

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

**NALAIYA THIRAN PROJECT BASED LEARNING  
on  
PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND  
ENTREPRENEURSHIP**

**A PROJECT REPORT**

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## 1. INTRODUCTION

The Internet of Things (IoT) plays a vital role in day-to-day life. 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 a drift 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. The technique 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 parents.

## 1.1 ABSTRACT

The children are less secure nowadays and have many issues concerning their security purpose. Many Family members spent more time in work and social accountability where they need to take care of their children. The current status in our country is not habitable for monitoring children. With the absence of a child monitoring system, it is hard to monitor the children every seconds. Where Under age children may be impulsive in the way they act and in places to be. Most of the human behaviour are shaped in their childhood stage, In order to get this behaviour child monitoring system is necessary. Children are prone to many incidents and accidents. The safety of children is very indispensable as children cannot protect themselves.

The main aim 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 system will ensures utmost security and ensure live tracking for kids. It proposes a model for child safety through smartphones that can track their children's location and provide the precise coordinates of the child's location in real-time Anywhere by monitoring the activities, the security state of the children are examined.

## **2. LITRATURE SURVEY**

### **2.1 EXISTING SYSTEM**

In the existing system, we employ a voice recognition module where the child's alarm commands are recorded and retained for future use. In the event that the same child issues the same command, it will compare it to the alert command that was previously recorded and adjust the emergency level in accordance with the alert command. The GSM features a SIM that is used to phone or send alarm messages to persons you can trust. When necessary, GPS is used to track the current location. The server will look up the appropriate device ID in the database, look for the appropriate contacts using that device ID, and assist in notifying the registered guardians.

The project's drawbacks include the following:

1. The youngster could not accurately produce the alert order while experiencing a panic attack.
2. The command generated might not coincide with the command previously stored.
3. Manual labour is needed for this job.

### **2.2 REFERENCES**

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

**Author : AnandJatti, MadhviKannan , Alisha RM, Vijayalakshmi P, ShresthaSinha**

**<https://ieeexplore.ieee.org/abstract/document/7808003>**

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.

## **2. Smart IOT Device for Child Safety and Tracking**

**Author : M Nandini Priyanka, S Murugan, KNH Srinivas, TDS Sarveswararao, E Kusuma Kumari.**

<https://www.ijitee.org/wp-content/uploads/papers/v8i8/H6836068819.pdf>

Child safety and tracking is a major concern as the more number of crimes on children are reported nowadays. With this motivation, a smart IoT device for child safety and tracking is developed to help the parents to locate and monitor their children. The system is developed using LinkIt 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 emergency. The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same.

### **3. Child Safety & Tracking Management System**

**Author: Aditi Gupta, Vibhor Hari**

<https://ieeexplore.ieee.org/document/7546695>

Today, technology is growing rapidly and providing all essential and effective solutions for every requirement. Now a day's child security is an important area of concern. This model is developed to rectify the worries of parents regarding their child security. In this scenario, Our system ensures maximum security and ensures live tracking for their kids because parent worries are genuine. 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 is able to send a quick message and its current location via Short Message services. This proposed system is validated by testing on the Android platform.

### **4. Kids' Health Monitoring System at Day-Care Centers using Wearable Sensors and Vocabulary-based Acoustic Signal Processing**

**Author : Abhishek Basak, Seetharam Narasimhan and Swarup Bhunia**

<https://ieeexplore.ieee.org/document/6026744>

Wearable sensors for healthcare and wireless health monitoring are rapidly becoming ubiquitous. They enable remote, accurate and low-cost health monitoring and can provide personal healthcare with timely detection of health issues. In this paper, we present a novel integrated system for monitoring children at day-care centers in order to facilitate proper care of health issues and overall wellbeing, including early detection of symptoms for various diseases, posttreatment monitoring as well as encouraging healthy habits and activities. The proposed "Kids Health Monitoring System", referred to as KiMS, is built around a wearable acoustic sensor with embedded digital signal processing capabilities in order to detect various audio signals of interest, such as coughs, sneezes, and cries. It is also equipped with wearable body temperature and pulse rate sensors, along with on-site processing and a Bluetooth unit for communicating alerts and activity on a timely basis. The record of a child's activities can be used by daycare specialist, parents or the healthcare provider for understanding the probable cause or time of onset of symptoms and encouraging healthy habits. This paper also presents a signal processing framework for feature detection and classification of various audio signals, under varying Signal to Noise Ratios (SNR).

## 2.3 PROBLEM STATEMENT

### **PROBLEM STATEMENT :Child Safety Monitoring & Notification**

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. Bythis, 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.

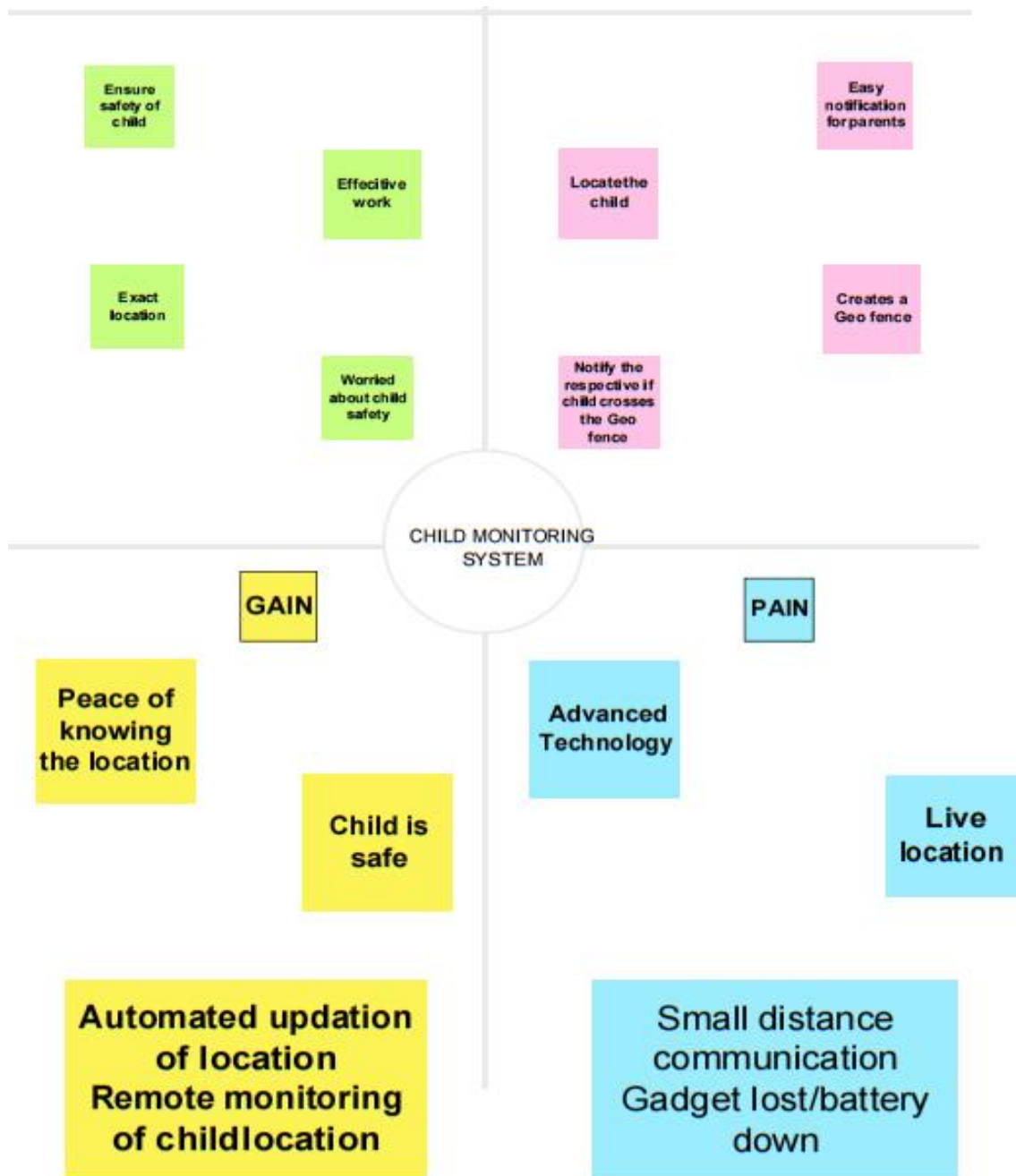
#### **Disadvantages:**

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



### 3.IDEATION & PROPOSED SOLUTION

#### 3.1 EMPATHY MAP



## 3.2 BRAIN STROM

### STEP 1

#### 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.

- 10 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.

10 minutes

- Team gathering**  
Define who should participate in the session and send an invite. Share relevant information in pre-work ahead.
- Set the goal**  
Think about the problem you'll be focusing on solving in the brainstorming session.
- Learn how to use the facilitation tools**  
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#)

### 1 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.

10 minutes

How might we (your problem statement)?

#### Key rules of brainstorming

To run a smooth and productive session

- Stay on topic
- Defier judgment
- Go for volume
- Encourage wild ideas
- Listen to others
- If possible, be visual

**Need some inspiration?**

Get a bunch of ideas, all in one place, all in one place, all in one place.

