44f9c65f1..." }

Fig:7.2.1

This figure shows the cloudant database output in ibm cloud.

7.3 FEATURE:3

IBM IoT PLATFORM:

Internet of Things (IoT) devices may easily be used to generate value thanks to the IBM Watson™ IoT Platform, which is a fully managed, cloud-hosted service. Start securely transmitting data up to the cloud using the open, lightweight MQTT messaging protocol by registering and connecting your device, whether it a sensor, a gateway, or anything else, to Watson IoT Platform. In order for your apps to access and utilise your live and historical data, you may configure and manage your devices using your web dashboard or our secure APIs.

API:

The IBM Watson™ IoT Platform has a number of APIs that may be used to create software for connected devices, gateways, and covers. HTTP basic authentication provides security for the HTTP APIs. A key and an authentication token are provided when you generate an API key using the dashboard.

Any HTTP API call must provide the 6-character organisation ID, which is the unique identifier for each Watson IoT Platform organisation.

MQTT:

The MQTT protocol may be used to link apps, gadgets, and gateways to the IBM Watson™ IoT Platform. The HTTP REST API may also be used to link devices to the Watson IoT Platform. MQTT is the main protocol that devices and applications utilise to communicate with Platform Service. It is an open standard that is governed by the OASIS standards group and externally recognised by ISO. A publishing and subscribing messaging transport protocol called MQTT was created to facilitate the effective flow of real-time data between mobile and sensor devices.

While it is feasible to code straight to TCP/IP because MQTT uses it, you may alternatively utilise a library that takes care of the MQTT protocol's specifics for you. MQTT operates via TCP/IP. It is possible to use a variety of MQTT client libraries. IBM supports and helps grow a number of client libraries, some of which are available at the following websites: MQTT professional wiki Eclipse Paho project

SDK:

The SDKs are open source and licensed under the Eclipse Public License, they power IBM's service monitoring and drive hundreds of thousands of automated tests every day.

Usable SDKs:

- C
- Java
- Node.js
- Python

IBM WATSON IOT PLATFORM:

