



**SAVEETHA** **AUTONOMOUS**  
**ENGINEERING COLLEGE**

Approved by AICTE | Affiliated to Anna University

TNEA CODE  
**1216**

## **A Project Report**

**On**

**IoT Based Safety Gadget for Child Safety Monitoring & Notification**

**SUBMITTED BY**

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**SUBMITTED TO**

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# **Project Report Format**

## **ABSTRACT**

### **1. INTRODUCTION**

1.1 Project Overview

1.2 Purpose

### **2. LITERATURE SURVEY**

2.1 Existing problem

2.2 References

2.3 Problem Statement Definition

### **3. IDEATION & PROPOSED SOLUTION**

3.1 Empathy Map Canvas

3.2 Ideation & Brainstorming

3.3 Proposed Solution

3.4 Problem Solution fit

### **4. REQUIREMENT ANALYSIS**

4.1 Functional requirement

4.2 Non-Functional requirements

### **5. PROJECT DESIGN**

5.1 Data Flow Diagrams

5.2 Solution & Technical Architecture

5.3 User Stories

### **6. PROJECT PLANNING & SCHEDULING**

6.1 Sprint Planning & Estimation

## 6.2 Sprint Delivery Schedule

Reports from JIRA

## **7. CODING & SOLUTIONING**

(Explain the features added in the project along with code

7.1 Feature 1

7.2 Feature 2

Database Schema (if Applicable)

## **8. TESTING**

8.1 Test Cases

8.2 User Acceptance Testing

## **9. RESULTS**

Performance Metrics

## **10 ADVANTAGES & DISADVANTAGES**

## **11 CONCLUSION**

## **12 FUTURE SCOPE**

## **13 APPENDIX**

13.1 Source Code

13.2 GitHub & Project Demo Link

## **ABSTRACT:**

In today's world children are less secure and have many issues concerning their security purpose. More family's spent their time for work and social accountability but since Children are gifts of GOD they need the care of family. The current status of our country is not habitable for monitoring children in school. With the absence of a child monitoring system, it is hard to monitor the whereabouts of children. Underage children may be impulsive in the way they act and in places to be. Most of the human behaviour is shaped in the childhood stage, in order to get morally acceptable behaviour child monitoring system is necessary. Children are prone to many accidents. The safety of children is very indispensable as children cannot protect themselves.

The main goal of this project is to create a smart wearable device for children that uses refined technology to assure their safety. The paper provides a smart solution for deflecting losing kids while going out alone or with their parents based on the Internet of Things(IoT). Our proposed strategy ensures utmost security and ensures live tracking for their kids. This paper proposes a model for child safety through smartphones that can track their children's location and give the precise coordinates of the child's location in real-time anywhere. By monitoring the activities the security state of the child is examined.

## **1.INTRODUCTION**

### **1.1 Project Overview**

The Internet of Things (IoT) plays a vital role in day-to-day life. The major difference between IoT and the embedded system is that a dedicated protocol/software is embedded in the chip in the case of an embedded system, whereas, IoT devices are smart devices, which are able to seize decisions by sensing the environment around the device. The Internet of Things is increasingly finding a place at the heart of many business automation strategies. Companies are using sensors in the logistics chain to help them track where delivery is with extraordinary accuracy.

The motivation for this wearable comes from the increasing need for safety for little children in contemporary times as there could be scenarios of the child getting adrift in a major crowded sector. This paper focuses on the key aspect that a missing child can be assisted by the people around the child

and can play a remarkable role in the child's safety until reunited with the parents. If any deviant readings are disclosed by the sensor, then an SMS and phone calls are set off to the parent's mobile. Also, it overhauls the parental app through the cloud.

## **1.2 Purpose**

Approximately 80% of all reports of child abuse are made nowadays, with 74% of the victims being girls and the remaining 20% being males. In this world, a child goes missing every forty seconds. Children are the foundation of a country; if their future was threatened, it would have an effect on the development of the whole country.

The technique is equipped with GSM and GPS modules for sending and receiving calls, and SMS between the safety gadget and the parental phones. The system also consists of a Wi-Fi/cellular data module used to implement IoT and send all the monitored parameters to the cloud for android app monitoring on the parental phones. The panic alert system is used during panic situations alerts are sent to the parental phone, seeking help also the alert parameters are updated to the cloud. Most of the wearables available today are focused on providing the location, and activity of the child to the parent.

## **2.LITERATURE SURVEY**

### **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,

- i. 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.

### 2.2 References

1. Kamat, Mr DK, Ms Pooja S. Ganorkar, and Mrs RA Jain. "Child activity Monitoring using Sensors." International Journal of Engineering and Techniques 1.3 (2015): 129-133.
2. Saranya, J., and J. Selvakumar. "Implementation of children tracking system on android Mobile terminals." Communications and Signal Processing (ICCSP), 2013 International Conference on. IEEE, 291
3. P. Wei, R. Guo, J. Zhang and Y. T. Zhang, "A new wristband wearable sensor Using adaptive reduction filter to reduce motion artifact", Information Technology And Applications in Biomedicine 2008. ITAB 2008. International Conference on, pp. 278-281, May 2008

