

**IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND
NOTIFICATION**

A NALAIYATHIRAN PROJECT REPORT

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ABSTRACT

Attacks on children have been on the rise at an unprecedented rate in recent years, with victims finding themselves in perilous situations with little chances of contacting their families. The main goal of this project is to create a smart wearable device for children that uses

advanced technology to ensure their safety. As a result, this strategy is perceived as sending an SMS from the children's wearable to their parents or guardians. This project employs cutting-edge technology to protect the youngster through the use of a GSM module, ensuring that the child does not feel abandoned while dealing with such social issues. An Arduino Nano, GSM, GPS, temperature sensor, heartbeat sensor, and a panic button will be included in the wearable. The heartbeat sensor detects the child's heart rate and delivers it to the guardian on a regular basis. If the child falls suddenly, the accelerometer detects it and alerts the parents. As a result, the parent has a sense of security.

CHAPTER 1

1. INTRODUCTION

The Internet of effects is a network containing numerous physical biases, vehicles, electronic corridor, software, detectors, selectors, etc. It substantially enables these bias to efficiently, and intelligently connect these objects to collect the data and usefully change it for a purpose. The term IoT was first chased by Kevin Ashton in the time 1999. Internet Of effects(IoT) associates to be tasted and connect ever to cover the formerly being network and its structure. The important vision of IoT has evolved due to a confluence of colorful technologies, including ubiquitous wireless communication, real- time analytics, detectors, bedded systems, etc.

It's a technology that allows objects to be tasted or controlled ever across being network structure having multitudinous bias connected to it. These bias collect useful data with the help of colorful being technologies and also autonomously flow the data between other bias. In moment's script, over 80 of the world population affected towards the new technologies developed, including children by the operation of mobile phones, smart bias, laptops, and other smart outfit are also increased. This proposed system will be largely effective from other being ways in helping the victims. The system uses Arduino for the process integrated with detectors like temperature detectors, twinkle detectors, etc. The children with Activity Tracker that has access to IoT monitoring and GSM technology keep covering the children. The system has detectors connived with the processor which keeps seeing vital signals similar as twinkle rate, temperature, etc. So whenever some dangerous situations arise there may be an suggestion to parents. The parent can circumscribe the safety distance for each child and when it's overhauled the system will alarm both the parent and child. When the child crosses the zone(say a academy

zone) unfortunately due to some importunity, also the system automatically sends the information to the parents.

Children can not complain about abusements that they face in their diurnal life from their parents. They can't indeed realize what happens to them at their age. It's also delicate for parents to identify whether their children are being abused. Since to help children from being attacked, an independent real- time monitoring system is necessary for every child out there. In this system, the collected values from every detector like temperature detector, palpitation rate discovery detector, essence discovery detector, and the position value from GPS are used to descry the status of the child.

The Internet of effects(IoT) plays a major part in every day to day life. The major difference between IoT Internet bedded systems is that a devoted protocol/ software is bedded in the chip in case of an bedded system, whereas, IoT bias are smart bias, which can take opinions by seeing the terrain around the device. The development of detectors technology, vacuity of internet- connected bias; data analysis algorithms make IoT bias act smart in extremities without mortal interventions. So, IoT bias are applied in different fields similar as husbandry, drug, artificial, security and communication operations.

IoT systems are useful within a system to do deeper robotization, analysis, and integration. IoT contributes to technology through advances in software, tackle, and ultramodern tools. It indeed uses being and forthcoming technology in the fields of seeing, networking, and robotics. IoT brings global changes through its advanced rudiments in the social, profitable, and political impact of the druggies.

Child and women's safety is a grueling problem currently due to asocial rudiments in society. The crime rate is day by day adding . seminaries and workplaces need high surveillance for icing the safetyamong children and women.

Smart phones are playing major Part in rising the safety, where some mobile grounded operations give alert systems. During the exigency, mobile apps warn the control room of near police station or caretakers of children. The literature shows that position shadowing bias are available in the request, but it doesn't give the complete result to the problem. The result to this problem is to design an IoT device, which senses the child's position and terrain and during exigency, it should shoot the alert to the parents automatically

1.1 PROJECT OVERVIEW

a. PROJECT OVERVIEW:

A smart mobile phone provides various up to date services to us. Using the global positioning system (GPS), we can get to know our devices' geographic location and give information through short message service (SMS) service. Al-Mazloum et al. used these two services in their proposed system. They introduced GPS and SMS-based child tracking system using smart phone. This paper describes how a smart mobile phone helps parents track their children in real-time. Most kids and parents use an android mobile phone, and they know the mobile phone's available service. Their proposed system consists of two sides, the child side and the parent side. A request SMS goes to the child's device to know the child's exact location from the parent device.

After getting the request SMS, the child's device replies to the parent's device's GPS position. Kothawade et al. proposed a system "multi-platform application for parent and school using GPS tracking". In this paper, they developed a GPS based application system for an organization and parents mobiles. The organization can use this application for monitoring and tracking the location of the school buses.

Parents can get the addresses of their children and locate them on his/her mobile devices. School authority also can monitor and track the school buses timely and ensures the safety of children. It also allows parents to track real-time information about the school bus during travels. Almomani et al. proposed a system with two types of applications a web application and a mobile application for a user facility. A user can access this system at any time from anywhere. There are two sides: client-server.

The server-side carries a GPRS, a web, and an SMS server, and the client-side contains a GPS tracker and a GPS modem. The user information is stored in the database on the server-side. There is another similar concept used by Al-Suwaidi and Zemerly in their proposed system named "locating friends and family using mobile phones with a global positioning system (GPS)". They have also developed two approaches: the client-server approach. This paper showed both clients have the same control and command privileges, whereas the other system does not provide it. Gao et al. developed a security method named

child guard on smart devices for observing children's activities in real-time. Guardians used this system at a low cost, and they can get better benefits by using this system. Satish et al. described their paper about an android application used to track missing children.

The android application works with two services: GPS and SMS service. The GPS is used to track the location of the missing child. If GPS service is unable, the application can work with SMS service by sending and receiving the message. There is another paper where the researcher Bhoiet al. implements a project based on a particular area for each child. When the child comes out of this specific area of their school, then an alert message sends to the parent's mobile phone by using a panic switch. Saranya et al. proposed a child monitoring system based on android phones for the children's security. This system helps the parents to know whether their children are safe or not. This system consists of two functions. The software hand function monitors the child's activities, and the danger zone function alerts the guardians about their children's location

1.2 PURPOSE

In today's technological world, it's a natural part of life for older children and young teenagers to have gadgets. In many ways, gadgets such as mobile phones can help give them a safety edge, yet having the latest and greatest mobiles can also put them at risk of danger. Cruel crimes against children have been on the rise in recent years, with victims finding themselves in incredibly perilous situations where using their cellphones to notify their parents or the police is nearly impossible. Despite the fact that technology is constantly evolving, these acts continue to occur in numerous areas. The major goal of this project is to use modern technology to create a gadget that provides "Smart Child Safety" to protect children, which will be far more effective than current methods in assisting victims.

CHAPTER 2

2. LITERATURE SURVEY

01) International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 6 Issue: 5 (pg.no:200-201)

KhasimShaik, SanthosiBogaraju Proposed "Implementation of novel application for woman and child protection using IOT enabled techniques" This system focused on a wireless method which will send alert and communicate with a secure medium. The system here is based on smart phone which will be very much useful in helping victims. Women will be provided with smart band and the smart phone that has access to the GPS tracking mechanism that gets the location and these location values are displayed on the LCD. The Smart band is integrated with Smart phone and The GPS and the GSM can be used. The smart phone is connected to smart band watch through Bluetooth Low Energy (Bluetooth 4.0) module.

The device communicates with phone through an application designed specially that acts an interface between the smart band and the phone. Helen. A, FathimaFathila proposed "A smart watch for women security based on IOT concept „watch me"" The „Watch me" was designed in a way to secure women when they are exposed to external challenges and harassments in the society. Women safety by smart phone can be activated International only by a touch or one click. It is impossible to have mobiles on our hand under all circumstances. In such situations this watch me concept can be used. It works automatically based on heart beat rate which increases due to the secretion of epinephrine hormone from hpa axis that is specifically defined for each and every situation like fear, anger, anxiety and other reactions triggering the sensors automatically. Ms. Deepali, M. Bhavale, proposed "IOT based unified approach for women and children security using wireless and GPS" This system explains that the main goal of this project is to preserve the security of women and school children using a wireless portable safety device and school bus tracking system. This system consists of an emergency „PRESS" button and an electronic camera for capturing image. When the sensor kit button is pressed the camera will captures the image and will collect the information of the user. This system uses a wireless method which will alert and communicate with secure medium. Kavita Sharma, Anand More proposed "ADVANCE WOMAN SECURITY SYSTEM BASED ON ANDROID" This android application was designed to provide security and provide awareness on the time of critical situation for women.

This proposed system is GSM & GPS Based women Security System. The main objective of security system is to track the current location of the victim having an android

enabled mobile by extracting the longitude and latitude of that target person. The GPS device is placed inside the device (Android Phone). An emergency button is fixed on the device at a particular position. Generally service is made active by clicking on ACTIVE SERVICE button. On clicking this, button service gets activated and clicking on VOLUME key a new window is opened and SMS is sent to those contacts saved already at the time of registration. The SMS contain alert message and the current location. Shree Varsha. K, Dr. Umarani Srikanth proposed "A survey on android application for personal security" The project explained that when the user touches the application, within few seconds the app will be executed automatically and turns on the camera in order to capture the images (victim's surrounding). The app picks up the user's GPS location (Current Location) exactly and shares it along with location to the nearest helpers (Ambulance, Police Station, etc).

The main feature of this application is that the helper will get the details of user (Image, address and personal information) in order to avoid fake details. The nearby helpers can be found using cloud crawling techniques according to the affected users. Nagaraju. J, Sadanandam. V proposed, "Self-salvation – the women's security module" The main idea of this project was to help and guard the women to prevent themselves from kidnaps and chain snatchings. Here three methods of Safety and security for women are introduced. In each and every method there will be an alert message that is sent to the existing Phone Numbers through GSM technology. The purpose of using GPRS is that to track the location and position. Also a Smart Phone app is developed for controlling and for sending the alert message to the parents and police station. Women will be provided with equipment which is not visible to others. Nitishree proposed "A review on IOT based smart GPS device for child and women safety applications" The paper was based on IOT (Internet of Things).

This paper proposes an Android based solution to aid parents to track their children in real time. The concerned device is connected to server via internet. The device can be used by parents to track their children in real time or for women safety. The proposed solution takes the advantage of the location services provided by GSM. It allows the parents to get their child's location on real time by SMS. Here, a prototype model (device) is created which is simulation based. The work comprises ARM-7 LPC2148 as microcontroller, along with GPS and GSM module. Embedded C core compile using Keil and virtual simulation check using Proteus 8.1 is done. A server is created which will collect all the data generated by our prototype system and send the same to server using GPRS. A Dummy server will be created by using Filezilla. This

device will also have the facility of Emergency help key (SOS), if anyone presses the key, automatic help message will be sent to 3 registered mobile numbers on Server. AbhijitParadkar proposed, "All in one intelligent safety system for women security" A model had been proposed for the women security in public places which aims to provide the 100% safe environment. The integration of various existing systems on women security has been gathered together. An advanced women security system to provide the safety measure in public places as well as travelling alone through public transports have been introduced finally.

The proposed system can be implemented as an android app application or using Arduino based board. It consists of Database Module, SOS Key Press Module and Voice Recognition Module, Auto receiving call module, Global Positioning System (GPS) module, GSM System Module, Spy camera detection module, Intrusion Detection Module, Area zone module, Fake call Tool Module, Action after getting the Handler Notification, Audio and video recording module, Call on 100 or other emergency number, Generate Electric Shock for Self Defense module, Screaming Alarm Siren module all integrated within a single module Vijaylashmi. B, Renuka. S proposed "Self defense system for women safety with location tracking and SMS alerting through GSM network" The proposed idea was a quick responding; cost protection system for women in distress can call for help just with the press of a button on smart band. It has the ability to help women wearing this device as a watch or band, in case of any harassment .By the press of a switch that is located on the watch or band or when the women has fallen the information about the attack along with the body posture and location information is sent as SMS alert to a few predefined emergency numbers. The system consists of embedded hardware and software co-designed for this dedicated application. It allows for exact location of the victim, as soon as the Emergency key on the belt is pressed.

