IoT Based Safety Gadget For Child Safety

Monitoring & Notification

NALAIYA THIRAN PROJECT BASED LEARNING

on

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

Project Report Submitted by

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ABSTRACT

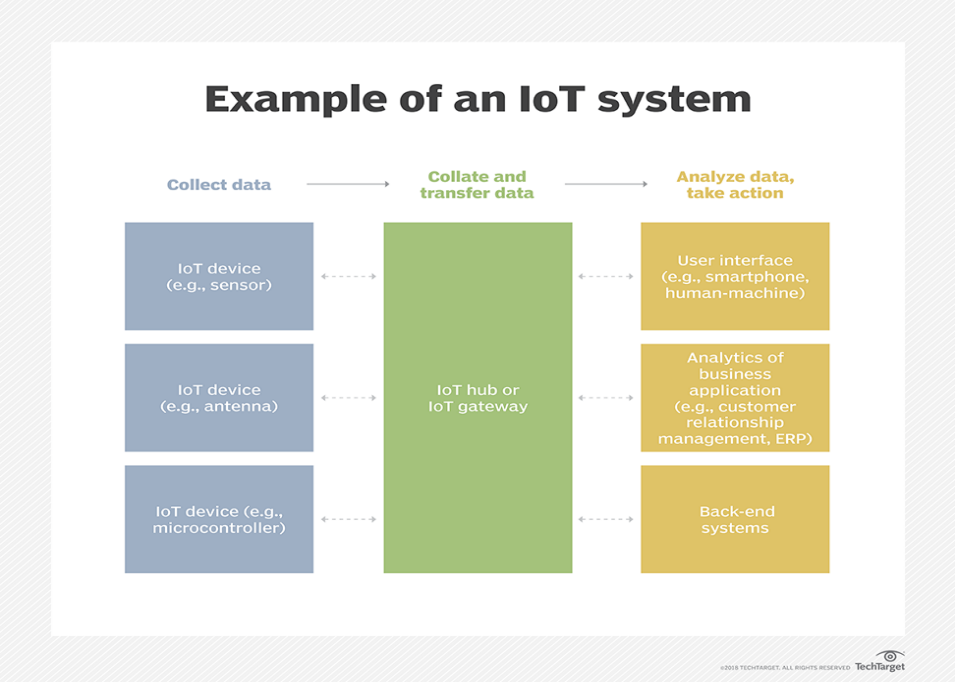
As we know in present era everything is based on digital technology. Human being is going to connect each other by using mobile network. Ths project proposes an SMS based solution to reduced parents insecurity and to track children's in real time. Different devices are connected with a single device. The concerned device is connected to mobile via SMS. Child tracker helps the parents in continuously monitoring the child's location. They can simply leave their children in school or parks and create a geofence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.An Android app was designed and developed to collect the location data from cloud database to compute the relative distance location of a child when he or she leaves the maximum set distance, using node-red dervices.Finally, a user study was conducted to analyze the user experience of the system developed.

CONTENT

1.INTRODUCTION

Internet of Things (IoT) is a network of physical objects or people called “things” that are embedded with software, electronics, network, and sensors that allows these objects to collect and exchange data. The goal of IoT is to extend to internet connectivity from standard devices like computer, mobile, tablet to relatively dumb devices like a toaster. IoT makes virtually everything “smart,” by improving aspects of our life with the power of data collection, AI algorithm, and networks. The thing in IoT can also be a person with a diabetes monitor implant, an animal with tracking devices, etc.

How IoT works?



An IoT ecosystem consists of web-enabled smart devices that use embedded systems, such as processors, sensors and communication hardware, to collect, send and act on data they acquire from their environments. **IoT devices** share the sensor data they collect by connecting to an IoT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally. Sometimes, these devices communicate with other related devices and act on the information they get from one another. The devices do most of the work without human intervention, although people can interact with the devices -- for instance, to set them up, give them instructions or access the data.

1.1 PROJECT OVERVIEW

Child safety is a major concern in any society due to the vulnerability of a child and consequently, higher rates of crimes against children. With this issue on our hands, a smart wearable Internet of Things sensor network for monitoring the environment of a child can be developed to help parents ensure the safety of their children. It must also necessarily include a mechanism for tracking the child. An advantage of this wearable device is that, according to its design, it can be accessed from any mobile device and does not mandate a lot of technical knowledge from the user to operate.

PROJECT FLOW

- ✓ The GPS coordinates of the child will be sent to the IBM IoT platform.
- ✓ Location can be viewed in the Web Application.
- ✓ A parent can create a geofence in the web application.
- ✓ The web application will check if the child is inside or outside the geofence.
- ✓ Notifies the parents if the child goes out of the geofence.

To accomplish this, we have to complete all the activities and tasks listed below:

- ✓ Create and configure IBM Cloud Services
  - ii. Create IBM Watson IoT Platform
  - iii. Create a device & configure the IBM IoT Platform
  - iv. Create Node-RED service
  - v. Create a database in Cloudant DB to store location data
- ✓ Develop a web Application using Node-RED Service.
  - vii. Develop the web application using Node-RED.
  - viii. Integrate the geofence & google map.
- ✓ Develop a python script to publish the location details to the IBM IoT platform.

1.2 PURPOSE

Child tracker helps the parents in continuously monitoring the child's location. They can simply leave their children in school or parks and create a geofence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in database.

2. LITERATURE SURVEY

2.1 & 2.2 Existing problem and Referance

1.Smart IoT Device for Child Safety and Tracking.

Authors: M Nandini Priyanka, S Murugan, K. N. H. Srinivas, T. D. S. Sarveswararao, E. Kusuma Kumari.
Published in: 2019 IEEE.

The system is developed using Link-It ONE board programmed in embedded C and interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & digital camera modules. The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during an emergency.

Merits:

The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same.

Demerits:

To implement the IoT device which ensures the complete solution for child safety problems.

2.Child safety wearable device.

Authors: Akash Moodbidri, Hamid Shahnasser
Published in: 2017 IEEE.

The purpose of this device is to help parents to locate their children with ease. At the moment there are many wearable's in the market which helps to track the daily activity of children and also helps to find the child using Wi-Fi and Bluetooth services present on the device.

Merits:

This wearable over other wearable is that it can be used in any phone and it is not necessary that an expensive smartphone is required and doesn't want to be very tech savvy individual to operate.

Demerits:

As, this device's battery gives short life-time. High power efficient model will have to be used which can be capable of giving the battery life for a longer time.

3.Child Safety & Tracking Management System by using GPS.

Authors: Aditi Gupta, Vibhor Harit.
Published in: 2016 IEEE.

This paper proposed a model for child safety through smart phones that provides the option to track the location of their children as well as in case of emergency children can send a quick message and its current location via Short Message services.

Merits:

The advantages of smart phones which offers rich features like Google maps, GPS, SMS etc.

Demerits:

This system is unable to sense human behavior of child.

4.Children Location Monitoring on Google Maps Using GPS and GSM.

Authors: Dheeraj Sunehera, Pottabhatini Laxmi Priya.
Published in: 2016 IEEE.

This paper provides an Android-based solution for parents to track their children in real time. Different devices are connected with a single device through channels of internet. The concerned device is connected to a server via the Internet. The device can be used by parents to track their children in real time or for women's safety. The proposed solution takes the location services provided by GSM module. It allows the parents to get their child's current-location via SMS.

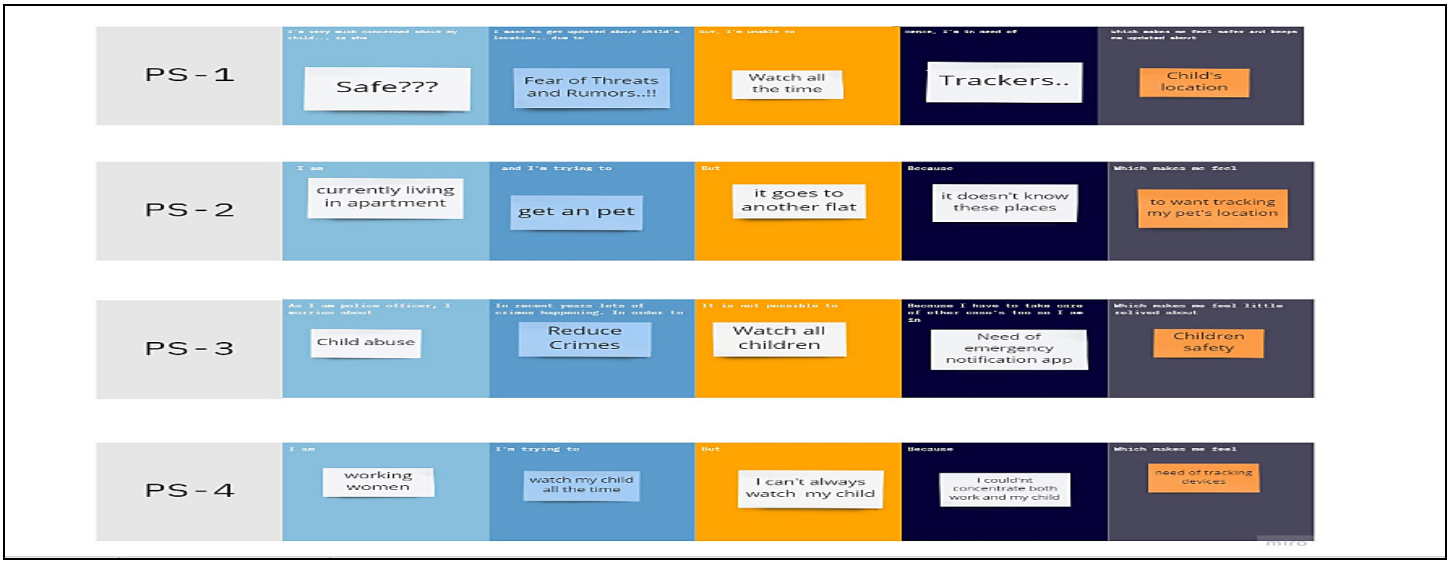
Merits:

A child tracking system using android terminal and hoc networks.

