Project Report

Date	25 November 2022
Team ID	PNT2022TMID14548
Project Name	Project – IOT-Based Safety Gadget for Child Safety Monitoring and Notification

Team Members

Bolleneni Venkata Sai Nishitha

Bommisetty Keerthi Sai

Gadikota Vaishnavi

Koneti Kavya

1. **INTRODUCTION**
    a. Project Overview
    b. Purpose
2. **LITERATURE SURVEY**
    a. Existing problem
    b. References
    c. Problem Statement Definition
3. **IDEATION & PROPOSED SOLUTION**
    a. Empathy Map Canvas
    b. Ideation & Brainstorming
    c. Proposed Solution
    d. Problem Solution fit
4. **REQUIREMENT ANALYSIS**
    a. Functional requirement
    b. Non-Functional requirements
5. **PROJECT DESIGN**
    a. Data Flow Diagrams

b. Solution & Technical Architecture

c. User Stories

6. PROJECT PLANNING & SCHEDULING

a. Sprint Planning & Estimation

b. Sprint Delivery Schedule

7. CODING & SOLUTIONING

a. Coding

b. Geo-Fence 8. **RESULTS**

a. Performance Metrics

9. ADVANTAGES & DISADVANTAGES

10.CONCLUSION

11.FUTURE SCOPE 12.**APPENDIX**

Source Code

GitHub & Project Demo Link

1. INTRODUCTION

Project Overview

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.

Purpose

It assists parents to monitor their children remotely. In case situations happen, notifications will be sent to parents so that actions can be taken. Through this, child safety can be ensured. By this, parents know what is happening remotely and can take actions if something goes wrong. It provides parents with the real-time location to monitor the child. It makes parents to make monitor their child from their workplace.Parents can be relax and calm by using this device.

2. LITERATURE SURVEY

Existing Problem

Parents need to ensure safety of their children but in realtime they need to get to work and need to worry about their child whether he/she is safe or not.So to ensure safety they need to monitor & to notify their child what he/she is doing and to know whether they are in safe atmosphere or not to ensure the safety of the child.

References

- 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), Bangalore, 2016, pp. 1108-1112.

- David Hanes, Gonzalo, Patrick Grosetete, Robert, Barton, Jerome Henry “IoT Fundamental and Networking Technologies, Protocols”.

