

# **IoT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION**

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**BATCH NUMBER: B4-4M6E**

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# 1.INTRODUCTION

## 1.1 Project Overview

The project aims at providing a simple monitoring system for children, so that they could safely move around. Child safety and tracking is of utmost importance as children are the most vulnerable. With increasing crimes such as child kidnapping, child abuse and so on, the need for an advanced smart security system has become a necessity and thus the development of this safety gadget ensures safe movement of children through distant monitoring. 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.

## 1.2 Purpose

Basically, the security of children these days is crucial . They can't realize what actually happens to them at their age. It is also difficult for parents to identify if their children are safe and sound. To prevent children from being attacked, an autonomous real-time monitoring system is necessary for every child out there. It would be easier for working parents and guardians to monitor the activities of their children from a distant location.

The purpose of the device is to track the location of the child by specifying the geofence markings. When the user moves out of the mentioned markings, the registered parent is sent an alert by GPS monitoring. Proper safety is ensured through this gadget, which works as a principle of Internet of Things (IoT).

## 2.LITERATURE SURVEY

### 2.1 Existing problem

As mentioned in paper *Child Safety & Tracking Management System by Using GPS, Geo-Fencing & Android Application: An Analysis* by Aditi Gupta and Vibhor Harit, Today's technology is developing quickly and offering all necessary and efficient answers for every need. The safety of children today is a major worry. The concept mentioned in the paper, was created to relieve parents' concerns about the safety of their children. Due to the legitimate concerns of the parents, their solution provides the highest level of protection and enables live tracking for the children in this situation. This study offered a model for child safety using smart phones that gives parents the option to track their children's whereabouts as well as the ability for kids to send a fast message and their current location in case of an emergency via Short Message Services. Testing on the Android platform verifies the suggested system. The limitations in the existing solution are:

- The child must be able to use an Android smartphone, hence this application is only useful for certain age groups of children.
- When the mobile is switched off monitoring is not possible.

### 2.2 References

1. A. Srinivasan, S. Abirami, N. Divya, R. Akshya and B. S. Sreeja, "Intelligent Child Safety System using Machine Learning in IoT Devices," 2020 5th International Conference on Computing, Communication and Security (ICCCS), 2020, pp. 1-6, doi: 10.1109/ICCCS49678.2020.9277136.
2. A. Moodbidri and H. Shahnasser, "Child safety wearable device," 2017 International Conference on Information Networking (ICOIN), 2017, pp. 438-444, doi: 10.1109/ICOIN.2017.7899531.
3. M. Benisha et al., "Design of Wearable Device for Child Safety," 2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV), 2021, pp. 1076-1080, doi: 10.1109/ICICV50876.2021.9388592.
4. R. Kamalraj, E. S. Madhan, K. Ghamya and V. Bhargavi, "Enhance Safety and Security System for Children in School Campus by using Wearable Sensors," 2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC), 2020, pp. 986-990, doi: 10.1109/ICCMC48092.2020.ICCMC-000183.
5. B. Ranjeeth, B. S. Reddy, Y. M. K. Reddy, S. Suchitra and B. Pavithra, "Smart Child Safety Wearable Device," 2020 International Conference on Electronics and Sustainable

*Communication Systems (ICESC), 2020, pp. 116-120, doi: 10.1109/ICESC48915.2020.9156001.*

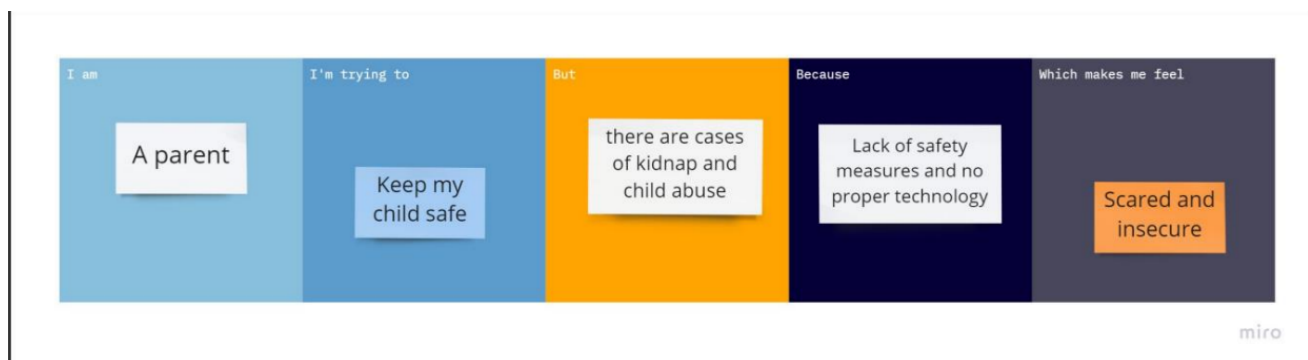
6. A. Jatti, M. Kannan, R. M. Alisha, P. Vijayalakshmi and S. Sinha, "Design and development of an IOT based wearable device for the safety and security of women and girl children," 2016 IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2016, pp. 1108-1112, doi: 10.1109/RTEICT.2016.7808003.

7. U. Chowdhury et al., "Multi-sensor Wearable for Child Safety," 2019 IEEE 10th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON), 2019, pp. 0968-0972, doi: 10.1109/UEMCON47517.2019.8992950.

8. S. Srivastava, S. K. Tiwari, S. Jha and M. Singh, "Child Activity Monitoring using IoT," 2022 3rd International Conference on Electronics and Sustainable Communication Systems (ICESC), 2022, pp. 519-523, doi: 10.1109/ICESC54411.2022.9885305.