Demerits:

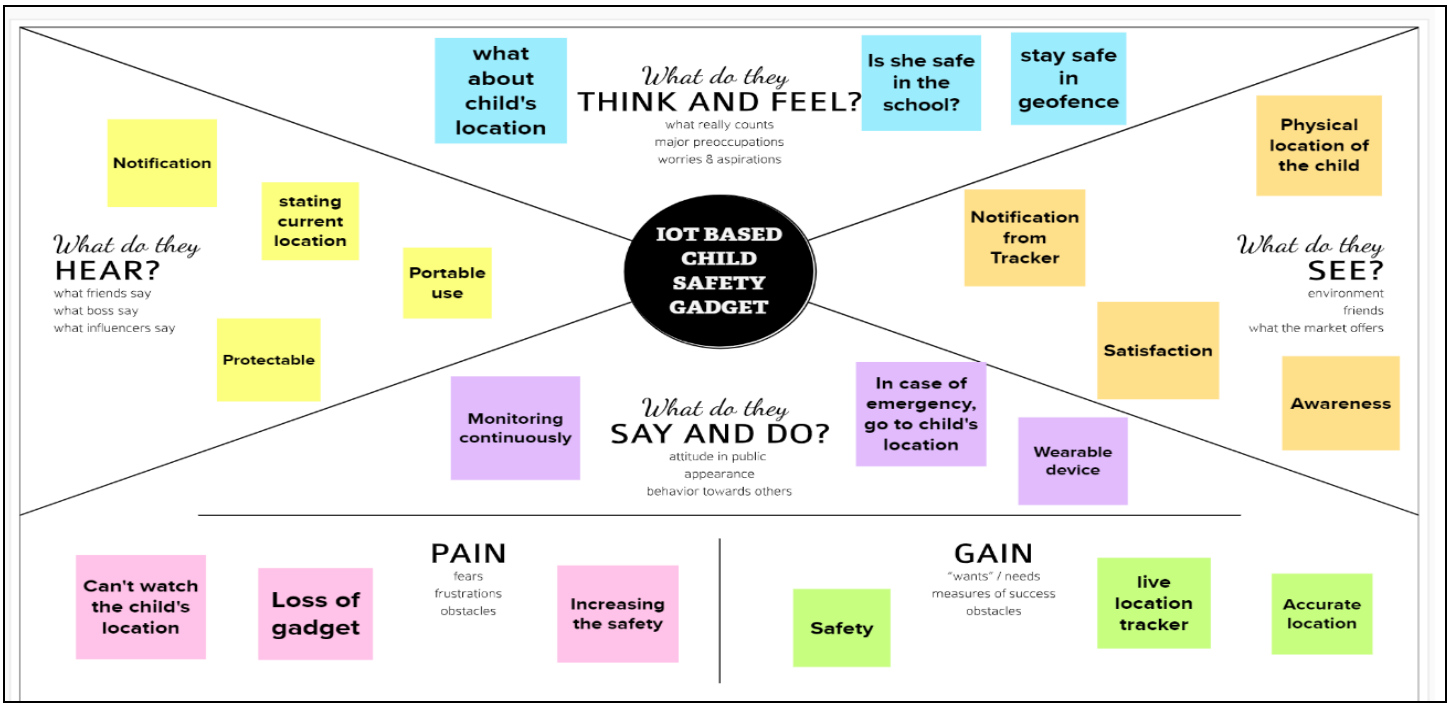
This device cannot be used in rural areas.

2.3 Problem Statement Definition

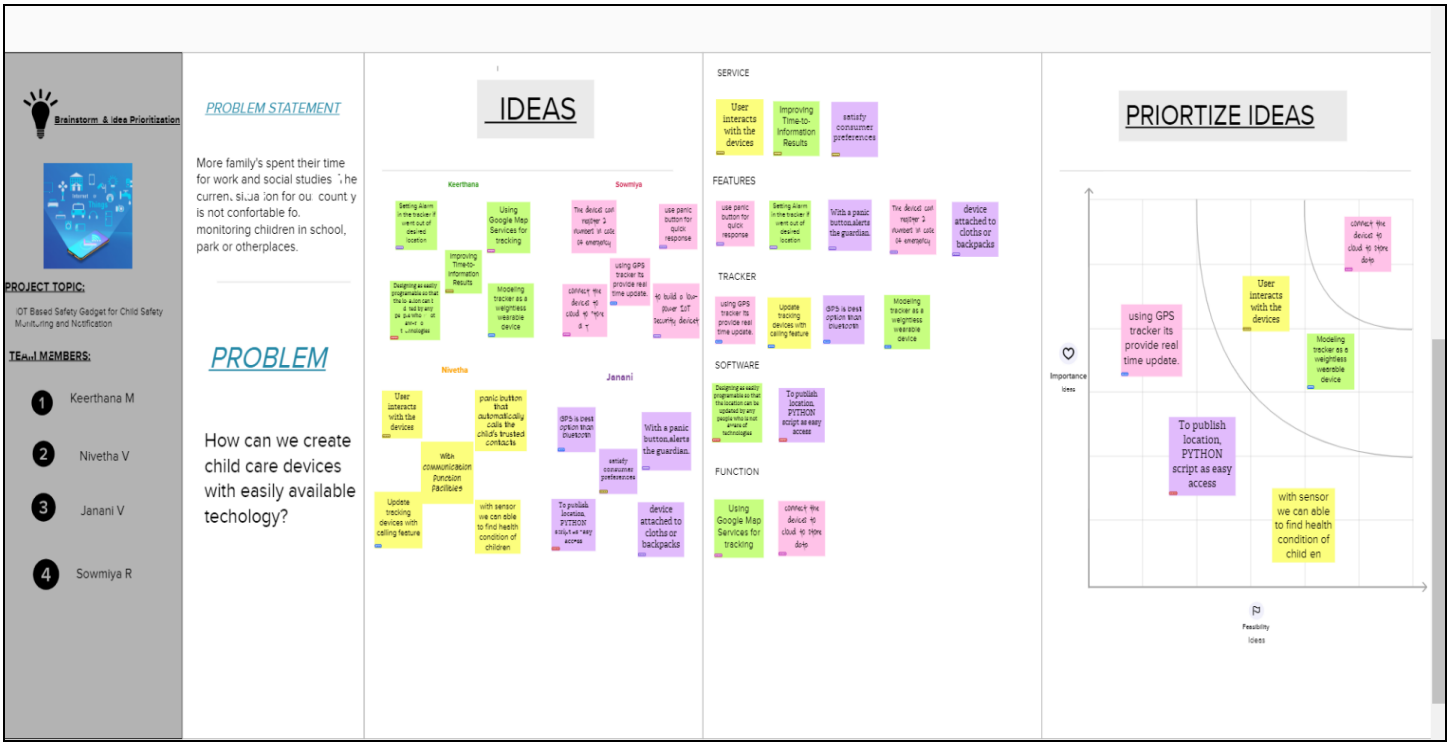


3.IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Nowadays,parents concern more about serious cases such as missing children,abduction and abuse. They cannot sit with their children or 24*7 hours to secure their children and monitor the children's activities.
2.	Idea / Solution description	Create a Child tracker which helps the parents with continuously monitoring the child's location. The notification will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.
3.	Novelty / Uniqueness	The novelty of the work is that the system automatically alerts the parent/caretaker by sending notification,when immediate attention is required for the child during emergency
4.	Social Impact / Customer Satisfaction	make children parents more assure about their kid's security, we have a feature in our device called Geo-Fence. Geo-Fencing feature allows you to mark a particular area as safe-zone. Whenever your child crosses that specific area, you will get an instant notification on your phone.
5.	Business Model (Revenue Model)	● Easy to use ● Low cost ● Weightless ● Compatible
6.	Scalability of the Solution	● Gadget ensures the safety and tracking of the children ● Parents need not worry about their children.

3.4 Problem Solution

Purpose: To create a child safety gadgets

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	✓ Registration through Gmail ✓ Registration through phone number
FR-2	User Confirmation	✓ Confirmation via email ✓ Confirmation via OTP

FR-3	App installation	✓ Installation through link ✓ Installation through play store
FR-4	Settings geofence	Setting by user to find child location
FR-5	Detecting child location	✓ Detecting location via app ✓ Detecting location via SMS
FR-6	User Interface	✓ User Login Form. ✓ Admin Login Form.
FR-7	Database	✓ Stored in cloud for seamless connectivity. ✓ Parents and kids link with the distance and the location values obtained from the mobile devices are stored here. ✓ The values include parent id,kid id,distance,longitude,latitude etc.
FR-8	Server	✓ It connects the database and the front end application. ✓ The backend server has been implemented to run as a service and is deployed in an IBM cloud instance. ✓ The backend server has been implemented to run as a service and is deployed in an IBM cloud instance.
FR-9	GPS tracking	The system is implemented with a GPS module, which acquires the location information of the user and stores it to the database.
FR-10	API	The value collected is sent to the database using an API.
FR-11	React JS	✓ We are using react js as front end for our project. ✓ Node JS for the back end we are

		using node js.
FR-12	GPS modules	It receives data directly from satellites.
FR-13	Battery Life	✓ If the child or parent forgets to charge the device for a whole day then also the device will work. That's why we aim to make this device last the whole day with one charge. ✓ It should be long-lasting.
FR-14	Location History	✓ The location history will help to track the child's activity so that the aren't will be updated. Location history will be there for 30 days. ✓ For example if the child gets missing with the help of location history the aren't can track down their child's activity and also can find their child.