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A. RFID-based System for School Children Transportation Safety Enhancement

This paper presents a system to monitor pick-up/drop-off of school children to enhance the safety of children during daily transportation from and to school. The system consists of two main units, a bus unit, and a school unit. The bus unit the system is used to

detect when a child boards or leaves the bus. This information is communicated to the school unit that identifies which of the children did not board or leave the bus and issues an alert message accordingly. The system has a developed web-based database-driven application that facilitates its management and provides useful information about the children to authorized personnel. A complete prototype of the proposed system was implemented and tested to validate the system functionality. The results show that the system is promising for daily transportation safety.

B. Design and Development of an IOT based wearable device for the Safety and Security of women and girl children

The aim of this work is to develop a wearable device for the safety and protection of women and girls. This objective is achieved by the analysis of physiological signals in conjunction with body position. The physiological signals that are analyzed are galvanic skin resistance and body temperature. Body position is determined by acquiring raw accelerometer data from a triple axis accelerometer. Acquisition of raw data is then followed by activity recognition which is a process of employing a specialized machine learning algorithm. Real-time monitoring of data is achieved by wirelessly sending sensor data to an open source Cloud Platform. Analysis of the data is done on MATLAB simultaneously. This device is programmed to continuously monitor the subject's parameters and take action when any dangerous situation presents itself. It does so by detecting the change in the monitored signals, following which appropriate action is taken by means of sending notifications/alerts to designated individuals.

C. Child Safety Wearable Device

Parents need not have a smart mobile. Set of keywords are used to gain information from the kit. LOCATION keyword is used to obtain the location of the child. UV keyword is used to obtain the temperature of the surroundings. BUZZ keyword is used to turn on the buzzer which is fixed in that device. SOS is used to send a signal to the device.

D. Smart Intelligent System for Women and Child Security

A portable device which will have a pressure switch. As soon as an assailant is about to attack the person or when the person senses any insecurity from a stranger, he/she can then put pressure on the device by squeezing or compressing it. Instantly the pressure sensor senses this pressure and a conventional SMS, with the victim's location will be sent to

their parents/guardian cell phone numbers stored in the device while purchasing it, followed by a call. If the call is unanswered for a prolonged time, a call will be redirected to the police and the same message will be sent. Additionally, if the person crosses some area which is usually not accessed by the person then a message with the real-time location is sent to the parent/guardian's phone via conventional SMS.

2.1 EXISTING PROBLEM

Real-Time Child Abuse and Reporting System

In the existing system, we use a voice recognition module in which the alert commands from the child are stored and kept for further reference. If the same child delivers the same command, it will compare with the alert command which was previously stored and sets an emergency level according to the alert command. The GSM has a SIM which is used to send an alert message or an alert call to the trusted peoples. GPS is used to track the live location and it is used when needed. The server will search the respective device ID from the database and search for respective contacts according to that device ID and helps in alerting the registered guardians.

The disadvantage of this project are,

- The child could not produce the exact alert command during a panic condition.
- ii. The command produced may not match with the previously stored command.
- iii. This project requires manual intervention.

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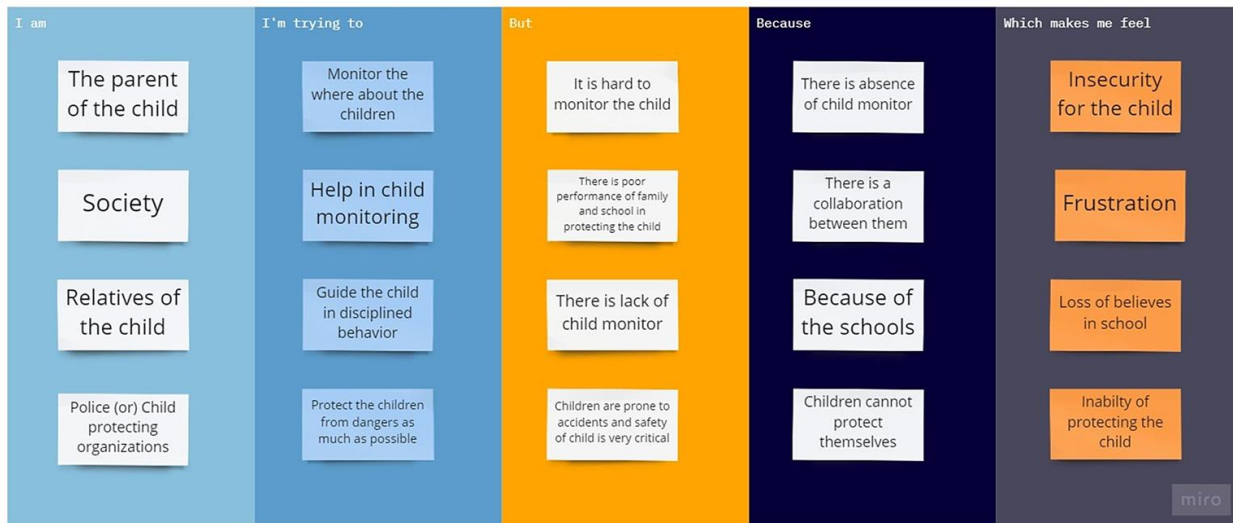
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2.3 PROBLEM STATEMENT DEFINITION

Further families are now spending time on work and social duties, hence down from their children. This causes increased enterprises about their safety and whereabouts and has made keeping a track of their conditioning relatively grueling. Crimes against children are adding Year after Year. According to a study, roughly, 000 children go missing in India every time

(1). There's an supposition that every 10 twinkles, a child goes missing. Mumbai and Delhi have the loftiest rate when compared to other metro metropolises. With the lack of vacuity of affordable child covering systems, it's hard to cover the whereabouts of Children

(2). The safety of children is veritably critical since children can not cover themselves. A evanescent lack of maternal supervision should be combated with an applicable IT result in environment. thus, the proposed system must warn the parents when the child walks too far down and/ or outside the “ circle of safety ” when they're down. In case of an exigency or a situation of fear, the child must be suitable to communicate with their parents. Still, the aid of technology can increase effectiveness and drop the time necessary to detect and reach the child, If in case the child does go missing or has a fall.



CHAPTER 3

3. IDEATION & PROPOSED SOLUTION

IDEATION:

Ideation is the creative process of generating new ideas, which can be accomplished through a variety of ideation techniques, such as brainstorming and prototyping. If done right, ideation is what helps founders and executives determine the right problem to solve and how to solve it.

Ideation is the process where you generate ideas and solutions through sessions such as Sketching, Prototyping, Brainstorming, Brainwriting, Worst Possible Idea, and a wealth of other ideation techniques. Ideation is also the third stage in the Design Thinking process

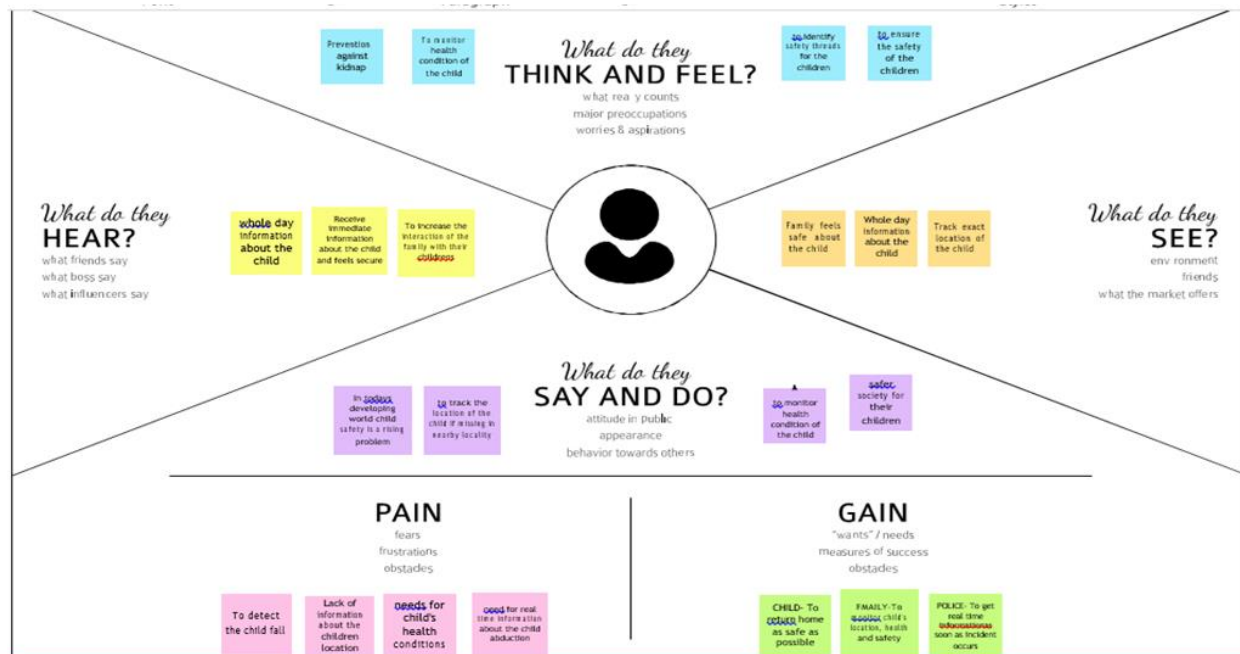
PROPOSED SOLUTION:

Proposed Solution means the technical solution to be provided by the Implementation agency in response to the requirements and the objectives of the Project.

Proposed Solution means the combination of software, hardware, other products or equipment, and any and all services (including any installation, implementation, training, maintenance and support services) necessary to implement the solution described by Vendor in its Proposal.

3.1 EMPATHY MAP CANVAS

An empathy map helps to map what a design team knows about the potential audience. This tool helps to understand the reason behind some actions a user takes deeply. This tool helps build Empathy towards users and helps design teams shift focus from the product to the users who are going to use the product.



3.2 IDEATION & BRAINSTORMING

Brainstorming is a method design teams use to generate ideas to solve clearly defined design problems. Brainstorming is a method of generating ideas and sharing knowledge to solve a particular commercial or technical problem, in which participants are encouraged to think without interruption. Brainstorming is a group activity where each participant shares their ideas as soon as they come to mind. At the conclusion of the session, ideas are categorised and ranked for follow-on action.

When planning a brainstorming session it is important to define clearly the topic to be addressed. A topic which is too specific can constrict thinking, while an ill-defined topic will not

generate enough directly applicable ideas. The composition of the brainstorming group is important too. It should include people linked directly with the subject as well as those who can contribute novel and unexpected ideas. It can comprise staff from inside or outside the organisation.

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

PROBLEM

- *With the absence of child monitoring system it is hard to monitor the where about of children.
- *The poor performance of family's and school to monitor the children's by Collaboration.
- *Lack of child monitoring in school affect the child's behavior.
- *Children are prone to many accidents.
- *Safety of children is very critical since children cannot protect themselves.