[View examples](#)

Step-2: Brainstorm, Idea Listing and Grouping

2

Brainstorm

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

10 minutes

1

Problem EV

1.1

1.2

1.3

1.4

1.5

1.6

1.7

1.8

1.9

1.10

2

Landscape EV

2.1

2.2

2.3

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2.5

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2.10

3

Microclimate EV

3.1

3.2

3.3

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4

Human EV

4.1

4.2

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3

Group Ideas

Take time sharing your ideas while clustering similar or sticky notes have been grouped, give each cluster a name bigger than six sticky notes, try and use if you can break it

10 minutes

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Problem EV

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Microclimate EV

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Human EV

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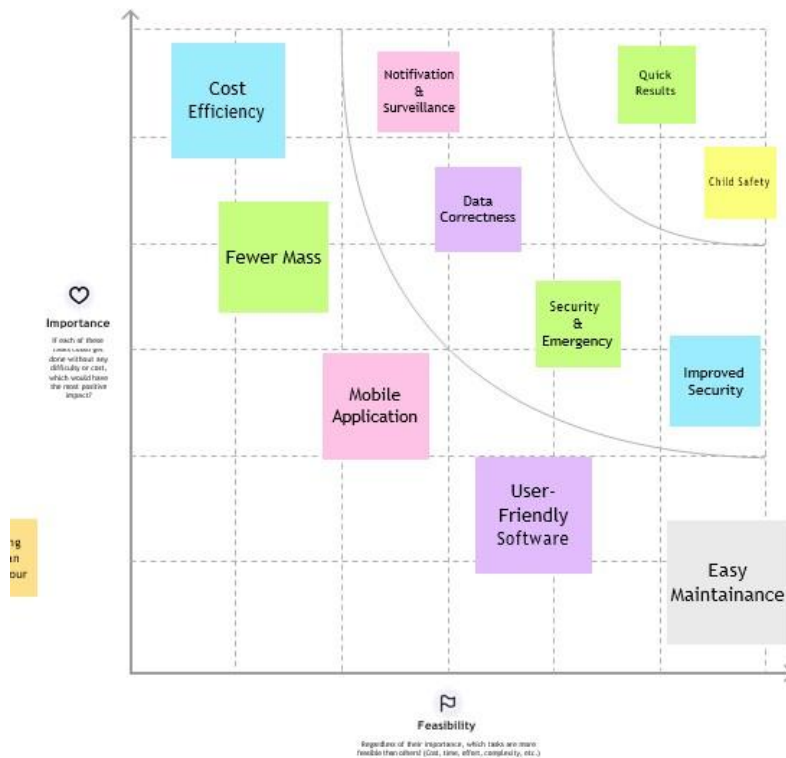
## STEP 3

4

### Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



→

### After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

#### Quick add-ons

- ☐ **Share the mural**  
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- ☐ **Export the mural**  
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

#### Keep moving forward

- Strategy blueprint**  
Define the components of a new idea or strategy.  
[Open the template](#)
- Customer experience journey map**  
Understand customer needs, motivations, and obstacles for an experience.  
[Open the template](#)
- Strengths, weaknesses, opportunities & threats**  
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.  
[Open the template](#)

[Share template feedback](#)

### 3.3 PROPOSED SYSTEM

In the existing system, manual intervention was required. But in the proposed system, we make every action autonomously.

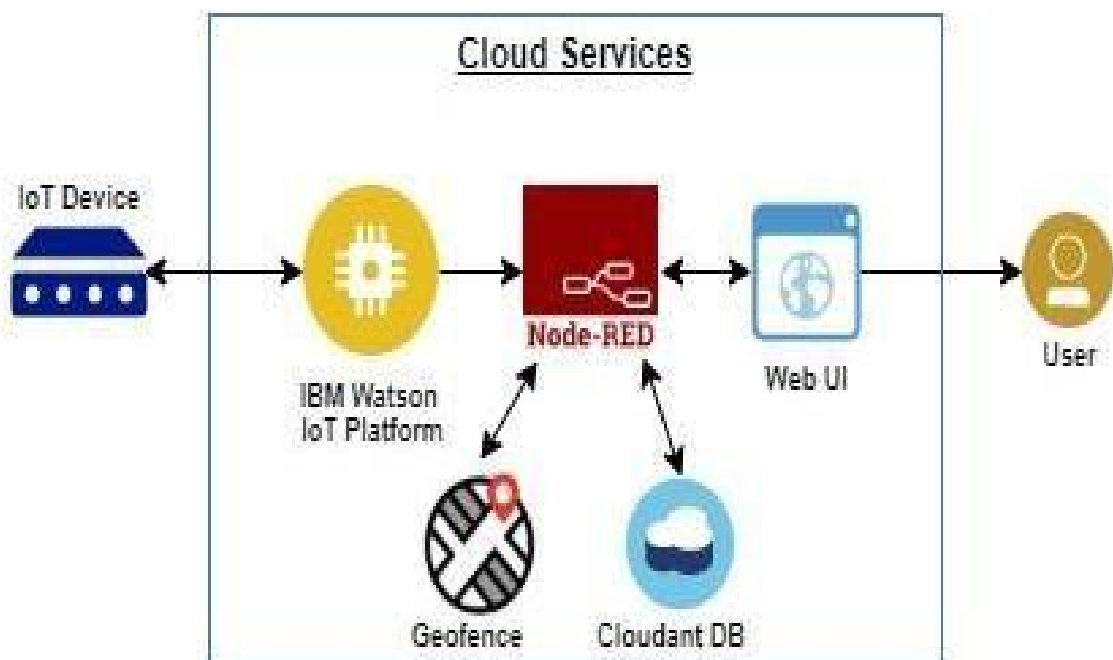


Fig.1: Block diagram of the proposed system

We can use both web application as well as mobile application or either one of it as the front end user interface, cloud, and database as the back end for storing and retrieving information, and a device for monitoring.



Fig.2: GPS

GPS is used to track the live location of the child who is wearing that device. With the help of GPS, we can easily perform Geo-fencing concept, in which we will be able to feed a particular boundary to that device.



Fig.3: GSM

If the child goes beyond that particular boundary specified, the respective guardians will receive an alert notification using GSM. In our system, we use several components like,

1. GPS
2. GSM
3. IBM Watson Cloud
4. IBM IoT Platform
5. IBM Node RED
6. IBM Cloudant DB

## 7. IBM IoT Platform

## 8. IBM Node RED

## 9. IBM Cloudant DB

Watson Studio allows you to train, deploy, and manage your AI models, and prepare and analyze information during a single integrated environment.



Fig.4 :IBM WATSON CLOUD

The Internet of Things (IoT) is the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. By combining IoT data with IBM Cloud technologies, business can extract valuable insights to improve virtually every aspect of their operations and enable innovative, new business models.

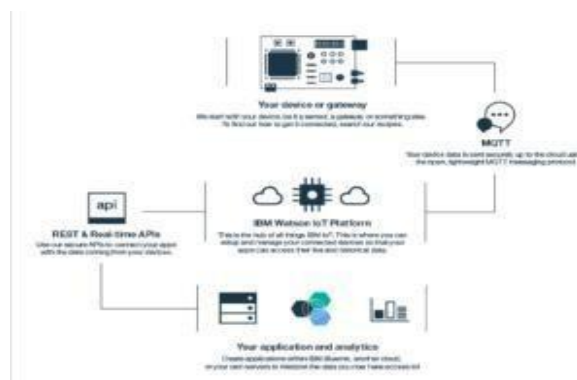


Fig.5:IBM IoT Platform

NODE-RED is a stream based advancement instrument for visual programming and basically its main focus on visual apparatus for wiring the Internet of Things. This programming instrument is developed for wiring together equipment gadget(Hardware), APIs and online administrations in new and intriguing manners.

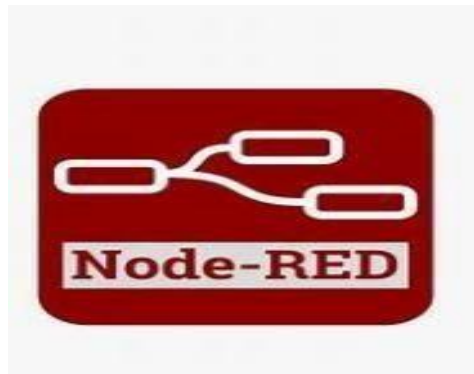


Fig.6:IBM Node RED

IBM Cloudant allows queries to run against a single database that returns an array of matching documents and a bookmark, which allows access to the next block of search



Fig.7:IBM Cloudant DB



### 3.4 PROBLEM SOLUTION FIT

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <div>C</div> <p>Parents are the majority of our customers, and working and lacking the leisure to take taking care of their kids. These parents aren't with accessibility at any moment to look following their kids. If the case so they are in need of anything to make their children under their watchful eye.</p>	<b>6. CUSTOMER CONSTRAINTS</b> <div>C</div> <p>Our customers' problems with connectivity or perhaps the communication protocols themselves are the limitations they must deal with. There's a potential that technical inefficiencies will cause problems to occur. If they gave it some second thought, they might not be able to afford</p>	<b>5. AVAILABLE SOLUTIONS</b> <div>C</div> <p>Of course, there are solutions readily available on the market, such as the Child GPS Tracking System, the Child Safety GSM Kit, etc. However, the cost and ineffectiveness of the solutions once acquired are a barrier</p>	Explore AS, differen
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <div>___</div> <p>To improve the proposed solution's functionality so that it can operate without issue at any moment, so greatly increasing child safety. to reassure the parents that their monitoring of their children will never be stopped.</p>	<b>9. PROBLEM ROOT CAUSE</b> <div>RC</div> <p>If you think about where the problem started, it started with just a few irrational people who have nothing to do with kids and are only interested in things like money and child abuse (which mostly affects young girls).</p>	<b>7. BEHAVIOUR</b> <div>BE</div> <p>The suggested solution is constantly eager/tends to make the device operate effectively so that it does not have to contend with any additional limitations. The solution also aims to make sure that clients receive the most effective functionalities possible.</p>	
Focus on J&P, tap into BE, understand RC	Focus on J&P, tap into BE, understand RC			