4.2 Non-Functional requirements

NFR NO	Non-functional Requirements	Description
NFR-1	Usability	✓ Device have GSM can help to inform the parents or relatives about the current situations of the child by deliver the message immediately to save the child.
NFR-2	Security	✓ Make children parents more assure about their kid's security, we have a feature in our device called Geo-Fence. ✓ Whenever your child

		crosses that specific area, you will get an instant notification on your phone.
NFR-3	Reliability	✓ Portable ✓ Easy to use ✓ Flexibility
NFR-4	Performance	✓ Create a Child tracker which helps the parents with continuously monitoring the child's location. ✓ The notification will be sent according to the child's location to their parents or caretakers. ✓ The entire location data will be stored in the database.
NFR-5	Availability	✓ Track your child even in a crowd ✓ Get travel details of kids at anytime ✓ Know the current location
NFR-6	Scalability	✓ Gadget ensures the safety and tracking of the children. ✓ Parents need not worry about their children.
NFR-7	Valuability	The system should be able to deliver promptly to the financing authority. In the case of non-profit organizations, the

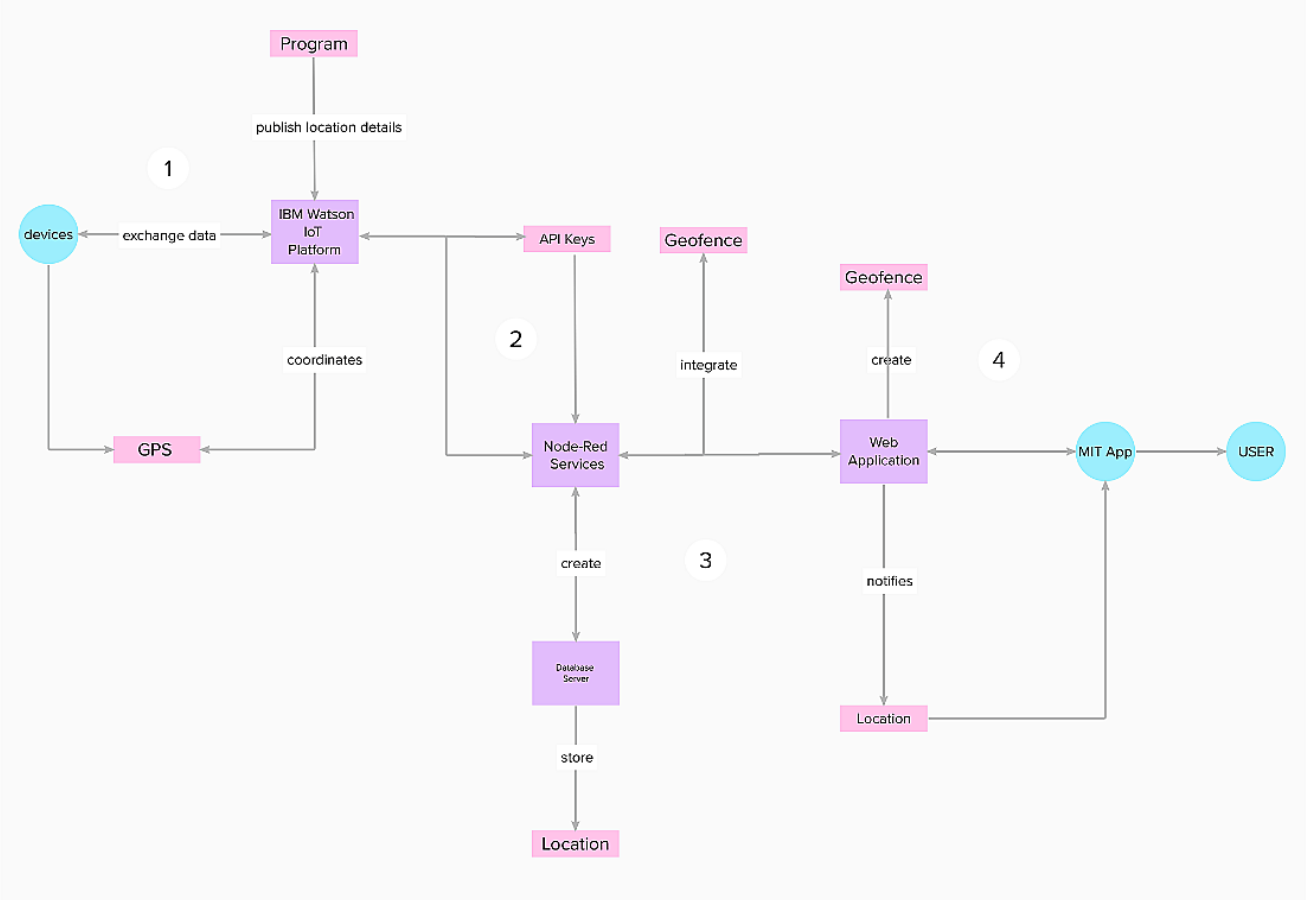
		solution should be 'advancing the mission'.
NFR-8	Usability	Device have GSM can help to inform the parents or relatives about the current situations of the child by deliver the message immediately to save the child.

5. PROJECT DESIGN

5.1 Data Flow Diagrams

FLOWS:

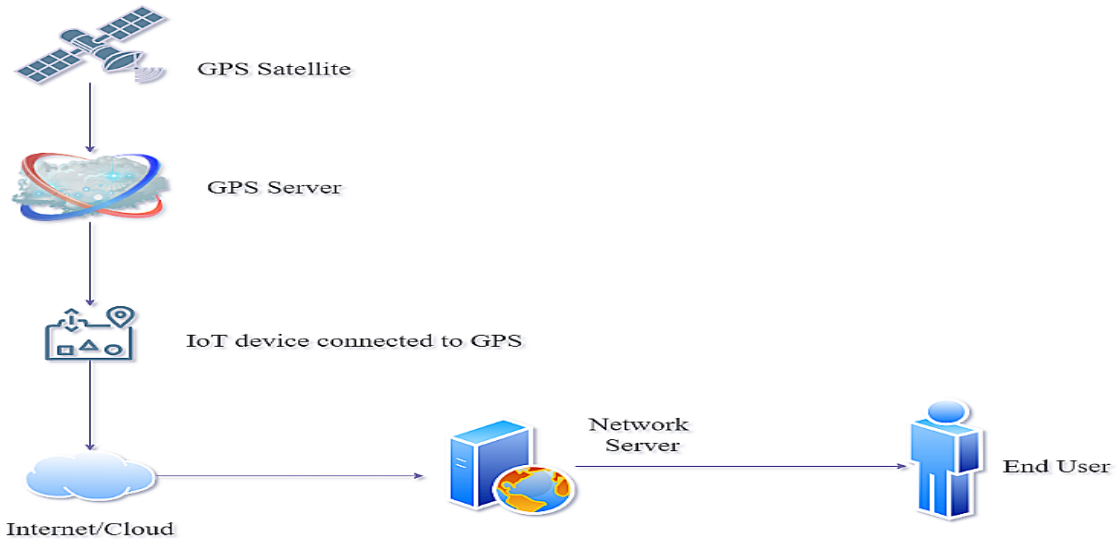
1. Connecting IoT devices to the Watson IoT platform and exchanging the sensor data.
2. The GPS coordinates of the child location will be sent to the IBM IoT platform
3. Creates a database in Cloudant DB to store location data.
4. Develop a web Application using Node-RED Service.
5. The web application will check if the child is inside or outside the geofence
6. Notifies and alerts the parents if the child goes out of the geofence.



5.2 Solution & Technical Architecture

SOLUTION ARCHITECTURE:

- Using the Minimum Viable Architecture model can ultimately result in a highly polished end product as it relies on testing assumptions with small experiments and guiding development using the findings of said experiments.
- Providing a flexible framework that can help achieve target business objectives, MVA responds to evolving customer requirements and technologies and can go a long way in promoting agility.
- The safety of a child at a large public event is a major concern for event organizers and parents. We address this important concern and proposes an architecture model of the IoT-enable smart child safety tracking digital system.



Solution Architecture

- This IoT-enabled digital system architecture integrates the Cloud, Mobile and GPS technology to precisely locate the geographical location of a child on an event map.
- The proposed architecture model describes the people, information, process, and technology architecture elements, and their relationships for the complex IoT-enable smart child safetytracking digital system

TECHNICAL ARCHITECTURE:

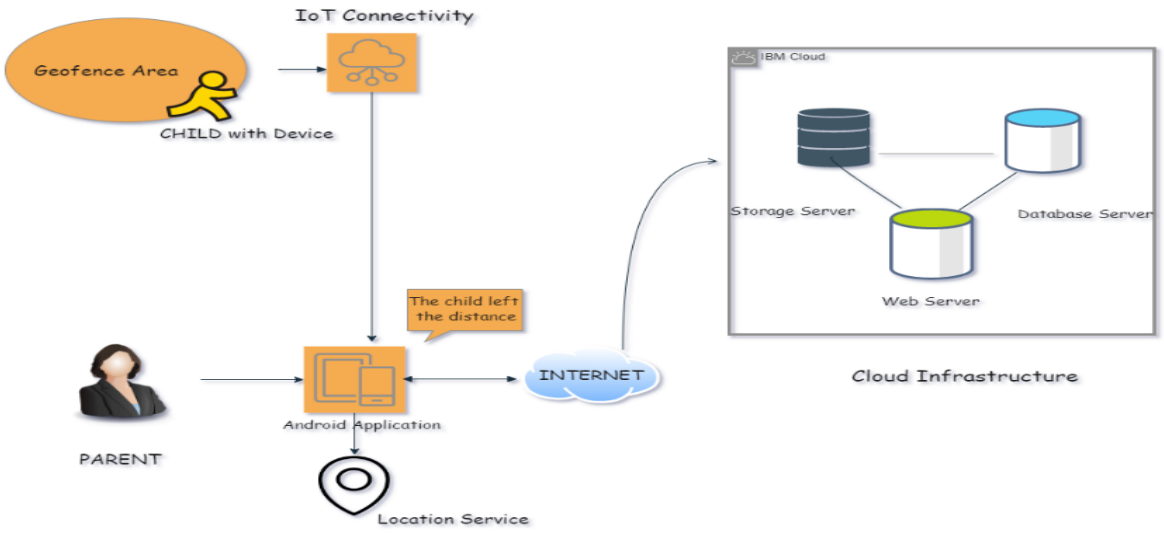


Table-1 :

Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI	node JS
2.	Application -1	To publish location details in IBM Watson Platform	Python
3.	Application -2	Process in the IoT application	IBM Watson IoT Platform
4.	Application -3	It assists the IoT Platform	IBM Watson Assistant
5.	Database	Data Configuration & Types	IBM Bluemix & HTTP
6.	Cloud Database	Database Service on Cloud	IBM Cloudant
7.	File Storage	File storage requirements	IBM Block Data Storage
8.	External API-1	Connect the device to the IoT platform	IBM Device API
9.	External API-2	Connect the node-RED services	Location API
10.	Machine Learning Model	It uses past behaviour to identify patterns and builds models that help predict future behaviour and events	Using program condition loop
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Wireless local Server Cloud Server Configuration : IBM Cloud Server	Cloud Foundry

Table-2:

Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Sensors, software applications & Cloud application	Open connectivity foundation
2.	Security Implementations	The technology segment focused on safeguarding	Encryptions, monitor traffic congestion, using

		connected devices and networks in the IoT	admin, device authentication
3.	Scalable Architecture	If the communication stack from the end devices to the cloud is made asynchronous, so that load times are cut down	Agile methodology, IBM architecture
4.	Availability	use of distributed servers , the system must be available 24/7	client server, server service,GPS System
5.	Performance	number of requests per sec, stimulate devices from different locations and real time system	network technologies like wifi, 4G, etc. it works with popular chip sets

5.3 User Stories

User Type	**Functional Requirement**	**User Story Number**	**User Story / Task**	**Acceptance criteria**	**Priority**	**Release**
Customer (Mobile user)	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	Sprint-4
		USN-2	As a user, I will receive a confirmation email once I have registered for the application	I can receive confirmation email & get confirmed	High	Sprint-4
		USN-3	As a user, I can register for the application through browser	I can register & access the dashboard with Google Sign in	Low	Sprint-4
		USN-4	As a user, I can register for the application through Gmail	---	Medium	Sprint-4
	Login	USN-5	As a user, I can log into the application by entering	---	High	Sprint-4

			email & password			
	Dashboard	USN-6	As a user,I can see the desired information on the screen of the phone	I can access my screen	High	Sprint-2
Customer (Web user)	Users	USN-1	As a user, I can integrate all users in this account	I can configure the account, active and inactive	Medium	Sprint-2
	Web applicator	USN-2	As a web applicator, I can form backend server	I can progress the code in the server	Medium	Sprint 3
Customer Care Executive	Security	USN-1	As a customer care, I can secure the data in cloud database	I can secure the data location	High	Sprint-3

Administrator		USN-1	As a user,I can manage the application	I can configure the settings their account.	Medium	Sprint-3
Devices	Simulation	USN-1	As a user, I can connect the required parameter in device.	I can deliver the product	High	Sprint-1
		USN-2	As a user, I can activate the device	I can applicable to the child devices	Medium	Sprint-1
Message Sender	API requests	USN-1	As a message sender, API requests whenever some function is invoked from a device.	I can send or receive the from an application.	High	Sprint-2
	Fast SMS	USN-2	As a sender, I can send bulk messages using the sms	I can receive the messages in device	Low	Sprint-3
Programmer	Software	USN-1	As a programmer, I can ceate the user friendly program for ease access by parents	To configure the devices	High	Sprint-2
		USN-2	As a software, I compute coding in	To simultaneously run the device	High	Sprint-2

			devices			
Authenticator	User	USN-1	As a user, I can use identification technique in IoT device	I can emminent the security	High	Sprint-3
	Open Authorization	USN-2	As a user, I uses an open standard communication protocol	It provides tokens to the end users	Medium	Sprint-3
	Identifier	USN-3	User successfully register into the system	It stores the user's unique identification	Medium	Sprint-2
Admin	Admin Authorities	USN-1	In this other end-users are restricted	to add devices into the system	Low	Sprint-4
	User	USN-1	As a user, I can create organizations	The user to login to IoT Platform	High	Sprint-2
		USN-2	As a user, I allows admin to create & edit user accounts	For assigning access rights to user or device group	Medium	Sprint-2
		USN-2	As a software, I compute coding in devices	To simultaneously run the device	High	Sprint-2

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Product backlog, Sprint Schedule, Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint- 1	Simulation	USN-1	As a user, I can install online simulator	1	medium	Janani V
Sprint- 1		USN-2	As a user, I can connect the required parameters in device	1	high	Nivetha V
Sprint- 1		USN-3	As a user, I can activate the device	2	medium	Sowmiya R
Sprint- 1		USN-4	As a user, I will write the code in this stimulation	3	high	Keerthana M

Sprint- 1		USN-5	As a user, I can run the program to check whether the error is present or not.	5	high	Nivetha V
Sprint- 2	Cloud	USN-1	As a user, I create a cloud server	2	medium	Keerthana M
Sprint- 2		USN-2	As a user, I can enter the device specification in the created cloud	2	medium	Janani V
Sprint- 2		USN-3	As a user, I can integrate device into this cloud.	3	high	Keerthana M
Sprint- 2		USN-4	As a user, I can connect device through wifi to the cloud.	5	high	Nivetha V
Sprint- 3	Programming Tool	USN-1	As a programmer, I can provide a browser-based editor.	2	low	Janani V
Sprint- 3		USN-2	As an editor, I can easy to wire together flows using the wide range of nodes in the palette.	3	medium	Sowmiya R
Sprint- 3		USN-3	I can be deployed to its runtime in a single click.	5	high	Keerthana M
Sprint- 3	Platform	USN-1	As a programmer, I can use Node.js platform.	3	medium	Sowmiya R
Sprint- 3		USN-2	As a user, I can integrate the geofence nodes in the	3	high	Nivetha V

			palette.			
Sprint- 3		USN-3	As a programmer, I can communicate through HTTP to the tool.	2	medium	Sowmiya R
Sprint- 4	API	USN-1	As a user, I can generate API tokens through cloud.	3	medium	Keerthana M
Sprint- 4		USN-2	As a user, I use API keys to integrate the programming tool.	3	medium	Sowmiya R
Sprint- 4		USN-3	As a user, I can register SMS services.	2	high	Nivetha V
Sprint- 4	SMS	USN-1	As a user, I can send messages through API to the client number.	2	high	Keerthana M
Sprint- 4		USN-2	As a user, I can receive messages through inform of SMS.	2	high	Janani V

6.2 Sprint Delivery Schedule

Project Tracker, Velocity & Burndown Chart

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	12	6 Days	24 Oct 2022	29 Oct 2022	12	29 Oct 2022
Sprint-2	12	6 Days	31 Oct 2022	05 Nov 2022	12	31 Oct 2022
Sprint-3	18	6 Days	07 Nov 2022	12 Nov 2022	18	12 Nov 2022
Sprint-4	12	6 Days	14 Nov 2022	19 Nov 2022	12	19 Nov 2022

Velocity:

AV for sprint-1 = 12/6 = 2 points

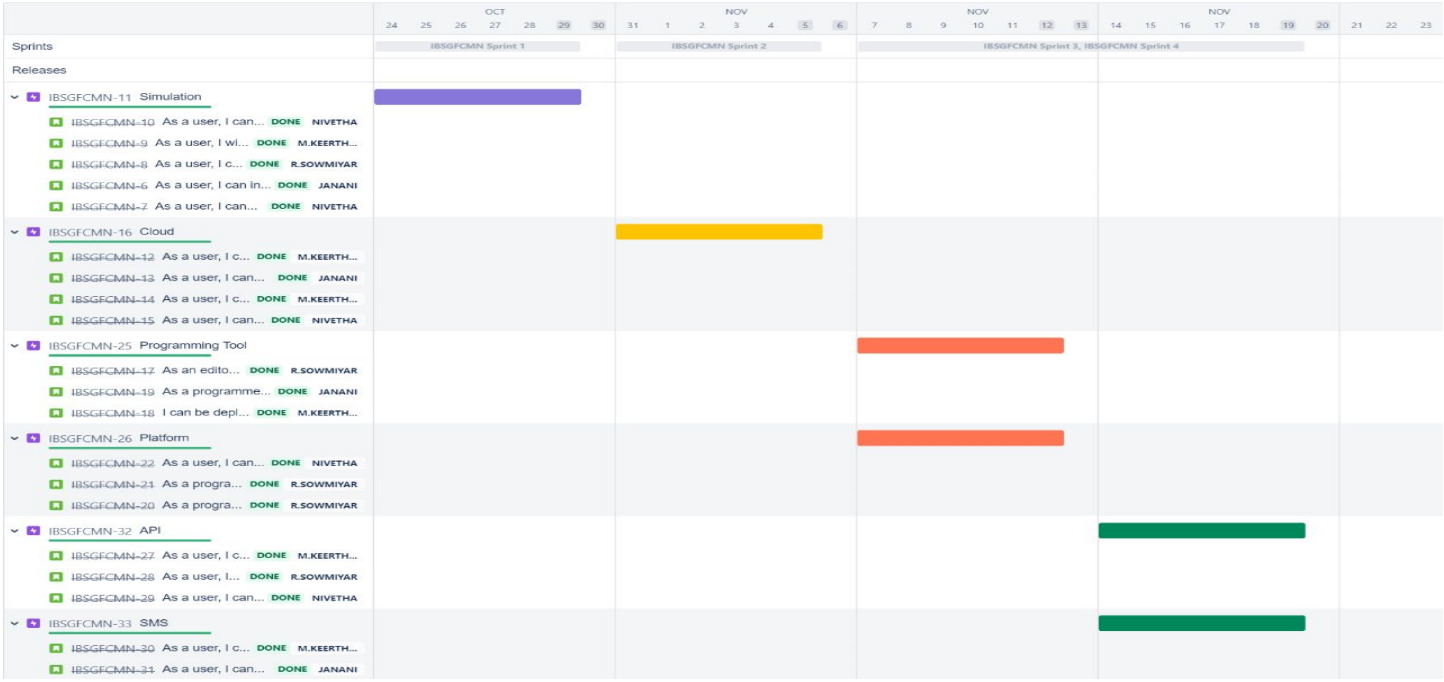
AV for sprint-2 = 12/6 = 2 points

AV for sprint-3 = 18/6 = 3 points

AV for sprint-4 = 12/6 = 2 points

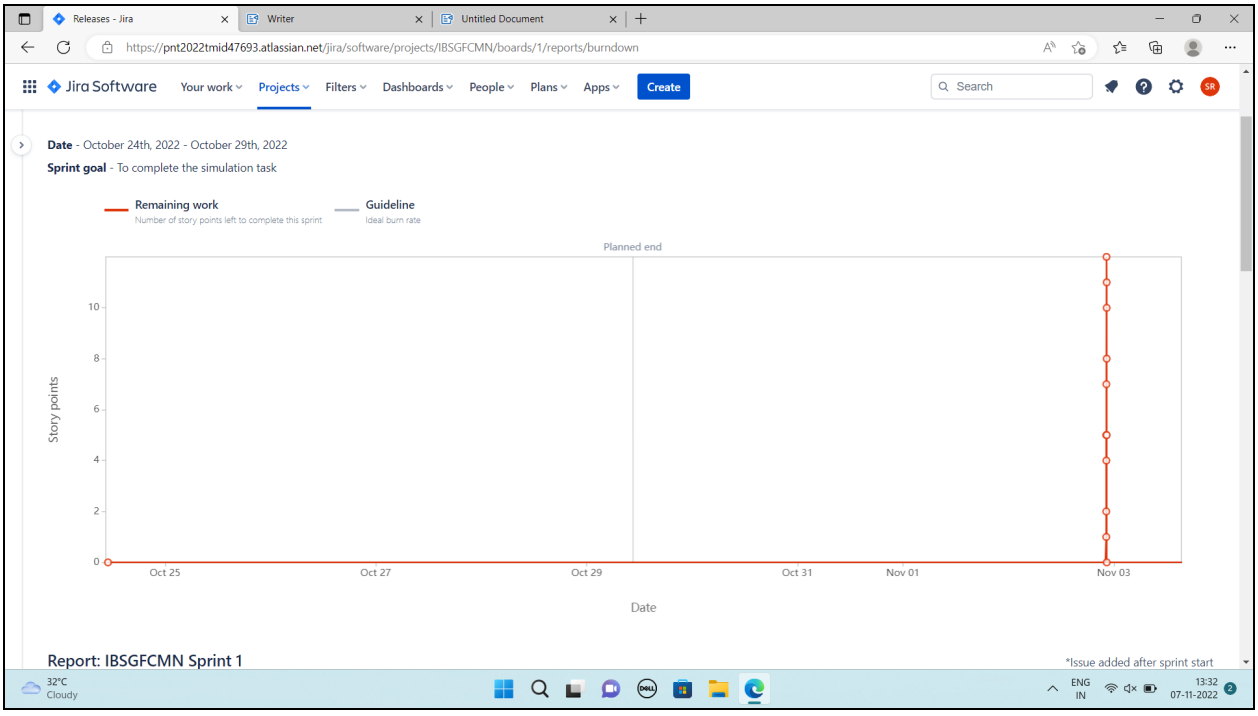
6.3 Reports from JIRA

JIRA RoadMap:

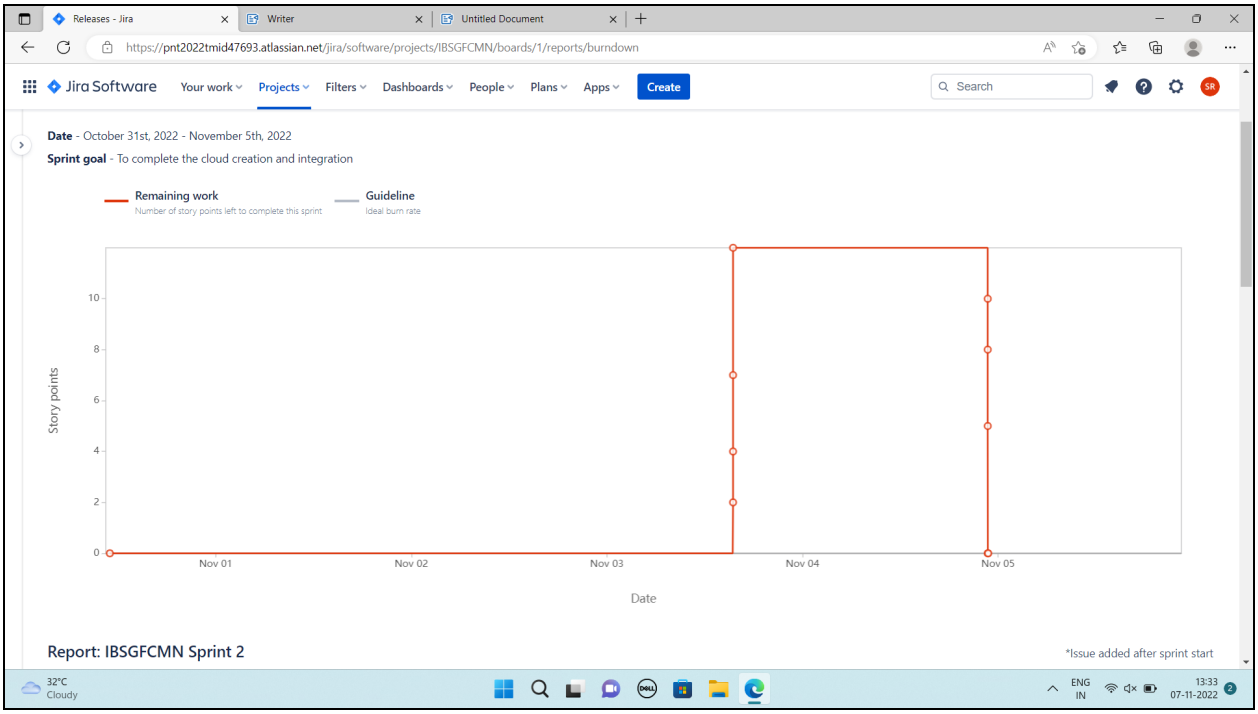


Burndown Chart:

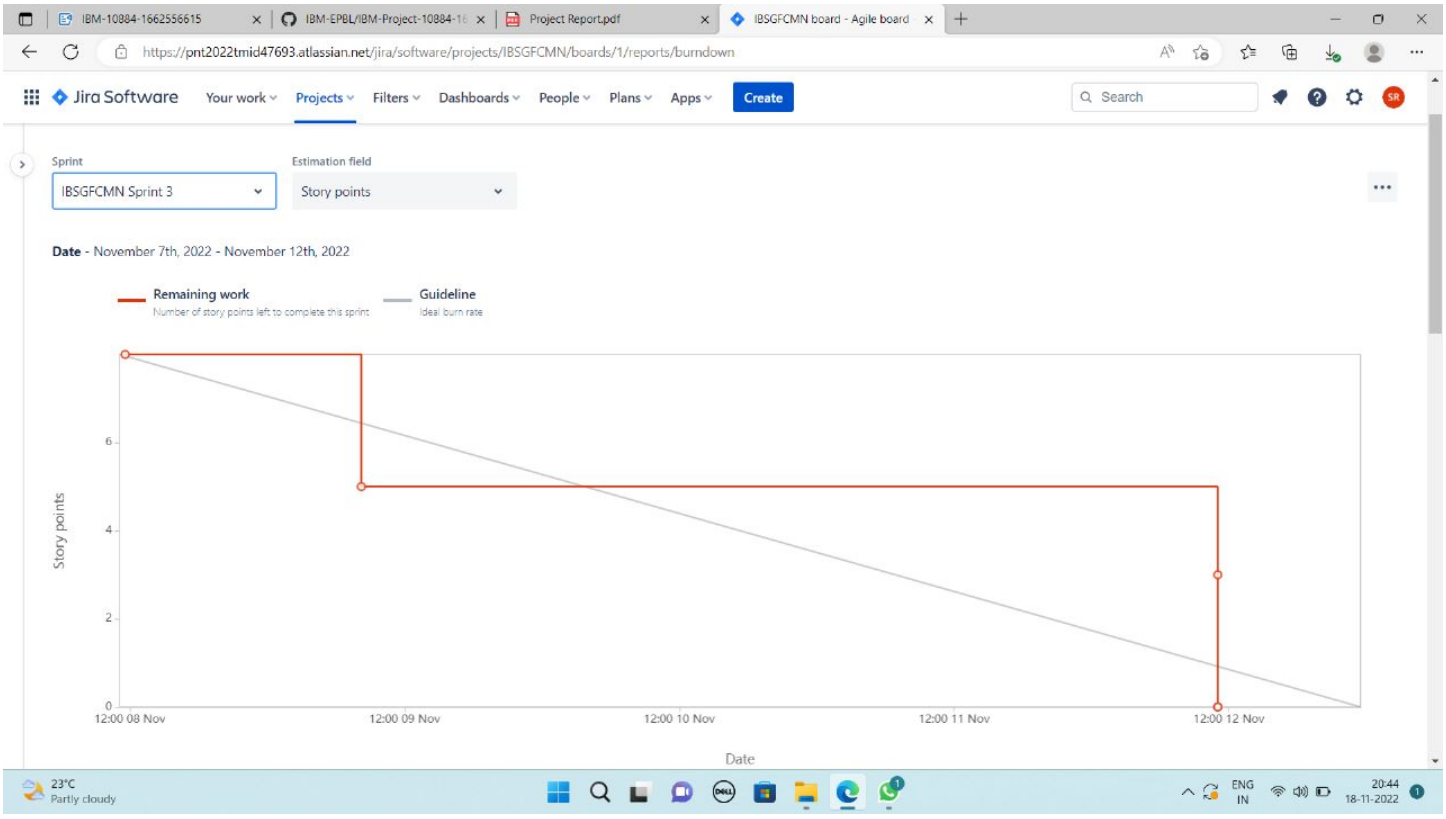
Sprint-1



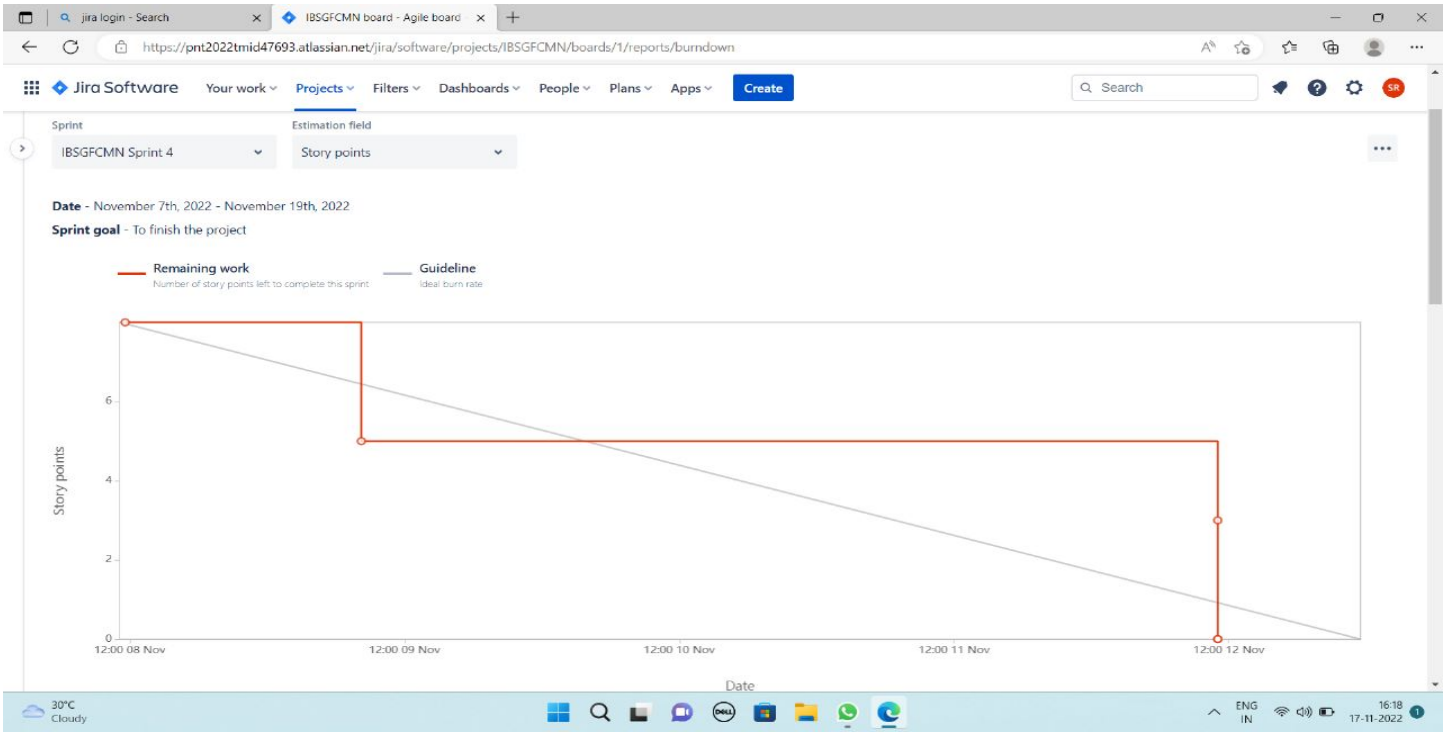
Sprint-2



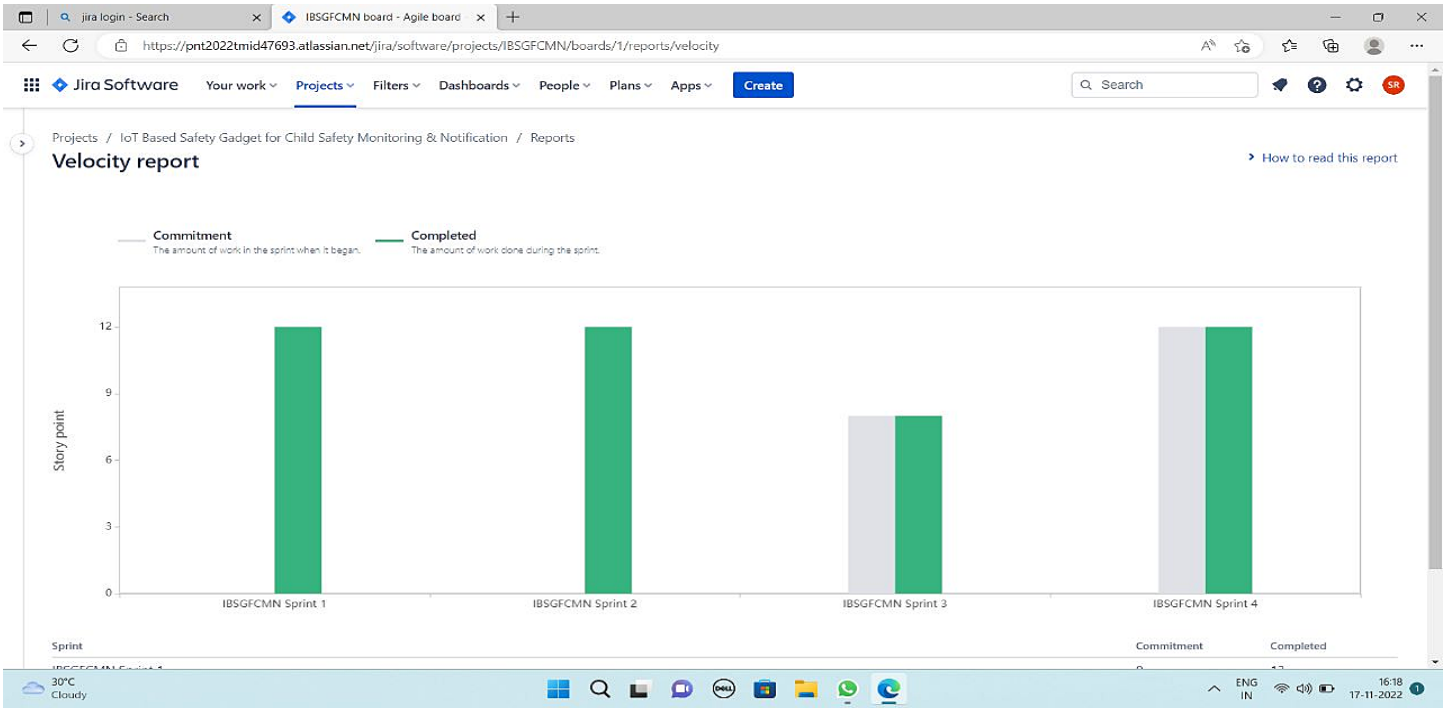
Sprint-3



Sprint-4



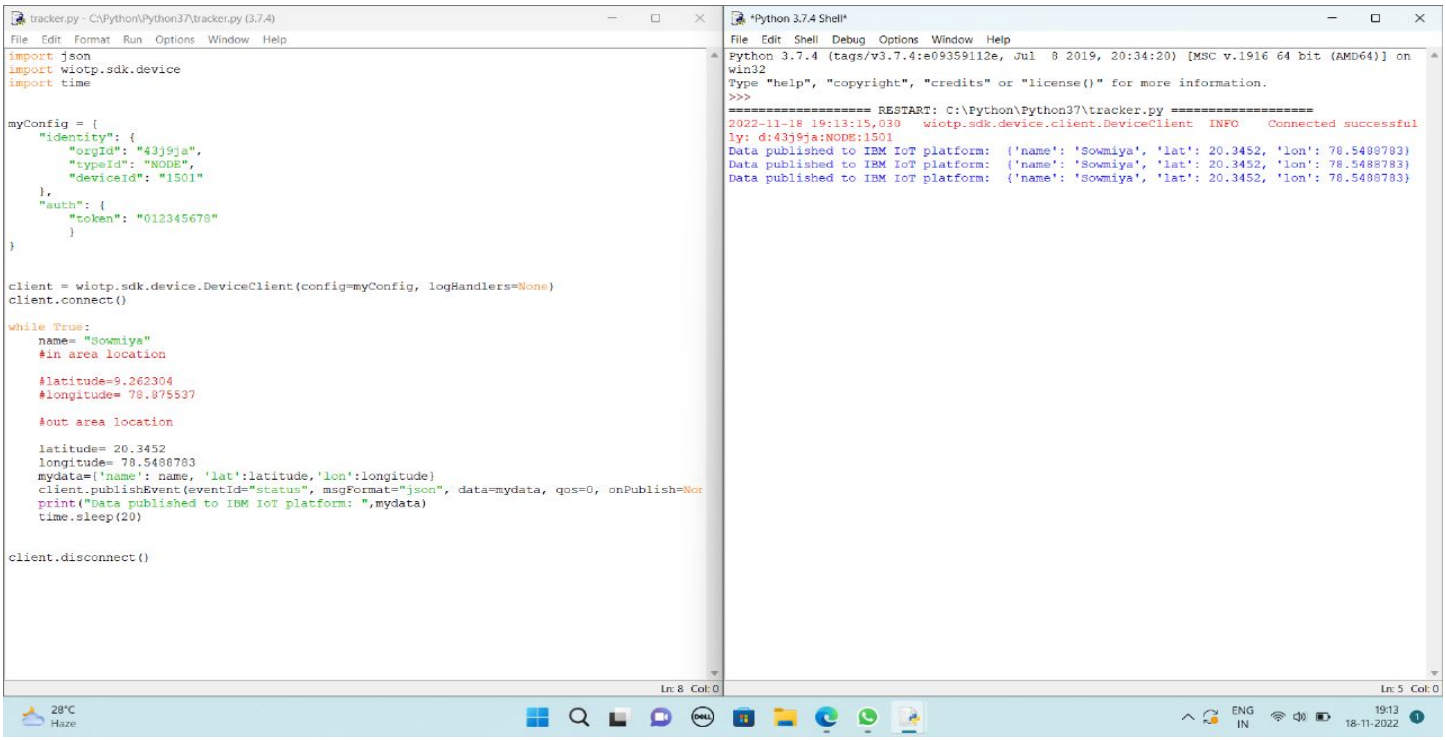
Velocity Report



7. CODING & SOLUTIONING

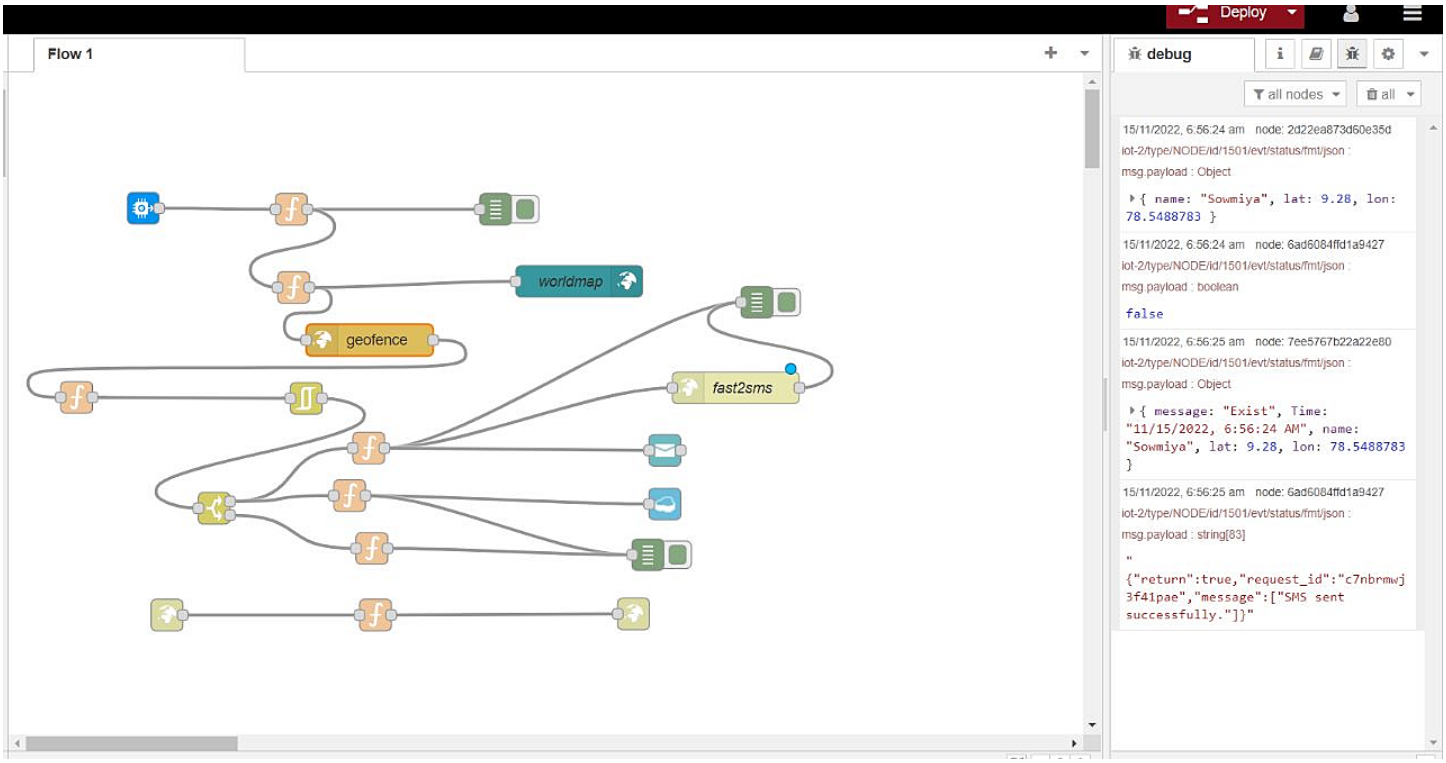
7.1 Feature 1 - PYTHON CODE

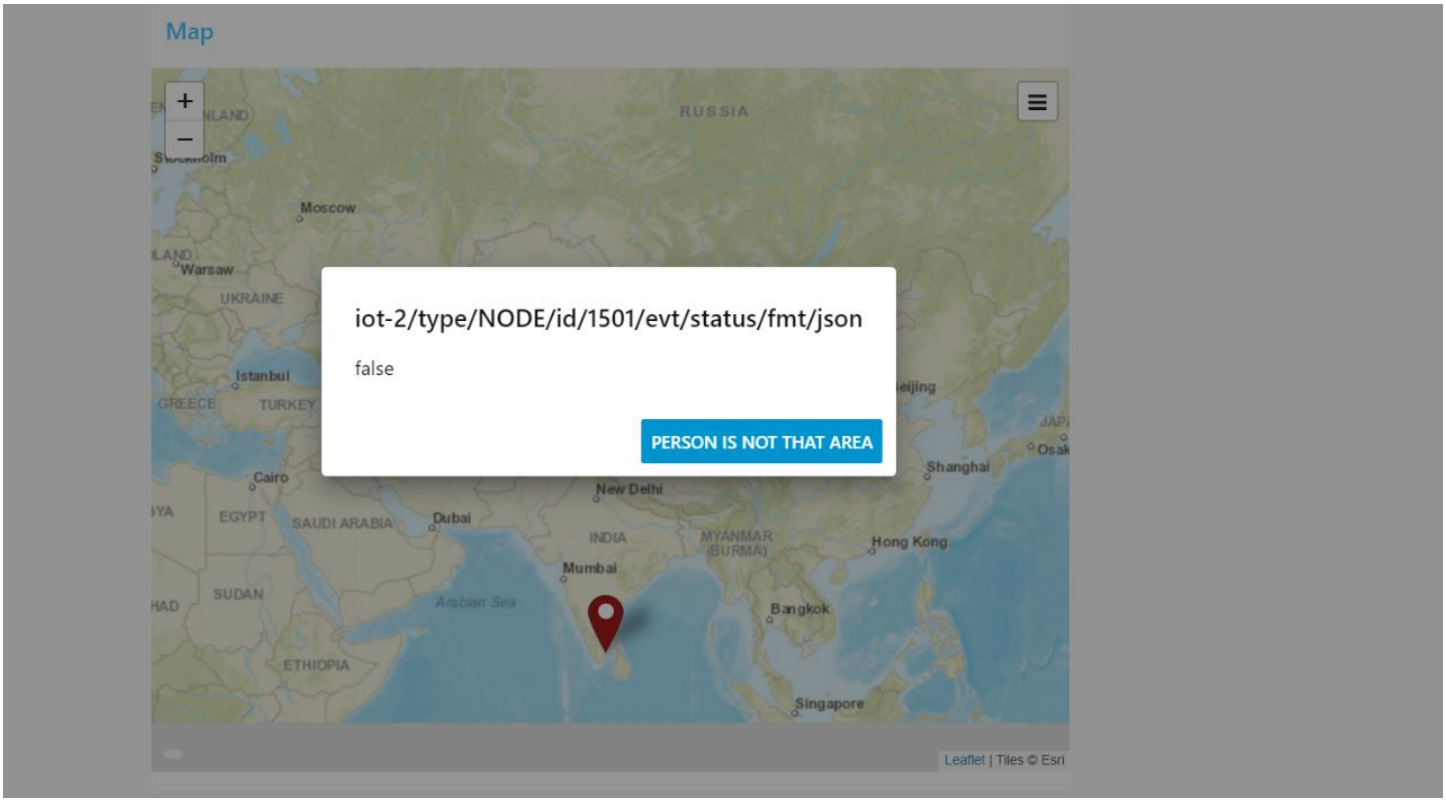
Instead of hardware, we are using python code. In this code we manually send location details to the IBM Watson IoT platform.



7.2 Feature 2 -NODE-RED Service

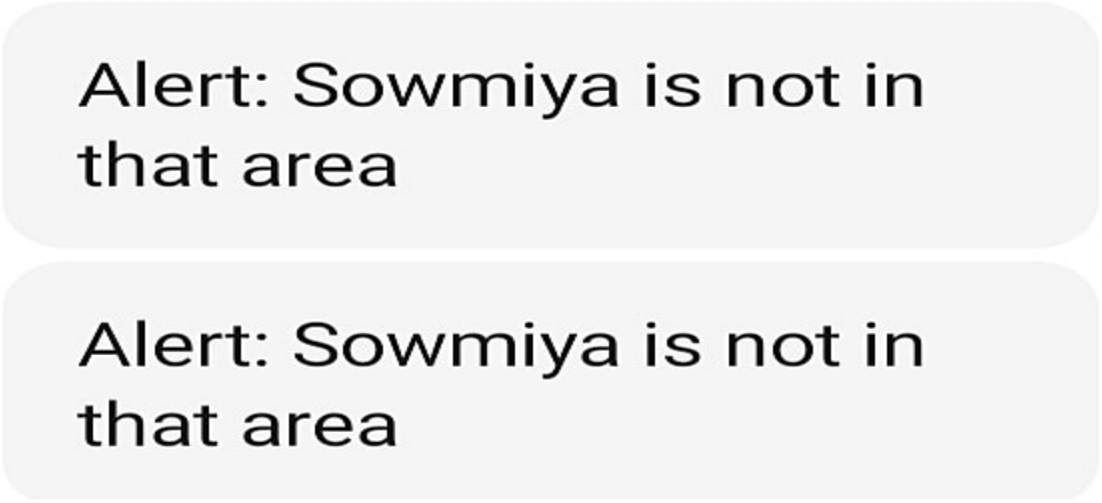
- Once we get the location details in the IBM Wastson IoT Platform , We are extracting that data into the NODE-RED Service.
- We are going to pass the data to geofence node it is going to check whether that particular person in that area or not.
- Along with the entire data, we are store the location details in Cloudant database.
- If the child crosses the location, we are showing web UI pop-up alert


Deploy
Flow 1
debug
all nodes
all
15/11/2022, 6:56:24 am node: 2d22ea873d60e35d
iot-2/type/NODE/id/1501/evt/status/fmt/json :