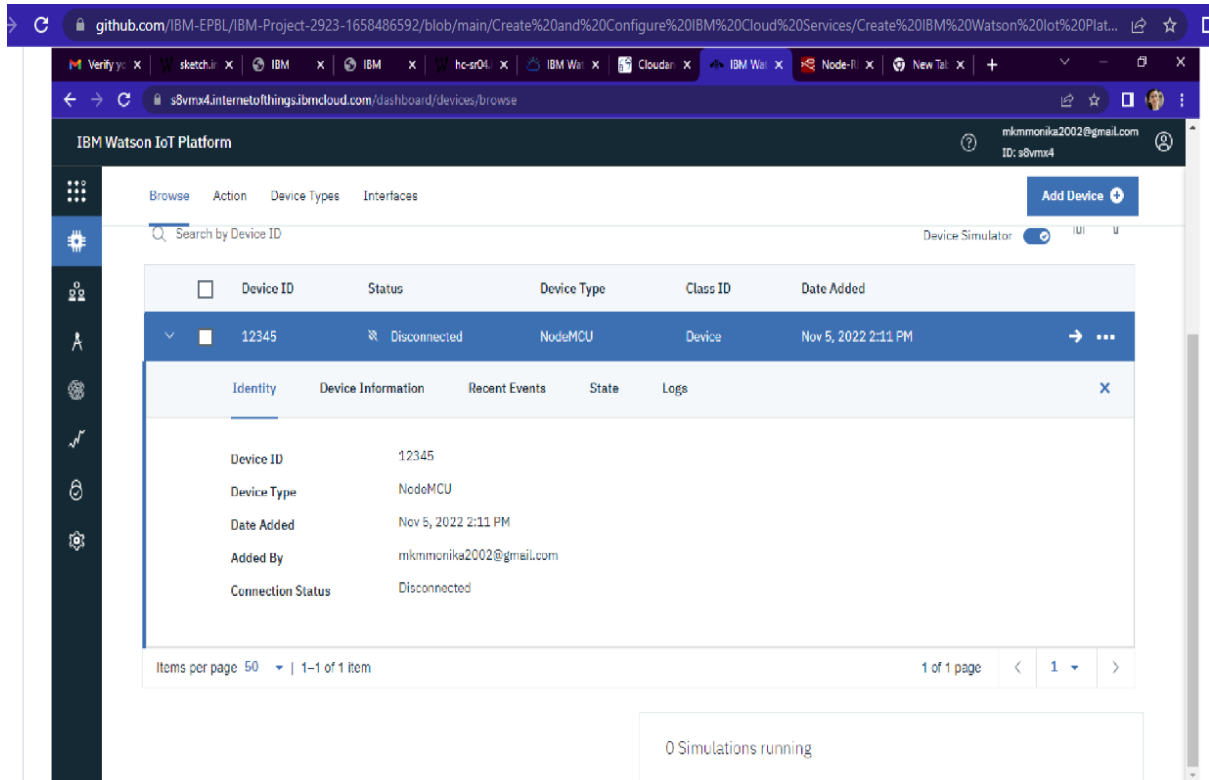


Fig:7.3.1

This figure shows the IBM Watson IOT Platform. In this, it shows the device created in the platform and the details of the device is shown in the figure.

Python Script:

To receive data from node-red by using IBM Watson IoT platform

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

config={
    "org":"s8vmx4",
    "type" : "12345",
    "id":"NodeMCU",
    "auth-method":"token",
    "auth-token":"123456789"
}
client= ibmiotf.device.Client (config)
client.connect()