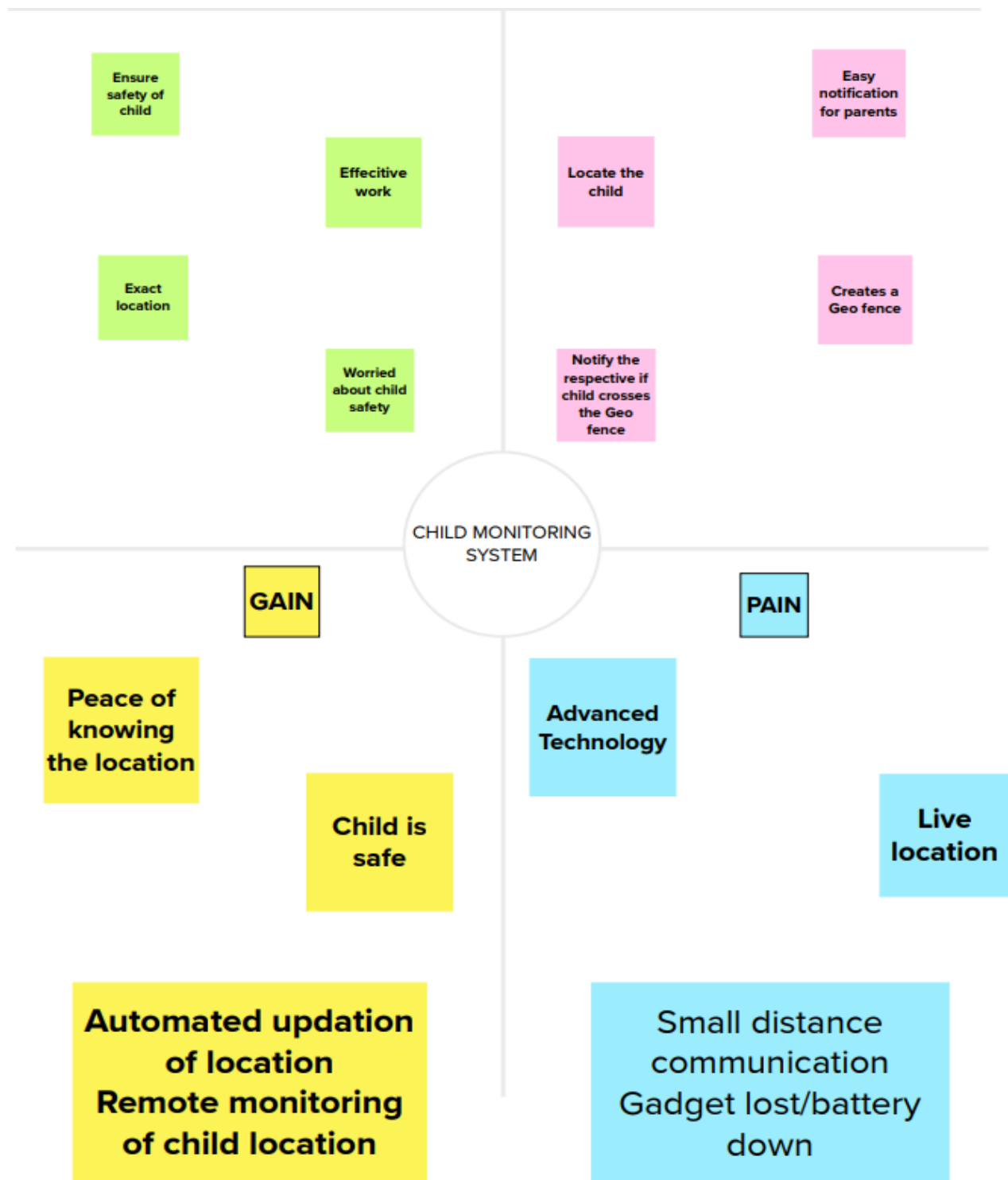
### 2.3 Problem Statement Definition

- 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.

- Children are the backbone of one's nation, if the future of children was affected, it would Impact the entire growth of that nation. For every 40 seconds, a child goes missing in this world.
- Due to the abuse, the emotional and mental stability of the children gets affected which in turn Ruins their career and future.
- Parents Are responsible for taking care of their own children. But, due to economic Condition and aims to focus on their Child's future and career, parents are forced to crave For money. Hence, it becomes difficult to cling on to their Children all the time.
- The system has a developed web-based database-driven application that facilitates its management and provides useful information about the children to authorized personnel.
- 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.
- Real-time monitoring of data is achieved by wirelessly sending Sensor data to an open source Cloud Platform. 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.
- In our system, we provide an environment where this problem can be resolved in an efficient manner. It makes parents to easily monitor their children in real time just like staying beside them as Well as focusing on their own career without any manual Intervention

### 3.IDEATION & PROPOSED SOLUTION

#### 3.1 Empathy Map Canvas





## 3.2 Ideation & Brainstroming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions. Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room. Reference: <https://www.mural.co/templates/empathy-map-canvas>

### Step-1: Team Gathering, Collaboration and Select the Problem Statement

**Brainstorm & idea prioritization**

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

15 minutes to prepare  
1 hour to collaborate  
2-8 people recommended

**Before you collaborate**

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

15 minutes

- Team gathering**  
Each user should participate in the session and send at least 10 relevant information or ideas worth about
- Set the goal**  
Think about the problem you're focusing on solving in the brainstorming session.
- Learn how to use the facilitation tools**  
Use the Facilitation Superpowers to set a happy and productive session.

**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.

15 minutes

**Key rules of brainstorming**

To run an smooth and productive session

- Stay in topic
- Encourage wild ideas
- Defer judgment
- Listen to others
- Get the volume
- If possible, be visual

**Need some inspiration?**

Check out some of our templates to inspire your work.

