IoT Based Safety Gadget for Child Safety Monitoring & Notification

TEAM ID: PNT2022TMID33026

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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.Children are prone to many incidents and accidents. The safety of children is very indispensable as children cannot protect themselves. 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.

1. Introduction

1.1 Project Overview

The Internet of Things (IoT) plays a vital role inday-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 are markable 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 techniqueis equipped with GSM and GPS modules for sending and receiving calls, and SMS between the safety gadget andtheparental 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.

1.2 Purpose

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

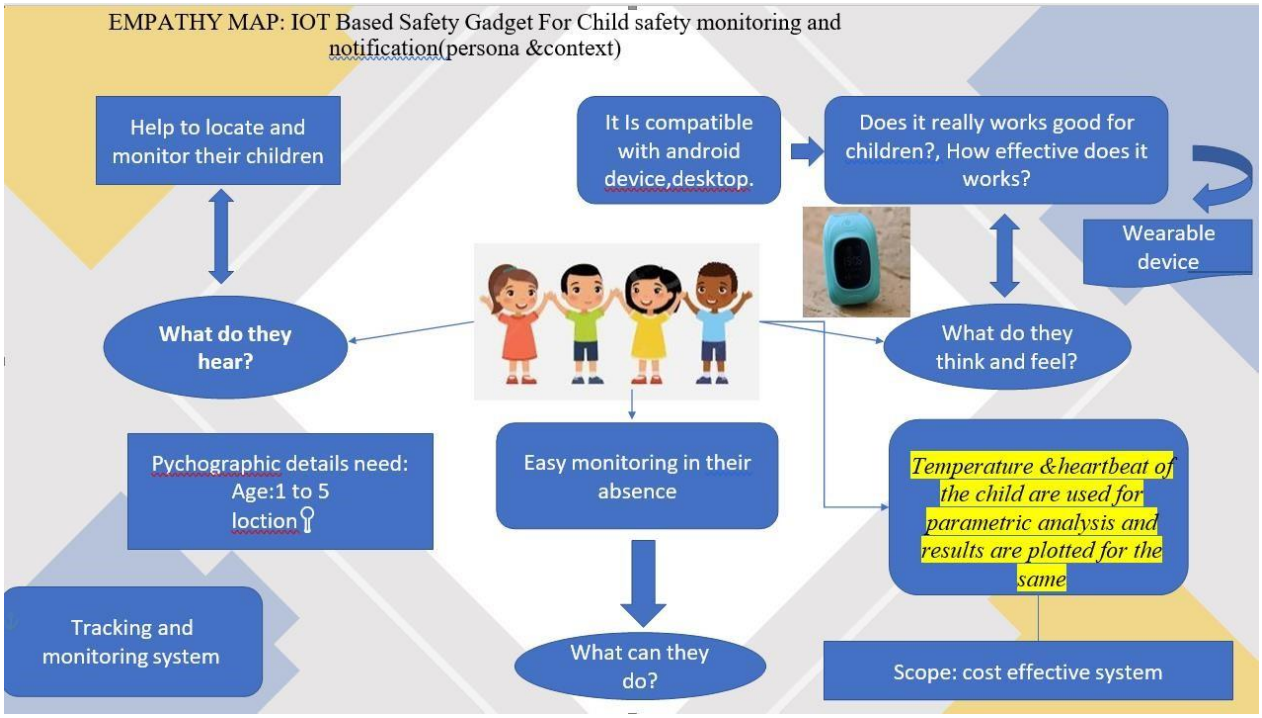
2. LITERATURE SURVEY

Basically, children cannot complain about the problem which they face in their daily life to their parents. They can't even realize what actually happens to them at their age. It is also difficult for parents to identify their children are being affected. Since to prevent children before being attacked, an autonomous real-time monitoring system is necessary for every child out there. In this system, the collected value from every sensor like temperature sensor, pulse rate detection sensor, metal detection sensor, and the location value from GPS are used to detect the status of the child and alert the respective guardians using GSM accordingly. Attacked, an autonomous real-time monitoring system is necessary for every child out there. In this system, the collected value from every sensor like temperature sensor, pulse rate detection sensor, metal detection sensor, and the location value from GPS are used to detect the status of the child and alerts the respective guardians using GSM accordingly. RFID -based System for School Children Transportation Safety Enhancement. This paper presents a system to monitor pick-up/drop-off of school children to enhance the safety of children during daily transportation from and to school. The system consists of two main units, a bus unit, and a school unit. The bus unit the system is used to detect when a child boards or leaves the bus. This information is communicated to the school unit that identifies which of the children did not board or leave the bus and issues an alert