def myCommandCallback (cmd):
    a=cmd.data
    if len(a["command"])==0:
        pass
    else:
        print(a["command"])
def pub (data):
    client.publishEvent (event="status", msgFormat="json",data=data, qos=0)
    print("Published data Successfully: %s",data)
while True:
    s=random.randint(0,100)
    h=random.randint(0,100)
    t=random.randint(0,100)
    data={"sm":s,"hum":h,"temp":t}
    pub(data)
    client.commandCallback = myCommandCallback
    time.sleep(2)
client.disconnect()
```

7.4 FEATURE 4:

TTS SERVICE:

An existing application or the Watson Assistant may be used to turn written text into natural-sounding audio using the IBM Watson Text to Speech API. This service supports a variety of languages and voices. Interacting with people in their local language will give your brand a voice and enhance customer experience. Enhance usability for users of various abilities, offer audio choices to prevent driving while distracted, or automate customer service interactions to eliminate hold times.

In order to convert text into natural-sounding speech in a variety of languages, dialects, and voices, the IBM Watson™ Text to Speech service offers APIs that make use of IBM's speech-synthesis material. For each language, the service offers at least one male or female voice, and occasionally both. With little lag, the audio is transmitted back to the client. The service offers both a WebSocket and synchronous HTTP Representational State Transfer (REST) interface for voice synthesis. Both ports accept input in SSML and plain text. For speech-synthesis applications, SSML, an XML-based markup language, provides text notation. The SSML element and word timings are likewise supported via the WebSocket interface.

Benefits:

- Improve user undergo
Help all customers comprehend your message by translating written text to audio.
- Boost contact firmness
Solve customer issues faster by providing key data in their native language.
- Protect your data
Enjoy the protection of IBM's world-class data governance practices.
- Run it anywhere
Support global languages and deploy on-premises or on any cloud.

PLATFORM:

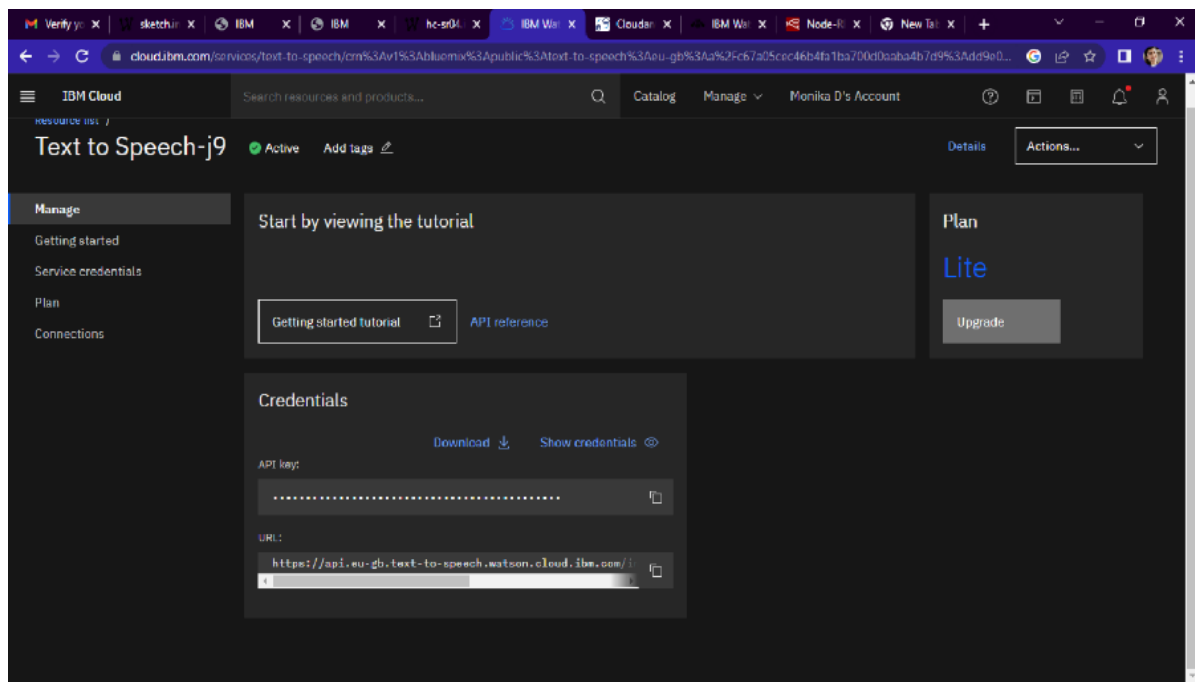


Fig:7.4.1

This figure shows that Text to Speech platform in IBM cloud. Speech synthesis is the creation of human speech using artificial means. A voice synthesiser is a type of computer system that may be used for this purpose. It can be included into hardware or software products. Normal language text is translated into voice by a text-to-speech (TTS) system; other methods translate symbolic linguistic representations, such as phonetic transcriptions, into speech. Speech recognition is the procedure used in reverse.

Concatenating segments of recorded voice that are kept in a database can produce synthesised speech. The size of the stored speech units varies between systems; a system that stores phones or diphones has the widest output range but may not be as clear. The preservation of whole words or phrases enables high-quality output for certain usage areas. As an alternative, a synthesiser might integrate a vocal model.

CHAPTER 8

TESTING

8.1 TEST CASES:

- Verify whether user is able to access the URL.
- Verify if user input stored in the cloud.
- Verify if it remains the medicine intake to the user.
- Verify it gives voice notice.
- Verify whether patient has taken the medicine or not.

8.2 USER ACCEPTANCE TESTING:

Defect Analysis:

Resolution	Severity 1	Severity2	Severity 3	Severity 4	Sub total
By Design	8	4	2	1	15
Duplicate	2	0	3	0	5
External	3	1	0	1	5
Fixed	9	2	4	10	25
Not Reproduced	0	0	0	0	0
Skipped	0	0	2	1	3
Won't Fix	0	2	1	1	4
Totals	22	9	12	14	57

Table:8.2.1

This table describes the defect analysis of the project.

Test Case Analysis:

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

Table:8.2.2

This table describes the test case analysis of the project.

CHAPTER 9

RESULTS

9.1 PERFORMANCE METRICS

Output:

PHYTHON OUTPUT:



The image shows a screenshot of a Python IDE Shell window titled "IDLE Shell 3.8.10". The window contains a list of 30 lines of output, each starting with "Published data Successfully: %s" followed by a list of three strings: "aspirin", "D Cold", and "D Cold". The output is displayed in a monospaced font. The window has a menu bar with "File", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The status bar at the bottom right shows "Ln: 2195 Col: 3".