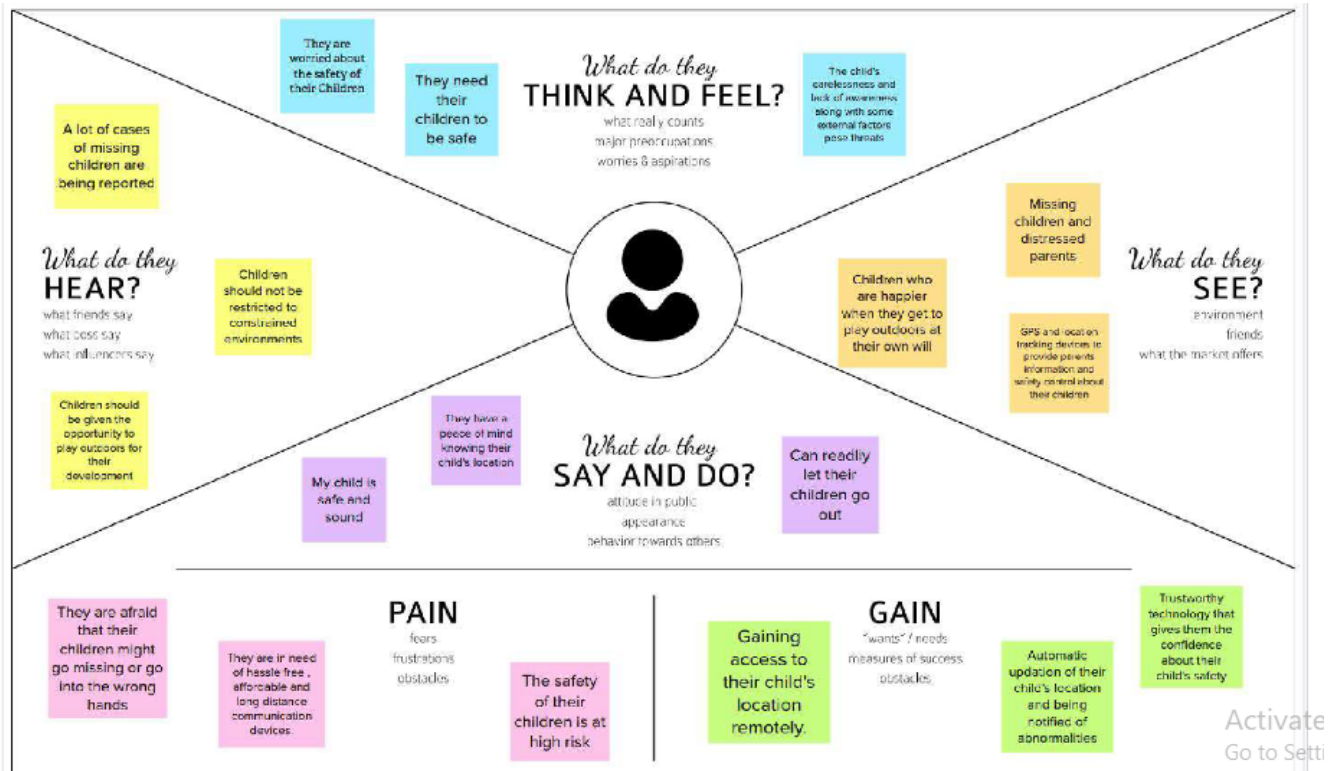
## 2.3 Problem Statement Definition

With the increasing rate of child kidnapping and trafficking there is lack of tracking technology for children. Hence an IoT based safety gadget for child safety is probably the need of the hour today.



## 3. IDEATION & PROPOSED SOLUTION

### 3.1 Empathy Map Canvas



### 3.2 Ideation & Brainstorming

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.

⌚ 5 minutes

**PROBLEM**

How might we provide IOT Based Child Safety Monitoring and Notification?

2

## Brainstorm

Write down any ideas that come to mind for our child safety gadget.