msg.payload : Object
{ name: "Sowmiya", lat: 9.28, lon: 78.5488783 }
15/11/2022, 6:56:24 am node: 6ad6084ffd1a9427
iot-2/type/NODE/id/1501/evt/status/fmt/json :
msg.payload : boolean
false
15/11/2022, 6:56:25 am node: 7ee5767b22a22e80
iot-2/type/NODE/id/1501/evt/status/fmt/json :
msg.payload : Object
{ message: "Exist", Time: "11/15/2022, 6:56:24 AM", name: "Sowmiya", lat: 9.28, lon: 78.5488783 }
15/11/2022, 6:56:25 am node: 6ad6084ffd1a9427
iot-2/type/NODE/id/1501/evt/status/fmt/json :
msg.payload : string[83]
"{"return":true,"request_id":"c7nbrmwj3f41pae","message":["SMS sent successfully."]}"
worldmap
geofence
fast2sms


Map
iot-2/type/NODE/id/1501/evt/status/fmt/json
false
PERSON IS NOT THAT AREA
RUSSIA
Moscow
Warsaw
UKRAINE
Istanbul
GREECE
TURKEY
Cairo
EGYPT
SAUDI ARABIA
Dubai
New Delhi
INDIA
MYANMAR (BURMA)
Mumbai
Arabian Sea
Bangkok
Hong Kong
Shanghai
SUDAN
ETHIOPIA
Singapore
Leaflet | Tiles © Esri

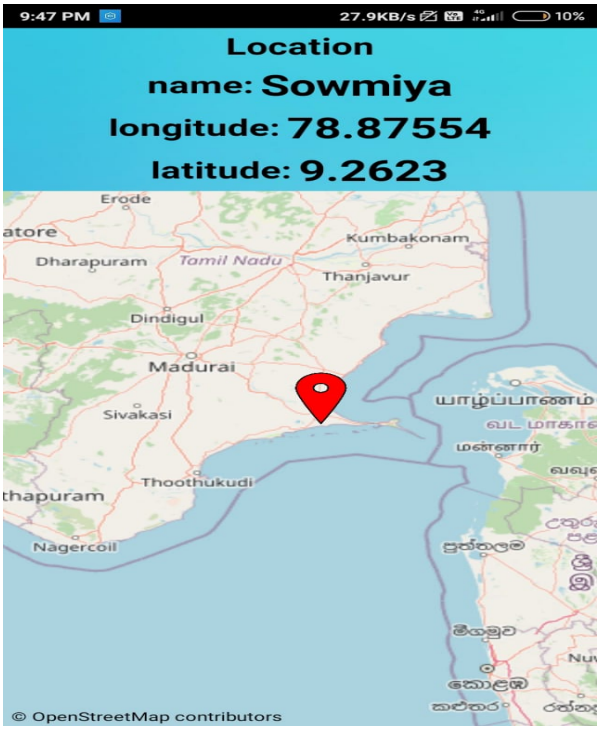
7.3 Feature 3 - Fast2sms

Whenever that person is not in that area , we are going to send fast SMS to that particular child's guardian.