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

| Person 1 | Person 2 | Person 3 | Person 4 |
|---|---|---|--|
| There are a lot of tools used for child's location and health detection | To get real time information about the child as soon as the incident occurred | IBM cloud is collects the data regarding this projects and stores in it | There are many sensors that can be used for the cloud and sensors to get the status and information. |
| Development process of the system is unique | Real life implementation and development consideration | cloudant database system is initiated | cap provide better security to the citizens |
| tools used are raspberry pi, node red, etc., | Watson IOT platform is used here to develop the system | Gets rescued immediately and safely if in danger | body temp, body posture can be sensed |
| Implementation of hardware and software | Python codes are implemented using swift and x code software | Development process of the system is slightly complex | There are many sensors that can be used for the cloud and sensors to get the status and information. |

Idea by Team member 1

this device's battery gives short life-time.

following up cases

parent should be monitored by the system

immediate response from the device after the child accident

Idea by Team member 3

ALL THE SENSORS SHOULD BE USED TO IMPLEMENT THE HARDWARE SYSTEM

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

Group idea by team

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

Idea by team member 2

Identifying registers of families/ children at risk

in editing in cases where appropriate

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

Idea by team member 4

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

THE DEVICE SHOULD BE USED TO GET THE REAL TIME INFORMATION

3.3 PROPOSED SOLUTION

Proposed Solution means the technical solution to be provided by the Implementation agency in response to the requirements and the objectives of the Project.

| S.No | Parameter | Description |
|------|--|--|
| 1. | Problem Statement (Problem to be solved) | Absence of child monitoring, child's protection, child's safety |
| 2. | Idea/ Solution description | Panic alert system should also be connected with the device; Gadget plug and unplug should be monitored |
| 3. | Novelty / Uniqueness | Installation of small solar panels to charge the battery of the smart gadget to gain minimum battery backup |
| 4. | Social Impact / Customer Satisfaction | Safer society for the children; family feels secure for the child. |
| 5. | Business Model (Revenue Model) | <p><u>Direct Sales</u></p> <p>There are two types of direct sales: inside sales, in which someone calls in to place an order or sales agents calling prospects; and outside sales, which is a face to face sale transaction.</p> <p><u>Advantages:</u> Direct sales models work great with relationship sales cycles, enterprise sales cycles, or complex sales cycles that entail multiple buyers and influencers.</p> <p><u>Disadvantages:</u> The direct sales model often requires hiring a sales team of some sort, which means that it isn't optimal for small ticket price items. If your offering is priced below the \$1,000-</p> |

| | | |
|----|-----------------------------|---|
| | | \$2,000 range, you'll have trouble building a scalable company. |
| 6. | Scalability of the Solution | Scalability, connectivity, artificial intelligence, security, dynamic nature, endpoint management, integration, analyzing, and compact nature of devices. |

3.4 PROBLEM SOLUTION FIT

Problem-solution fit is a term used to describe the point validating that the base problem resulting in a business idea really exists and the proposed solution actually solves that problem. Validate that the problem exists: When you validate your problem hypothesis using real-world data and feedback.

| | | |
|---|---|---|
| 1.CUSTOMER SEGMENT(S) With the absence of child monitoring system, it is hard to monitor the where about the child. Poor performance of the school to monitor the child by collaboration's. | 6.CUSTOMER LIMITATIONS Lack of child monitoring in school affects the child's behavior. Children are prone to many accidents. | 5.AVAILABLE SOLUTION Development process of the system is unique. Real life implementation and development consideration. |
|---|---|---|

| | | |
|---|--|--|
| <p>2. PROBLEM/ PAINS</p> <p>A panic alert system should be implemented in the wearable device. And need the real time information of the child abduction.</p> | <p>9.PROBLEM ROOT / CAUSE</p> <p>In today's developing world child safety is a rising problem. Since children cannot protect themselves, they are mostly involved in abductions.</p> | <p>7.BEHAVIOR</p> <p>Frustration, Emotional instability, stress reactions, anxiety, trauma and other psychological symptoms are observed commonly after child abduction and other traumatic experiences.</p> |
| <p>3.TRIGGERS TO ACT</p> <p>These risks can combine with each other to complex events, the analysis of which requires a systematic approach that takes into account not only the systems involved and their independencies, but also the combination of events and the various propagation processes that occur in such systems.</p> | <p>1. YOUR SOLUTION</p> <ul style="list-style-type: none"> a. Awareness among the consumers b. Education about the system implementation <p>Updation of the system</p> <p>4.Prediction</p> | <p>8.CHANNELS OF BEHAVIOR</p> <p>Online</p> <p>Twitter is indeed a social sensor with different sensitivity levels to detect the child's safety and depending on the event circumstances, a diverse pattern of social media behavior should be Expected.</p> |
| <p>4. EMOTIONS Before / After</p> <p>Before there was Insecurity for child and inability of protecting the child and now there is safety for the child and they can be detected at any time as there are into the geofence around them.</p> | | <p>Offline</p> <p>Awareness in society about child safety and their</p> |

| | | |
|--|--|--|
| | | protection and event circumstances of media behavior should be expected. |
|--|--|--|

CHAPTER 4

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

Following are the functional requirements of the proposed solution

| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task) |
|--------|-------------------------------|---|
| FR-1 | Software interface | This includes embedded application that will be used in supporting the various functions of the system Eg: GPS, Web Server and Database |
| FR-2 | User interface | It should be the connector between the various systems or between other part or unit of the system |
| FR-3 | Authentication | The system sends an approval request after the user enters personal information |
| FR-4 | External Interface | These requirements include interaction logic between software and user, screen layouts, buttons, functions on every screen, hardware interfaces (here a team describes what devices the software is created for), and other relevant particularities. |

| | | |
|------|-----------|--|
| FR-5 | Reporting | Reporting Requirements means any applicable laws, rules, regulations, instruments, orders or directives and any requirements of a regulatory or supervisory organization that mandate reporting and/or retention of safety and similar information |
|------|-----------|--|

4.2 NON-FUNCTIONAL REQUIREMENTS

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

| FR No. | Non-Functional Requirement | Description |
|--------|----------------------------|---|
| NFR-1 | Usability | Usability is a non-functional requirement, because in its essence it doesn't specify parts of the system functionality, only how that functionality is to be perceived by the user, for instance how easy it must be to learn and how efficient it must be for carrying out user tasks. |

| | | |
|-------|---------------------|---|
| NFR-2 | Security | Security is a non-functional requirement assuring all data inside the system or its part will be protected against malware attacks or unauthorized access. |
| NFR-3 | Reliability | Reliability is the extent to which the software system consistently performs the specified functions without failure. ELICITATION: Reliability requirements address the user concern for the system's immunity to failure |
| NFR-4 | Performance | The website's load time should not be more than one second for users. |
| NFR-5 | Availability | Employers can post jobs on the website throughout the week at any time during the day. |
| NFR-6 | Scalability | Scalability is the ability of the application to handle an increase in workload without performance degradation, or its ability to quickly enlarge. |

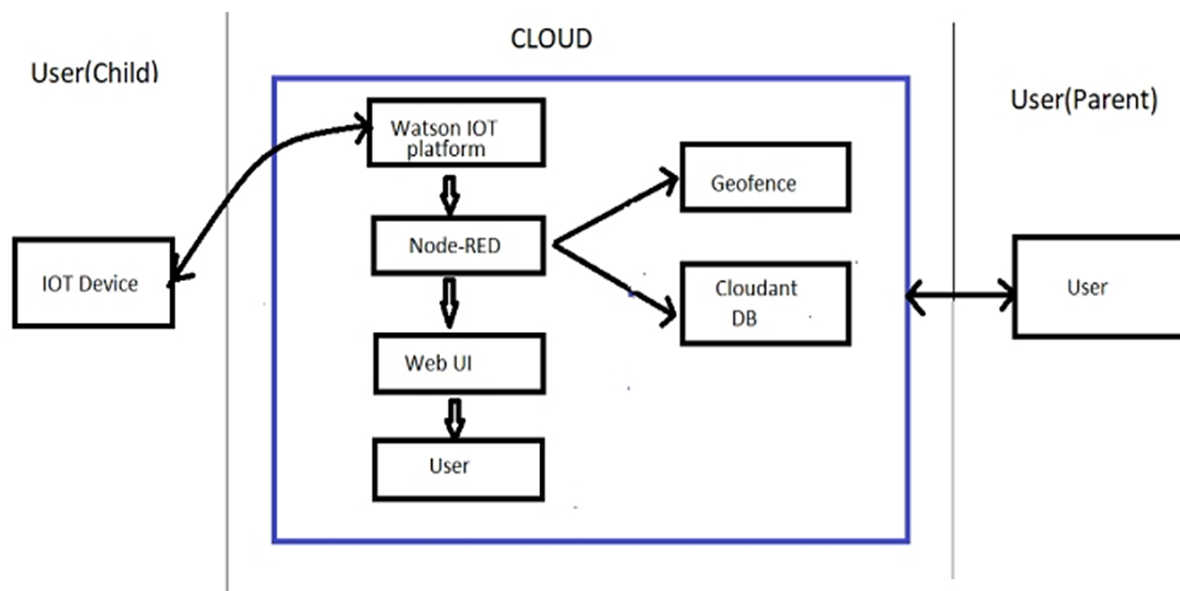
CHAPTER 5

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

A data flow diagram (DFD) is a graphical or visual representation using a standardized set of symbols and notations to describe a business's operations through data movement. They are often elements of a formal methodology such as Structured Systems Analysis and Design Method (SSADM). Superficially, DFDs can resemble flow charts or Unified Modeling Language (UML), but they are not meant to represent details of software logic.

DFDs make it easy to depict the business requirements of applications by representing the sequence of process steps and flow of information using a graphical representation or visual representation rather than a textual description. When used through an entire development process, they first document the results of business analysis. Then, they refine the representation to show how information moves through, and is changed by, application flows. Both automated and manual processes are represented.

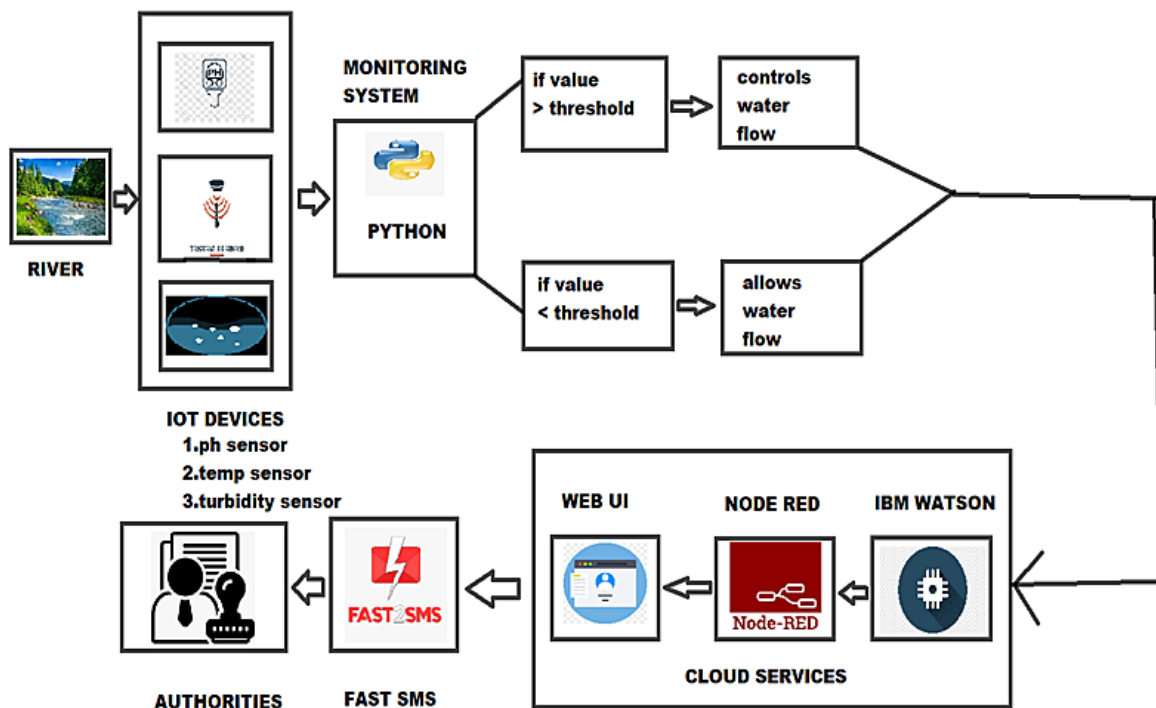


5.2 SOLUTION & TECHNICAL ARCHITECTURE

I) SOLUTION

An IoT architecture is a mix of hardware and software components that interact together to make up a smart cyber-digital system. Interoperating with one another, these components make up a base for an IoT solution to be built upon.