🕒 10 minutes

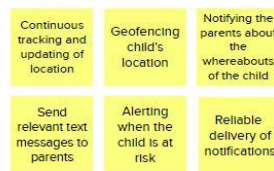
### TIP

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

### Harshini A



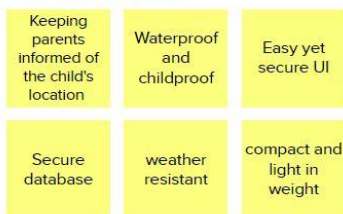
### Akshara R T



### Trinetra J



### Sudarsana Samhita S

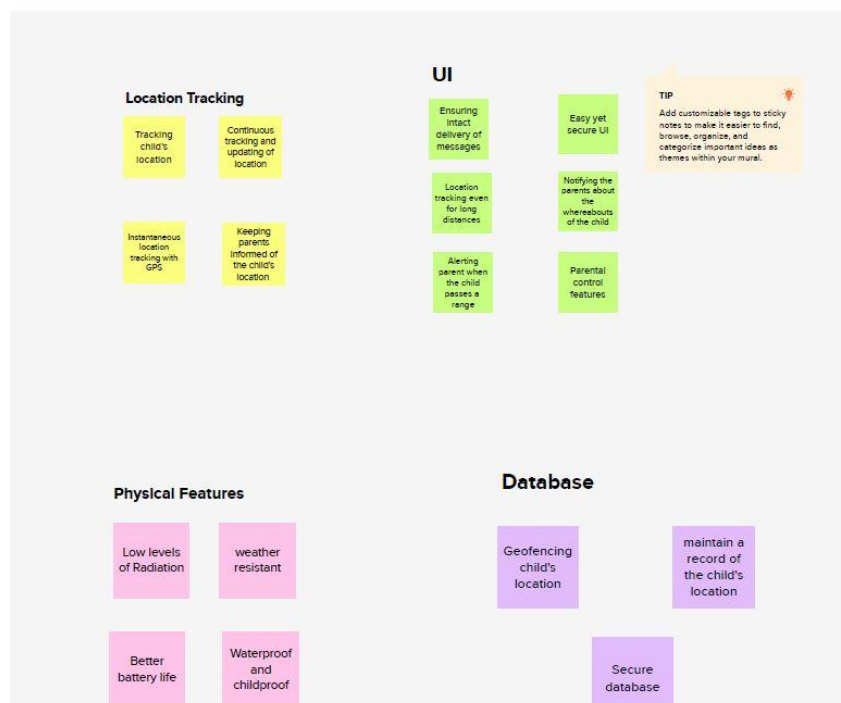


3

## Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

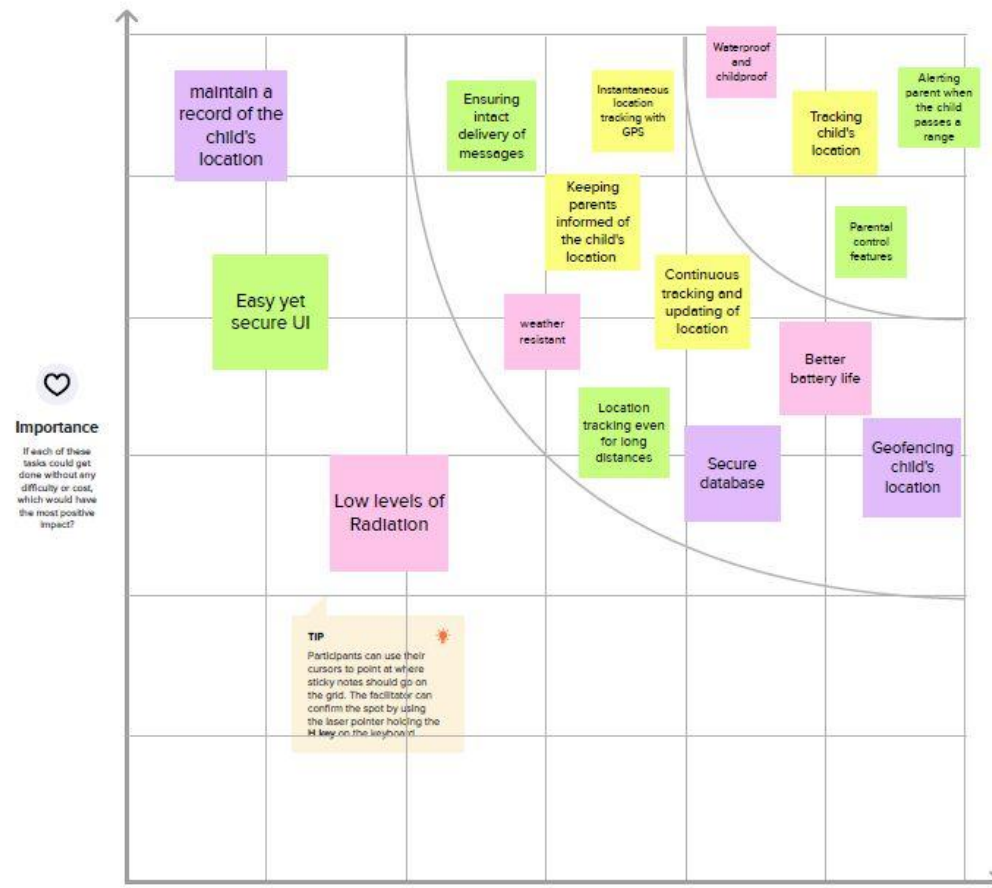


4

### 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



## 3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	With the increasing rate of child kidnapping and trafficking and lack of tracking technology for child, there is limited application for child monitoring. Hence an <b>IoT based safety gadget</b> for child safety is probably the need of the hour today



2.	Idea / Solution description	A good solution to this issue would be to design a smart wearable Internet of Things sensor based device for monitoring the environment of a child along with a mechanism for tracking the child. The gadget will make use of <b>GPS and a</b> python script to publish the location details to the IBM IoT platform. The wearable also functions to send <b>immediate alerts</b> to the user through in case if the child crosses the geofence.
3.	Novelty / Uniqueness	All the existing systems make use of GPS and a mobile app to track and receive alerts regarding the child's location, while this system make use of the IBM Watson IOT Platform and IBM Cloud Services which is reliable and efficient to maintain the database of the child's location. The parent can set geofence and receive alerts through the web application which is user friendly and secure created using the Node Red Service.
4.	Social Impact / Customer Satisfaction	The main concern of any parent would be the safety and security of their kids. The design of this model does not mandate a lot of technical knowledge from the user to operate and it is simple. The purpose of this device is to facilitate the guardian or parents in locating their child with ease and ensuring its well-being.
5.	Business Model (Revenue Model)	The target audience of this device is majorly the parents. Considering the Tracking ability of the device, <b>Hardware quality, used technology and sensors</b> , the starting range of price would go from Rs. 6000 and above. This type of wearable safety system is of utmost importance today and would be a must buy gadget in the market today.
6.	Scalability of the Solution	With the present needs for monitoring the child, the system is designed. It has a location database to maintain the entire location history of the child and the parent can set the geofence to determine the safer boundary of the child. . If there is a need for integrating additional sensors to improve accuracy, it can be done to make the system efficient in the long run.

### 3.4 Problem Solution fit

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> Working parents or busy parents of 0-10 year old kids <b>CS</b>	<b>6. CUSTOMER CONSTRAINTS</b> <b>CC</b> Lack of affordable, reliable and hassle free technology, Lack of availability of secure and easy Ui.	<b>5. AVAILABLE SOLUTIONS</b> <b>AS</b> There are existing solutions that offer location tracking for kids but they are not very efficient, cost effective and reliable all at the same time. This trade off should be addressed.	Explore AS, differentiate
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <b>J&amp;P</b> Instantaneous tracking and updation of child's location, geofencing and notifying parents of any abnormalities	<b>9. PROBLEM ROOT CAUSE</b> <b>RC</b> Customers have to do this to protect their children from potential threats and to ensure the safety while being far away from them.	<b>7. BEHAVIOUR</b> <b>BE</b> Customers panic, prevent their children from going out on their own, try using easily available technologies	

Identify strong TR & EM	<b>3. TRIGGERS</b> <b>TR</b> Coming across news about children being kidnapped and abducted, missing cases being reported.	<b>10. YOUR SOLUTION</b> <b>SL</b> Building a reliable technology that can address all the customer needs while being reliable and secure ensuring efficient functioning.	<b>8. CHANNELS of BEHAVIOUR</b> <b>CH</b> <b>8.1 ONLINE</b> Tracking their kids location with their mobile phones' GPS, reading news about child safety and other child missing cases.	Identify strong TR & EM
	<b>4. EMOTIONS: BEFORE / AFTER</b> <b>EM</b> Before : Feel insecure , worried , scared and confused.  After : Relieved , calm , confident , happy.		<b>8.2 OFFLINE</b> Customers accompany their children to ensure safety, send them together with other reliable people, seek for protection in public places.	

## 4. REQUIREMENT ANALYSIS

### 4.1 Functional Requirements:

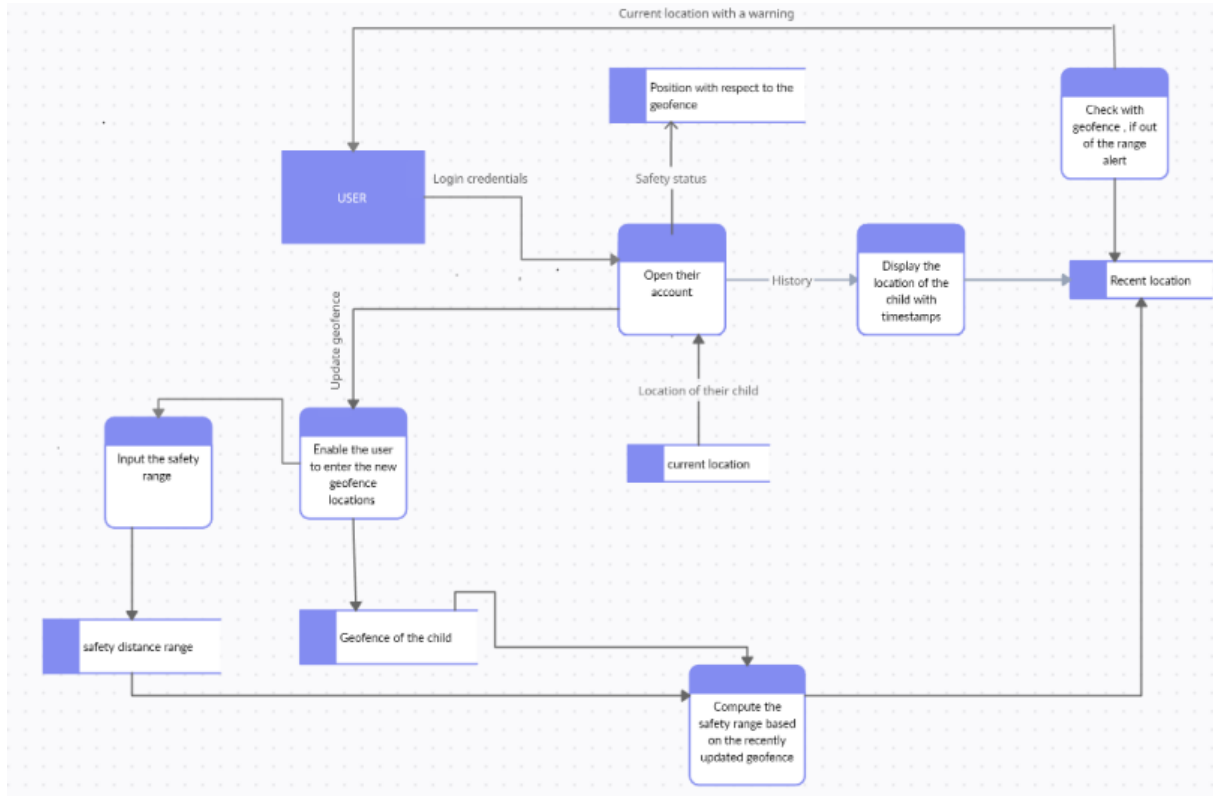
FR No.	Functional Requirement (Epic)	Sub Requirement (Story/Sub-Task)
FR - 1	User Registration	Registration through account Registration through Gmail
FR - 2	User Confirmation	Confirmation via Email Confirmation via OTP
FR - 3	User Notification	Notification to registered mobile number Notification via message
FR - 4	User location check	Check through account