[View examples](#)

## Step-2: Brainstorm, Idea Listing and Grouping

[illegible]

## Step-3: Idea Prioritization



### 3.3 Proposed Solution

**Proposed Solution Template : Project team shall fill the following information in proposed solution template.**

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<p>Now a days the employment is increased both men and women are working equally, so they are not taking care of their children. So, they can't monitor their child's activity continuously.</p> <p>When they went to out side there may be chance for lost their children to track the location of the child which makes the parents nervous.</p>
2.	Idea / Solution description	<p>Our idea is to develop an app which shows the location of the child through the GPS module.</p> <p>Create a Geo-fence around the location of the child to continuously check whether the child is within the range of the Geo-fence. If the child crosses the range of the Geo-fence a notification will be automatically generated and will be sent to the parents/caretaker.</p> <p>A notification is send to parents about the location of the child.</p>

3.	Novelty / Uniqueness	On condition different types of notification for different types of situation.
		The device will automatically send a notification to the parents if it is required from the cloud.
4.	Social Impact / Customer Satisfaction	This device create awareness and importance of the child safety. This will create a safe and peaceful environment for both the parents and the children by making the parents relaxed by knowing the child's location and providing the freedom for children.
5.	Business Model (Revenue Model)	The premium subscription of tracking and notification service (without ads) will be given to parents if they buy this product. If they like this usage of the device they can pay and get subscription for different duration and packs. By using this device the parents can feel relaxed about their children and can concentrate on their work
6.	Scalability of the Solution	The continuous tracking of the child's live location and storing the names of the past location the child has visited in a database for the use of any emergency purposes

### 3.4 Problem Solution fit

#### **Problem statement**

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. system. Every parent is aware of how challenging it is to constantly watch over and locate their children. It would be great if a device was available that could track a child's whereabouts constantly and notify them via text message. Making an IoT-based safety device that can send an SMS to the child's parents or caretakers to let them know something is wrong will alleviate their anxieties. The database stores the information that the device is tracking. A notification will be issued if the child leaves the geofence thanks to the design of the gadget.

Nowadays, crime rate associated with children keeps increasing due to which draws peoples' attention regarding child safety. This research is conducted to propose a child security smart band utilizing IoT technology. Online questionnaire and semi-structured interview are methodologies used to collect data. The online questionnaire gains feedbacks by sending questions electronically, where answers need to be submitted online. In the semi structured interview, researcher meets and asks respondents some predetermined questions while other being asked are not planned in advanced. Through information obtained, a smart band have been proposed to monitor the safety of children. By this, parents know what is happening remotely and can take actions if something goes wrong.

The safety device protects individuals from potential harms and dangers. A research done by [1]proposed the child safety wearable device using raspberry pi 3. The raspberry pi 3 gathers data from pi camera, pulse sensor and sound sensors. Then, send collected data to parents' smartphones by SMS using GSM shield. Images captured from pi camera and detect children location and send message to parents.

Advantages:

These benefits include stress relief, learning to understand cues from your infant, and increased self-esteem when it comes to being a parent.

Disadvantages:

If you get a monitor that links to your phone and uses wifi, it can get hacked. The hackers can change the image you see on your phone or talk to your child—saying some really scary effed up stuff

## 4. REQUIREMENT ANALYSIS

### 4.1 Functional requirement

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.
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Software interface	This includes embedded application that will 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

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.
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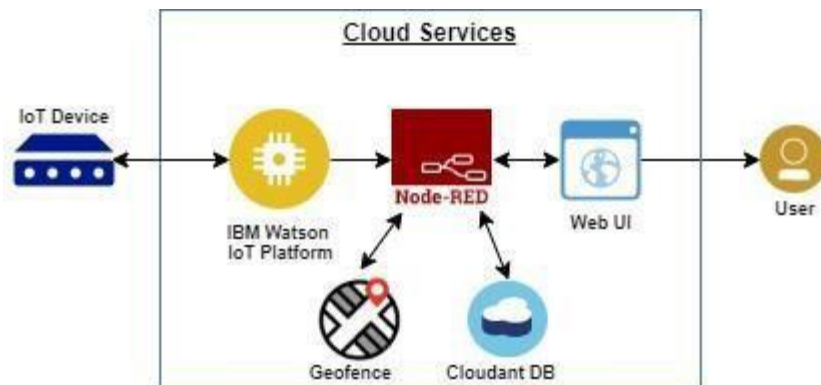
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## 5.PROJECT DESIGN

### 5.1 Data Flow Diagrams

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



User stories – use the below table

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Father	Registration	USN-1	As a user, i can login my email	Now i can get the confirmation from login credentials	High	Sprint-2
Mother		USN-2	As a user, I will connect to the application	With the login id ,I access to the device	High	Sprint-1
Guardian		USN-3	As a user my location gets automatically detected and updated from database	Now I can monitor the child's location using the device	Medium	Sprint-2
Others		USN-4	As a user, if the device crosses the geofencing area	Now I can receive the alert message from the device	Low	Sprint-3

### 5.2 Solution & Technical Architecture

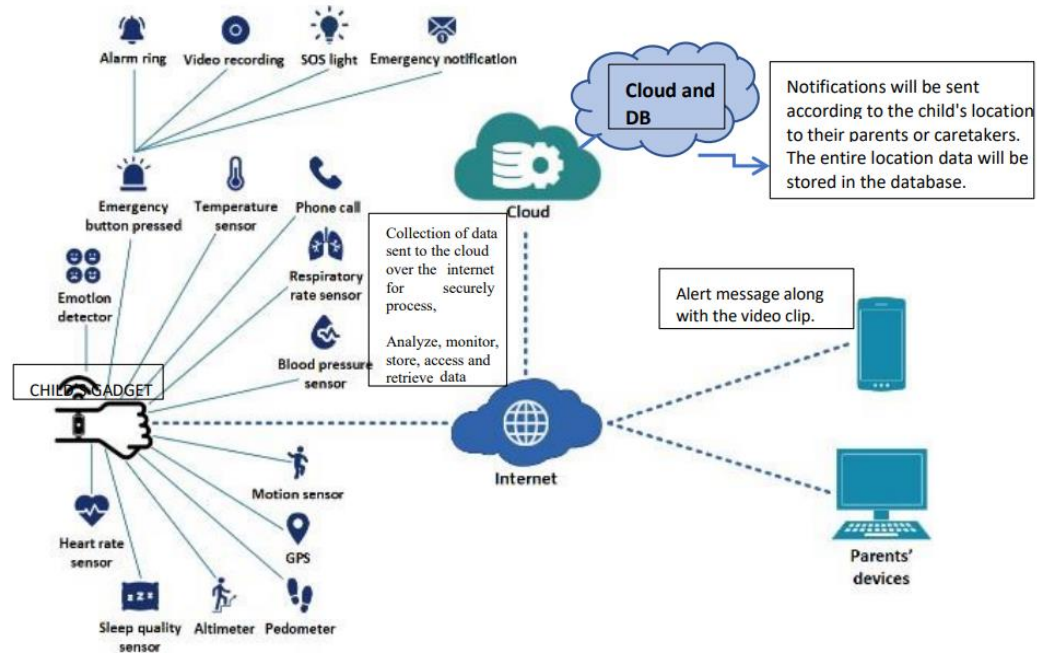
Solution Architecture:

The process used here is a complex process that is Solution architecture and it has many subdivisions that bridges the gap between business problems and technology solutions. Its objective is to :

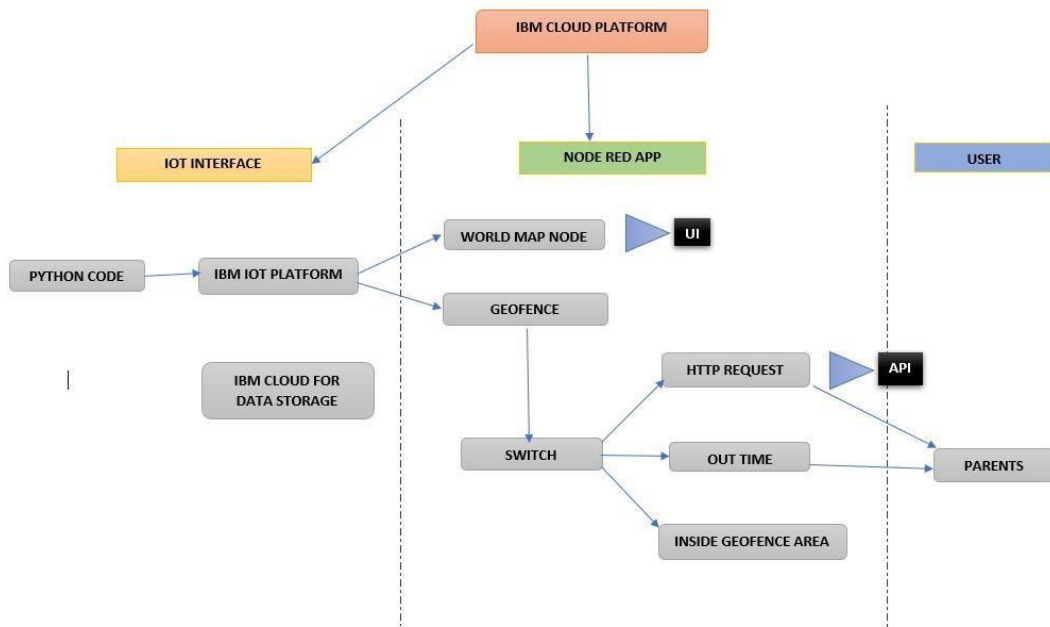
1. Define features, development phases, and solution requirements.

2. Provide specifications according to which the solution is defined, managed, and delivered.
3. Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
4. Find the best tech solution to solve existing business problems.
5. Shows its unique solutions compared to others.

## **SOLUTION ARCHITECTURE DIAGRAM**



## **Technical Architecture:**



## Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Coordinates mapped to location	World Map in NODE RED facility IBM Watson service (map)
2.	Application Logic-1	Updating geographical coordinates of the child's location to IBM IoT platform periodically (in this project we use static inputs)	Python
3.	Application Logic-2	Checks if location in within safe zone radius	Geofence Node in NODE RED facility IBM Watson STT service ( map)
4.	Cloud Database	Database Service on Cloud	IBM Cloudant

## Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Scalable Architecture	We need to update the implemented application periodically	Internet Of Things
2.	Availability	To make it available 24/7 for uninterrupted services we have implemented in distributed servers (cloud)	IBM CLOUD
3.	Performance	Network conditions should be stable even at worst conditions	High speed network plays a major role

### 5.3 User Stories

**User Stories Use the below template to list all the user stories for the product.**

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user & 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	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		
	Login	USN-4	As a user, I can register for the application by entering the user ID & password		High	
Customer Care Executive	Login			I can login only with my provided credentials	Medium	

## 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 AWeb 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□

### 6.2 Sprint Delivery Scheduling

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, and password, and confirming my password.	4	High
Sprint-1	Confirmation Email	USN-2	As a user, I will receive a confirmation email once I have registered for the application	4	High
Sprint-1	Authentication	USN-3	As a user, I can register for the application through Gmail and mobile app.	4	Medium
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High
Sprint-1	Dashboard	USN-5	As a user, I need to be able to view the functions that I can perform	4	High
Sprint-2	Notification	USN-1	As a user, I should be able to notify my parent and guardian in emergency situations	10	High
Sprint-2	Store data	USN-2	As a user, I need to continuously store my location data into the database.	10	Medium
Sprint-3	Communication	USN-3,1	I should be able to communicate with my parents	6	Low

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-3	IoT Device – Watson communication	USN-1,4	The data from IoT device should reach IBM Cloud	7	Medium
Sprint-3	Node RED- Cloudant DB communication	USN-5,2	The data stored in IBM Cloud should be properly integrated with Cloudant DB	7	High
Sprint-4	User – WebUI interface	USN-1,4	The Web UI should get inputs from the user	6	High
Sprint-4	Geofencing	USN-2,3,5	The geofencing of the child should be done based on the geographical coordinates	7	High

## 7. CODING & SOLUTIONING (Explain the features added in the project along with code)

## 7.1 Feature ANALYZE THE PREREQUISITES:

Needed prerequisites for child safety monitoring and notification using Internet Of Things (IoT) were