<b>3. TRIGGERS</b> <div>TR</div> <p>Customers are influenced by the fact that when other working parents try something and leave a positive review, they are more likely to try it themselves to improve their child safety.</p>	<b>10. YOUR SOLUTION</b> <div>SL</div> <p>Our team has been working very hard to come up with a workable solution to fix every problem that the current ones have. We are in high demand to guarantee the developing module's effective functions so that it won't ever fail.</p>	<b>8. CHANNELS of BEHAVIOUR</b> <div>CH</div> <p>Both offline and online working modes are included in our suggested solution. The produced device may have a tendency to operate on a plan B in the event of disconnectivities, which contains backup in the event that the actual working kit fails.</p>
<b>4. EMOTIONS: BEFORE / AFTER</b> <div>EM</div> <p>Customers (Parents) are frustrated since they don't know whether their kids are safe before utilising the gadget that was built. Once they begin using the established solution, they may feel free to concentrate on their work and be able to easily keep an eye on their kids at any moment.</p>		

## 4. REQUIREMENT ANALYSIS

### 4.1 FUNTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Authentication	Only the authorized person for that product will know Ensures security
FR-4	User Interface	The Inventor Able to see the location of children when they are out of geo fence will also track the exact information about the children
FR-5	Notification	Notified through mobile and mail

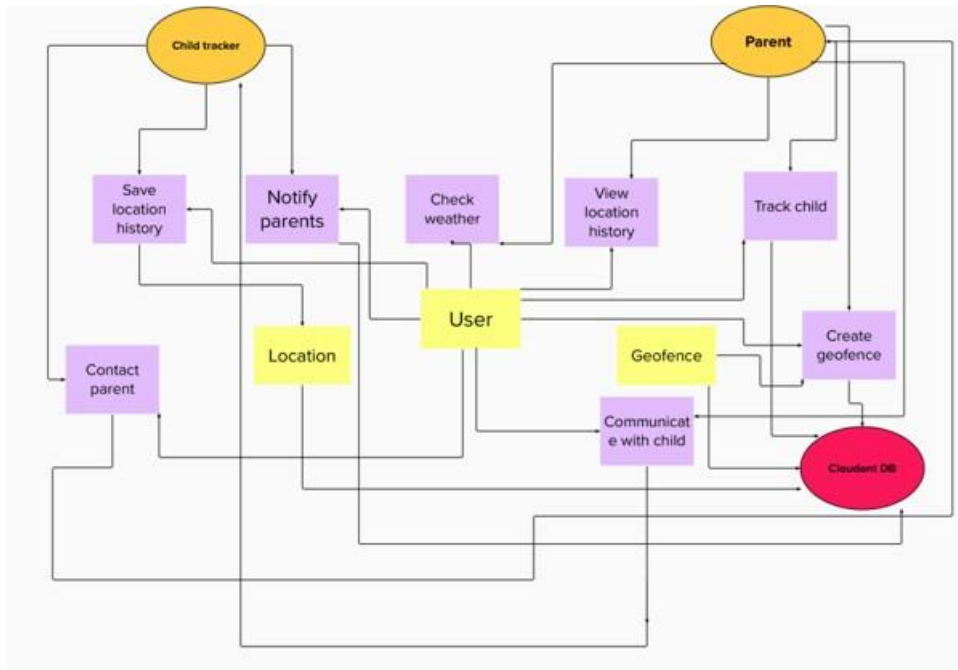
### 4.2 NON FUNTIONAL REQUIREMENTS

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

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Accessed through Mobile App Showing location (latitude and longitude) of child and also other measures to ensure safety like notification. Portable and comfortable to use.
NFR-2	Security	Database security and ensuring the safety of the product while in use.
NFR-3	Reliability	Once logged in, the webpage is available until logging out of the app, and a comfortable platform or creates a good environment for users to use.
NFR-4	Performance	Each page must load within 4 seconds and database needs to be updated every few seconds and a notification must be sent immediately if seen a change in the child's location.
NFR-5	Availability	The data must be available whenever needed and the product should be able to use at any time.
NFR-6	Scalability	The process must be flexible to use at anytime and versatile.

## 5. PROJET DESIGN

### 5.1 DATAFLOW DIAGRAM

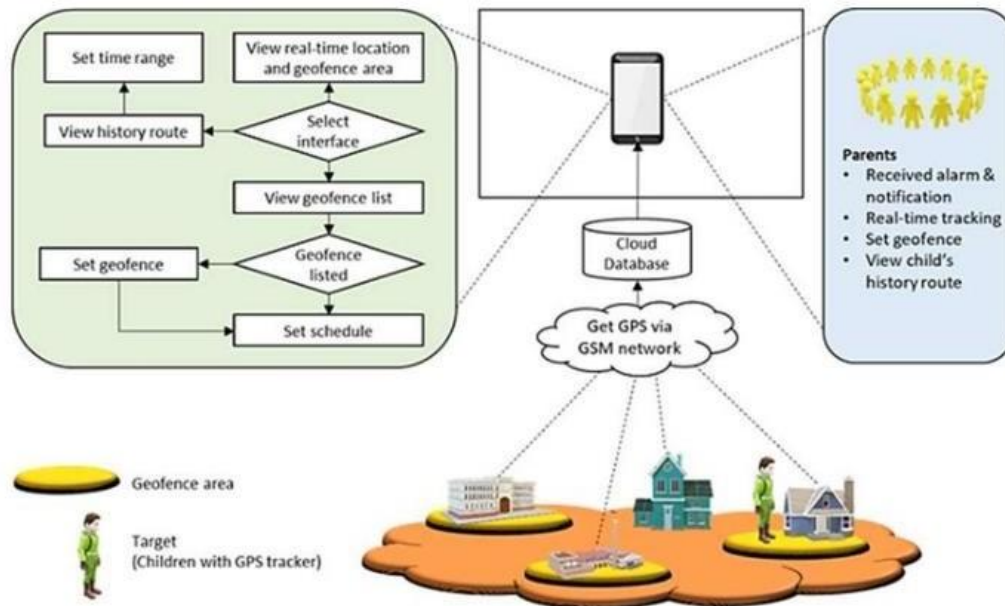


#### User Stories

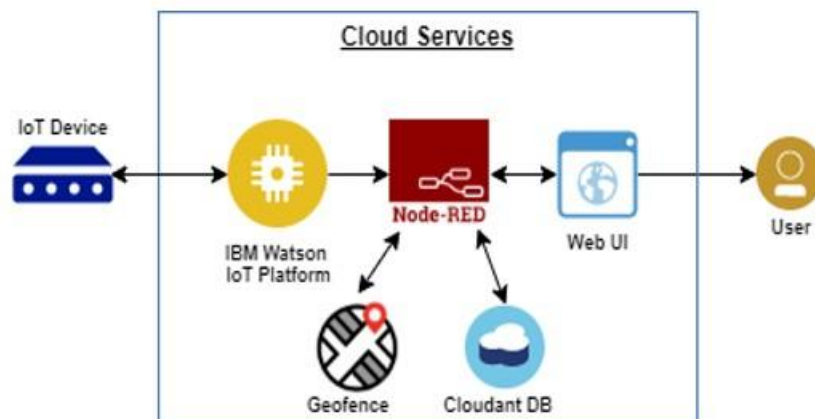
Parent	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-5	As a user, I need to be able to view the functions that I can perform		High	Sprint-1
Child	Notification	USN-1	As a user, I should be able to notify my parent in emergency situations		High	Sprint-2
	Store data	USN-2	As a user, I need to continuously store <u>my</u> location data into the db.		Medium	Sprint-2
	Communication	USN-3	I should be able to communicate with my parents		Low	Sprint-3

## 5.2 SOLUTION AND TECHNICAL ARCHITECTURE

### Solution Architecture Diagram:



### Technical Architecture:



**TABLE 1-COMPONENTS AND TECHNOLOGIES**

1.	Application Logic	The data to be collected and sent to the authenticator's(parent) via GSM providing the GPS coordinates to easily locate access and monitor the child	IBM Watson STT service, python etc
2.	Database	Data to be segregated and secured in the form of relational DBMS	MySQL
3.	Cloud Database	IBM	IBM Cloudant
4.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
5.	External API-1	To access the children location	GPS location monitoring etc
6.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration	Cloud Foundry