Solution architecture provides the ground for software development projects by tailoring IT solutions to specific business needs and defining their functional requirements and stages of implementation. It is comprised of many sub processes that draw guidance from various enterprise architecture viewpoint

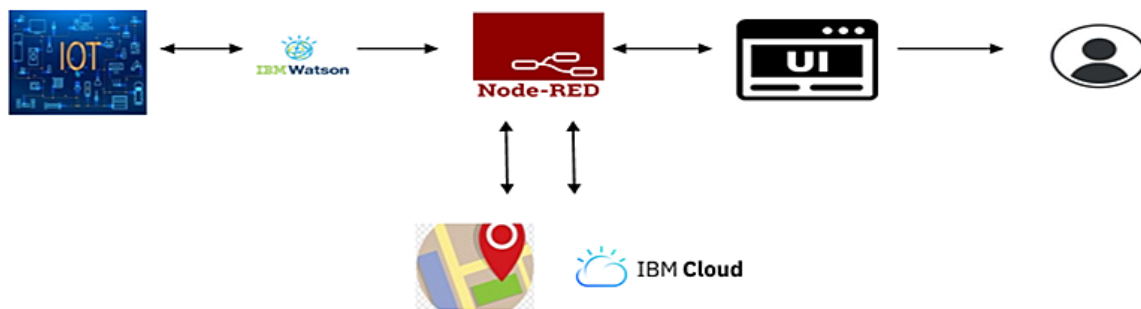


II) TECHNICAL ARCHITECTURE

Technical architect roles typically involve: Designing the structure of technology systems. Managing the implementation of programs. Coordinating with the software development team to ensure the system runs smoothly.

Technology architecture provides a more concrete view of the way in which application components will be realized and deployed. It enables the migration problems that can arise between the different steps of the IS evolution path to be studied earlier.

Technology stack Architecture



5.3 USER STORIES

A user story is an informal, general explanation of a software feature written from the perspective of the end user. Its purpose is to articulate how a software feature will provide value to the customer. It's tempting to think that user stories are, simply put, software system requirements. But they're not.

A key component of agile software development is putting people first, and a user story puts end users at the center of the conversation. These stories use non-technical language to provide context for the development team and their efforts. After reading a user story, the team knows why they are building, what they're building, and what value it creates. User stories are one of the core components of an agile program. They

help provide a user-focused framework for daily work — which drives collaboration, creativity, and a better product overall.

| UserType | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|-----------------------------------|-------------------------------|-------------------|---|--|----------|---------|
| Customer (Mobileuser & Web users) | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | I can access my account /dashboard | High | |
| | | USN-2 | As a user, I will receive confirmation email once I have registered myself | I can receive confirmation email & click confirm | High | |
| | | USN-3 | As a user, I can register for the application through Apple account and twitter | I can register & access the dashboard with Apple account Login and twitter account login | High | |
| | Login | USN-4 | As a user, I can register for the application by entering the user ID & | | High | |

| | | | | | | |
|---------------------------------|-------|--|---|---|--------|--|
| | | | Password | | | |
| Customer CareExecutive ve | Login | | As I enter I can view the working of the application and scan for any glitches and monitor the operation and check if all the usersare authorized | I can login only with my provided credentials | Medium | |
| Administrator | Login | | Maintaining and makingsure the database containing the location aresecure and accurate andalso updated constantly | I can login only with my provided credentials | High | |

CHAPTER 6

6. PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

- 1) Prerequisites.
 - IBM Cloud services
 - Software
- 2) Project Objectives.
 - Abstract
 - Brainstorming
- 3) Create and Configure IBM Cloud Services.
 - Create IBM Watson IoT Platform And Device
 - Create Node- Red Service
 - Create A Database In Cloudant DB
- 4) Develop the Python Script.
 - Develop A Python Script
- 5) Develop A Web Application Using Node-RED Service.
 - Develop The Web Application Using Node-RED
- 6) Ideation Phase.
 - Literature Survey on the Selected Project & Information Gathering
 - Prepare Empathy Map
 - Ideation
- 7) Project Design Phase -1
 - Proposed Solution - Prepare Solution Fit
 - Solution Architecture
- 8) Project Design Phase -2
 - Customer journey
 - Functional Requirement

- Data Flow Diagram
 - Technology Architecture
- 9) Project planning Phase.
- Prepare Milestones & Activity List
 - Sprint Delivery Plan
- 10) Project Development Phase.
- Project Development-Delivery Of Sprint-1
 - Project Development-Delivery Of Sprint-2
 - Project Development-Delivery Of Sprint-3
 - Project Development-Delivery Of Sprint-4

| 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 | 21 | 6 Days | 24 Oct 2022 | 29 Oct 2022 | 21 | 29 Oct 2022 |
| Sprint-2 | 17 | 6 Days | 31 Oct 2022 | 05 Nov 2022 | 17 | 05 Nov 2022 |
| Sprint-3 | 22 | 6 Days | 07 Nov 2022 | 12 Nov 2022 | 22 | 12 Nov 2022 |
| Sprint-4 | 30 | 6 Days | 14 Nov 2022 | 19 Nov 2022 | 30 | 19 Nov 2022 |

6.2 SPRINT DELIVERY SCHEDULE

| Sprint | Functional Requirement (Epic) | User Story Number | User Story/ Task | Story Points | Priority | Team Members |
|---------------|--------------------------------------|--------------------------|-------------------------|---------------------|-----------------|---------------------|
| | | | | | | |

| | | | | | | |
|------------------|--|-------|--|---|--------|---------------------------------------|
| Spr int- 1 | Create and Configure IBMCloud Services | USN-1 | As a user I need to enroll thecloud registration | 3 | HIGH | Theo Thrinish aMary |
| Spr int- 1 | | USN-2 | As a user, I will createIBM cloud account. | 2 | MEDIUM | Theo Thrinish aMary |
| Spr int- 1 | | USN-3 | Aftercreating cloud account launch IBM Watson IOTplatform by accessing cloud account | 5 | HIGH | Anitha |
| Spr int- 1 | | USN-4 | Create the node in IBM Watsonplatform | 7 | HIGH | MalarVizh i |
| Spr int- 1 | | USN-5 | After Creating node get deviceType and id | 1 | LOW | Nageswar i |
| Spr int- 1 | | USN-6 | Simulate the node created | 3 | MEDIUM | Nageswar i |
| Spr int- 2 | Create and accessNode- Red | USN-7 | As a user ,I can createNode-red by appdeployment | 5 | HIGH | The o Thri nis ha Mary |
| Spr int- 2 | | USN-8 | Connect IBM Watson withnode red through API key | 2 | LOW | Malarvizhi |

| | | | | | | |
|----------|--|--------|---|---|--------|---------------------|
| Sprint-2 | | USN-9 | Design the project flow using Node-Red | 7 | HIGH | Theo Thrinisha Mary |
| Sprint-2 | | USN-10 | Check for the proper connections and the output in the node red application | 3 | MEDIUM | Anitha |

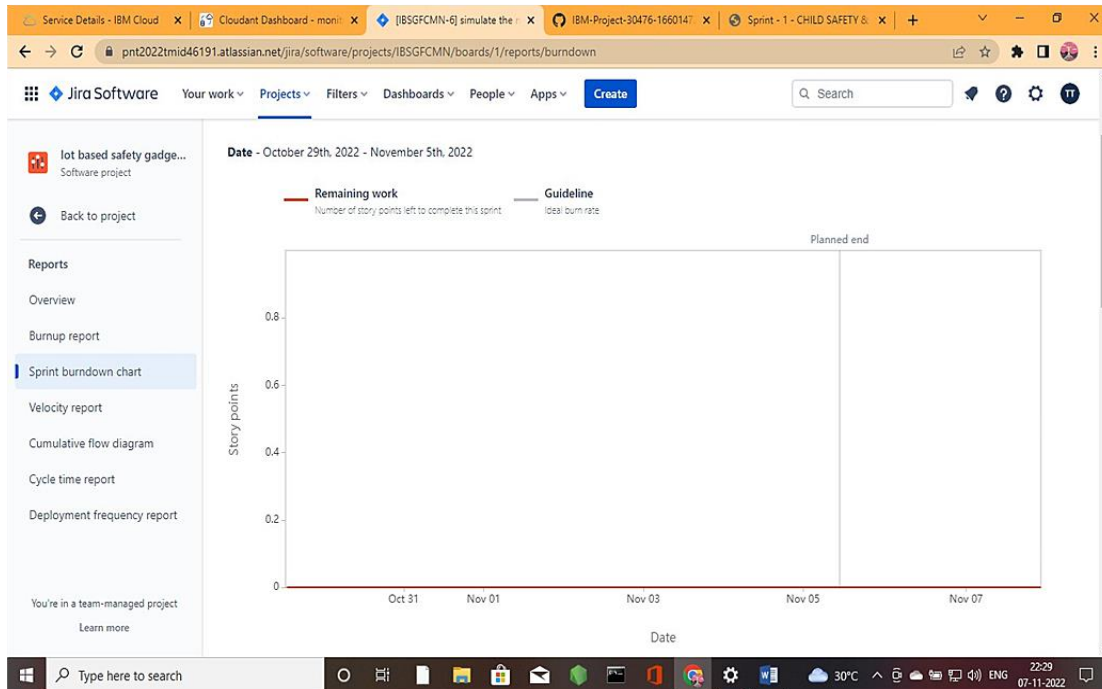
| Sprint | Functional Requirement (Epic) | User Story Number | User Story/ Task | Story Points | Priority | Team Members |
|----------|----------------------------------|-------------------|---|--------------|----------|---------------------|
| Sprint-3 | Create A Database in Cloudant DB | USN-11 | Launch the Cloudant DB and Create database to store the location data | 4 | HIGH | Nageswari |
| Sprint-3 | Develop the Python script | USN-12 | Install the python software | 2 | LOW | Theo Thrinisha Mary |
| Sprint-3 | | USN-13 | Develop the python scripts to publish details to IBM IoT Platform | 6 | HIGH | Malarvizhi |
| Sprint-3 | | USN-14 | Integrate the device id, authentication token in python script | 2 | LOW | Anitha |

| | | | | | | |
|----------|---|--------|--|----|--------|---------------------|
| Sprint-3 | | USN-15 | Develop the python code for publishing the location (latitude & longitude) to IBM IoT Platform | 8 | HIGH | Theo Thrinisha Mary |
| Sprint-4 | Create the Web application using Node Red | USN-16 | Develop the Web application using Node red | 5 | HIGH | Nageswari |
| Sprint-4 | | USN-17 | Connect to the IBM IoT Platform and get the location and Store the data in the Cloudant | 2 | MEDIUM | Malarvizhi |
| Sprint-4 | | USN-18 | Create the geofence and Google map for location identification | 8 | HIGH | Theo Thrinisha Mary |
| Sprint-4 | | USN-19 | Integrate the geofence and Google map to check if the child is inside or outside the geofence | 11 | HIGH | Theo Thrinisha Mary |
| Sprint-4 | | USN-20 | Send the notifications if the child is outside the geofence | 4 | HIGH | Anitha |