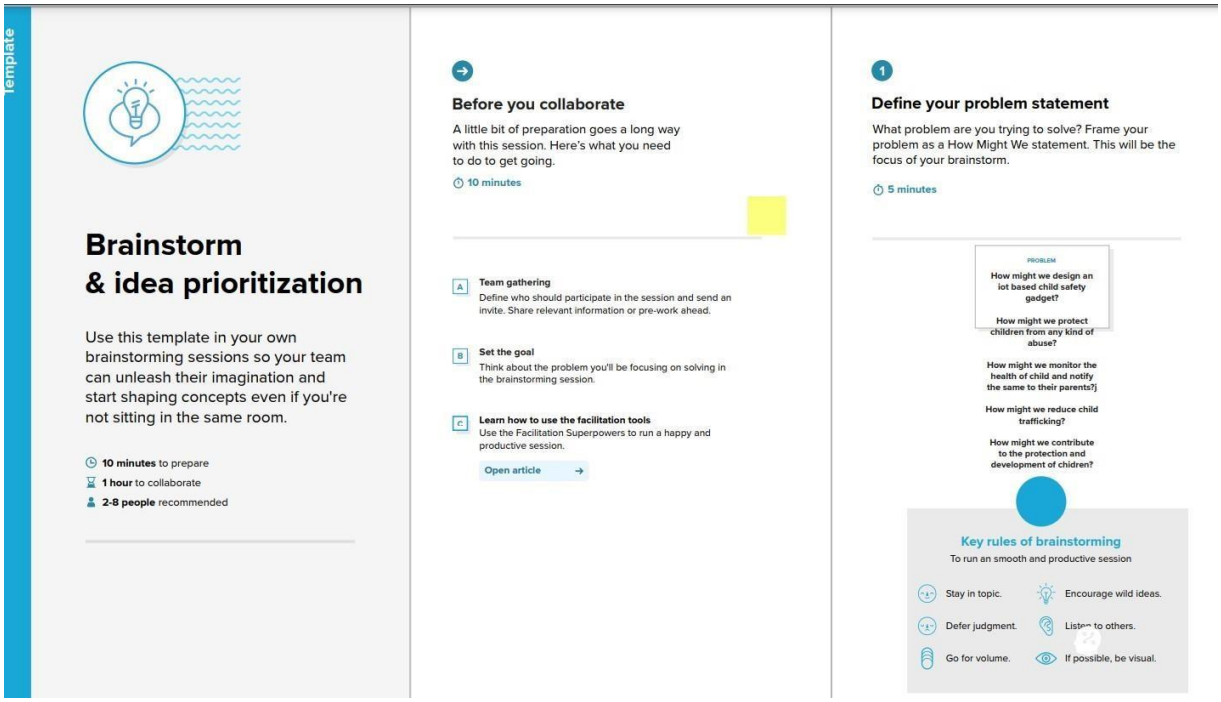
message accordingly. The system has a developed web-based database-driven application that facilities its management and provides useful information about the children to authorized personnel. And the geo-fence is created to the required children. Then, the child will be monitored periodically, when the child move out of the geo-fence then it will be intimated to the authorized persons. 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. Parents need not have a smart mobile. Set of keywords are used to gain information from the kit. LOCATION keyword is used to obtain the location of the child. UV keyword is used to obtain the temperature of the surroundings. BUZZ keyword is used to turn on the buzzer which is fixed in that device. SOS is used to send a signal to the device.
Parents need not have a smart mobile. Set of keywords are used to gain information from the kit. LOCATION keyword is used to obtain the location of the child. UV keyword is used to obtain the temperature of the surroundings. BUZZ keyword is used to turn on the buzzer which is fixed in that device. SOS is used to send a signal to the device.

3. IDEATION PHASE & PROPOSED SOLUTION

3.1 EMPATHY MAP



3.2 BRINSTROMING AND IDEA PRIORIZATION



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

To implement child safety monitoring by tracking children's surrounding activity using an IoT based child safety device

Key rules of brainstorming

To run an smooth and productive session

- Stay in topic.
- Defer judgment.
- Go for volume.
- Encourage wild ideas.
- Listen to others.
- If possible, be visual.