### 4.2 Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR – 1	<b>Usability</b>	Allows parents to keep a track of their child's location and also, help them raise an alarm in case of an emergency.
NFR – 2	<b>Security</b>	Creates a secure environment for children to move around.
NFR – 3	<b>Reliability</b>	Increased reliability towards technology and reduced reliability towards guardians.
NFR – 4	<b>Performance</b>	High performance in terms of simple usage and security.
NFR – 5	<b>Availability</b>	Any time usage backed up by power supply.
NFR - 6	<b>Scalability</b>	High level with increase in performance.

## 5.PROJECT DESIGN

### 5.1 Data Flow Diagrams



### 5.2 Solution & Technical Architecture

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

## FEATURES:

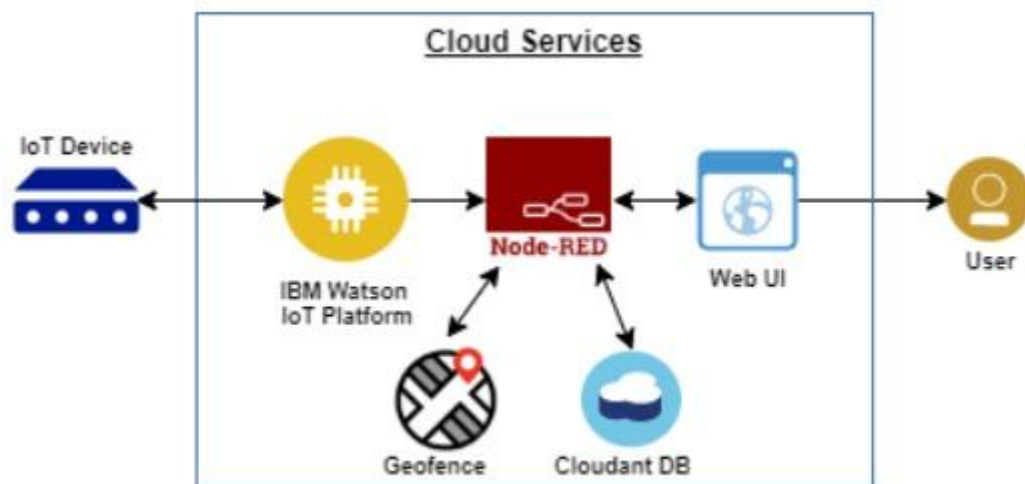
Development of a safety gadget for children to ensure their protection without direct monitoring of their parents. The various features involve:

- GPS
- Geo fence
- Notify alert signal

## SOLUTION:

- Track current location of the child using GPS and continuous monitoring of the same is done.
- When the gadget detects the activity to be outside the given geo fence (as mentioned by the parent or guardian), alert messages or notifications are sent to the registered device, appropriately.