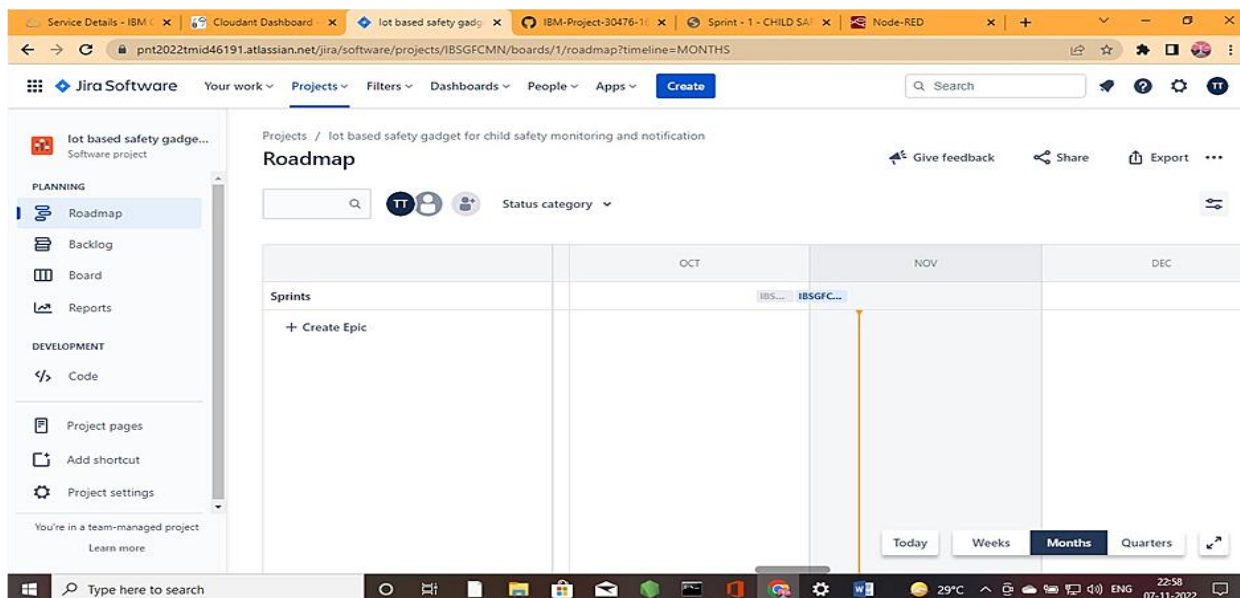
6.3 REPORTS FROM JIRA

- SPRINT 1

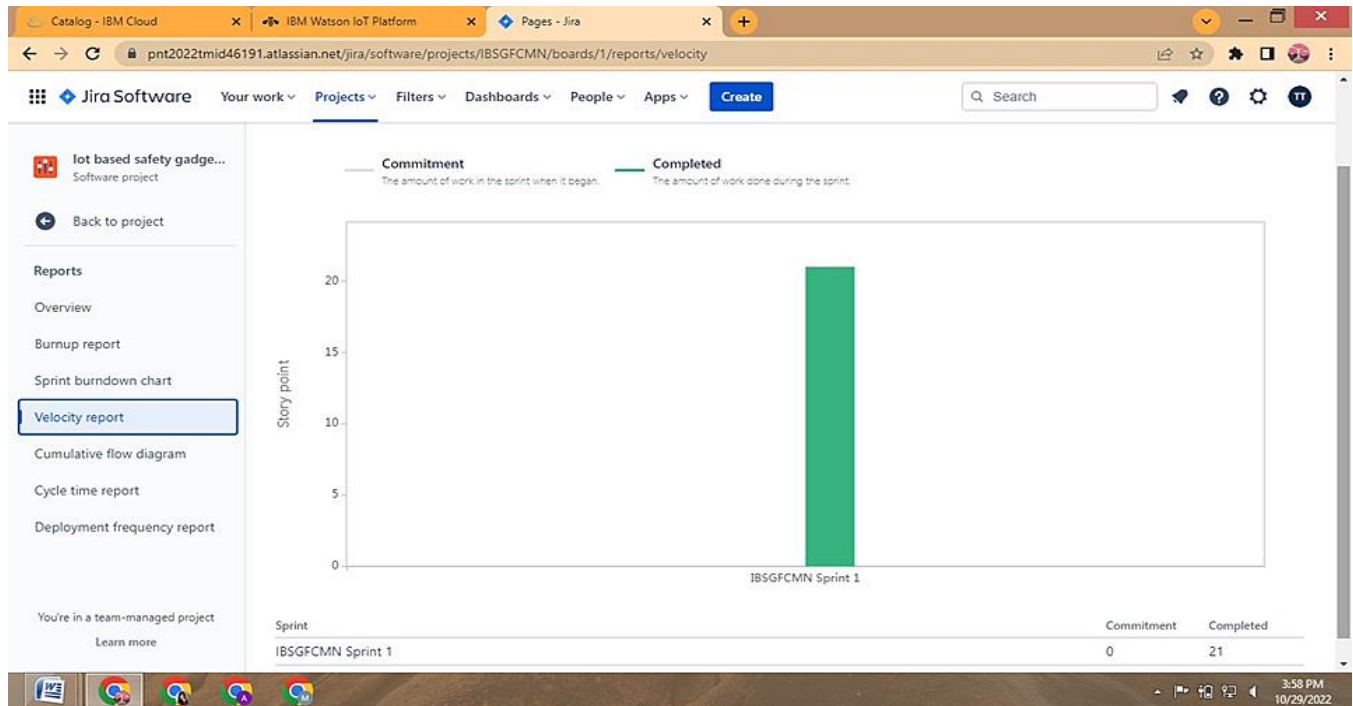
BURNDOWN CHART:



ROADMAP:

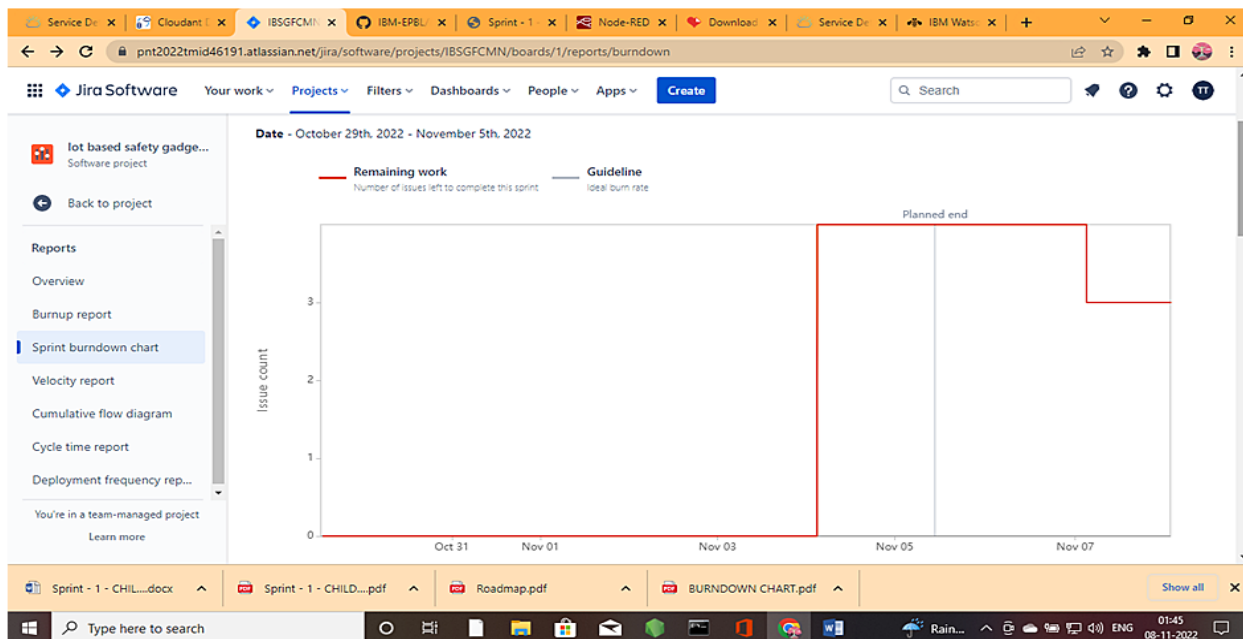


Velocity map:

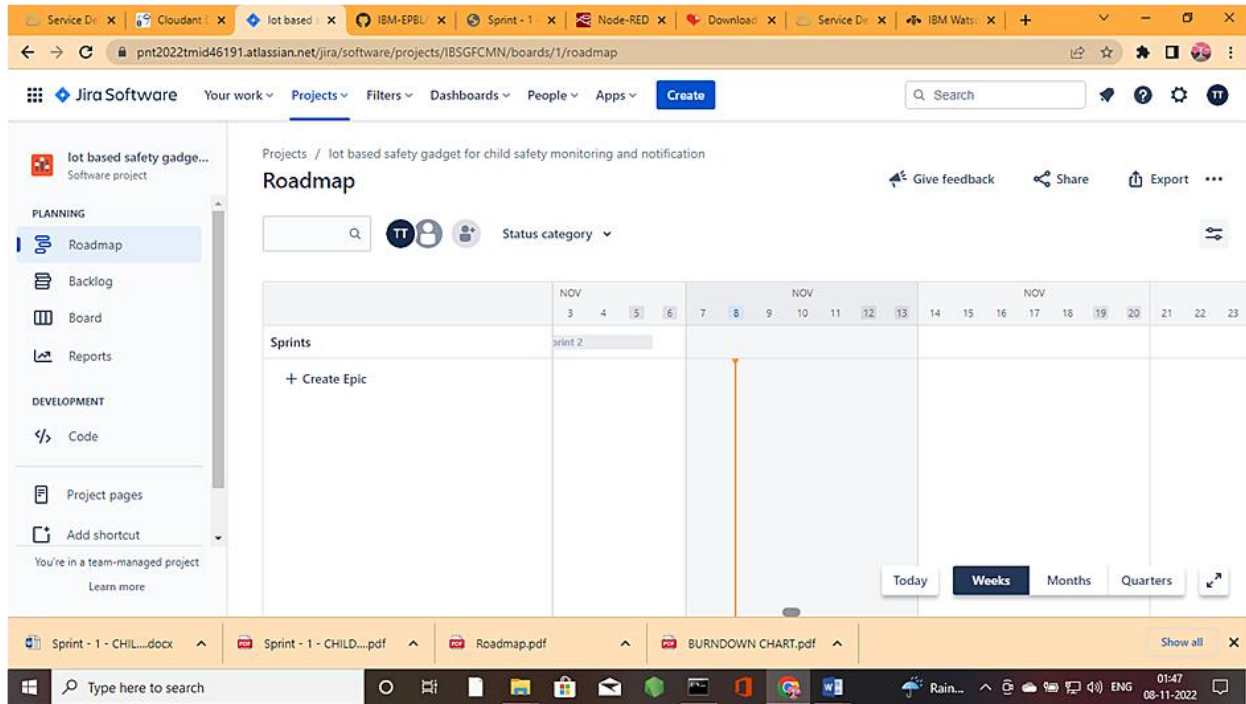


- **SPRINT 2**

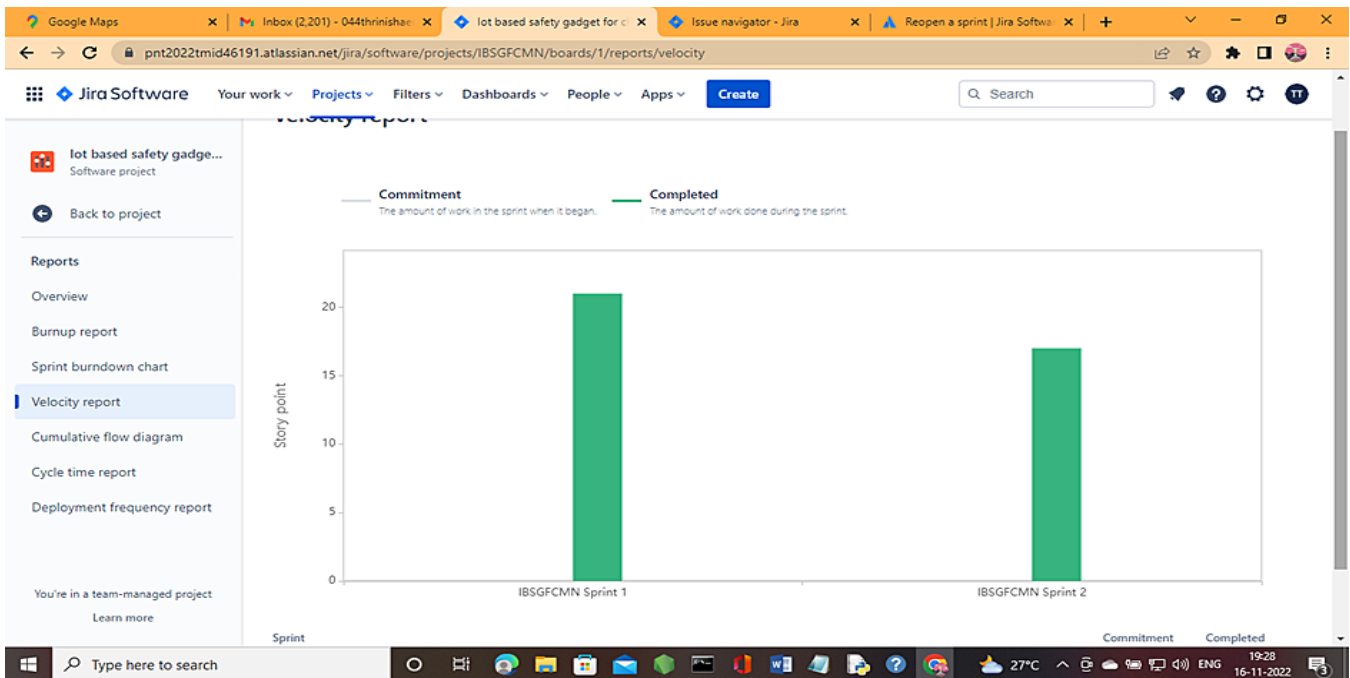
BURNDOWN CHART:



ROADMAP:

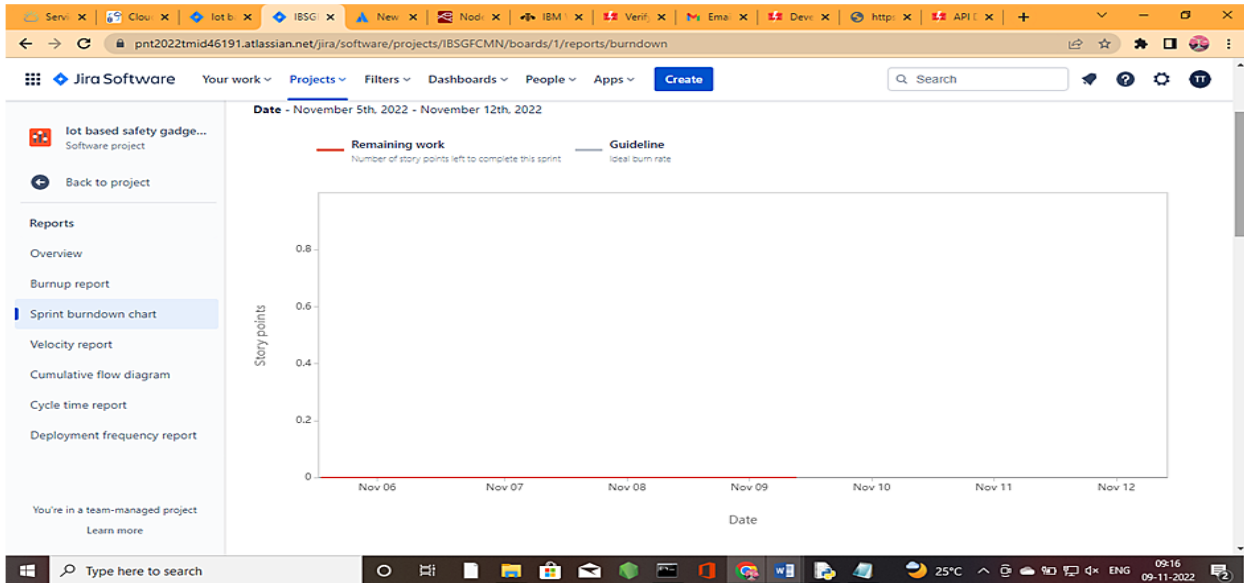


VELOCITY MAP

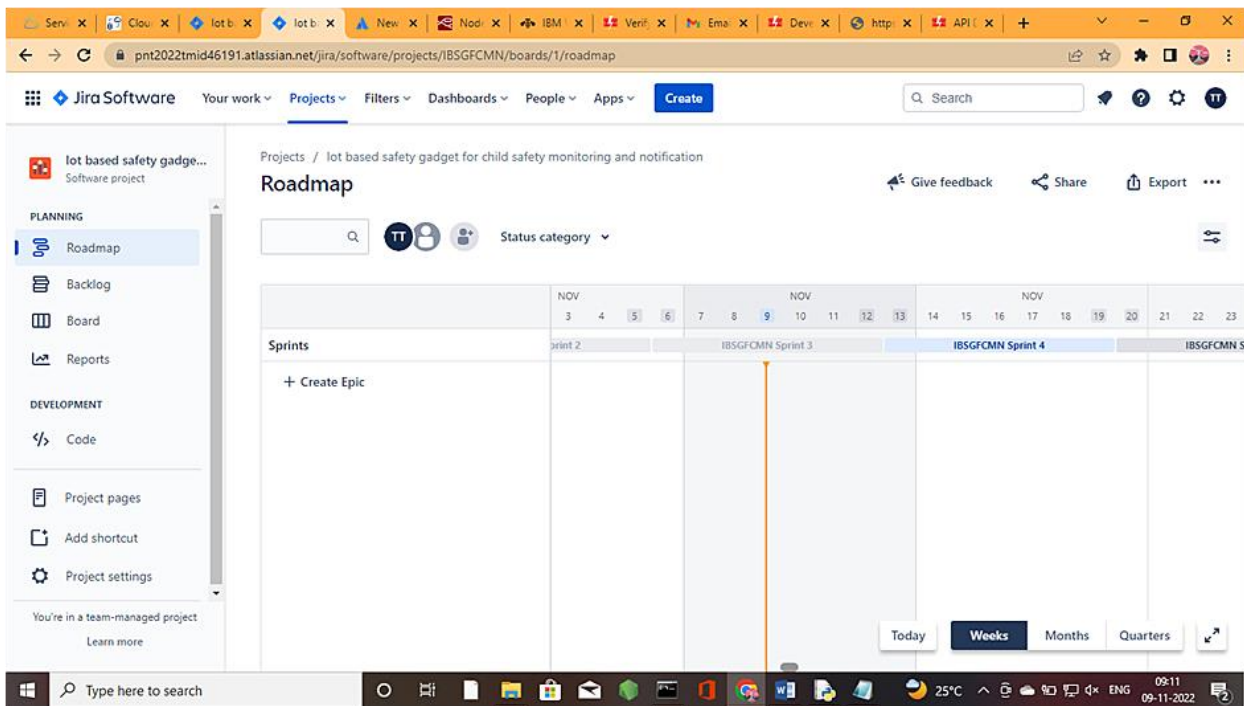


- **SPRINT 3**

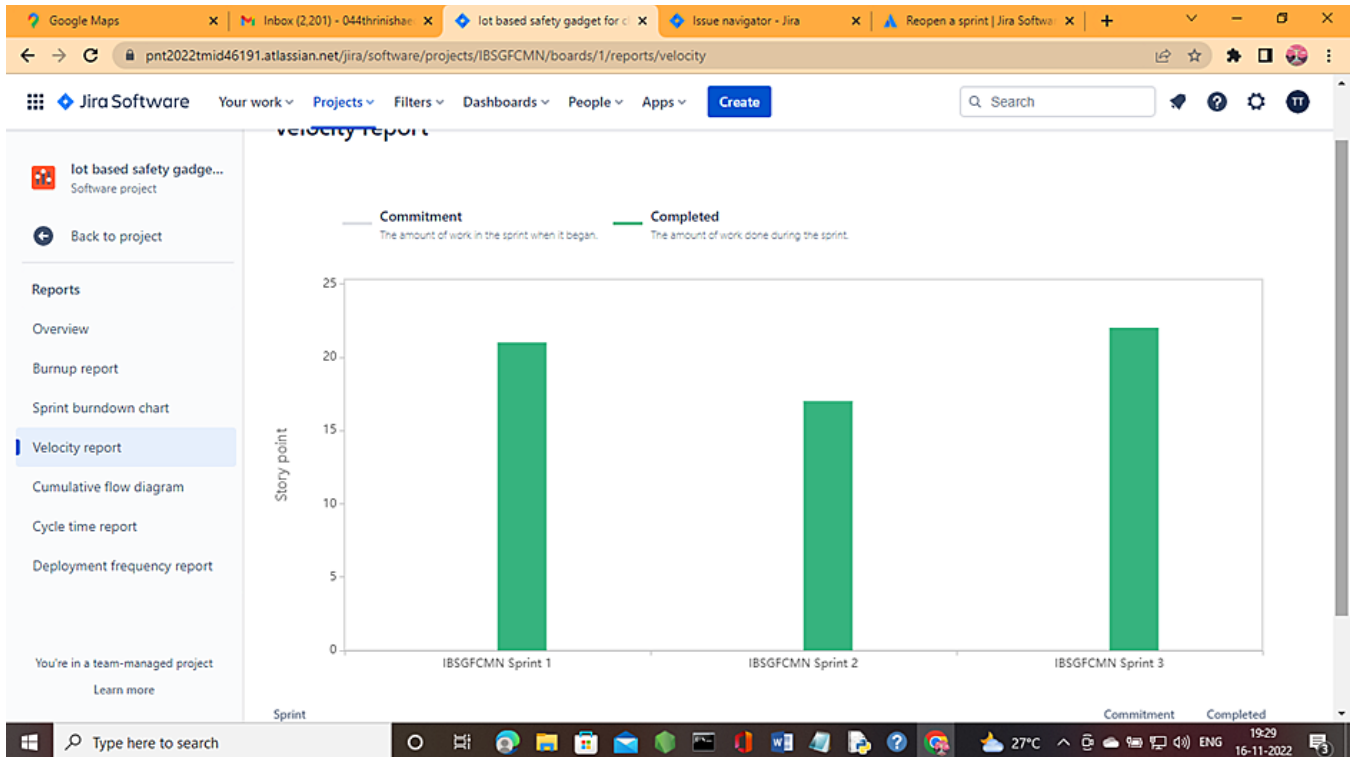
BURNDOWN CHART:



ROADMAP:

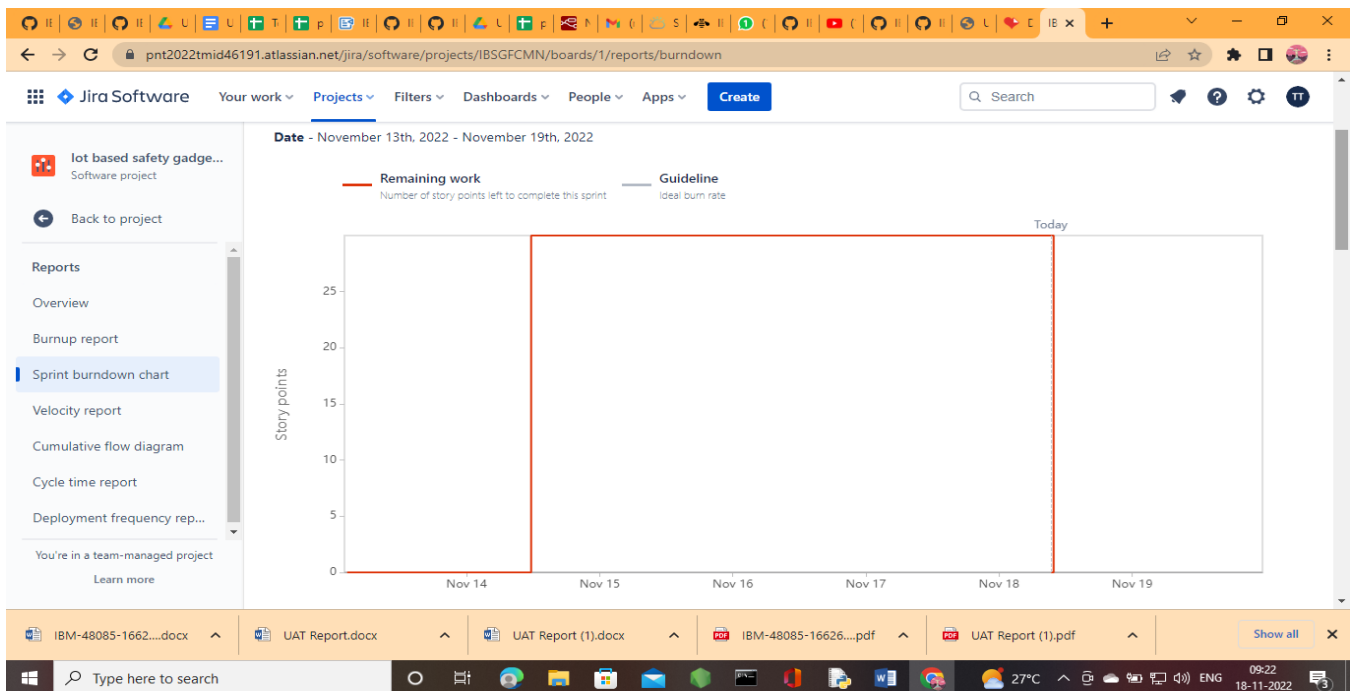


VELOCITY MAP:

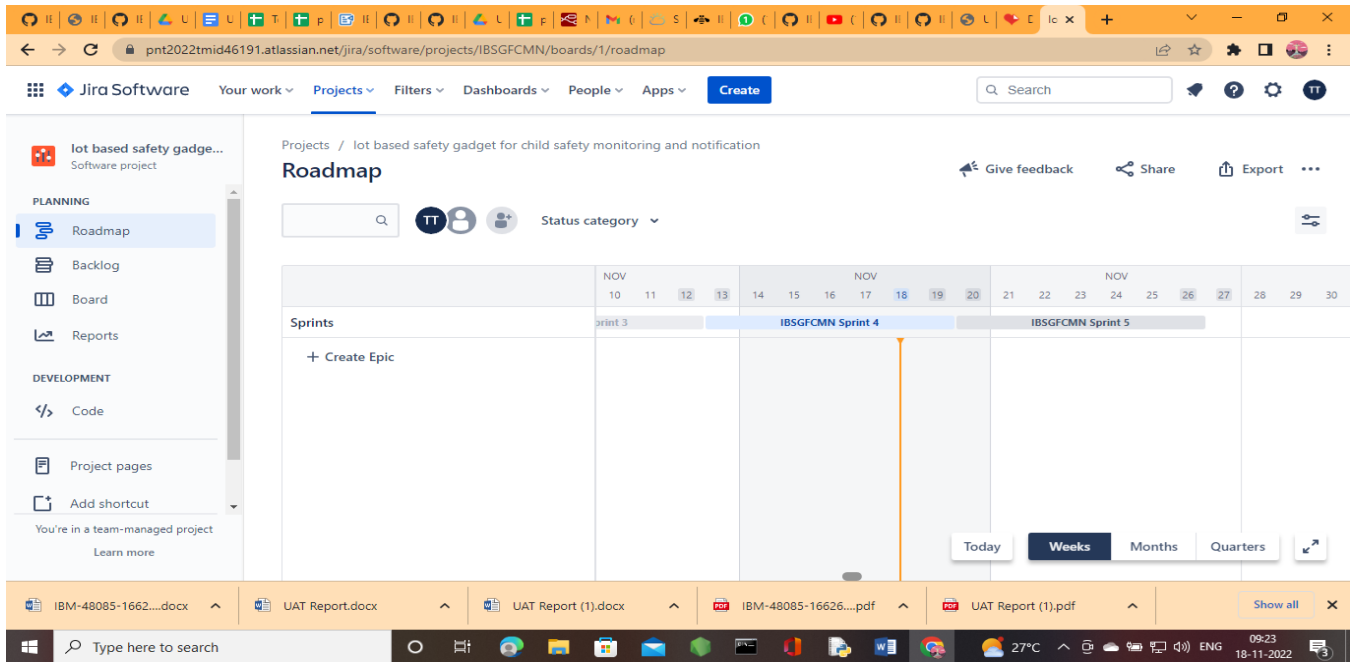


- **SPRINT 4**

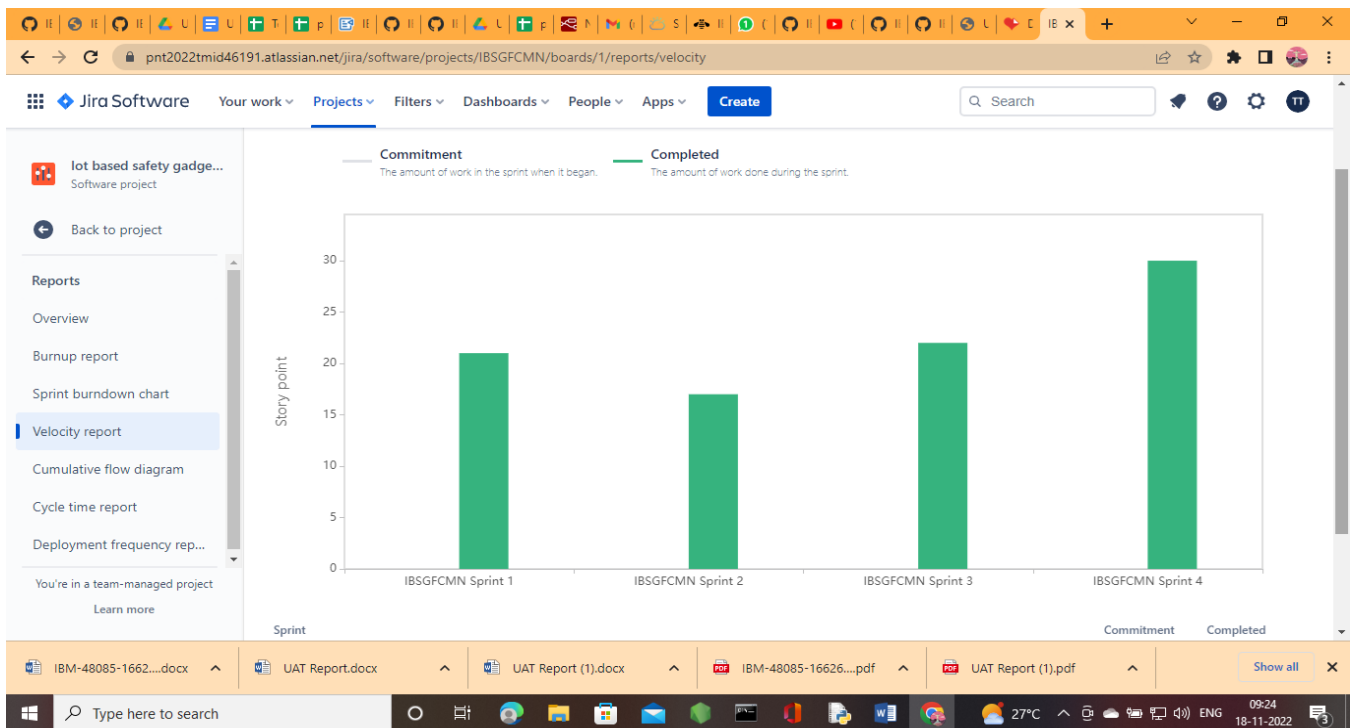
BURNDOWN CHART:



ROADMAP:



VELOCITY MAP:



CHAPTER 7

7. CODING & SOLUTIONING

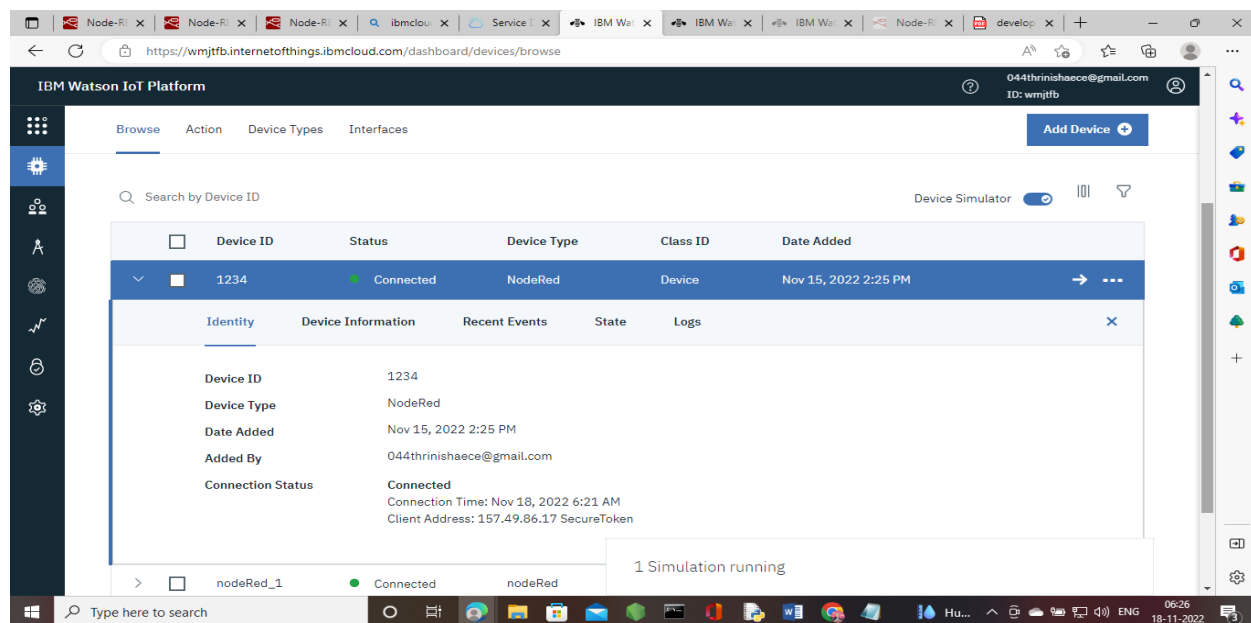
7.1 FEATURE 1

IBM WATSON IoT PLATFORM

The very first process in this project section is to develop the IBM IoT Platform. This IoT platform is the core formula for all the connection process. As the only way of connecting several applications is the basic work of the cloud platform. The process of signing in to the cloud process is the large process which carries verification segments too. After creating the Cloud Profile, let's move to device creation part.

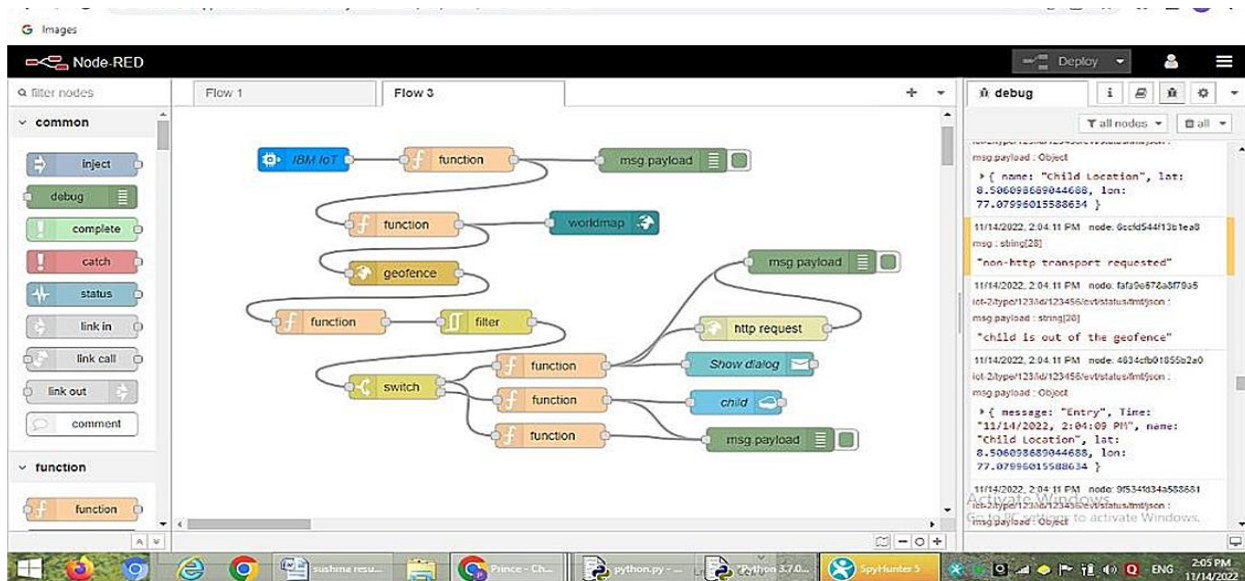
Device Creation:

Now the next step is to create a device, we have created a device with following details



After registering to the IBM IoT Platform and created the device, now we move onto the Node-Red Service, in this here we can create the Web user interface and the Web Application by designing the circuit. Our Node-Red Circuit designing are as follows.