Brainstorm

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

10 minutes

3

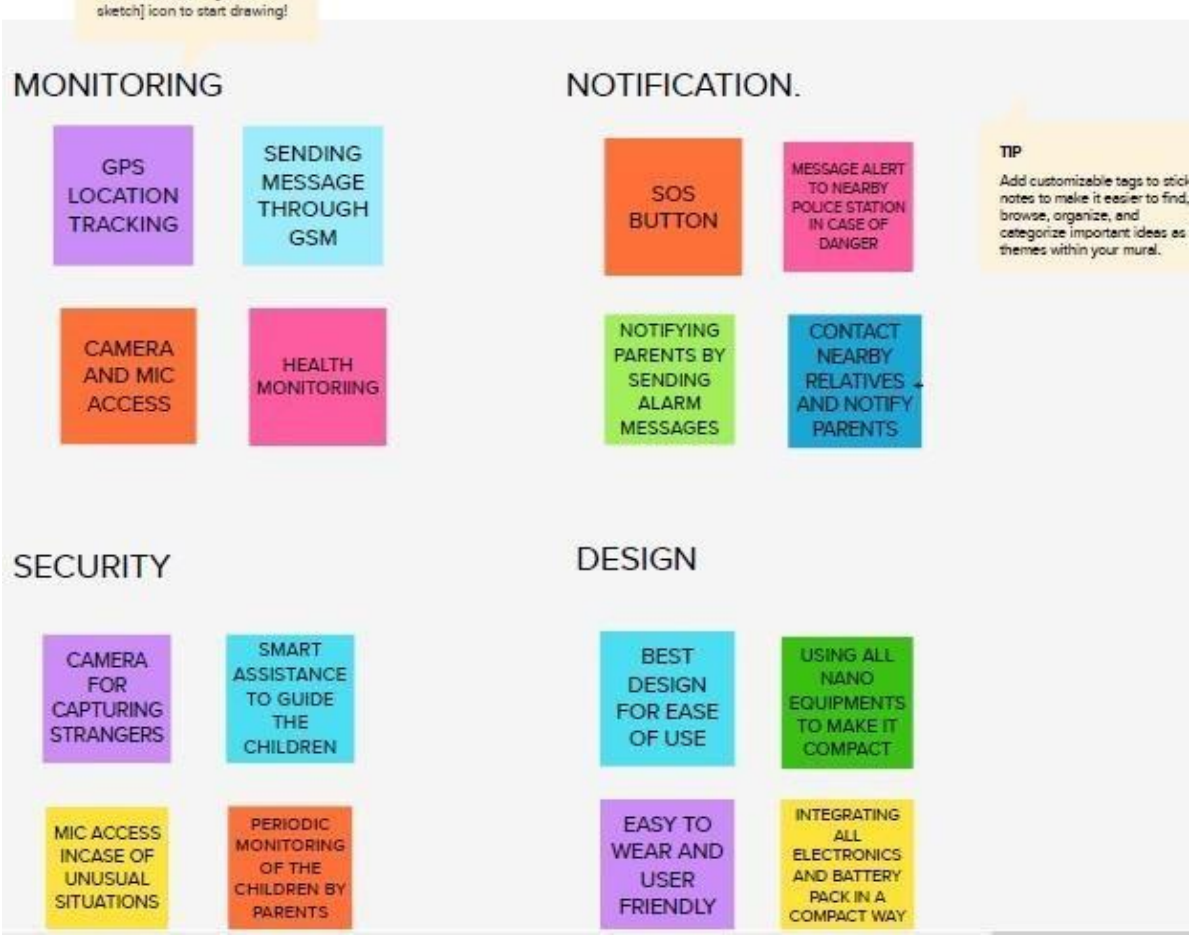
Group Ideas

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 and break it up into smaller sub-groups.

20 minutes

TIP

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



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

A **Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

B **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.