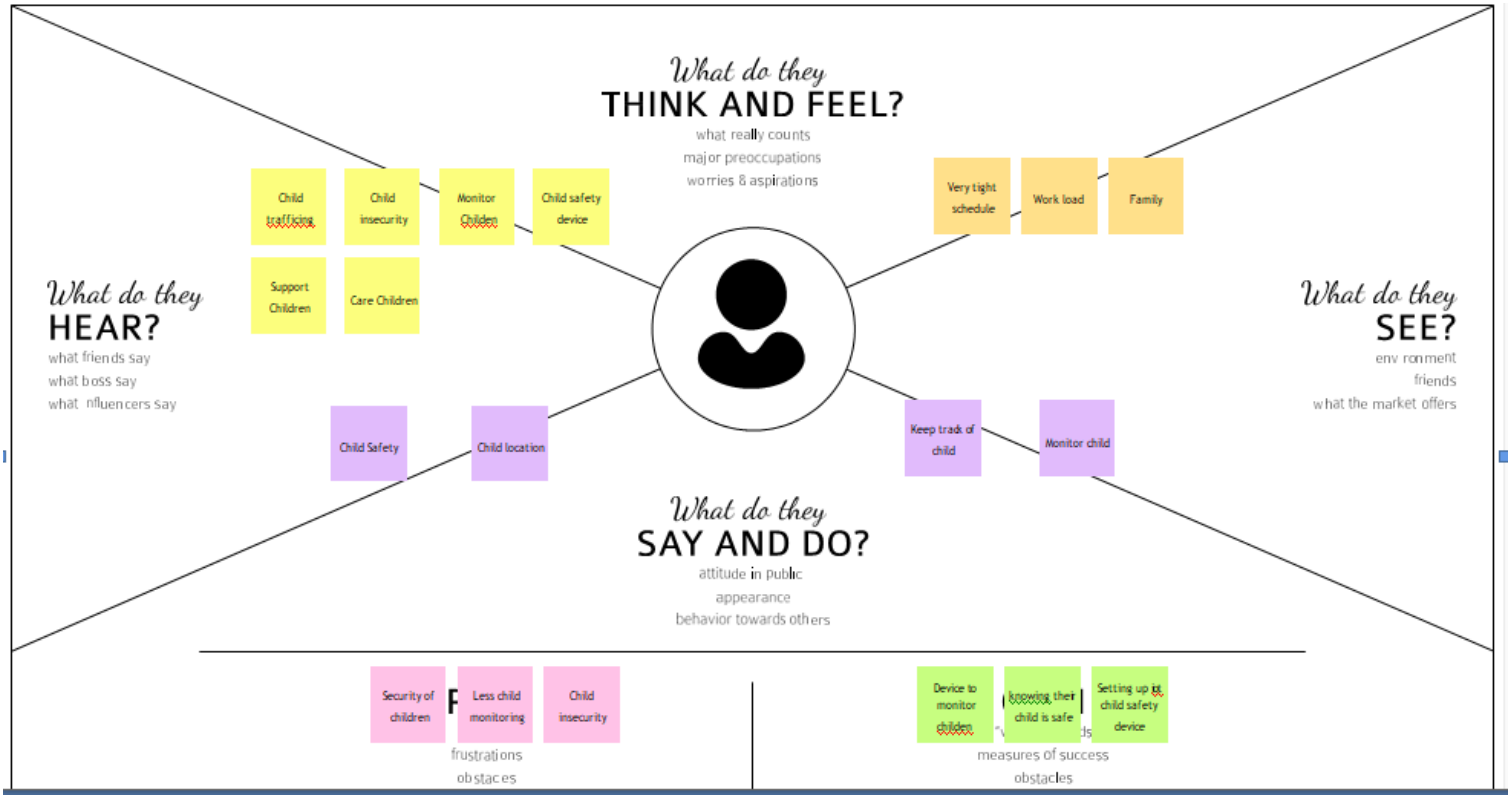
Problem Statement Definition

The objective of this project is to safeguard the child from threads. Now a days the safety measures of children has been reduced in huge number. Thus the violence against children increasing day by day.Our project mainly focus on sensing the children’s Temperature and Heartbeat. By monitoring the activities the state of the child is analyzed. By using GSM, if child reaches the critical state then the latitude and longitude of that particular location is sent as an alert message to the parents.