7.4 Feature 4 - Mobile App

In addition we are using mobile app to view the location details along with child name.



8. TESTING

Test Scenarios

1. Verify python code is run without error.
2. Verify the login the Cloud Services.
3. Verify create a device in the IBM Watson IoT platform and get the device credentials.
4. Verify the events is shown in the card.
5. Verify the events is stored in the database.
6. Verify to create a node -red services.
7. To create a web UI to interact with user.
8. To send SMS to the particular child's guardian.
9. Verify user is able to log into app with Valid credentials.
10. Verify it show the location in app.

8.1 Test cases

Sprint	Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	TC for Automation(Y/N)	BUG ID	Executed By
Sprint-1	PythonCode_TC_OO1	Code	Python3.7.4	Verify python code is run without error	Software	1.Download the python version3.7.4 2.Type the program and save it 3.Verify it is run continuously	import json import wiotp.sdk.device import time myConfig = { "identity": {	2022-11-16 15:17:30,513 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:43j9ja:NODE:1501 Data published to IBM IoT platform:	Working as expected	Pass	YES	NIL	Janani
Sprint-2	IBMCloud_TC_OO2	Functional	IBM Cloud Services	Verify the login the Cloud Services	IBM Cloud Services	1.Login in cloud.ibm.com 2.Obtain promocode in ICT	email id:	Successfully created the IBM account	Working as expected	Pass	YES	NIL	Keerthana
Sprint-2	IBM Watson IoT Platform_TC_OO3	Functional	IBM Cloud Services	Verify create a device in the IBM Watson IoT platform and get the device credentials.	IBM Cloud Services	1.In IBM Cloud Service go to catalog 2.To create an Internet of things platform 3.Launch the IBM Watson IoT Platform 4.Login the Platform by clicking organization ID	Create a device & integrate with code	{"name":"Sowmiya","lat":9.28,"lon":78.5488783}	Working as expected	Pass	YES	NIL	Nivetha
Sprint-2	Board_TC_OO4	Non-Functional	IBM Cloud Services	Verify the events is shown in the card	IBM Cloud Services	1.Go to IBM Watson IoT Platform 2.Create the board 3.Create name board 4.Create latitude board	BOARD: LOCATION	Text: Sowmiya Gauge: Latitude Gauge: Longitude	Working as expected	Pass	YES	NIL	Sowmiya
Sprint-2	CloundantDB_TC_OO4	Dataset	IBM Cloud Services	Verify the events is stored in the database	IBM Cloud Services	1.Go to IBM Cloud Services 2.In resources list, click on cloudant 3.In database, create a document to	Document: tracker	Successfully created the Database	Working as expected	Pass	NO	NIL	Nivetha
Sprint-3	NodeRedService_TC_OO5	Functional	IBM Cloud Services	Verify to create a node -red services	IBM Cloud Services	1.In IBM Cloud Service go to catalog 2.To create a NODE-RED app 3. Deploy the app 4.Visit the app URL 5.In node-red, we need to connect	Using geofence node, we create in form of circle to check whether the child in that area or not		Working as expected	Pass	NO	NIL	Keerthana
Sprint-3	WebUI_ TC_OO6	Functional	Node-Red Service	To create a web UI to interact with user	Node-Red Service	1.Go to dashboard 2.Open a link UI dashboard 5.Display the location 4.pop up SMS if person not in area	Show the pop up SMS in UI		Working as expected	Pass	NO	NIL	Janani
Sprint-4	FastSMS Service_ TC_OO7	Functional	Fast2SMS Service	To send SMS to the particular child's guardian	Software	1.login Fast2SMS Service 2.GO to Dev API 3.Sending SMS using HTTP Packag	Show the pop up SMS	Alert: Sowmiya is not in that area	Working as expected	Pass	NO	NIL	Sowmiya
Sprint-4	MobileApp_TC_008	Functional	MIT APP Inventor	Verify user is able to log into app with Valid credentials	Software	1.login MIT APP Inventor 2.Design Frontend & Backend	Username:sowmiya Password:****	User should navigate to next screen	Working as expected	Pass	YES	NIL	Nivetha
Sprint-4	MobileApp_TC_009	Functional	MIT APP Inventor	Verify it show the location in app	Software	1.login MIT APP Inventor 2.Design Frontend & Backend 3.Connect to node -red	Name: Sowmiya Latitude: ***** Longitude: *****	The App shows the location value	Working as expected	Pass	NO	NIL	Sowmiya

8.2 User Acceptance Testing

1.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 & Notification] project at the time of the release to User Acceptance Testing (UAT).

2.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	5	3	2	0	10
Duplicate	0	0	0	1	1
External	2	0	0	1	3
Fixed	6	2	0	0	8
Not Reproduced	0	1	1	0	2
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals	13	6	3	2	24

3.Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	1	0	0	1
Client Application	2	0	0	2
Security	1	0	0	1
Outsource Shipping	1	0	0	1
Exception Reporting	1	0	0	1
Final Report Output	2	0	0	2
Version Control	2	0	0	2

9. RESULTS

9.1 Performance Metrics

			NFT - Risk Assessment				
S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Risk Score	Justification
1	IoT Based Safety Gadget for Child Safety Monitoring & Notification	Existing	No Changes	No Changes	No Changes	GREEN	As we have completed the project successfully

NFT - Detailed Test Plan		
S.No	Project Overview	NFT Test approach
1	Track the location & send an alert to the particular's person	Load Test

	End Of Test Report			
S.No	Project Overview	NFT Test approach	Test Outcome	Approvals/SignOff
1.	We need to Track the location of particular child suppose, If the child crosses the geofence. It is send SMS to that parents/guardian then we need to track the location.	Load Test	Response time meets the actual Result.	Project's Mentors

NFT Test approach	
Load Test	
Scenario Name	Load Test - Location Tracker SAMPLE PROJECT
Scenario Type	Load Test - Duration 30 minutes
Scenario Objectives	To Stimulate Python Code(Location Details) and to monitor the performance of Location Tracker SAMPLE PROJECT
Steps	1. We have integrate IBM Watson IoT Platform in order to get this Location details from python program. 2. We also integrate fast SMS service in order to send an alert to guardian or parent
Entry Criteria	Test data is set-up. All the Components(software & hardware) is set-up. It is completed successfully.
Exit Criteria	Response time meets the actual Result. Test completion report is agreed upon by mentors.

10. ADVANTAGES & DISADVANTAGES

Advantages:

1. Peace of mind for parents

Parents no longer need to ring their child continuously, thus causing them to feel embarrassed, or interrupting their play and exploration.

Location tracking can also ease unnecessary worry if a child doesn't answer the phone straight away - through GPS tracking, a parent can receive a quick update and put their mind to rest.

2. Gives kids more freedom

It gives children more freedom because when parents know where the children are, means they're more relaxed about letting the kids go further afield.

3. Reassurance for children

Location tracking can also be reassuring for the child, particularly if they get lost - this is especially useful if a child wanders off in a crowded place.

4.Know the current location

Our Kids GPS Tracker provides real-time location of your children. You can track the live locations of your kids, where they are and what they are doing.

5.Get geofence details of kids at any time

Send alert Notification to the parents if their children cross the geofence.

Disadvantage

1. Kids may become more secretive

Young people may respond to being tracked by becoming increasingly secretive and flouting the surveillance by, for example, leaving their phone at a friend's house so their parents think they're there.

2. They don't become streetwise

Young people run the risk of not learning to be independent and safe on their own.

3. Internet and social media access

Children need a smartphone for their parents to install a tracking app, but this can expose them to the potential dangers associated with social media and the internet such as cyberbullying, inappropriate contact with strangers and unsupervised access to inappropriate information.

4. Trust issues

If they're being tracked, young people may feel their parents think they can't be trusted. By contrast, if they feel they are trusted, such responsibility can help them behave in a trustworthy manner.

11. CONCLUSION

This Project demonstrates smart IoT devices for child safety tracking and monitoring, to help the parents to locate and monitor their children.

We have integrate IBM Watson Iot Platform in order to get this location details (i.e. latitude & longitude) from python program and we also integrate Fast SMS service in order to send an alert to guardian/ parent.

The system also consists of mobile app and send all the monitored parameters to cloud on parental phone.

12. FUTURE SCOPE

This system can be further enhanced by installation of mini-camera inside smart gadget for better security so that live footage can be seen on parental phone during panic situations.

GPS device come with a panic button that let your child alert you when something wrong or they need help.

The system can be modified by installation of small solar panels for charging the battery of smart gadget to gain maximum battery backup.

13. APPENDIX

Source Code :

Link: https://github.com/IBMEPBL/IBMProject108841659241904/tree/main/Final%20Deliverables/Source%20Code

Github & Project Demo Link:

Github Link: https://github.com/IBM-EPBL/IBM-Project-10884-1659241904

Video Link: https://drive.google.com/file/d/1YGYuoXMPUizRK16yq0ha2dzefk8D6kP6/view?usp=drivesdk