**Table-2: Application Characteristics:**

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	The proposed solution being framed in the form an android application providing the end user an easy surveillance of their children (preferably users are parents)	UI/UX design development
2.	Security Implementations	The developed application should be accessible in the way it can only respond to the comments of the relevant users	Encryptions, IAM Controls.
3.	Scalable Architecture	The app format comes the way easier to handle and operate.	Not yet determined
4.	Availability	The developed solution tends to be available in the market at any time	Not yet determined
5.	Performance	Highly proper and betterment functionalities are to be ensured in the designed solution	Not yet determined

## 6. PROJECT PLANNING AND SCHEDULING

### 6.1 SPRINT PLANNING AND ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Login	USN-1	As a customer, I might ensure login credential through gmail ease manner for the purpose of sending alert message to the parents or guardians (or) Informing through normal message.	2	High	Karan B, Adhishayaa P V
Sprint-1	Registration	USN-2	As a user, I have to registered my details and tools details in a simple and easy manner by considering the safety of child, this registered system sends notification to the parents	2	High	M Dhanush Kumar, Evangeline Felicia I
Sprint-2	Dashboard	USN-3	As a user, In case of any emergency situation parents(1) must get the alert notification and location of the child.	2	Medium	Karan B, Adhishayaa P V
Sprint-3	Dashboard	USN-4	As a user, I(parent) need to safeguard child and tracking the child's location and it is Important to notify near police station incase of more emergency.	2	High	M Dhanush Kumar, Evangeline Felicia
Sprint-3	Dashboard	USN-5	As a user, Its good to have a IOT based system to safeguard monitoring without presence of parent.	2	High	Karan B, Adhishayaa P V
Sprint-4	Monitoring the environment	USN-1	User can monitor the situation of the environment from a dashboard that displays sensor information about the environment and child health.	2	High	M Dhanush Kumar, Evangeline Felicia
Sprint-4	Event notification	USN-6	Sending an alert SMS to the parents and guardians in case of panic situation	2	High	Karan B, Adhishayaa P V

### 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	20	4 Days	04 Nov 2022	07 Nov 2022	12	07 Nov 2022
Sprint-2	20	4 Days	07 Nov 2022	10 Nov 2022	14	10 Nov 2022
Sprint-3	20	4 Days	10 Nov 2022	13 Nov 2022	15	13 Nov 2022
Sprint-4	20	4 Days	14 Nov 2022	17 Nov 2022	12	17 Nov 2022

## 6.2 SPRINT DELIVERY SCHEDULE

### SPRINT 1

HTML:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<link rel="stylesheet" href="/css/login.css">
<title>Sign Up</title>
<script>
if (window.location.hostname !==
"localhost") { if (location.protocol !==
"https:") { location.replace(
`https:${location.href.substri
ng( location.protocol.length
)}`
)
}
} </script>
<script src="/localforage.js"></script>
</head>
<body>
<div class="wrapper">
<div class="loginContainer">
<span>Login to Continue</span>
<div class="traditionalLoginContainer">
<form class="signupForm" action="/" method="post">
<input type="text" name="firstName" placeholder="First Name" id="firstName">
<input type="text" name="lastName" placeholder="Last Name" id="lastName">
<input type="text" name="username" placeholder="User Name" id="username">
<input type="email" name="email" placeholder="Email" id="email">
<input type="password" name="password" placeholder="Password" id="password">
<input class="loginButton" type="submit" value="Sign Up">
</form>
</div>
<div class="loginWithFireContainer">
<button type="button" class="fire" title="Login with SAFETY"
id="fire">Login with SAFETY</button>
</div>
<a class="hyperLink" href="/login">Already have an Account? Login ↗ </a>
</div>
</div>
<script>
// Necessary for Fire OAuth to Function
const fireBroadcastingChannel = new
BroadcastChannel('fireOAuthChannel');
fireBroadcastingChannel.addEventListener('message', async event => {
let data = event.data
/**
```

```
* @typedef {Object<string, any>} Data
* @property {boolean} success - Whether the login was successful * @property {string}
token - The data returned from the login i.e. Fire Token
*/
// data.token is the message sent from the fireOAuthChannel after verification
// data.success is a boolean that indicates whether the verification was successful
// data.token is the fire token
// What to do with the Fire Token?
// * Fire Token is an unique token which uniquely identifies the user who authorized your login attempt
// with Fire
// * You can use this token ONLY ONCE as it will be destroyed after the first use
```



```

// 1. Send the fire token to the Fire Server to verify the user
// - You can do that client sided or server sided
// - You need to send a POST Request to the Fire Server with the fire token
// at the URL: http://localhost:3003/api/tokens/verify
// - The Fire Server will verify the fire token and return a response
// - If the verification was successful - CODE (200), the Fire Server will return a response
with the user's data
// - If the verification was unsuccessful - CODE (400) or CODE (401), the Fire Server will
return a response with an error 'message' // - You can use the data returned from the Fire
Server to create a new user in your database
// This example will send the token to Fire Servers and console.log the
response console.log("%c" + `Fire Token: ${data.token}`, `color: #f1c40f;
font-weight: bold;`);
const response = await fetch('https://fire.adaptable.app/api/tokens/verify', { method: 'POST',
headers: { 'Content-Type': 'application/json' }, body: JSON.stringify({
token: data.token
})
})
// get the response
const responseData = await response.json()
// console.log the response
console.log(responseData) await localforage.setItem('userData', {...responseData, isFire: true})
// Adding the user data to the user Database
let database = await
localforage.getItem("userDatabase") if (database ==
null) {
database = []
}
database.push(responseData) await localforage.setItem("userDatabase", database)
// redirect to the home page window.location.href = '/' })
function popupwindow(url, title, w, h) { var left = (screen.width/2)-(w/2); var top =
(screen.height/2)-(h/2); return window.open(url, title, 'toolbar=no, location=no,
directories=no, status=no, menubar=no, scrollbars=no, resizable=no, copyhistory=no,
width='+w+', height='+h+', top='+top+', left='+left);
}
document.getElementById("fire").addEventListener("click",
function() { popupwindow("/fireoauth.html", "Fire OAuth", 450,
600)
}) </script>
<script>
// this.Website's Scripts / App Logic
document.querySelector(".signupForm").addEventListener("submit" , async (e) =>
{ e.preventDefault() let firstName = document.getElementById("firstName").value
let lastName =
document.getElementById("lastName").value let
username =
document.getElementById("username").value let email
= document.getElementById("email").value
let password =
document.getElementById("password").value let
profilePic =
`https://avatars.dicebear.com/api/adventurer-
neutral/${firstName}${lastName}.svg?backgroundColor=variant03`
let data = { firstName, lastName, username, email, password, profilePic }
await localforage.setItem("userData", data)

```

```
let database = await
localforage.getItem("userDatabase") if (database ==
null) {
database = []
}
database.push(data) await localforage.setItem("userDatabase", database) window.location.href = "/"
}) </script>
</body>
</html>
```

## SPRINT 2

### □ CONFIRMATION EMAIL:

```
INDEX: <!DOCTYPE html>
<html lang="en" style="height: 100%; margin: 0;">
<head>
<meta charset="UTF-8" />
<meta name="description" content="The Home Page after Logged In" />
<meta name="viewport" content="width=device-width, initial-scale=1.0" />
<title>IOT Based Safety Gadget for Child Safety Monitoring and Notification</title>
<script src="./localforage.js"></script>
<script>
if (window.location.hostname !==
"localhost") { if (location.protocol !==
"https:") { location.replace(
`https:${location.href.substri
ng( location.protocol.length
)})`
)
}
}async function check() {
let data = localforage.getItem("userData")
if (data == null) { window.location.href = "/login"
}
}check() </script>
</head>
<body
style=" height: 100%; margin: 0;
font-weight: 300;
font-family: -apple-system, BlinkMacSystemFont, 'Segoe UI', Roboto, Oxygen, Ubuntu,
Cantarell, 'Open Sans', 'Helvetica Neue', sans-serif; " >
<div
class="wrapper" style=" height:
90%; display: flex;
flex-direction:
column; align-items:
center; justify-
content: center; text-
align: center; " >
<div
class="details" style=" display: flex;
flex-direction: column; align-items:
center; gap: 20px;
padding: 1rem;
border-radius:
5px;
box-shadow: 0 0 8px 0px #44444444; max-width: 80%; " >
<h1 class="name" style="margin: 0"></h1>
<div
class="imageContainer" style="padding: 10px; height: 10rem; width: 10rem" >
<img class="image" alt="profile picture" />
</div>
<h2 class="email" style="margin: 0"></h2>
<a style="text-decoration: none;text-align: center;font-size: 1.2rem;color: #0070f3;font-
weight: 400;" href="./dashboard">Go to Dashboard ↗ </a>
```

</div>  
</div>  
<script>

```

async function main() {
let name =
document.querySelector(".name") let
image = document.querySelector(".image")
let email =
document.querySelector(".email")
let userData = await
localStorage.getItem("userData") if(userData ==
null) { window.location.href = "/login"
}name.innerHTML = `Welcome ${userData.firstName}
${userData.lastName}!` image.src = userData.profilePic
email.innerHTML = `Your email is: <a style="text-decoration: none;color:
#0072B5;" href="mailto:${userData.email}">${userData.email}</a>` }main()
</script>
</body>
</html>

```

### SPRINT-3

#### NOTIFICATION and STORE DATA