The first step is to install the IBM IOT block from the node-red service and we have set four functions namely, latitude, longitude, location these four functions process the bin value with corresponding location of the child, whenever the child gets out of the geo-fence, an alert message is sent to the guardian or parent. Location of the child can be seen in the map.



After the successful simulation of the Node-RedService, User Interface is created. Our WebUI includes a dashboard which has the location of the particular child and a alert message to be sent.

7.2 FEATURE 2

PYTHON CODE

Our Python Code is very Simple and easy to understand. The programs carries our device details and the requirements of the project are kept defined. All conditions are made properly and the output is done successfully

Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the IoT-Based Safety Gadget for Child Safety Monitoring and Notification project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

| Resolution | Severity 1 | Severity 2 | Severity 3 | Severity 4 | Subtotal |
|----------------|---------------|---------------|---------------|---------------|----------|
| By Design | 12 | 5 | 3 | 4 | 24 |
| Duplicate | 2 | 0 | 3 | 0 | 5 |
| External | 3 | 5 | 0 | 2 | 10 |
| Fixed | 10 | 1 | 5 | 15 | 31 |
| Not Reproduced | 0 | 0 | 2 | 0 | 2 |
| Skipped | 0 | 0 | 2 | 1 | 3 |
| Won't Fix | 0 | 4 | 3 | 2 | 9 |
| Totals | 27 | 15 | 18 | 24 | 84 |

Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

| Section | Total Cases | Not Test ed | Fai l | Pa ss |
|--------------|----------------|----------------|----------|----------|
| Print Engine | 8 | 0 | 0 | 8 |

| | | | | |
|---------------------|----|---|---|----|
| Client Application | 50 | 0 | 0 | 50 |
| Security | 3 | 0 | 0 | 3 |
| Outsource Shipping | 4 | 0 | 0 | 4 |
| Exception Reporting | 10 | 0 | 0 | 10 |
| Final Report Output | 5 | 0 | 0 | 5 |
| Version Control | 3 | 0 | 0 | 3 |

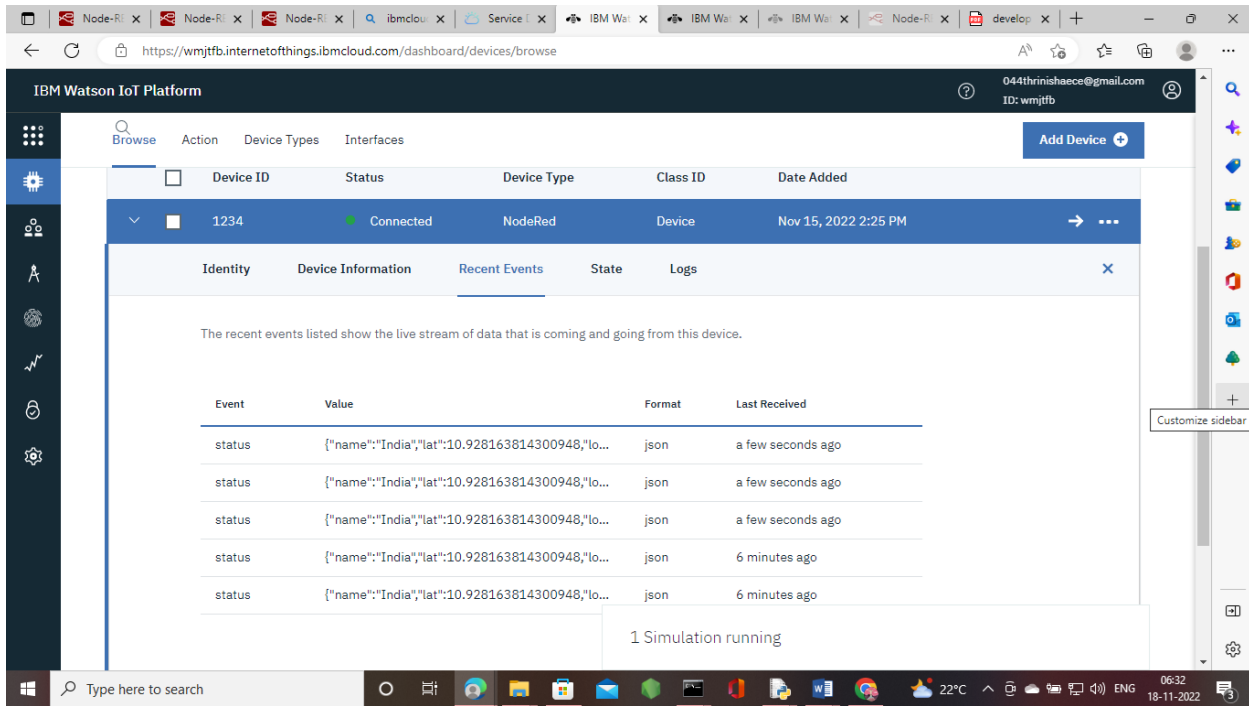
test case excel link : <https://1drv.ms/x/s!AhC-4VXBBNjHgTFwLMVklzf-hjEA>

CHAPTER 9

RESULTS

9.1 PERFORMANCE METRICS

The performance and the working of the code is ver quick and the results appears in quick succession. Our code is linked with the most used IBM Watson IoT Platform which works with much perfection. This cloud platform is very secure to use and configure easily. As the code is simulated within seconds the result appears. We have done lot of works using this IoT platform which is very simple and good user friendly platform. Below we display our connected IoT platform which delivers the results as the code is run.



CHAPTER 10

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- **Easy Availability& Affordability**

Gone are the days when buying a GPS enabled Wearable Device for kids was considered a luxury. Today, however, the scenario is different. There are plenty of options readily available. It is easy to buy a smart watch for kids of your choice online. What's more, these magnificent tech gadgets don't burn a big hole in your pockets and make up for an affordable buy. Now a smart watch is just a click away! Besides, these smart-watches lend a style statement to your fashion-conscious kids.

Tracking Made Easy

Fueled by IOT, the GPS enabled Wearable Device act as a saviour for parents who are always clouded with worries about their kids. Tracking a child was never this easy. These Wearable Device allow parents to track their children in crowded/public places or when

they are out of sight say at school, picnic or an outing. Parents can use these smart-watches to track the location of their lost kids.

- **Smart watch is Technology in Disguise**

No matter how tech advanced the smart watches are, they hardly look like one. Most manufacturers have worked hard to mold their tech wonders in a time piece that looks everything but a tech piece! Their childish designs and bright colour combination is perfect to disguise them. This is precisely why most people can hardly spot the difference between a smart watch and an ordinary watch. Good for kids whose parents use them, as their adorable designs keep these watches safe from the prying eyes.

- i. **Watches Over Your Kids**

GPS tracker watches are a boon for parents as they help in watching over your kids when either they are away or you are away from them. These devices:

1. Tracks kids when they reach school or arrive home from school.
2. Track kids when they are untraceable in a crowded space.
3. Track kids when they are away from home and out of your sight.

Guarantees Peace of Mind to Parents

Parents, whether at home or office, are always worried about the safety of their kids. The fear of losing your child to avoidable circumstances is the concern area for all mommies and daddies. On the other hand, a smart watch equipped kid is always traceable and reachable in case of contingencies and emergencies. This in fact, offers great solace for parents, who are relieved at the thought of maintaining an uninterrupted connectivity with their children, anytime, anywhere. Enough to of course, guarantee the much-needed peace of mind.

DISADVANTAGES:

Daily battery charging may be difficult to remember for the wearable trackers. Frequent monitoring of child location notification is difficult. Children may lose the gadget.

CHAPTER 11

11. CONCLUSION

The perpetration of an exertion shamus system using IOT safeguards children and it can also be effectively used for women, and senior people to cover them and guard them in the fastest way which is possible automatically. This system substantially focuses on a wireless system that will warn and communicates with a secure medium and can perform the real-time monitoring of particular zone and descry safety with effective delicacy. This idea can be enforced in different areas of security around academy zones, institutions, and shopping zones where facing dangerous situations happens because of attacks. This system would be largely sensitive and easy to handle. Its quick action response will give better deliverance to every individual stoner.

The word unborn resembles the word Children. AsDr.A.P.J Abdul Kalam words “ youths are the unborn pillars of one’s nation”, moment's children are hereafter's youths, and conserving their dreams and life for a better future is necessary. thus, every parent should take care of their children, without letting them fall into the dark world of abuse, which entirely ruins them physically, mentally, and emotionally destroying our future. Hence, considering the significance of our future, our design makes it easy for parents to track their children and visually cover them on regular base, which makes them ensures the safety of their children and reduces the rate of incidents of child abuse. Throughout the exploration, it's easily explained the IoT conception, child safety issues, and the need of using child security systems. Some former studies have been included for designing the IoT- grounded child security smart band. It assists parents to cover their children ever.

CHAPTER 12

12. FUTURE SCOPE

In our system, we automatically cover the child in real-time using the Internet of effects, with the help of GPS, GSM, and Raspberry Pi. This system requires network connectivity, satellite communication, and high-speed data connection when we use web cameras and GPS to the lively examiner. It's delicate to cover when there occurs any interference to satellite communication or any network issue. There also occurs time detention in videotape streaming through the garçon. Hence in the future, these issues can be overcome by using the Zigbee conception or penetrating the system without the internet and using high-speed garçon transmission.

This exploration demonstrates Smart IoT bias for child safety and shadowing helping parents to detect and cover their children. If any abnormal values are read by the detector also an SMS is transferred to the parent's mobile and an MMS indicating an image captured by the periodical camera is also transferred. The unborn compass of the work is to apply the IoT device which ensures the complete result for child safety problems. currently, crime rates, particularly hijackings of children, are on the rise. likewise, it isn't always doable to be there with them because utmost parents must work to support their families. The suggested approach has the implicit to minimize the number of child- missing cases. This system provides a shadowing tool for parents to track their child's whereabouts outside exercising WFPS, allowing them to know the exact position of the youth. likewise, contribute to precluding this tragedy from recreating in the future.

CHAPTER 13

13. APPENDIX

PROJECT DEMONSTATION VIDEO UPLOADED HERE

SOURCE CODE :

```
import json

import wiotp.sdk.device

import time

myconfig = {

    "identity": {

        "orgId": "wmjtfb",

        "typeId": "NodeRed",

        "deviceId": "1234"

    },

    "auth": {
```

```
"token": "1234567890"
```

```
}
```

```
}
```

```
client = wiotp.sdk.device.DeviceClient(config=myconfig, logHandlers=None)
```

```
client.connect()
```

```
while True:
```

```
    name= "India"
```

```
    #in area location
```

```
    latitude= 10.928163814300948
```

```
    longitude= 78.7481278181076
```

```
    #out area location
```

```
    #latitude= 17.4219272
```

```
    #longitude= 78.5488783
```

```
    myData={'name': name, 'lat':latitude, 'lon':longitude}
```

```
    client.publishEvent(eventId="status",      msgFormat="json",      data=      myData,  
qos=0),#onpublish=None
```

```
    print("Data published to IBM IOT platform: ",myData)
```

```
    time.sleep(10)
```

```
client.disconnect()
```

GITHUB LINK: <https://github.com/IBM-EPBL/IBM-Project-30476-1660147203>

13PROJECT DEMO LINK:https://www.youtube.com/embed/VAM0eUYJ_Uc