- ❖ IBM Watson IoT Platform
- ❖ Node-RED Service
- ❖ Cloudant DB **Python code:** import time

```
import json import
```

```
wiotp.sdk.device
```

```
import time
```

```
myConfig={
```

```
    "identity": {
```

```
        "orgId": "hj5fmy",
```

```
        "typeid": "NodeMCU",
```

```
        "deviceId": "12345678"
```

```
    },
```

```
    "auth": {
```

```
        "token": "12345678"
```

```
    }
```

```
}
```

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



```
client.connect()

while True:

    name= "Smartbridge"

#in area location

#latitude-=17.4225176

# Longitude= 78.5458842

#out area location

#latitude = 17.4219272

#longitude =70.5488783

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(5)

client.disconnect()
```

OUTPUT:

```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Python 3.7.0 (tags/v3.7.0:01b1900, Sep 27 2019, 04:59:15) [MSC v.1914 64 bit (AMD64)] on win32
Type "copyright()" for more information.
>>>
REGISTRATION: C:\Users\pushp\AppData\Local\Programs\Python\Python37\chilidkoc.exe
2022-11-11 15:25:42,202 http://www.ibm.com/ibmcloud/devices/1234 Data published to IBM IoT Platform:
{"name": "Pushpalatha K", "lat": 17.4219272, "lon": 78.5488793}
Data published to IBM IoT Platform: {"name": "Pushpalatha K", "lat": 17.4219272, "lon": 78.5488793}
Data published to IBM IoT Platform: {"name": "Pushpalatha K", "lat": 17.4219272, "lon": 78.5488793}
Data published to IBM IoT Platform: {"name": "Pushpalatha K", "lat": 17.4219272, "lon": 78.5488793}
Data published to IBM IoT Platform: {"name": "Pushpalatha K", "lat": 17.4219272, "lon": 78.5488793}
Data published to IBM IoT Platform: {"name": "Pushpalatha K", "lat": 17.4219272, "lon": 78.5488793}
```

Registration successful | My IBM | IBM Cloud | Service Details - IBM | IBM Watson IoT Platform | Service Details - IBM | IBM Watson IoT Platform | WhatsApp

420419106022@martinternz.com  
ID: pibajet

IBM Watson IoT Platform

Browse Action Device Types Interfaces

Search by Device ID

Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location	Added By
1234	Connected	abcd	Device	Nov 3, 2022 6:33 PM		420419106022@martinternz.com

Identity Device Information Recent Events State Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
status	{"name": "Pushpalatha K", "lat": 17.4219272, "lon": ...}	json	a few seconds ago
status	{"name": "Pushpalatha K", "lat": 17.4219272, "lon": ...}	json	a few seconds ago
eventflow	{"randomNumber": 24, "temp": 97, "hum": 87}	json	a few seconds ago
status	{"name": "Pushpalatha K", "lat": 17.4219272, "lon": ...}	json	a few seconds ago

Items per page: 50 | 1-1 of 1 item

1 of 1 page

1 Simulation running

Registration successful | My IBM | IBM Cloud | Service Details - IBM | IBM Watson IoT Platform | Service Details - IBM | IBM Watson IoT Platform | WhatsApp

420419106022@martinternz.com  
ID: pibajet

IBM Watson IoT Platform

Browse Action Device Types Interfaces

Browse Devices

All Devices Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID

Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location	Added By
1234	Connected	abcd	Device	Nov 3, 2022 6:33 PM		420419106022@martinternz.com

Items per page: 50 | 1-1 of 1 item

1 of 1 page

1 Simulation running

## 7.2 Feature 2

### ALGORITHM:

- Import Packages
- Create 'myConfig' location
- Implement the wiotp.sdk.device.DeviceClient
- Run a while Loop
- Finally set the latitude and longitude range
- Desired result Obtained