```
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
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Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
Published data Successfully: %s ('aspirin', 'D Cold', 'D Cold')
```

Fig:9.1.1

This figure represents the python output which is displayed in the python software.

IBM WATSON OUTPUT:

Identity	Device Information	Recent Events	State	Logs
The recent events listed show the live stream of data that is coming and going from this device.				
Event	Value	Format	Last Received	
status	{"medicine1":"aspirin","medicine2":"D Cold"}	json	a few seconds ago	
status	{"medicine1":"aspirin","medicine2":"D Cold"}	json	a few seconds ago	
status	{"medicine1":"aspirin","medicine2":"D Cold"}	json	a few seconds ago	
status	{"medicine1":"aspirin","medicine2":"D Cold"}	json	a few seconds ago	
status	{"medicine1":"aspirin","medicine2":"D Cold"}	json	a few seconds ago	

0 Simulations running

Fig:9.1.2

This figure represents the output in the IBM Watson IOT Platform. In this it is displayed that what medicine should be taken.

CHAPTER 10

ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- The voice instruction to take the medication at the specified time is announced to the user.
- The cloudant DB securely stores all the data, which is accessible at any time.
- There is authentic Security and Privacy all the time.

DISADVANTAGES:

- The user must manually enter the information for each day in the format required.
- It requires internet connectivity all the time.
- The only cloud storage that the Admin may access is inaccessible to the user.
- The data on medications should be updated often.

CHAPTER 11

CONCLUSION

The use of smart phones and mobile apps has significantly expanded in recent years, therefore creating mobile applications for health services can have the intended community impact. Despite the fact that there are many different mobile applications for medication reminders, a native mobile application that is created based on the suggestions of experts in this field is crucial.

Seniors can benefit from the initiative Personal Assistance for Seniors who are Self-Reliant by being reminded to take their medications on time. It has TTS Service, an IBM AI service that reminds users to take their medications. It is constructed technically using a variety of platforms, including IoT, NODE RED, Cloudant DB, and Watson Assistant. These applied sciences aid in creating a more beautiful and enjoyable environment to live in.

CHAPTER 12

FUTURE SCOPE

This project will eventually have a wide platform deployment scope. Special features that help seniors in their everyday lives can also be incorporated to this. Future development is reliant on requirements and newly developed applied science. In order to make it easier for senior citizens to take their medications, a lot of hardware has been produced. The user will receive notifications from these devices when they have taken their medications and when it is time to defecate the pills out. These effective hardware solutions are still developing and will likely become the elderly's future helpers.

CHAPTER 13

APPENDIX

SOURCE CODE:

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

config={
    "org":"s8vmx4",
    "type": "12345",
    "id":"NodeMCU",
    "auth-method":"token",
    "auth-token":"123456789"
}
client= ibmiotf.device.Client (config)
client.connect()

def myCommandCallback (cmd):
    a=cmd.data
    if len(a["command"])==0:
        pass
    else:
        print(a["command"])
def pub (data):
    client.publishEvent (event="status", msgFormat="json",data=data, qos=0)
    print("Published data Successfully: %s",data)
while True:
    s=random.randint(0,100)
    h=random.randint(0,100)
    t=random.randint(0,100)
    data={"sm":s,"hum":h,"temp":t}
    pub(data)
    client.commandCallback = myCommandCallback
    time.sleep(2)
client.disconnect()
```

GITHUB LINK:

<https://github.com/IBM-EPBL/IBM-Project-2923-1658486592>

PROJECT LINK:

<https://youtu.be/JuWXOw52jQk>