## SOLUTION ARCHITECTURE DIAGRAM:



## TECHNICAL ARCHITECTURE:

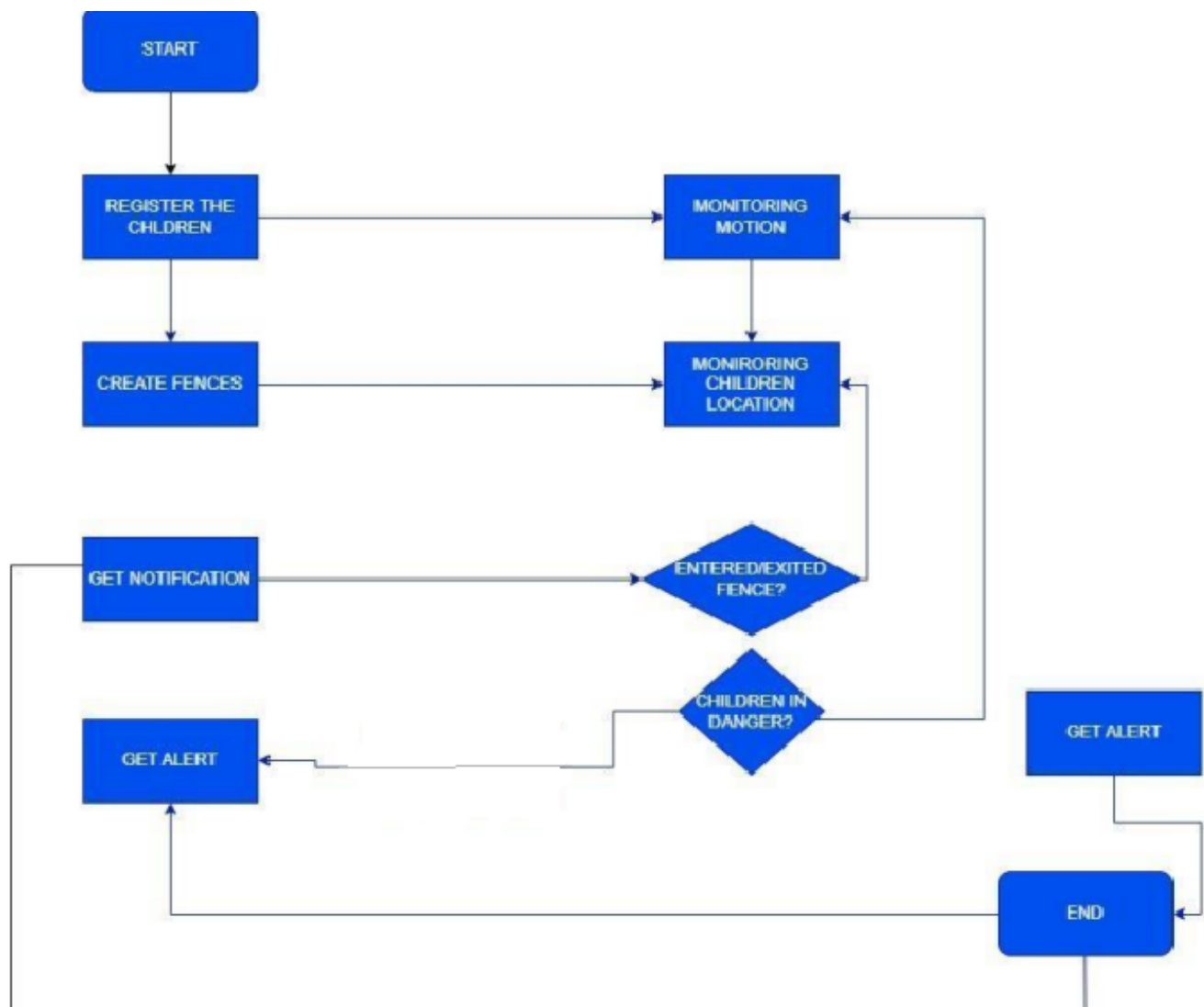


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Interaction of the user with the application using Web UI	Node Red
2	Application Logic-1	Tracking of user's location and monitoring of the same	Python
3	Application Logic-2	Sending notifications to the registered users	Node Red
4	Application Logic-3	Send alert when user crosses the geo-fence mentioned	IBM Watson Assistant

5	Cloud Database	Handles software and hardware provisioning, management and scaling and support.	IBM Cloudant
7	External API	Easy user interface.	MIT App inventor
8.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Kubernetes

Table-2: Application Characteristics:

S.N o	Characteristics	Description	Technology
1.	Open-Source Frameworks	A software for which the original source code is made freely available and may be redistributed and modified according to the requirement of the user.	Watson IoT platform, Wokwi, Node red.
2.	Security Implementations	Secure monitoring of the user's location without open-source access	IBM encryption services
3	Scalable Architecture	Presence of location sensors to quickly scale the user's current location.	GPS, IBM alert notification service.

## 5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Web user)	Registration	USN-1	As a user, I can register my account by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1

Web user		USN-2	As a user, I will receive confirmation email once I have registered myself	I can receive confirmation email & click confirm	High	Sprint-1
Web user		USN-3	As a user, I will be notified by the application if the credentials are invalid		High	Sprint-2
Web user	Login	USN-4	As a user, I can log into the application by entering email and password		High	Sprint-1
Web user	Login	USN-5	As a user, I can logout of the application.	I can login only with my provided credentials	Medium	Sprint - 3
Mobile user(app)	App	USN-6	As a user I can and monitor the child's movement by clicking the monitor button on the homepage		High	Sprint - 4
Web user	Web interface	USN-7	As a user, I can receive alert notifications in the webpage, if the movement of the child is beyond the geofence		High	Sprint-3
Web user	Web interface	USN-8	As a user, I can check the location of the child using the app		Medium	Sprint-3



## 6. PROJECT PLANNING & SCHEDULING

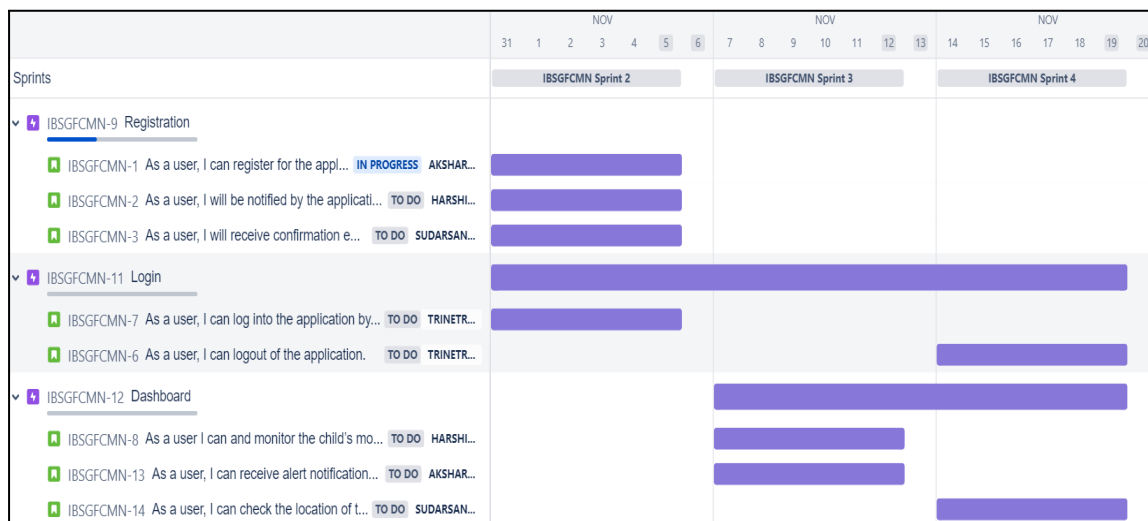
### 6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint -1	Registration	USN-1	As a user , i can register to the application by entering my email, password, name and phone number	8	High
Sprint -2		USN-2	As a user, I will receive confirmation email once I register	5	Medium
Sprint -1		USN-3	As a user, I will be notified by the application if the credentials are invalid	5	Medium
Sprint -2	Login	USN-4	As a user, I can log into the application by entering email and password	8	High
Sprint -4		USN-5	As a user, I can logout of the application.	5	High
Sprint -3	Dashboard	USN-6	As a user I can and monitor the child's movement by clicking the monitor button on the homepage	5	High
Sprint -3		USN-7	As a user, I can receive alert notifications in the webpage, if the movement of the child is beyond the geofence	8	High
Sprint -4		USN-8	As a user, I can check the location of the child using the app	8	High