```

#include<WiFi.h>//library for wifi
#include<PubSubClient.h>//library
for MQTT
void callback(char* subscribe topic, byte* payload, unsigned int
payload length);
//-----credentials of IBM Account--#define ORG "frpi8s"// IBM ORGANIZATION ID
#define DEVICE_TYPE "NodeMCU"//DEVICE TYPE MENTIONED
IN IOT WATSON
PLATFORM #define DEVICE_ID "12345"//DEVICE ID MENTIONED
IN IOT WATSONPLATFORM
#define TOKEN "12345678"//Token String
data3;float dist;
//-----customize the above value-- char server [] =ORG
".messaging.internetofthings.ibmcloud.com";//servername
char publish topic[]="ultrasonic/evt/Data/fmt/json";/*topic
name andtype
of event perform and
format in which data to
be send*/
charsubscribetopic[]="ultrasonic/cmd/test/fmt/String";/
*cmd REPRESENT
Command tupe and
COMMAND IS TEST OF FORMAT STRING*/
char authMethod[]="use-token-auth";//authentication
method char token[]=TOKEN;
char clientid[]="d:" ORG ":" DEVICE_TYPE":" DEVICE_ID;//CLIENT ID
//
WiFiClient wifiClient;// creating an instance for wificlient
PubSubClient client(server, 1883 , callback ,
wifiClient);/*calling the predefined
client id by passing parameter like server id,portand

```

```
wificredential*/ int LED =4;
int trig =5; int echo=18; void setup(){
Serial.begin(115200); pinMode(trig,OUTPUT);
pinMode(echo,INPUT); pinMode(LED,OUTPUT); delay(10);
Serial.println(); wificonnect(); mqttconnect();
void loop() { digitalWrite(trig,LOW); digitalWrite(t2r9ig,HIGH);
```

```

delayMicroseconds(10); digitalWrite(trig,LOW);
float dur=pulseIn(echo,HIGH); float dist=(dur * 0.0343)/2;
Serial.print("distance in
cm"); Serial.println(dist);
PublishData(dist); delay(1000);
if (!client.loop()) { mqttconnect();
}
}
/*..... retriving to
cloud..... */
void PublishData(float dist){ mqttconnect();//function call for
connecting to ibm
/*creating the string in form of JSON to update the data to ibm
cloud*/ String
object;if(dist<100)
{
digitalWrite(LED,HIGH); Serial.println("no object is
near"); object="Near";
}
else
{
digitalWrite(LED,LOW); Serial.println("no object found"); object="No";
}
String payload="{\"distance\":"; payload
+=dist; payload +="," "\"object\":\":";
payload += object; payload += "\"}";
Serial.print("Sending payload:
"); Serial.println(payload);
if(client.publish(publishtopic, (char*)
payload.c_str())){ Serial.println("Publish ok");/* if its
sucessfully upload data on the cloud then it will print publish
ok in serial monitor or else it will print publish
failed*/
} else{
Serial.println("Publish failed");
}
}
void
mqttconnect(){ if(!client.connected()){ Serial.print("Re
connecting client to "); Serial.println(server);
while(!client.connect(clientid,authMethod, token)){ Serial.print("."); delay(500);
}
initManagedDevice
(); Serial.println();
}
}
void wificonnect()//function defenition for wificonnect
{
Serial.println(); Serial.print("Connecting to ");WiFi.begin("vivo 1816",
"taetae95",6);//PASSING THE WIFI CREDIDENTIALS TO
ESTABLISH CONNECTION
while
(WiFi.status() !=WL_CONNECTED){ delay(500);
Serial.print(".");
}
Serial.println(""); Serial.println("WiFi connected");

```

```
Serial.println("IP address");  
Serial.println(WiFi.localIP());  
}
```



```

void
initManagedDevice(){ if(client.subscribe(subscribetopic)){ Serial
l.println((subscribetopic)); Serial.println("subscribe to cmd OK");
}else{
Serial.println("subscribe to cmd failed");
}
}
void callback(char*
subscribetopic,byte*payload,unsigned int
payloadLength)
{
Serial.print("callback invoked for topic: ");
Serial.println(subscribetopic); for(int i=0; i< payloadLength;
i++){
//Serial.print((char)payload[i]); data3 +=(char)payload[i];
}
//Serial.println("dta: "+ data3);
//if(data3=="Near")
//{
//Serial.println(data3);
//digitalWrite(LED,HIGH);
//}
//else //{
//Serial.println(data3);
//digitalWrite(LED,LOW);//} data3="";

```

## SPRINT 4

```

<!DOCTYPE
PE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-
width, initial-scale=1.0">
<link rel="stylesheet" href="/FIREOAUTH.css">
<link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/nprogress/0.
2.0/n progress.min.css">
<link rel="shortcut icon"
href="https://raw.githubusercontent.com/tharunoptimus-
pd/firepwa/main/favicon.ico?token=GHSAT0AAAAAABR4
6 HVJ5M5L3QGFRZRQXOISYUJUWAA" type="image/x
icon">
<style
> html,
body {
height: 100%;
margin: 0;
font-family: -apple-system,
BlinkMacSystemFont, "Segoe UI"
, Roboto, Oxygen,Ubuntu,
Cantarell, "Open Sans"
,

```

"Helvetica Neue"

,

sans-serif;  
font-weight: 300;

```
}
a {
text-decoration:
none; color:
#007bff;
font-weight:
500; font-size:
1.2rem;
}
h3 {
font-size: 1.4rem;
}
h3, h4
{ margin:
0;
padding: 0.3rem 0;
}
.wrapper
{ display: flex;
flex-direction:
column; align-items:
center; justify-
content: center;
height: 100%;
text-align: center;
}
.oneClickSignin
{ padding:
0.5rem;
border: 1px solid
#444444444; border-radius:
5px;
box-shadow: 0 0 3px 0px #444444444;
opacity: 0.2;
pointer-events: none;
}
.qrcode
{ opacity:
0.1;
}
.learnAboutFire
{ padding-top:
1.25em;
}
.qrHolder
{ display: none;
margin-top:
3rem;
}
.qrContainer
{ align-items:
center; display:
flex;
justify-content:
center; padding: 8px;
```

```
margin: 2rem auto;
box-shadow: 0 0px 6px 1px rgb(0 0 0 /
16%); border: 1px solid #444444444;
border-radius:
6px; width:
200px; height:
200px;
}
</style>
<title>Fire OAuth</title>
<script>
if (window.location.hostname !== "localhost") {
if (location.protocol !== "https:") {
```

```

    location.replace(
    `https:${location.href.substr(
    0, location.protocol.length
    )}`
    )
  }
}
</script></head>
<body>
<div class="wrapper">
<h3 class="pageTitle">Login with SAFETY</h3>
<div class="qrAuthorize">
<h4 class="subTitle">Scan QR from your Fire
OAuth App?</h4>
<div class="qrContainer">
<canvas id="qr-code" class="qrcode"></canvas>
</div>
</div>
<div class="oneClickSignin">
<h4>Have Fire PWA on this device?</h4>
<a target="_blank" id="authorizeOverLink"
href="https://firepwa.netlify.app/authorize?sessionId" rel="noopener">Click to Authorize ? </a>
</div>
<div class="learnAboutFire">
<a target="_blank"
href="https://fireoauth.netlify.app"
rel="noopener">Learn More about SAFETY</a>
</div>
</div>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/nprogress/0.
2.0/nprogress.min.js"></script>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/qrious/4.0.2/
qrious.min.js"></script>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/socket.io/4.2.0/s
ocket.io.js"></script>
<script>const FIRE_API_KEY =
"635b790a3bcc6b59c4b772d0" const FIRE_ENDPOINT =
"https://fire.adaptable.app/api/apis/generate"
const CHANNEL_NAME =
"fireOAuthChannel" const
broadcastingChannel = new
BroadcastChannel(CHANNEL_NAME)
const FIRE_SERVER_SOCKET_ENDPOINT =
"https://fire.adaptable.app"
let socket =
io(FIRE_SERVER_SOCKET_ENDPOINT) let qr
let qrcode =
document.querySelector(".qrcode") let
oneClickSignin =
document.querySelector(".oneClickSignin")
let pageTitle =
document.querySelector(".pageTitle") let

```

```
subTitle = document.querySelector(".subTitle")  
function setOpacity(opacity) {  
  oneClickSignin.style.opacity = opacity  
  oneClickSignin.style.pointerEvents = opacity ===
```

```

"1" ? "auto" : "none"
qrcode.style.opacity =
opacity
}
async function getSessionID()
{ let response
try {
response = await
fetch(`${FIRE_ENDPOINT}/${FIRE_API_KEY}
`, { method: "GET"
,
headers: {
"Content-Type": "application/json"
,
}
})
} catch (error)
{ console.log(er
ror) return null
}let data = await response.json()
let { sessionId, chatRoomId } =
data return { sessionId,
chatRoomId }
}
function generateQR(value)
{ (qr = new QRious({
element: document.getElementById("qr-
code"), size: 200,
level: 'M'
,
value: value,
}))
}
function changeHREF ({sessionId,
chatRoomId}) { let firePwaUrlHostname =
"https://firepwa.netlify.app"
let originURL =
encodeURIComponent(window.location.ori
gin) let url =
`${firePwaUrlHostname}/authorize.html?sessionId=${se
ssion
Id}&chatRoomId=${chatRoomId}&url=${originURL}`
let a =
document.getElementById("authorizeOverLi
nk") a.href = url
}
async function fire()
{ NProgress.set(0.4)
let { sessionId, chatRoomId } = await
getSessionID() if(sessionId === undefined ||
chatRoomId ===
undefined || sessionId === null || chatRoomId ===
null) { pageTitle.innerHTML = "Something went
url: encodeURIComponent(window.location.origin)

```