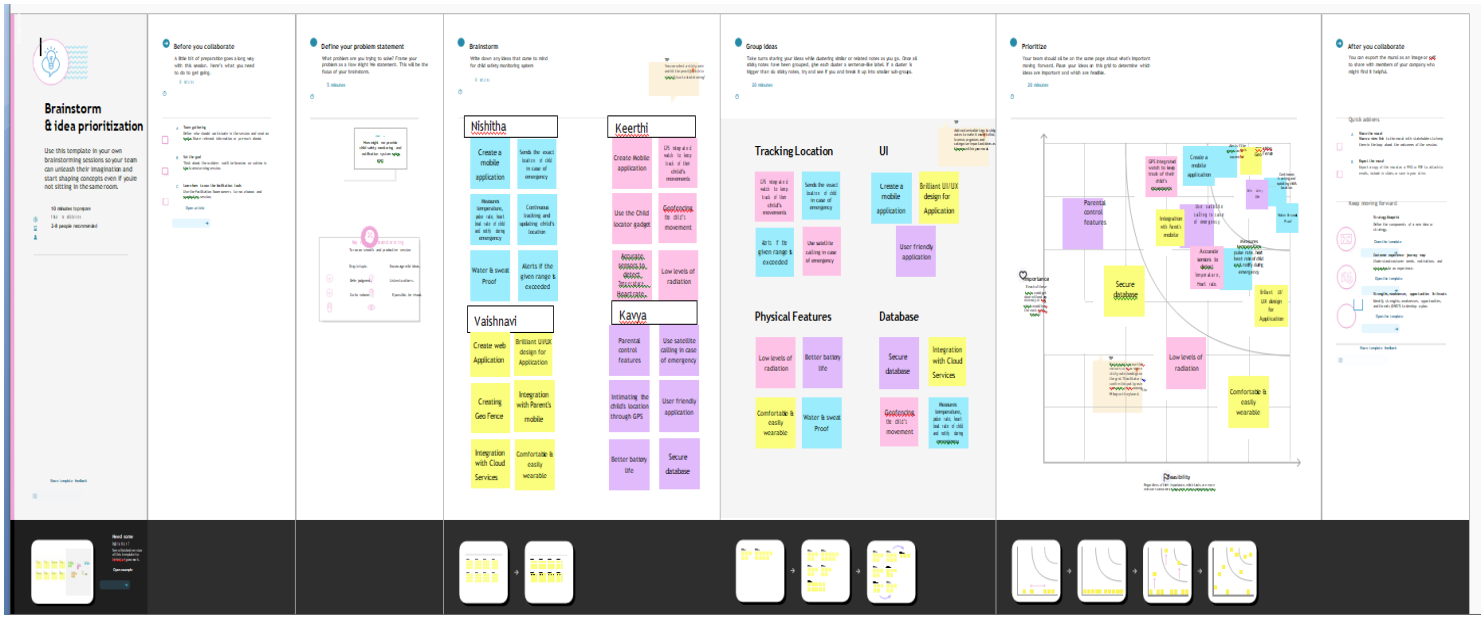

I am
A parent
I'm trying to
Ensure my child's safety
But
There are issues of child abuse, kidnapping and accident
Because
Due to lack of proper usage of technology and safety awareness
Which makes me feel
Unsafe & frightened