**Modified Version of Code according to main project:**

```
import json import
wiotp.sdk.device
import time
myConfig={
    "identity": {
        "orgId": "hj5fmy",
        "typeid": "NodeMCU",
        "deviceId": "12345678"
    },
    "auth": {
        "token": "12345678"
    }
}

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

[illegible]

### Steps Followed:

- 
- The screenshot displays the Node-RED web interface in a browser. The top bar shows several open tabs, including 'Welcome to Project', 'IBM', 'My IBM', 'Service Details - IBM C...', 'IBM Watson IoT Platform', 'Node-RED: node-red', 'Node-RED map all the', and 'WhatsApp'. The address bar shows the URL: 'node-red-eszft-2022-11-14-au-syd.mybluemix.net/red/#flow/ee7abc63d81a8a5'.
- The main workspace is titled 'Node-RED' and shows a flow diagram with three flows: Flow 1, Flow 2, and Flow 3. Flow 2 is currently selected and contains the following nodes:
- IBM IoT** (connected)
  - function** (connected to IBM IoT)
  - msg.payload** (connected to the first function node)
  - function** (connected to the first function node)
  - workmap** (connected to the second function node, with a 'connected 1' indicator)
  - geofence** (connected to the workmap node)
  - function** (connected to the geofence node)
  - rbe** (connected to the function node)
  - msg.payload** (connected to the rbe node)
  - switch** (connected to the function node)
  - function** (connected to the switch node)
  - http request** (connected to the function node)
  - show dialog** (connected to the function node)
  - child** (connected to the function node)
  - msg.payload** (connected to the function node)
- The left sidebar shows the 'common' and 'function' node categories. The right sidebar shows the 'debug' console with a log of messages, including the following JSON objects:
- ```
{
  "name": "Pushpalatha K",
  "lat": 17.4219272,
  "lon": 78.5488783
}
```
- The bottom of the screen shows the Windows taskbar with various application icons and the system clock indicating 17:28 on 15-11-2022.

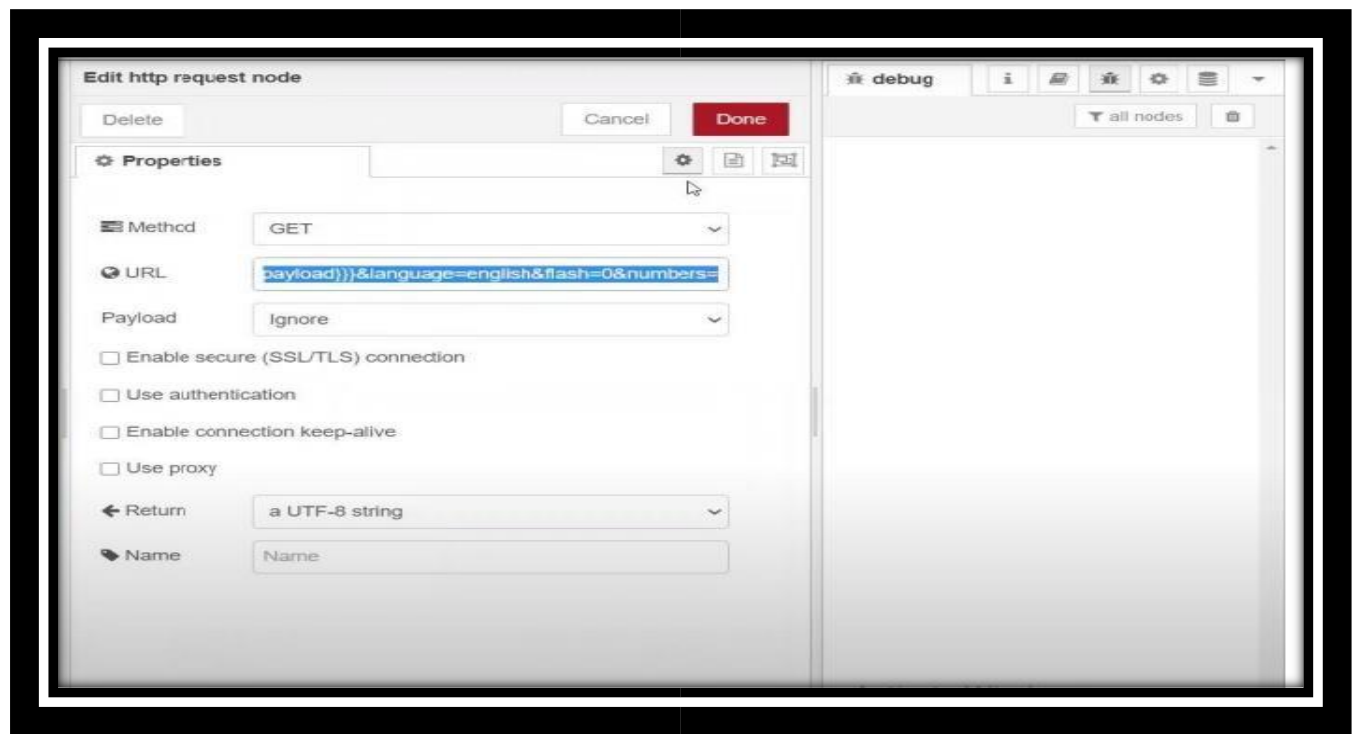
- [illegible]

The screenshot displays the Node-RED web interface. The top browser tabs include 'Welcome to Project', 'IBM', 'Service Details - IBM', 'IBM Watson IoT Platform', 'Node-RED: node-red', 'Node-RED map all', and 'WhatsApp'. The address bar shows a URL for a Node-RED instance.

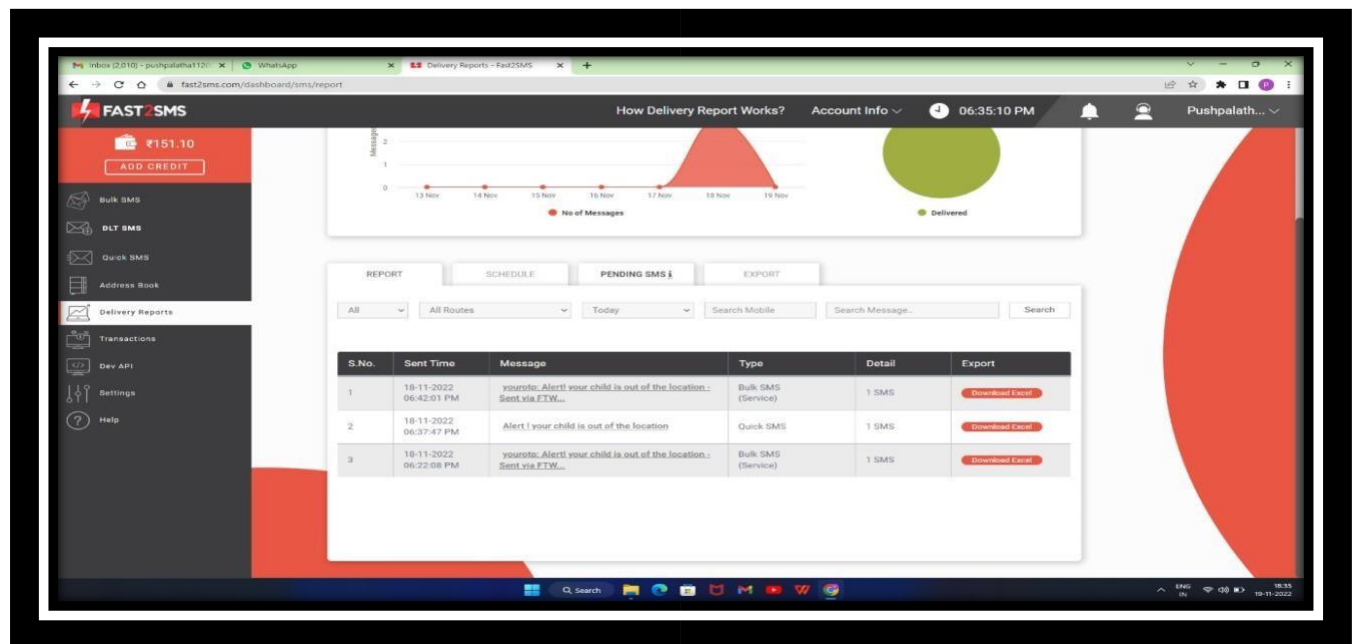
The main workspace is titled 'Node-RED' and shows a flow with three flows. The first flow starts with a 'geofence' node (blue) connected to a 'function' node (orange). The second flow starts with a 'function' node (orange) connected to a 'geofence' node (orange). The third flow starts with a 'function' node (orange) connected to a 'switch' node (green), which then branches into four 'function' nodes (orange). These 'function' nodes are connected to various output nodes: 'msg.payload' (green), 'http request' (green), 'show dialog' (green), 'msg' (blue), and 'msg.payload' (green).

The right sidebar shows the 'Edit geofence node' configuration. It includes a map of Chennai with a geofence circle. Below the map, there are settings for 'Floor' (ground), 'Ceiling' (infinity), 'Action' (add "inarea" property), and 'Name' (Geofence name). The 'Enabled' checkbox is checked.