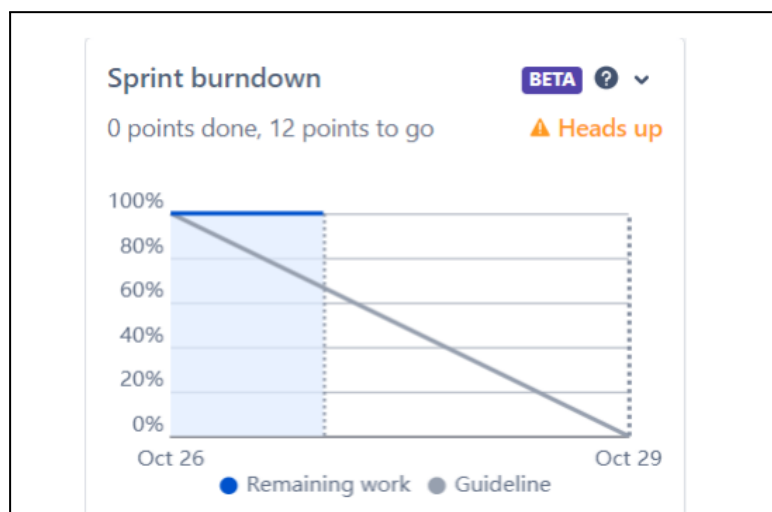
## 6.2 Sprint Delivery Schedule

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	13	6 Days	24 Oct 2022	29 Oct 2022	13	29 Oct 2022
Sprint-2	13	6 Days	31 Oct 2022	05 Nov 2022	13	05 Nov 2022
Sprint-3	13	6 Days	07 Nov 2022	12 Nov 2022	13	12 Nov 2022
Sprint-4	13	6 Days	14 Nov 2022	19 Nov 2022	13	19 Nov 2022

## 6.3 Reports from JIRA



## Burndown Chart:



## 7. CODING & SOLUTIONING

```
proj code.py - D:\Python\Python codes - IBM\proj code.py (3.7.6)
File Edit Format Run Options Window Help

import json
import wiotp.sdk.device
import time

myConfig = {
    "identity": {
        "orgId": "6ni2t5",
        "typeId": "device1",
        "deviceId": "deviceid1"
    },
    "auth": {
        "token": "deviceauth1"
    }
}

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

while True:

    name="Smartbridge"
    #in area location

    latitude=11.664325
    longitude=78.146011

    #out area location

    #latitude= 17.421927
    #longitude=78.548878
    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()
```

### 7.1 Feature 1

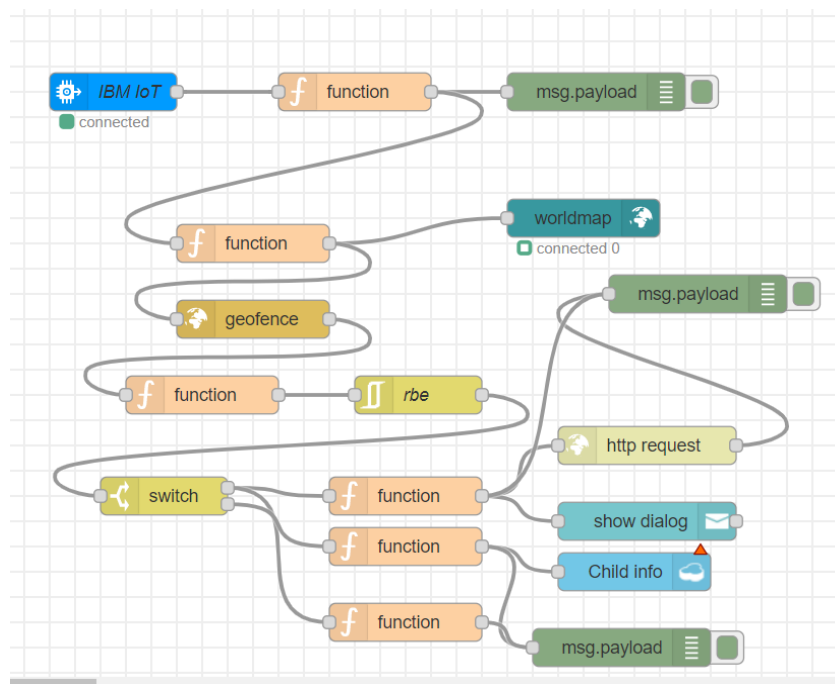
#### JSON:

Latitudes and Longitudes of the child are sent in the form of JSON text as it is legible by humans, it is lightweight, requires less coding, and processes data more quickly than other data formats

## **wiotp-sdk-device:**

The latitude and longitude values generated in the python code are sent to the IBM Watson IoT platform using this package.

## **7.2 Feature 2**



## **worldmap:**

The latitude and longitude of the child is indicated or plotted in the form of a marker in the world map using the worldmap node of Node Red.

## **geofence:**

This node of Node Red enables to set the safe boundary for a child.

## 8. TESTING

### 8.1 Test Cases

Test case ID	Feature Type		Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_001	Functional	Signup Page	Verify user is directed to the correct signup page on entering the URL	Internet connection, Browser	1.Type the URL and click enter 2.Verify login/Singup page is displayed or not	<a href="http://169.51.195.38:30039/signup">http://169.51.195.38:30039/signup</a>	Login/Signup page should display	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
LoginPage_TC_002	UI	Signup Page	Verify the UI elements in Login/Signup page	Internet connection, Browser	1.Type the URL and click enter 2.Verify login/Singup popup with below UI elements: a.email text box b.password text box c. Username text box d.phone number text box e.submit button f. Existing user? Login	<a href="http://169.51.195.38:30039/signup">http://169.51.195.38:30039/signup</a>	Application should show below UI elements: a.Email text box b.Password text box c. Username text box d.Phone number text box e.Submit button f. Existing user? Login	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
LoginPage_TC_003	Functional	Signup Page	Verify user is able to register in the application with Valid credentials	Internet connection, Browser	1.Type the URL and click enter 2.Enter the following details: a.email text box b.password text box c. Username text box d.phone number text box e.submit button f. Existing user? Login	<a href="http://169.51.195.38:30039/signup">http://169.51.195.38:30039/signup</a>	Application should show below UI elements: a.Email text box b.Password text box c. Username text box d.Phone number text box e.Submit button f. Existing user? Login	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Valid credentials	Internet connection, Browser	1.Type the URL and click enter 2.Enter Valid Email in Email text box 3.Enter valid password in password text box 4.Click on submit button	Email:aksharajai2001@gmail.com Password: Testing123	User account is created successfully and mail is sent to the user	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
LoginPage_TC_005	Functional	Login page	Verify user is able to log into application with Invalid credentials	Internet connection, Browser	1.Type the URL and click enter 2.Enter invalid email in Email text box 3.Enter valid password in password text box	Email: hi Password: Testing123	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J