3. IDEATION & PROPOSED SOLUTION

Empathy Map Canvas



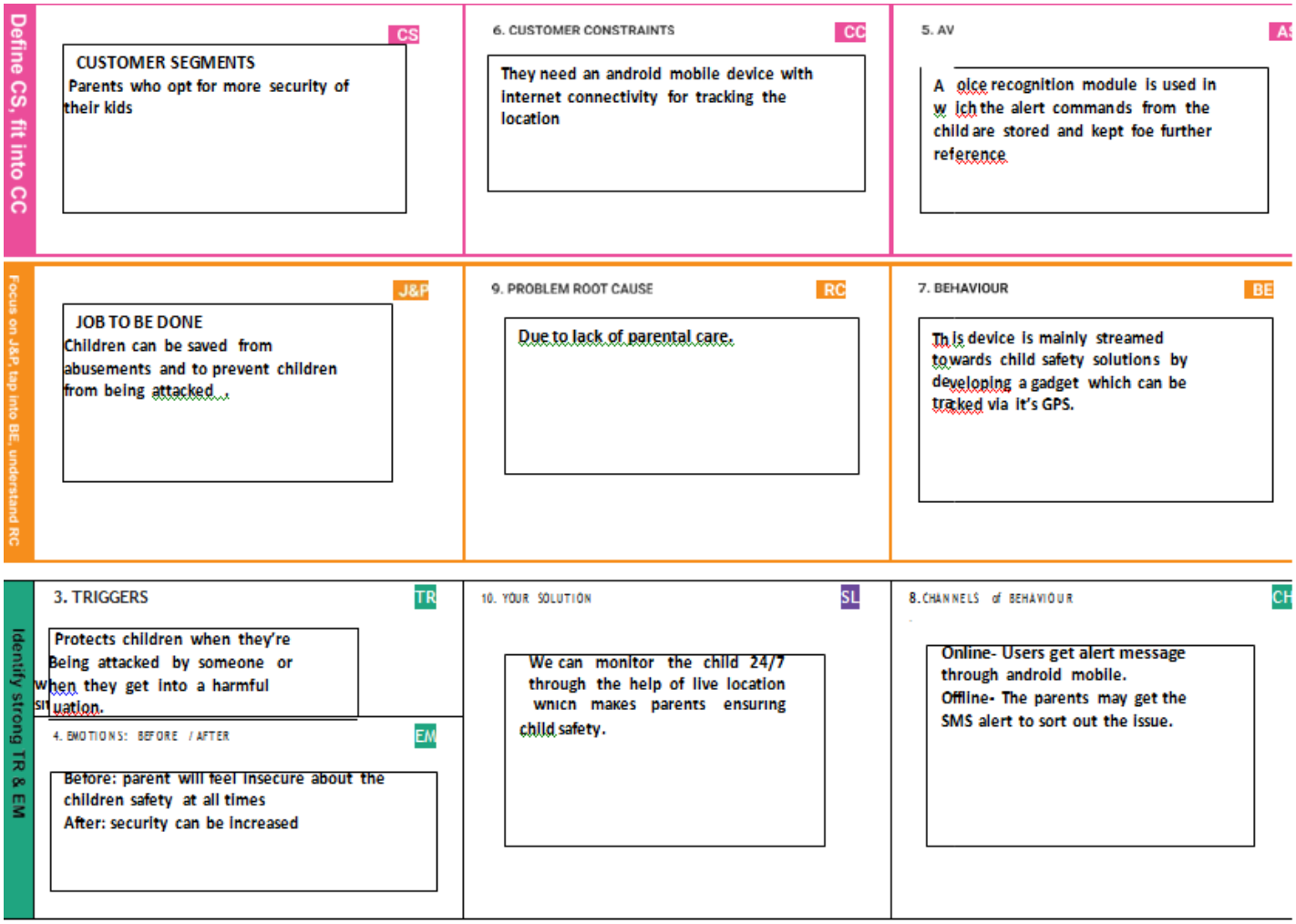
Ideation & Brainstorming



Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	It provides a security cover to the child .
2.	Idea / Solution description	The aim of this device is to provide safety to the child by allowing the parent to locate the child and view their surroundings. This device can be used to monitor the temperature and motion of the child.
3.	Novelty / Uniqueness	It provides parents with the real time location, surrounding temperature, UV radiation index and SOS light along with distress alarm buzzer for their child's surroundings and the ability to locate their child or alert by standers in acting to rescue or comfort the child. This system requires network connectivity, satellite communication, and high-speed data connection when we use web camera and GPS to lively monitor.
4.	Social Impact / Customer Satisfaction	Through this, child safety can be ensured and crime rate will be reduced. However, the proposed device is not robust enough and does not contain sufficient functions to operates like a mobile phone.
5.	Business Model (Revenue Model)	Compliance monitoring, preventive maintenance, asset tracking, automatic fulfillment, and remote diagnostics.
6.	Scalability of the Solution	Low cost design and implementation of an IoT based system that allows schools, parents and authority.

Problem Solution fit



4. REQUIREMENT ANALYSIS

Functional Requirements

SI No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
1.	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
2.	User Confirmation	Confirmation via Email Confirmation via OTP
3.	Authentication	Only the authorized person for that product will know Ensures security

4.	User Interface	The Inventor Able to see the location of children when they are out of geofence will also track the exact information about the children
5.	Notification	Notified through mobile and mail

Non- Functional Requirements

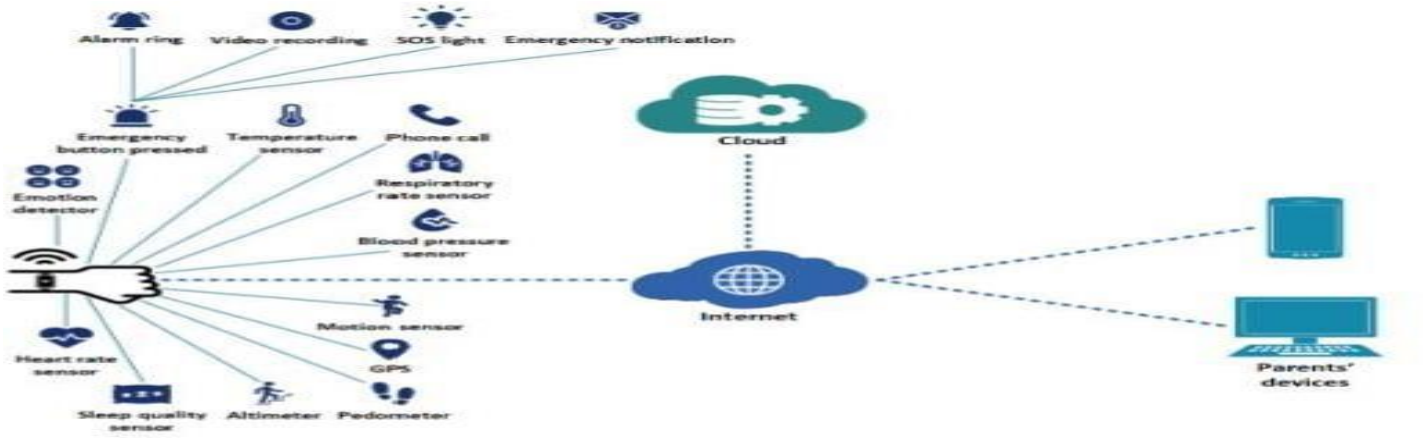
SI No.	Non-Functional Requirement	Description
1.	Usability	Accessed through Mobile App Showing location (latitude and longitude) of child and also other measures to ensure safety like notification. Portable and comfortable to use.
2.	Security	Database security and ensuring the safety of the product while in use.
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.
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.
5.	Availability	The data must be available whenever needed and the product should be able to use at any time.