- Editing the HTTP Request URL

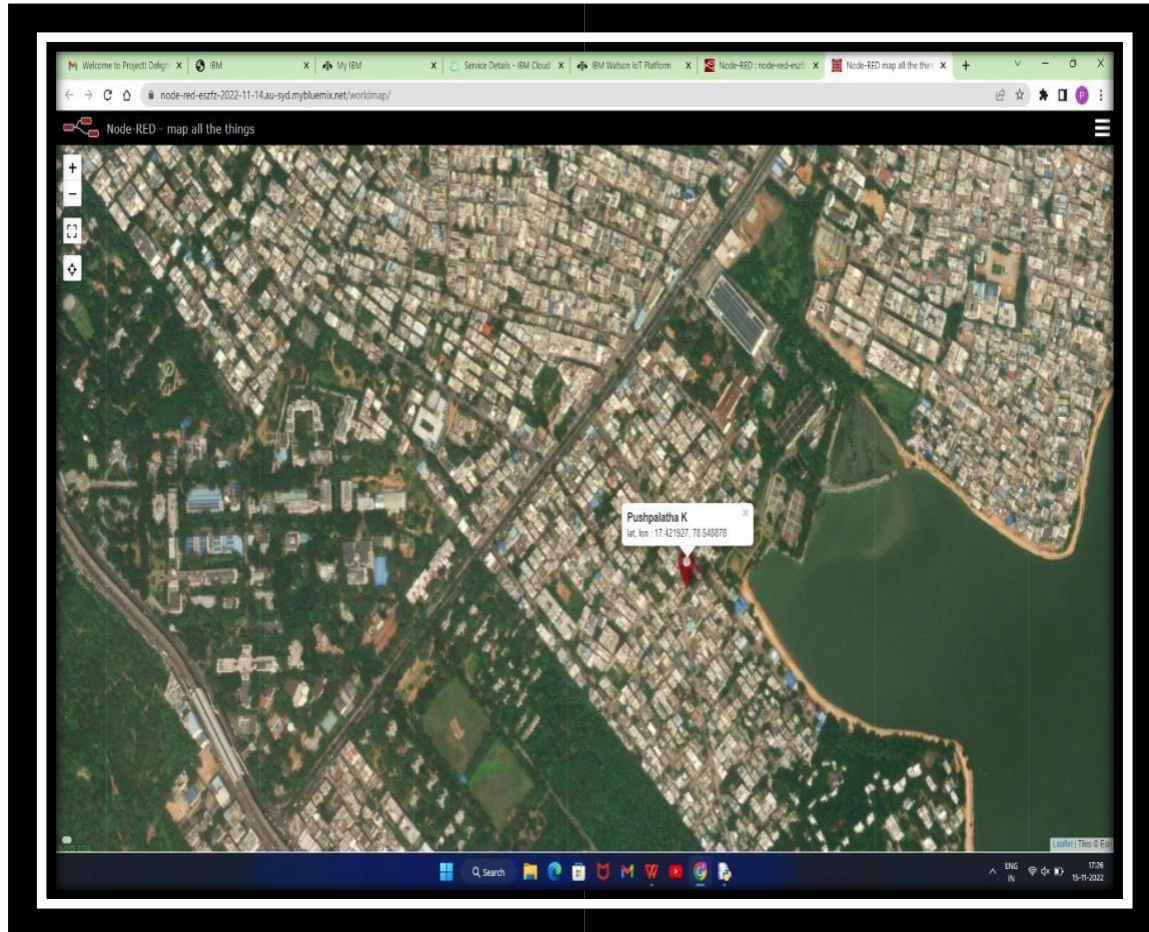


- Fast to sms output

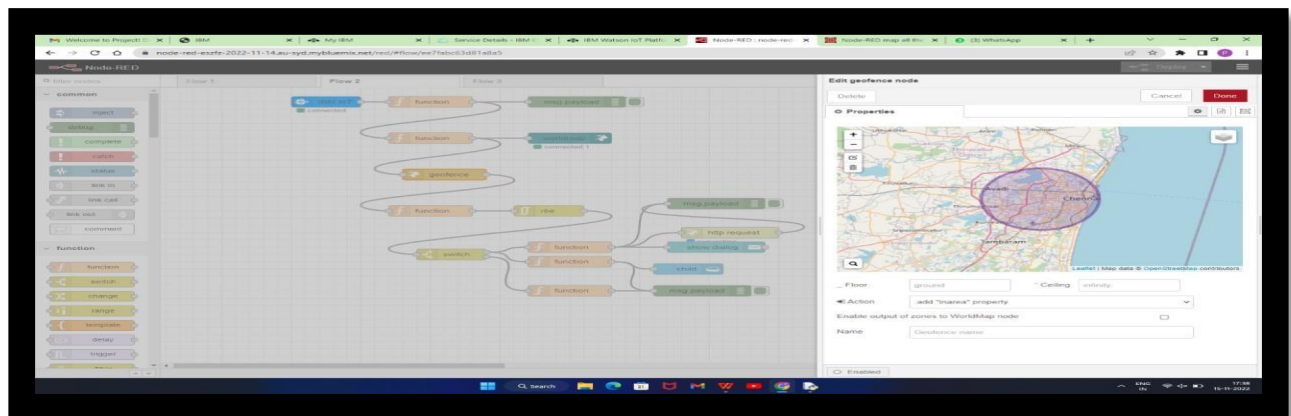




- **Located the child**



- **Created the geofence node**







## 8. TESTING

## 8.1 Test Case

[illegible]

## 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 and 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      | 7          | 2          | 3          | 2          | 14       |
| Duplicate      | 1          | 0          | 0          | 2          | 3        |
| External       | 2          | 4          | 0          | 5          | 11       |
| Fixed          | 10         | 2          | 3          | 7          | 22       |
| Not Reproduced | 0          | 0          | 1          | 1          | 2        |
| Skipped        | 0          | 0          | 0          | 1          | 1        |

### 3. Test Case Analysis

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

| Section             | Total Cases | Not Tested | Fail | Pas s |
|---------------------|-------------|------------|------|-------|
| Print Engine        | 6           | 0          | 0    | 6     |
| Client Application  | 25          | 0          | 0    | 25    |
| Security            | 3           | 0          | 0    | 3     |
| Exception Reporting | 8           | 0          | 0    | 8     |
| Final Report Output | 5           | 0          | 0    | 5     |
| Version Control     | 2           | 0          | 0    | 2     |

## 9.RESULTS

### 9.1 Performance Metrics

Use performance monitoring to know the velocity of data records processed by your deployment.

You enable performance monitoring when you select the deployment to be tracked and monitored. Performance metrics are calculated based on the following information:

- scoring payload data
- For proper monitoring purpose, log in every scoring request in Watson OpenScale as well.
- Payload data logging is automated for IBM Watson Machine Learning engines.
- For other machine learning engines, the payload data can be provided either by using the Python client or the REST API.
- Performance monitoring does not create any additional scoring requests on the monitored deployment.

## **10.ADVANTAGES & DISADVANTAGES**

### **Advantages**

In our system, we provide an environment where this problem can be resolved in an efficient manner. It makes parents to easily monitor their children in real time just like staying beside them as well as focusing on their own career without any manual intervention.

### **Disadvantages:**

Hackers may gain access to the system and steal personal information. Since we add so many devices to the internet, there is a risk that our information as it can be misused.

They rely heavily on the internet and are unable to function effectively without it.

With the complexity of systems, there are many ways for them to fail.

We lose control of our lives—our lives will be fully controlled and reliant on technology.

Overuse of the Internet and technology makes people unintelligent because they rely on smart devices instead of doing physical work, causing them to become lazy.