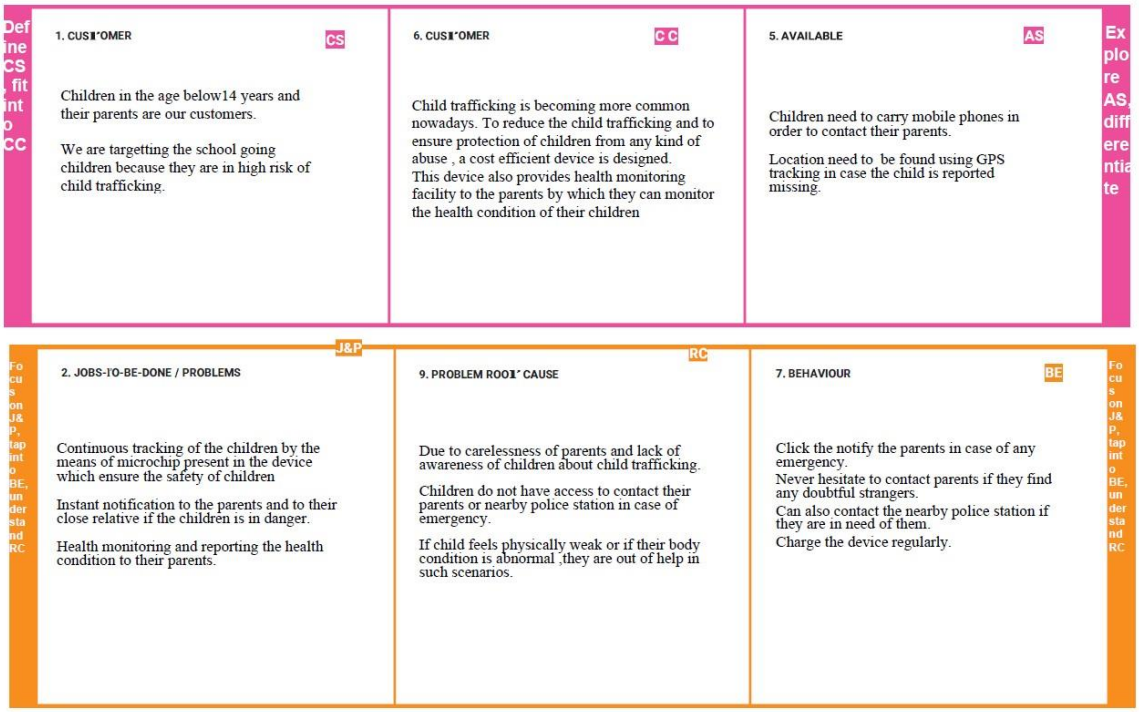
Open the template →

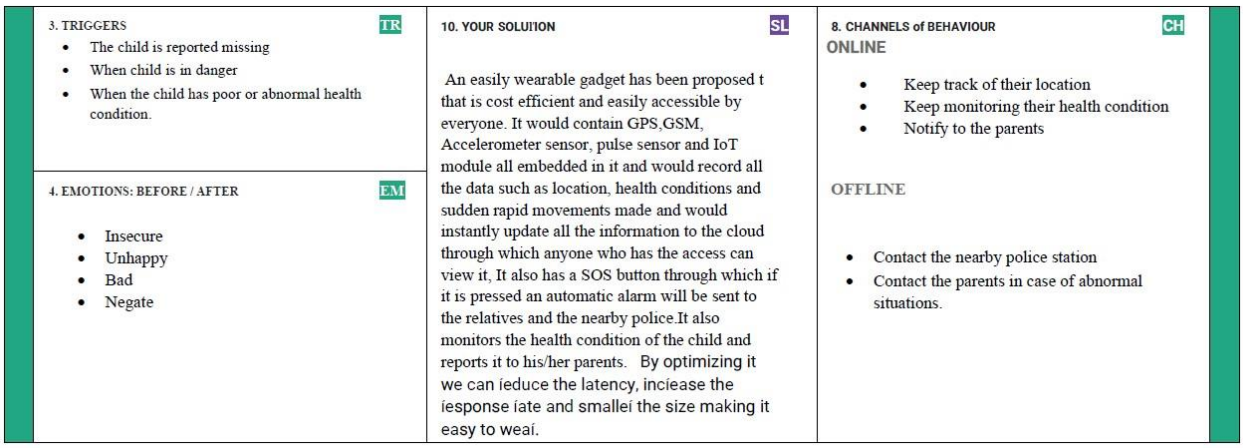
Share template feedback

3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To propose a model of an IOT based safety gadget for child safety monitoring and notification
2.	Idea / Solution description	Using a user friendly gadget which monitors parameters such as the location, health condition and sudden movements of child and sends notification to his/her relatives.
3.	Novelty / Uniqueness	We are using a microchip board in the device with the help of which parents can monitor the location of child and also get message in case of any emergency.
4.	Social Impact / Customer Satisfaction	Cost efficient and protecting the children from child trafficking and any kind of abuse.
5.	Business Model (Revenue Model)	With using, parents can safely send their child out without the fear of getting into any kind of trouble. Without using, increases the probability of child trafficking and less security for the child.
6.	Scalability of the Solution	Cost efficient device and it is developed in such a way that the location of the children is tracked continuously and it ensure the safety of the children.