6.	Scalability	The process must be flexible to use at anytime and versatile.

5. PROJECT DESIGN

Data Flow Diagrams

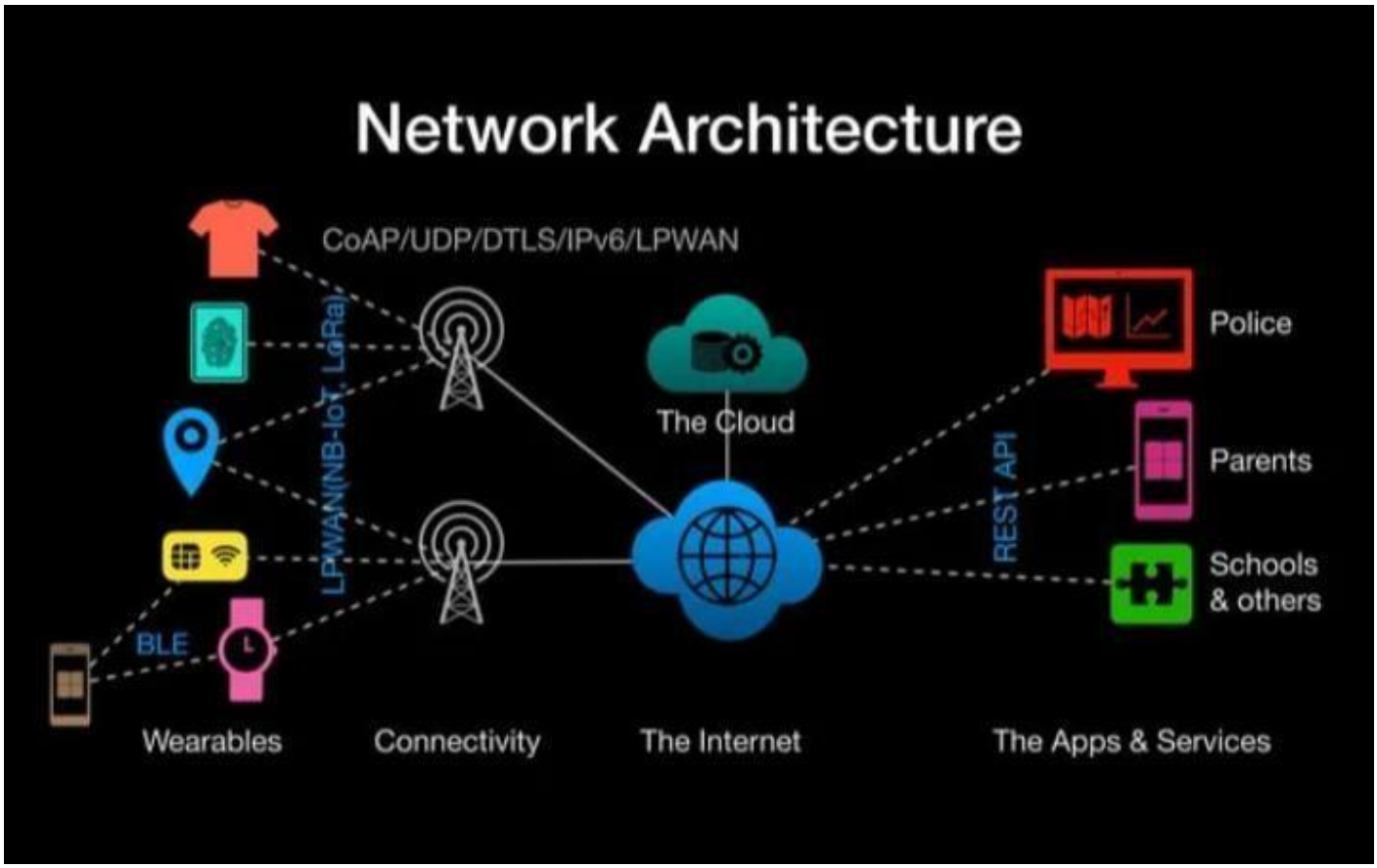
The overall percentage of child abusements filed nowadays in the world is about 80%, out of which 74% are girl children and the rest are boys. For every 40 seconds, a child goes missing in this world. Children are the backbone of one's nation, if the future of children was affected, it would impact the entire growth of that nation. Due to the abusements, the emotional and mental stability of the children gets affected which in turn ruins their careerand future. These innocent children are not responsible for what happens to them. So, 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 difficultto cling on to their children all the time. 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.