Unskilled workers are at a high risk of losing their jobs, which could lead to unemployment. Smart surveillance cameras, robots, smart ironing systems, smart washing machines, and other facilities are replacing security guards, maids, ironmen, and dry-cleaning services etc.

It is very difficult to plan, build, manage, and enable a broad technology to IoT framework.

Deploying IoT devices is very costly and time-consuming.

## **11.CONCLUSION**

This research demonstrates Smart IoT device for child safety and tracking helping the parents to locate and monitor their children. If any abnormal values are read by the sensor then an SMS is sent to the parents mobile and an MMS indicating an image captured by the serial camera is also sent. The future scope of the work is to implement the IoT device which ensures the complete solution for child safety problems.

## **12.FUTURE SCOPE**

This research demonstrates Smart IoT device for child safety and tracking, to help the parents to locate and monitor their children.

If any abnormal readings are detected by the sensor, then an SMS and phone call is triggered to the parents mobile. Also ,updated to the parental app through the cloud.

The system is equipped with GSM and GPS modules for sending and receiving call, SMS between safety gadget and parental phone.

The system also consists of Wi-Fi module used to implement IoT and send all the monitored parameters to the cloud for android app monitoring on parental phone.

Panic alert system is used during panic situations alerts are sent to the parental phone, seeking for help also the alert parameters are updated to the cloud.

Boundary monitoring system is implemented on safety gadget with the help of BEACON technology, as soon as the safety gadget moves far away from the BLE listener gadget an alert is provided to itself.

Future Scope of Work 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.

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

### 13.1Source Code

#### **Modified Version of Code according to main project:**

```
import json import
wiotp.sdk.device
import time
myConfig={
    "identity":{
        "orgId": "hj5fmy",
        "typeid": "NodeMCU",
        "deviceId": "12345678"
    },
    "auth": {
        "token": "12345678"
    }
}

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

client.connect()

while True:

    name= "Smartbridge"

#in area location
```



```
# latitude=17.4225176

Longitude= 78.54588742

#out area location

#latitude = 17.4219272

#longitude =70.5488783

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(5)

client.disconnect()
```

## OUTPUT

### 1. Purpose of Document

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| Duplicate      | 1             | 0             | 0             | 2             | 3        |
| External       | 2             | 4             | 0             | 5             | 11       |
| Fixed          | 10            | 2             | 3             | 7             | 22       |
| Not Reproduced | 0             | 0             | 1             | 1             | 2        |
| Skipped        | 0             | 0             | 0             | 1             | 1        |

## 13.2Github & Design



<https://github.com/IBM-EPBL/IBM-Project-15590-1659601273>

**Project Demo Link:**

<https://youtu.be/R4zKCpcHpF0>