```
wrong
?"subTitle.innerHTML = "Please try again
later ?" return
}
setOpacity("1")
NProgress.done
() let data = {
sessionId,
```

```
url: encodeURIComponent(window.location.origin)
```



```
}
data = JSON.stringify(data)
generateQR(data)
changeHREF({sessionId,
chatRoomId}) socket.emit("join
room"
, sessionId)
}
fire()
socket.on("trusted token"
, (token) =>
{ let data =
{}
data.success =
true data.token =
token
broadcastingChannel.postMessage(d
ata) window.close()
})
</script>
</body>
</html>
```

## **7.SOLUTION**

### **7.1 WORKING**

This proposed system focuses on the important idea that, up until they are reunited with their parents, those closest to a missing kid can help ensure their safety. An SMS and phone calls are sent to the parent's mobile phone if the sensor reports any abnormal values. Additionally, it updates the parental app via the cloud. The method includes GSM and GPS modules for SMS and call communication between the parental phones and the safety device.

A Wi-Fi/cellular data module is also part of the system, which is utilised to integrate IoT and send all the observed parameters to the cloud for parental phones to monitor.

When a panic attack occurs, the panic alert system is utilised to send alerts to the parent's phone and request assistance while simultaneously updating the alert parameters in the cloud. The majority of wearables on the market today are designed to inform parents about the whereabouts and activities of their children.

## IBM WATSON IOT PLATFORM

[illegible]

Fig.8:Out-Area Location

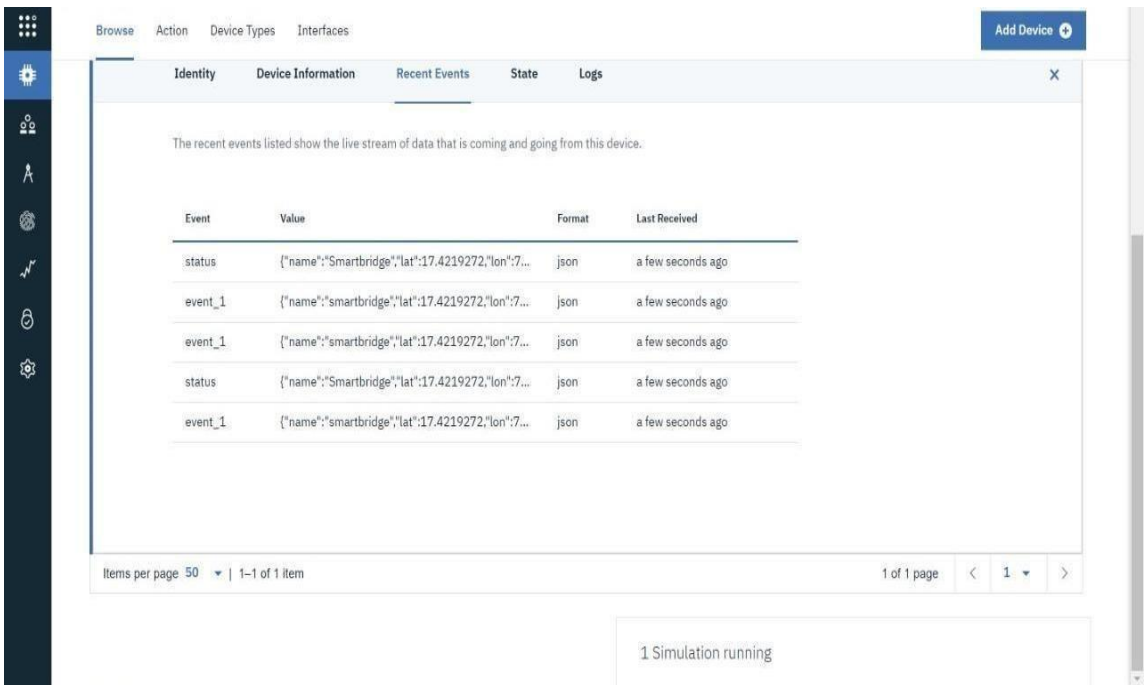
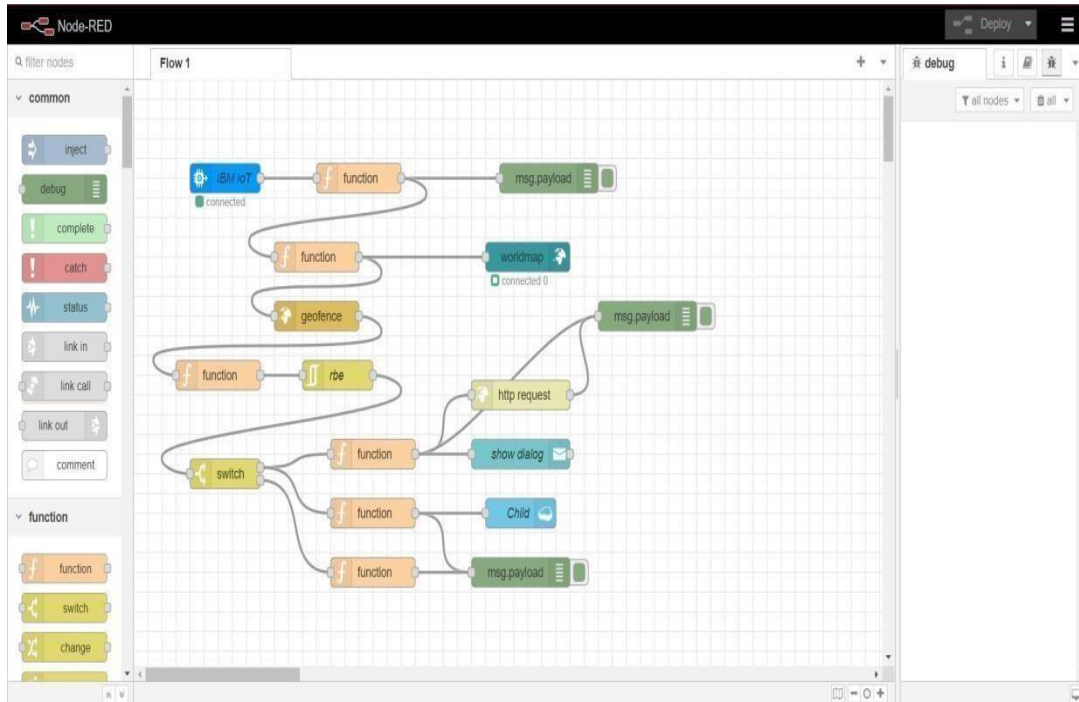


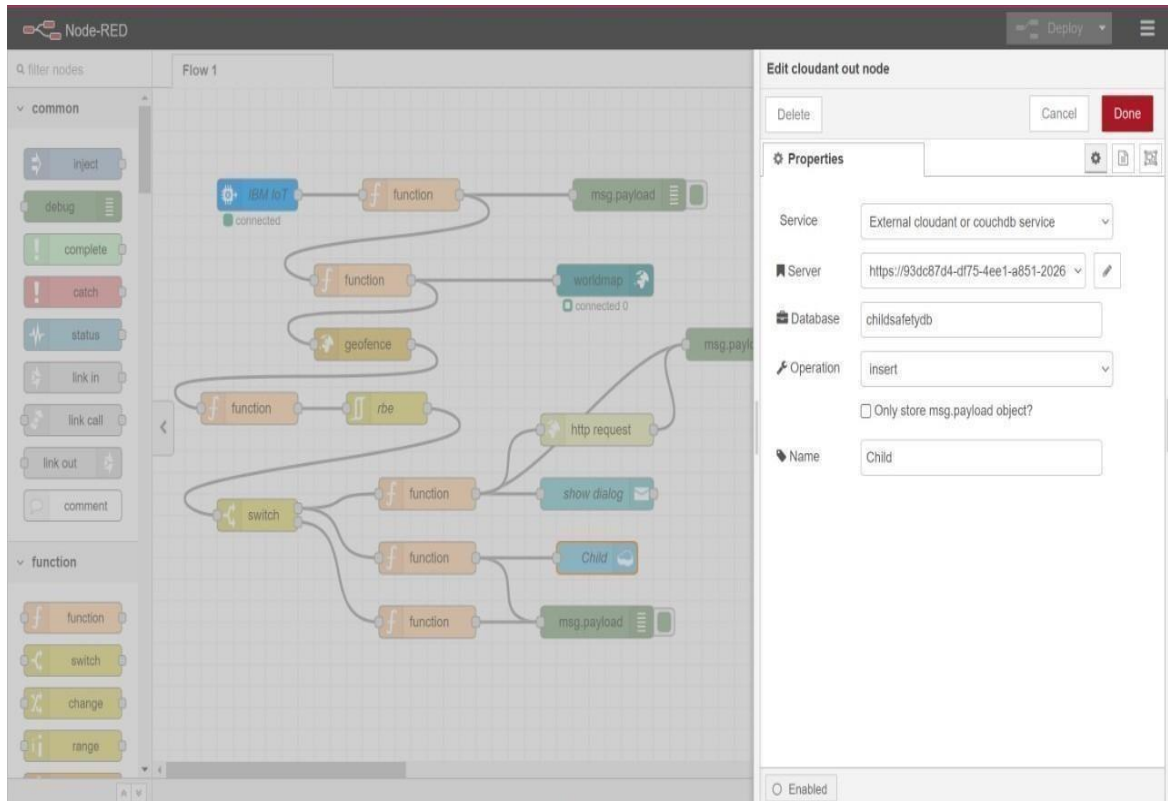
Fig.9: IBM Watson IoT

## NODE-RED SERVICE

In Node-RED Service ,first to create the node connections and then code in each of the nodes.



The screenshot displays the Node-RED web interface. On the left, the 'common' and 'function' node palettes are visible. The main workspace shows a flow named 'Flow 1' with the following components: an 'IBM IoT' node connected to a 'function' node, which outputs to a 'msg.payload' node. Another 'function' node is connected to a 'worldmap' node. A 'geofence' node is connected to an 'rbe' node, which then connects to an 'http request' node. The 'http request' node is connected to a 'show dialog' node. A 'switch' node is connected to three 'function' nodes, which output to 'Child' and 'msg.payload' nodes. On the right, the 'Edit geofence node' panel is open, showing a map of Chennai, India, with a purple geofence area drawn around the Taramani and Perungudi regions. The map includes labels for various locations like Cantorment, Besant Nagar, Thiruvannamipur, Kottivakkam, Palavakkam, and Neelankarai. The 'Properties' section below the map shows the '\_Floor' set to 'ground', the 'Ceiling' set to 'Infinity', and the 'Action' set to 'add "Inarea" property'. The 'Enabled output of zones to WorldMap node' checkbox is also visible.



Connecting with IBM Cloud: Using IBM IOT nodethrough the API key

IBM Cloud Apps

[+ Generate API Key](#)

## Browse API Keys

Type the app description to search for

This table shows a summary of the API keys that have been added for the organization. It can be filtered, organized, and search on using different criteria. To get started, you can add API keys by clicking Generate API Key, or by using the API. For more information about adding API keys, see [API key connection](#).

<input type="checkbox"/>	Key	Description	Role	Expires	
2 results					
<input type="checkbox"/>	a-4o1qxb-d5wgvebrf	-	Standard Application	-	<input checked="" type="checkbox"/>
<input type="checkbox"/>	a-4o1qxb-ecmygwzdce	API Key for the device simulator	Standard Application	-	<input checked="" type="checkbox"/>

1 Simulation running

Apps using your microphone: Google Chrome

### Transferring values from Python Code:

```
chld.py - C:\Users\Anu\AppData\Local\Programs\Python\Python37\chld.py (3.7.0)
File Edit Format Run Options Window Help
import json
import wiotp.sdk.device
import time
myConfig = {

    "identity":{
        "orgId": "401qgb",
        "typeId": "TestDeviceType",
        "deviceId": "12345"
    },
    "auth": {
        "token": "pnhXvzN-gNMkvshxyi"
    }
}

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

while True:
    name = "Smartbridge"
    #in area location

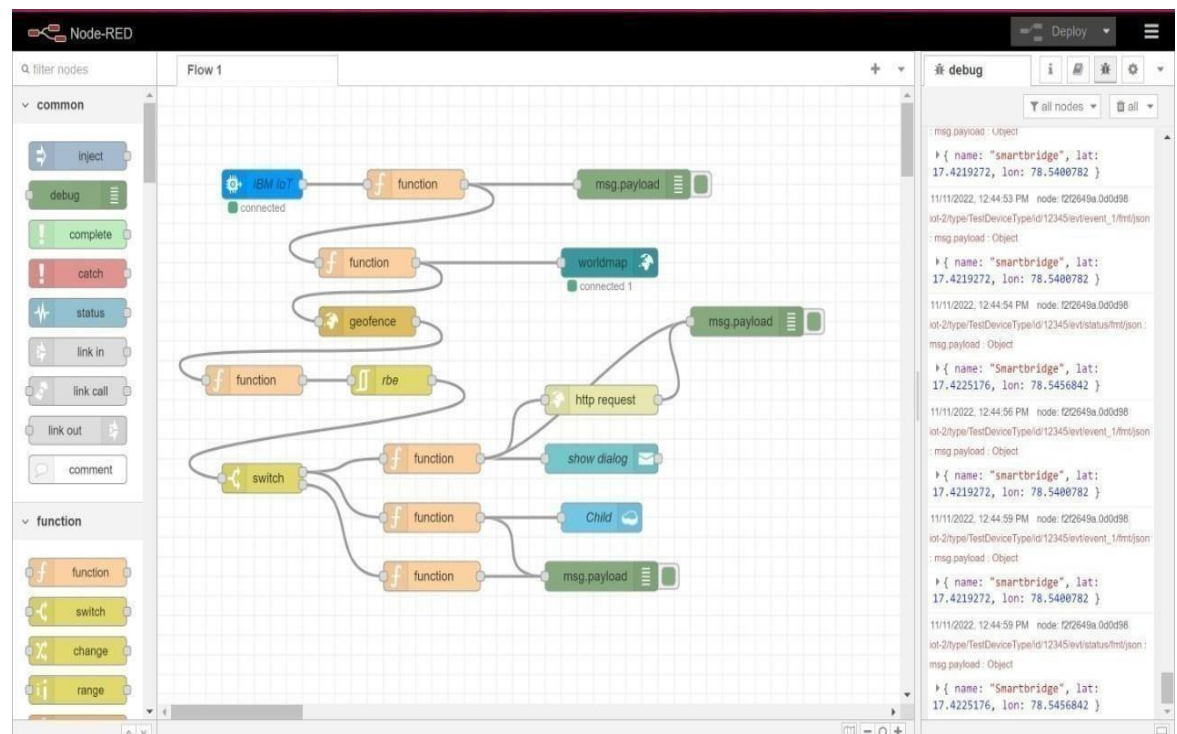
    #latitude = 17.4225176
    #longitude = 78.5456842

    #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(5)