Solution & Technical Architecture

Safety of a child in a large public event is a major concern for event organizers and parents. This paper addresses this important concern and proposes an architecture model of the

IoT-enable smart child safety tracking digital system. This IoT-enabled digital system architecture integrates the Cloud, Mobile and GPS technology to precisely locate the geographical location of a child on an event map. Theproposed architecture model describes the people, information, process, and technology architecture elements, and their relationships forthe complex IoT-enable smart child safety tracking digital system. The proposed architecture model can be used as a reference or guide toassist in the safe architecture driven development of the various child tracking digital systems for different public events.



User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1 (FATHER)	As a user, I can register by entering my email, password, and confirming my password. I can access the location of my children using the credentials provided as a Father.	I can access my account / dashboard and receive confirmation email & click confirm	High	Sprint-1
		USN-2 (MOTHER)	As a user, I can register by entering my email, password, and confirming my password. I can access the location of my children using the credentials provided as a Mother.	I can access my account / dashboard and receive confirmation email & click confirm	High	Sprint-1
		USN-3 (GUARDIAN/ CARETAKER)	As a user, I can also monitor the children's activities using a safety gadget monitoring system.	I can access my account / dashboard and receive confirmation email & click confirm	Medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering email & password.	I can access my account / dashboard.	Medium	Sprint-2
	Dashboard	USN-5	As a user, I can fix the geofence for my child's location so that I will receive alerts if	I can monitor the current location of my child.	High	Sprint-2

			my child crosses the geofence.			
Customer (Web user)	Registration	USN-1 (FATHER)	As a user, I can register by entering my email, password, and confirming my password. I can access the location of my children using the credentials provided as a Father.	I can access my account / dashboard and receive confirmation email & click confirm	High	Sprint-1
		USN-2 (MOTHER)	As a user, I can register by entering my email, password, and confirming my password. I can access the location of my children using the credentials provided as a Mother.	I can access my account / dashboard and receive confirmation email & click confirm	High	Sprint-1
		USN-3 (GUARDIAN/ CARETAKER)	As a user, I can also monitor the children's activities using a safety gadget monitoring system.	I can access my account / dashboard and receive confirmation email & click confirm	Medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering email & password.	I can access my account / dashboard.	Medium	Sprint-2
	Dashboard	USN-5	As a user, I can fix the geofence for my child's location so that I will receive alerts if my child crosses the geofence.	I can monitor the current location of my child.	High	Sprint-2
Customer Care	Dashboard	USN-6	As a customer care service person, whenever I receive a complaint, I forward the complaint and ensure that the complaint is resolved.	I can keep track of all the complaints and the status of the complaints received.	Medium	Sprint-3
Administrator	Admin Dashboard	USN-7	As an administrator, I will take care of all the payment processes, queries and complaints and login credentials.	I can access all the customer details, payment details and complaints received.	High	Sprint-4