					4. Click on submit button								
LoginPage_TC_006	Functional	Login page	Verify user is able to log into application with Invalid credentials	Internet connection, Browser	1. Type the URL and click enter 3. Enter valid email in Email text box 4. Enter invalid password in password text box 5. Click on submit button	Email: aksharajai2001@gmail.com Password: Testing	Application should show 'Incorrect email or password' validation message.	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
LoginPage_TC_007	Functional	Login page	Verify user is able to get the confirmation mail on successful registration.	Internet connection, Browser	1. Type the URL and click enter 3. Enter valid email in Email text box 4. Enter valid password in password text box 5. Click on submit button	Email: aksharajai2001@gmail.com Password: Testing123	Application should send confirmation mail to the registered email id	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
HomePage_TC_008	Functional	Home Page	Verify user is able to view the child's location in the form of marker	Internet connection, Browser	1. Type the URL and click enter 2. Enter Valid username/email in Email text box 3. Enter valid password in password text box 4. Click on submit button 5. Click monitor button	<a href="http://169.51.195.38:30039/home">http://169.51.195.38:30039/home</a>	Application should display Monitor option after logging into the account	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J

HomePage_TC_009	Functional	Home Page	Verify user receives a notification when child is not within the Geofence	Internet connection, Browser	1. Type the URL and click enter 2. Enter Valid Username/email in Email text box 3. Enter valid password in password text box 4. Click on submit button 5. Click on monitor button	<a href="http://169.51.195.38:30039/home">http://169.51.195.38:30039/home</a>	Application should display Monitor option after logging into the account, sends notification when child is out of geofence	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
HomePage_TC_010	Functional	Home Page	Verify user is able to logout of the application	Internet connection, Browser	1. Type the URL and click enter 2. Enter Valid Username/email in Email text box 3. Enter valid password in password text box 4. Click on submit button 5. Click Logout	<a href="http://169.51.195.38:30039/home">http://169.51.195.38:30039/home</a>	User is able to logout of the application successfully	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
App_TC_011	Functional	App	Verify in the MIT App inventor if the child is inside the area	Internet connection, MIT AI2 Companion	1. Open MIT AI2 Companion 2. Download the apk file 3. Open the app 4. Click on check location button	<a href="http://ai2.appinventor.mit.edu/b/4p63n">http://ai2.appinventor.mit.edu/b/4p63n</a>	User is able to open the app and check if the child is inside the area	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J
App_TC_012	Functional	App	Verify in the MIT App inventor if the child is outside the area	Internet connection, MIT AI2 Companion	1. Open MIT AI2 Companion 2. Download the apk file 3. Open the app 4. Click on check location button	<a href="http://ai2.appinventor.mit.edu/b/4p63n">http://ai2.appinventor.mit.edu/b/4p63n</a>	User is able to open the app and check if the child is outside the area	Working as expected	Pass	–	No	–	Akshara R T, Harshini A, Sudarsana Samhita S, Trinetra J

## 8.2 User Acceptance Testing

### 1. Purpose of Document

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

### 2. Defect Analysis

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

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	2	1	3	2	8
Duplicate	1	0	3	0	4
External	3	2	1	1	7
Fixed	6	1	6	3	16
Not Reproduced	0	0	0	0	0
Skipped	0	1	1	0	2
Won't Fix	0	1	0	0	1
Totals	11	4	14	6	35

### 3. Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
Signup Page	3	0	0	3
Login Page	4	0	0	4
Home Page	3	0	0	3
App	2	0	0	2



# 9. RESULTS

## 9.1 Performance Metrics

			NFT - Risk Assessment					
S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Load/Volume Changes	Risk Score	Justification
1	IoT Based Safety Gadget for Child Safety Monitoring and Notification	New	Low	Moderate	Low	>5 to 10%	ORANGE	The minor functional modifications and software changes has let to low level risks. Hence testing is not necessary.

## **10. ADVANTAGES & DISADVANTAGES**

### **Advantages**

- A tracking device can be useful in case the parent feels that his/her child is in danger.
- Not only does the device provide the real-time location.
- These devices help parents set a perimeter for their children when they leave the house. The moment they step beyond the defined area, the tracking software will alert the parent.

### **Disadvantages**

- If you're using GPS on a battery operated device, there could also be a battery failure and you'll need an external power supply which isn't always possible.
- GPS chips are hungry for power which drains battery in 8 to 12 hours. This needs replacement or recharge of the battery quite frequently.

## **11. CONCLUSION**

The design of this model does not mandate a lot of technical knowledge from the user to operate and it is simple. This gadget facilitates the guardian or parents in locating their child with ease and ensuring its well-being with the present needs for monitoring the child, the system is designed. It has a location database to maintain the entire location history of the child and the parent can set the geofence to determine the safer boundary of the child.

Hence, considering the importance, our project makes it easy for parents to track their children and to monitor them on regular basis, which makes them ensure the safety of their children and reduces the rate of incidents of child abuse.

## **12. FUTURE SCOPE**

In our system, we automatically monitor the child in real time using Internet of Things, with the help of GPS. This system requires network connectivity, satellite communication, and high-speed data connection with GPS to monitor. It is difficult to do so when there occurs any hindrance to satellite communication or any network issue. Hence in the future, the project will aim to include additional features like facilitate automatic emergency calls and to perform these actions with comparatively less battery usage.