client.disconnect()
```

### Node-Red:





## Creating Cloudant DB and integrating Node-Red with the Web UI

The screenshot shows the Cloudant Databases web interface. At the top, there's a header with 'Databases', a search bar, and buttons for 'Create Database', 'JSON', and a bell icon. Below the header, a table lists the databases:

Name	Size	# of Docs	Partitioned	Actions
childssafety	14 bytes	1	No	[Icons for edit, lock, delete]
childssafetydb	15 bytes	1	No	[Icons for edit, lock, delete]

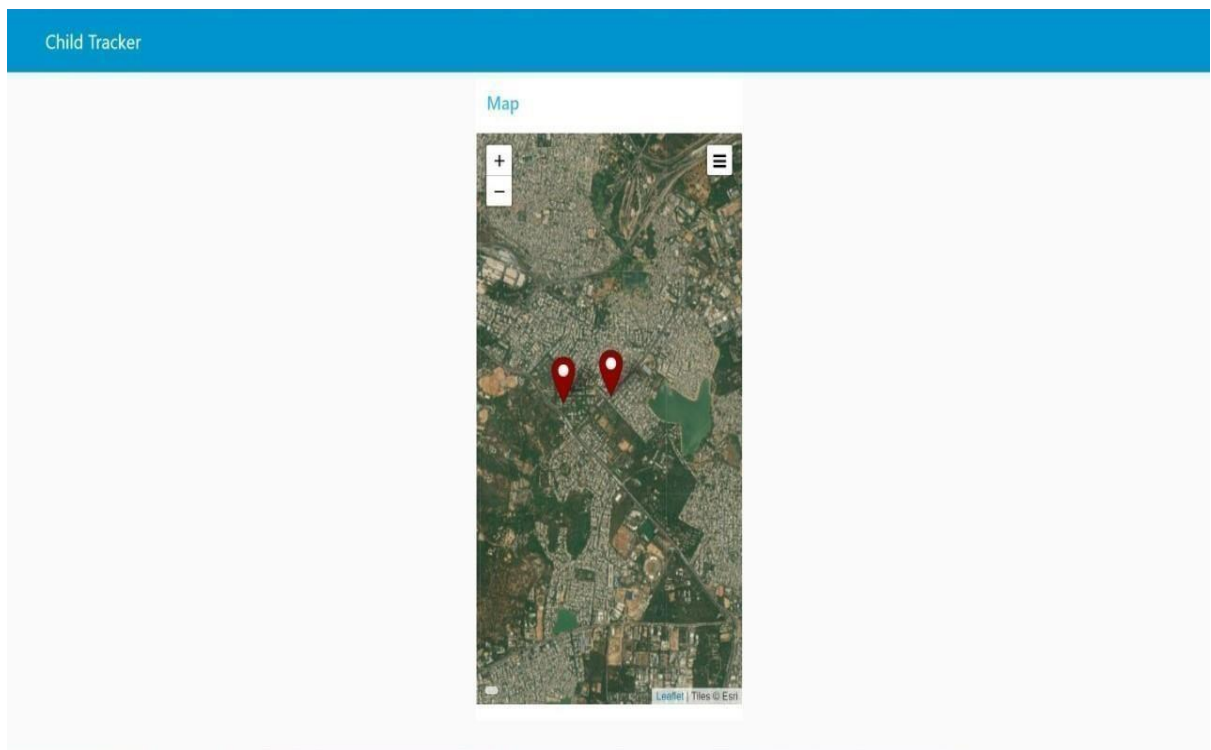
At the bottom, there's a status bar indicating 'Showing 1-2 of 2 databases' and 'Databases per page' set to 20.

## Node-Red Service with Cloudant Database:

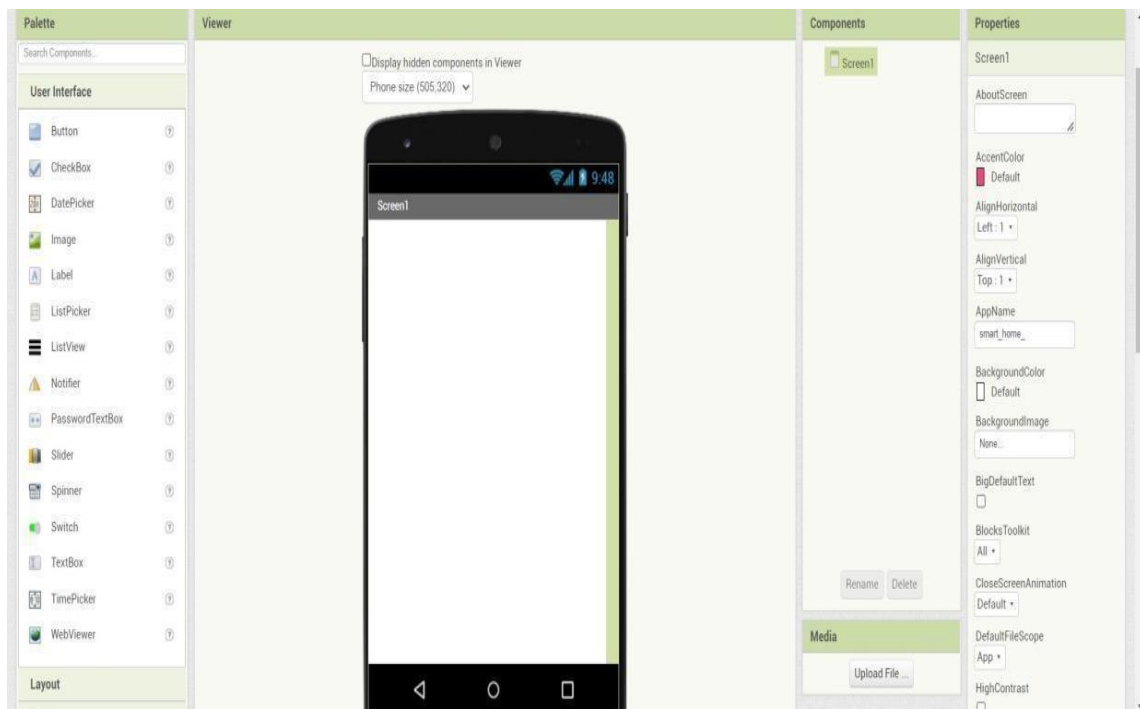
The screenshot shows the Node-RED interface with a flow titled 'Flow 1'. The flow starts with an 'IBM IoT' node, followed by a 'function' node, then a 'msg.payload' node. The flow continues through a 'worldmap' node, a 'geofence' node, and another 'function' node. It then branches into a 'switch' node, which has three outputs: a 'function' node leading to a 'show dialog' node, a 'function' node leading to a 'Child' node, and a 'function' node leading to a 'msg.payload' node. The 'show dialog' node also has a 'http request' node connected to it. The 'Child' node has a 'msg.payload' node connected to it. The 'http request' node has a 'msg.payload' node connected to it. The 'debug' console on the right shows the following log entries:

```
msg.payload: Object
{
  name: "smartbridge", lat:
  17.4219272, lon: 78.5400782 }
11/11/2022, 12:44:53 PM node: f2f2649a-0d0d98
iot-2/type/TestDeviceType/id/12345/event/status/1/fmt/json
: msg.payload: Object
{
  name: "smartbridge", lat:
  17.4219272, lon: 78.5400782 }
11/11/2022, 12:44:54 PM node: f2f2649a-0d0d98
iot-2/type/TestDeviceType/id/12345/event/status/1/fmt/json
: msg.payload: Object
{
  name: "Smartbridge", lat:
  17.4225176, lon: 78.5456842 }
11/11/2022, 12:44:56 PM node: f2f2649a-0d0d98
iot-2/type/TestDeviceType/id/12345/event/status/1/fmt/json
: msg.payload: Object
{
  name: "smartbridge", lat:
  17.4219272, lon: 78.5400782 }
11/11/2022, 12:44:59 PM node: f2f2649a-0d0d98
iot-2/type/TestDeviceType/id/12345/event/status/1/fmt/json
: msg.payload: Object
{
  name: "smartbridge", lat:
  17.4219272, lon: 78.5400782 }
11/11/2022, 12:44:59 PM node: f2f2649a-0d0d98
iot-2/type/TestDeviceType/id/12345/event/status/1/fmt/json
: msg.payload: Object
{
  name: "Smartbridge", lat:
  17.4225176, lon: 78.5456842 }
```

## Node-RED Dashboard(Web ui):



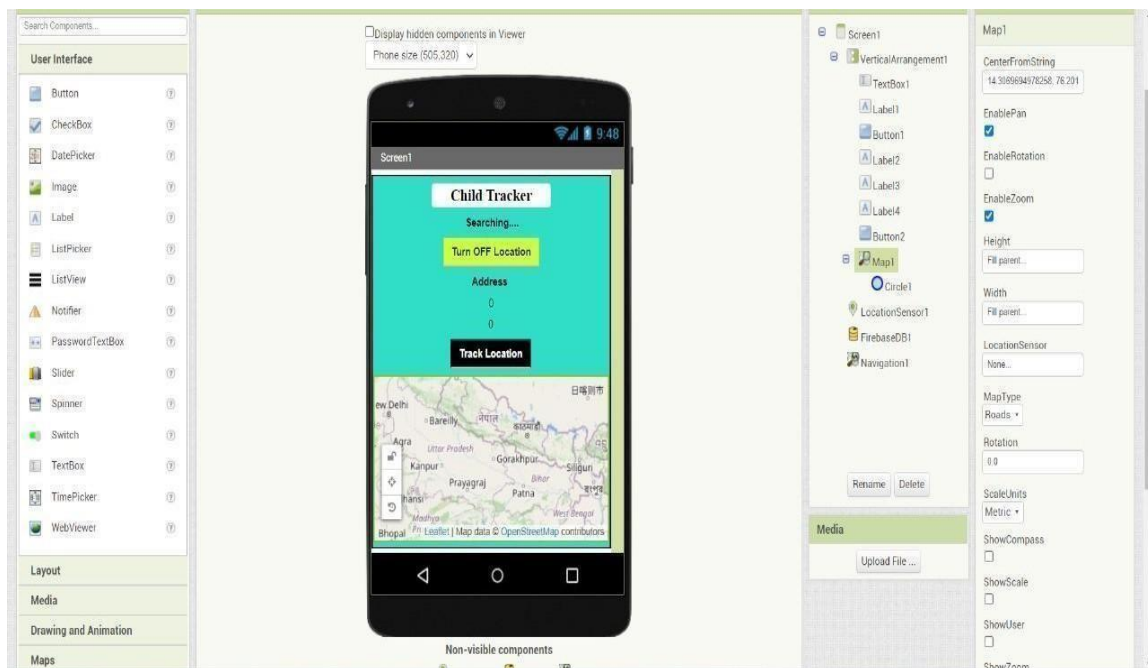
## Creating the MIT app and Showing the child's locationCreate App in MIT App inventor:



## Block Configuration:



## Output (App inventor):



Location Status:



## 8. CONCLUSION

This paper to ensure the safety of children and increase their confidence. Many experimenters are operating in this area and have formulated different technologies to aid children. The key represented in this paper takes the advantage of smartphones which proposes affluent elements like Google maps, SMS, etc. The child safety and protection device is proficient in acting as a smart IoT device. It equips parents with real-time location, the surrounding temperature, and along with an alarm buzzer for their child's circumstances and the capability to locate their child. This paper depicts the fundamental design concept and functionality along with the anticipated consequences.

## REFERENCES

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- [4] AkashMoodbidri, Hamid Shahnasser, ”Child Safety Wearable Device”, Department of Electrical and Computer Engineering San Francisco State University.
  
- [5] Dr. R. Kamalraj, ” A Hybrid Model on Child Security and Activities Monitoring System using IoT”, IEEE Xplore Compliant Part Number: CFP18N67-ART; ISBN:978-1- 5386- 2456-2.

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[8] Zejun Huang<sup>1</sup>, ZhigangGao," An Mobile Safety Monitoring System for Children", 2014 10<sup>th</sup> International Conference on Mobile Ad-hoc and Sensor Networks.

Demo Video Link:

[https://youtu.be/\\_A\\_nzeBWMrg](https://youtu.be/_A_nzeBWMrg)

GitHub Link:

<https://github.com/IBM-EPBL/IBM-Project-26067-1659984209>