6. PROJECT PLANNING & SCHEDULING

Sprint Planning & Estimation

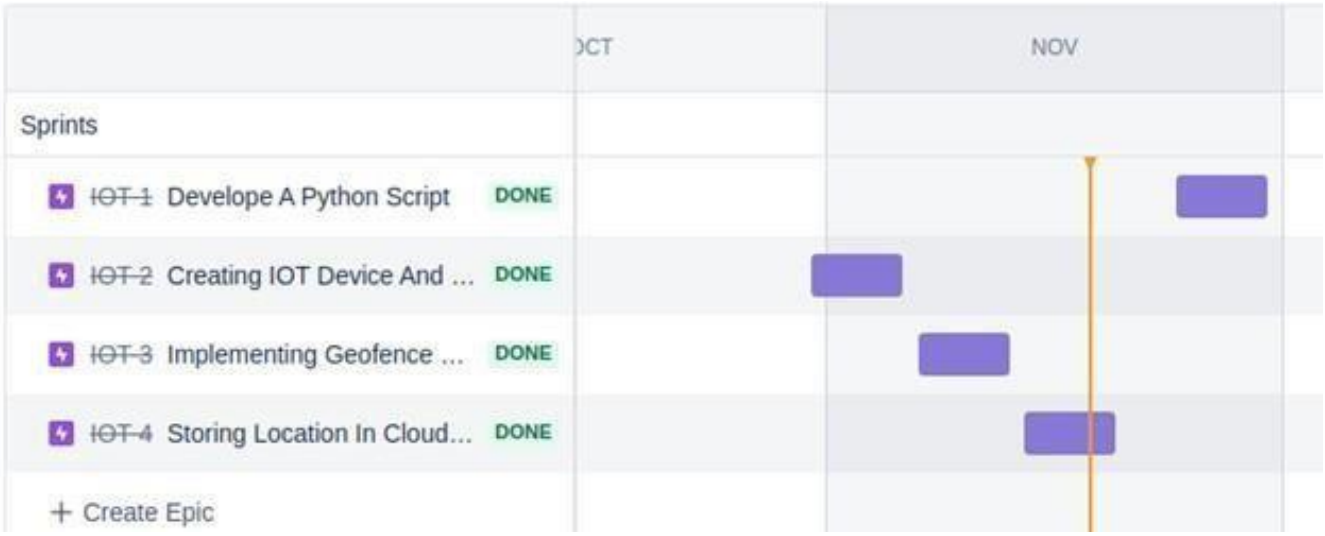
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, and password, and confirming my password.	4	High	BOLLENENI VENKATA SAI NISHITHA
Sprint-1	Confirmation Email	USN-2	As a user, I will receive a confirmation email once I have registered for the application	4	High	GADIKOTA VAISHNAVI
Sprint-1	Authentication	USN-3	As a user, I can register for the application through Gmail and mobile app.	4	Medium	BOMMISETTY KEERTHI SAI
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High	KONETI KAVYA
Sprint-1	Dashboard	USN-1	As a user, I need to be able to view the functions that I can perform	4	High	BOLLENENI VENKATA SAI NISHITHA
Sprint-2	Notification	USN-1	As a user, I should be able to notify my parent and guardian in emergency situations	10	High	BOMMISETTY KERTHI SAI
Sprint-2	Store data	USN-2	As a user, I need to continuously store my location data into the database.	10	Medium	GADIKOTA VAISHNAVI
Sprint-3	Communication	USN-3,1	I should be able to communicate with my parents	6	Low	KONETI KAVYA
Sprint-3	IoT Device – Watson communication	USN-1,4	The data from IoT device should reach IBM Cloud	7	Medium	BOLLENENI VENKATA SAI NISHITHA,BOMMISETTY KEERTHI SAI
Sprint-3	Node RED-Cloudant DB communication	USN-1,2	The data stored in IBM Cloud should be properly integrated with Cloudant DB	7	High	BOLLENENI VENKATA SAI NISHITHA,K