## 13. APPENDIX

### Source Code

```
proj code.py - D:\Python\Python codes - IBM\proj code.py (3.7.6)
File Edit Format Run Options Window Help

import json
import wiotp.sdk.device
import time

myConfig = {
    "identity": {
        "orgId": "6ni2t5",
        "typeId": "device1",
        "deviceId": "deviceid1"
    },
    "auth": {
        "token": "deviceauth1"
    }
}

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

while True:

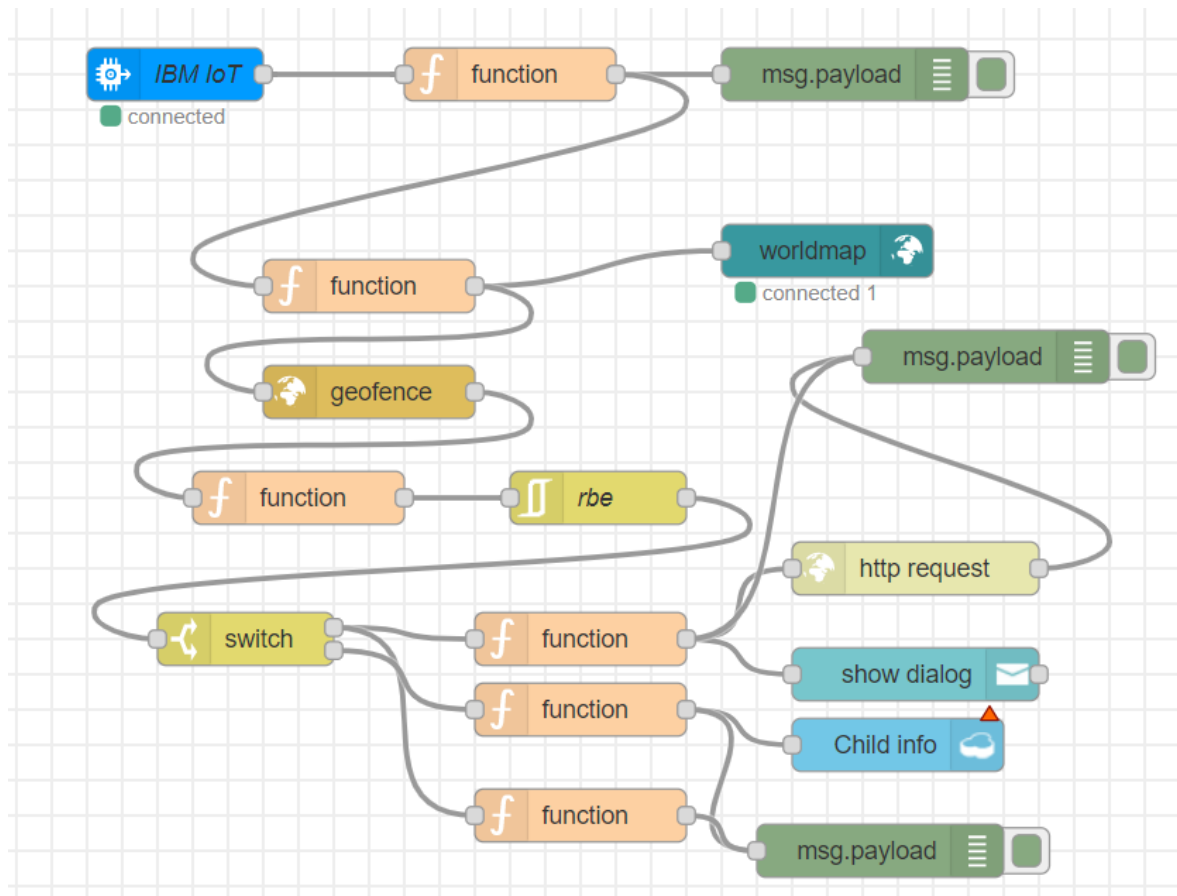
    name="Smartbridge"
    #in area location

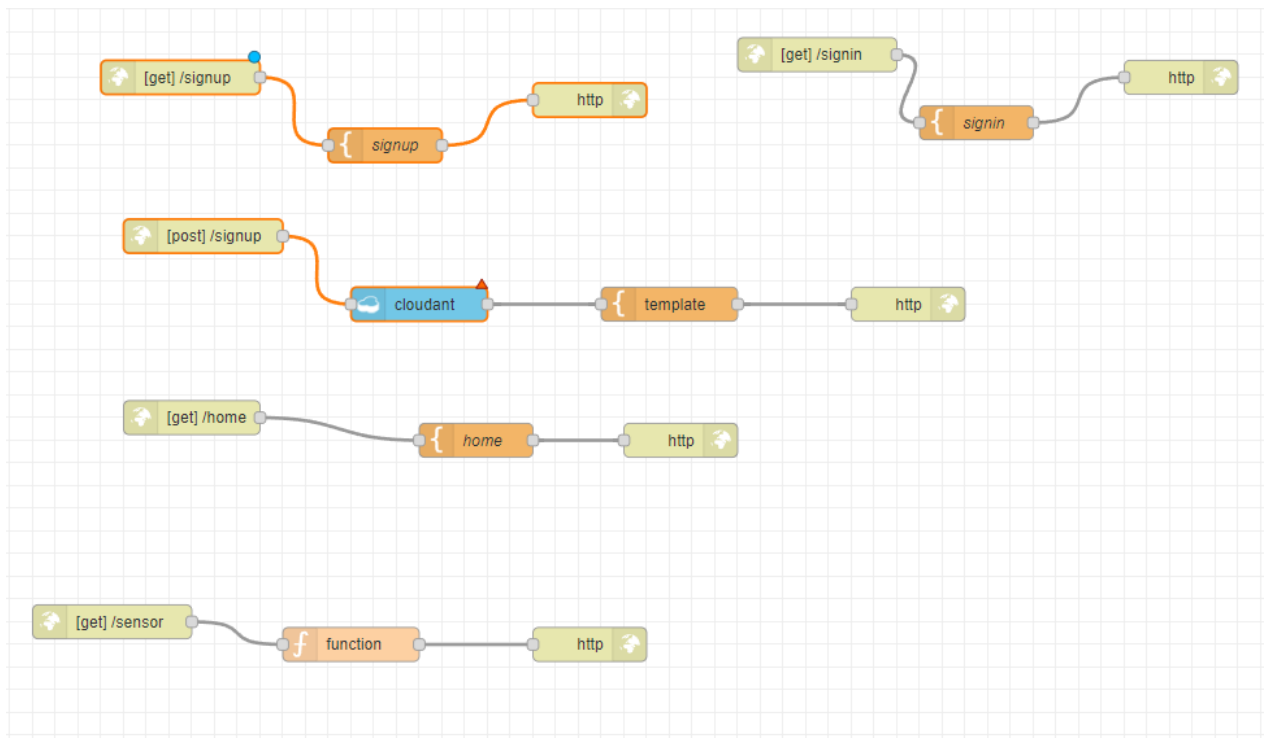
    latitude=11.664325
    longitude=78.146011

    #out area location

    #latitude= 17.421927
    #longitude=78.548878
    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()
```





MIT APP INVENTOR

Projects ▾ Connect ▾ Build ▾ Settings ▾ Help ▾

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IBM

Screen5 ▾ Add Screen... Remove Screen Publish to Gallery

Designer Blocks

Blocks

- Built-in
  - Control
  - Logic
  - Math
  - Text
  - Lists
  - Dictionaries
  - Colors
  - Variables
  - Procedures
- Screen5
  - Label1
  - TextBox1
  - Label2
  - TextBox2
  - Button1
  - Notifier1
  - Clock1

Rename Delete

Media

Backarrow\_client.png

Viewer

when Clock1.Timer

do

- set Web1.Url to "http://169.51.195.38:30039/sensor"
- call Web1.Get

when Web1.GetText

do

url	responseCode	responseType	responseContent
look up in pairs key "lat"			
call Web1.JsonTextDecode		jsonText	get responseContent
not found		not found	
look up in pairs key "lon"			
call Web1.JsonTextDecode		jsonText	get responseContent
not found		not found	

when Button1.Click

do

- if
- if TextBox1.Text == 11.66432 and TextBox2.Text == 78.14601
- then
- call Notifier1.ShowAlert
- notice "Person is inside the area"
- else
- call Notifier1.ShowAlert
- notice "Person is outside the area"

Show Warnings

0 0

## **GitHub & Project Demo Link**

GitHub Link: <https://github.com/IBM-EPBL/IBM-Project-42587-1660668850>

Project Demo Link:

[https://drive.google.com/file/d/1TAmkNowhYIKMFMmocgXIsK\\_aBtV7-ymh/view?usp=share\\_link](https://drive.google.com/file/d/1TAmkNowhYIKMFMmocgXIsK_aBtV7-ymh/view?usp=share_link)