						ONETI KAVYA
Sprint-4	User – WebUI interface	USN-1,4	The Web UI should get inputs from the user	6	High	BOMMIS ETTY KEERTHI SAI,GADI KOTA VAISHNA VI
Sprint-4	Geofencing	USN-2,3,1	The geofencing of the child should be done based on the geographical coordinates	7	High	GADIKOTA VAISHNAVI ,KONETI KAVYA

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	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Reports from JIRA



7. CODING

Coding

```
import json

import wiotp.sdk.device

import time

myConfig ={

   "identity":{

   "orgId": "rdegyk",

   "typeId":"safetygad",

   "deviceId":"gad1"

   },

   "auth":{

      "token":"gyg06jzil(!lTGsKxV"

     }

}

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

client.connect()
```

```
while True:
    name="locater"
    #in area location
    #latitude=13.145997614532394
    #longitude=80.0619303452179
    #out area location
    latitude=13.15412
    longitude=80.05729
    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(2)
client.disconnect()
```

Geo-fence

A geofence is a virtual perimeter for a real-world geographic area.[1] A geofence could be dynamically generated (as in a radius around a point location) or match a predefined set of boundaries (such as school zones or neighborhood boundaries).The use of a geofence is called geofencing, and one example of use involves a location-aware device of a location-based service (LBS) user entering or

exiting a geofence. This activity could trigger an alert to the device's user as well as messaging to the geofence operator. This info, which could contain the location of the device, could be sent to a mobile telephone or an email account.

8. RESULTS

Performance Metrics

It is being used as it allows the correct sample of respondents to be selected due to which becomes convenient to obtain results. Besides, the results offered are affordable and usable. Since the respondents are properly chosen, the results tend to be more accurate, precise and reliable.

9. 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

It can be easily removed or damaged while playing and by any intruders.This requires internet connectivity to get monitored and to notify alert messages to parents.

10. CONCLUSION

The word Future resembles the word Children. As Dr. A.P.J Abdul Kalam’s words “Youngsters are thefuture pillars of one’s nation", today's children are tomorrow's youngsters, preserving their dreams and life for a better future is necessary. Therefore, each and every parent should take care of their own children, without

letting them to fall into the dark world of abusements, which entirely ruin them physically, mentally and emotionally destroying our future. Hence, considering the importance of our future, our project makes it easy for parents to track their children and to visually monitor them on regular basis, which makes them ensure the safety of their children and reduces the rate of incidents of child abuse.

11. FUTURE SCOPE

In our system, we automatically monitor the child in real time using Internet of Things, with the help of GPS, GSM, and Raspberry Pi. This system requires network connectivity, satellite communication, and high-speed data connection when we use web camera and GPS to lively monitor. It is difficult to monitor when there occurs any hindrance to satellite communication or any network issue. There also occurs time delay in video streaming through the server. Hence in the future, these issues can be overcome by using Zigbee concept or accessing the system without internet and using high-speed server transmission.

12. APPENDIX

Source Code

Code for IN Area Location:

```
import json import

wiotp.sdk.device

import time myConfig

={

 "identity":{

 "orgId": "rdegyk",
```

```
 "typeId":"safetygad",
 "deviceId":"gad1"
 },
 "auth":{
 "token":"gyg06jzil(!lTGsKxV"
 } } client =
wiotp.sdk.device.DeviceClient(config=myConfig,
logHandlers=None) client.connect() while True:
name="locater"
 #in area location
 latitude=13.145997614532394
 longitude=80.0619303452179
  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(2)
 client.disconnect()
```

Code for OUT Area Location:

```
import json import

wiotp.sdk.device

import time myConfig

={

 "identity":{

 "orgId": "rdegyk",

 "typeId":"safetygad",

 "deviceId":"gad1"

 },

 "auth":{

 "token":"gyg06jzil(!lTGsKxV"

 } } client =

wiotp.sdk.device.DeviceClient(config=myConfig,

logHandlers=None) client.connect() while True:

name="locater"

#out area location

 latitude=13.15412
```

```
longitude=80.05729

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(2)

client.disconnect()
```

GitHub Link: https://github.com/IBM-EPBL/IBM-Project-37364-1660305739

Project Demo:
https://drive.google.com/drive/folders/16KZ1m4tSVH1l7udrLHGF_PND4_tTEFTi