3.4 Problem Fit Solution





4. REQUIREMENT ANALYSIS

4.1 Functional requirement

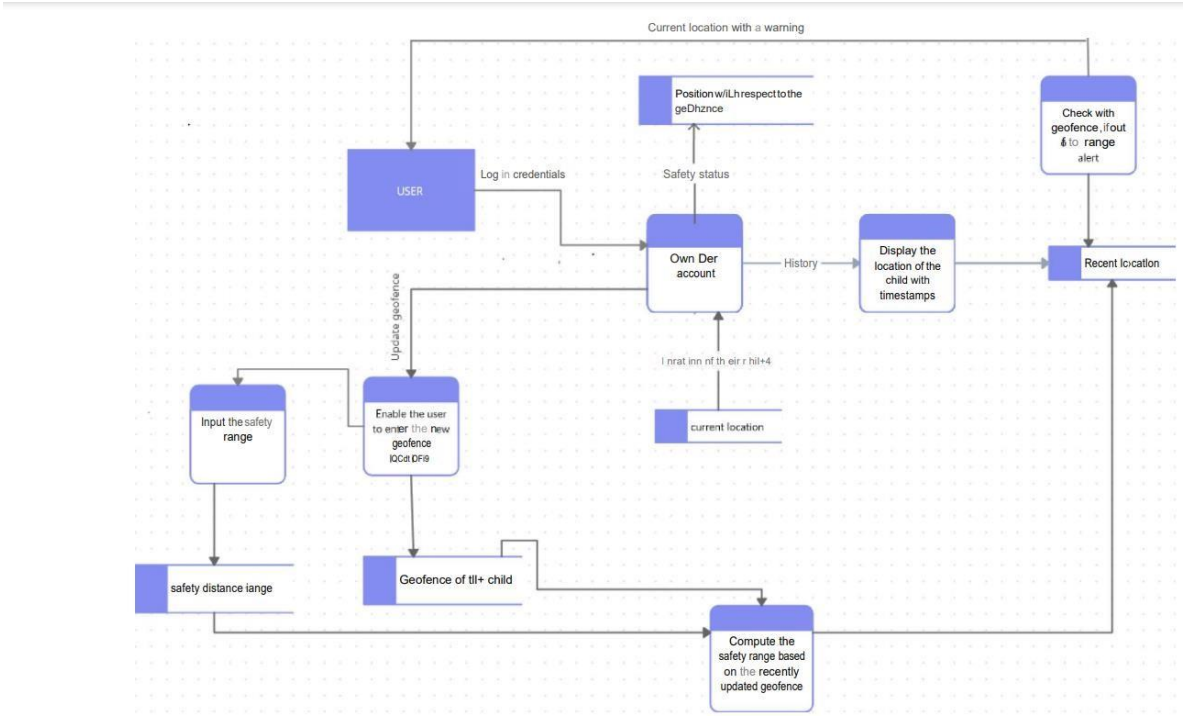
FR No.	Functional Requirement (Epic)	Sub Requirement (Story/Sub-Task)
FR - 1	User Registration	Registration through account Registration through Gmail
FR - 2	User Confirmation	Confirmation via Email Confirmation via OTP
FR - 3	User Notification	Notification to registered mobile number Notification via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

4.2 Non-Functional requirements

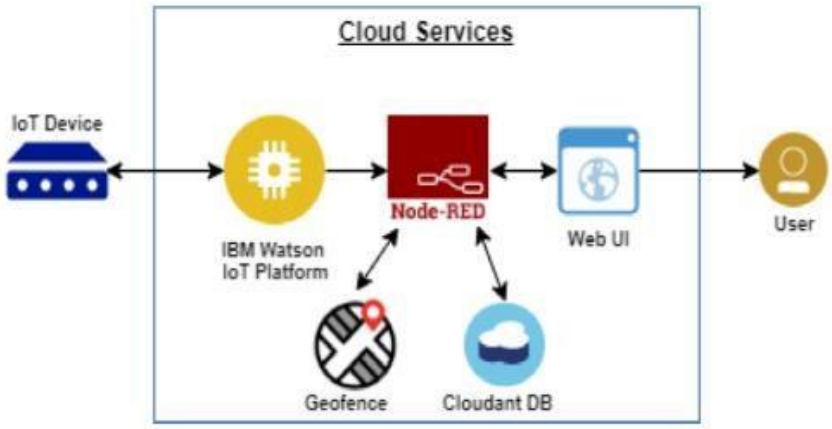
FR No.	Non-Functional Requirement	Description
NFR – 1	Usability	Allows parents to keep a track of their child's location and also, help them raise an alarm in case of an emergency.
NFR – 2	Security	Creates a secure environment for children to move around.
NFR – 3	Reliability	Increased reliability towards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

5. PROJECT DESIGN

5.1 Data Flow Diagrams



Solution Architecture Diagram:



5.2 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 my location data into the db.		Medium	Sprint-2

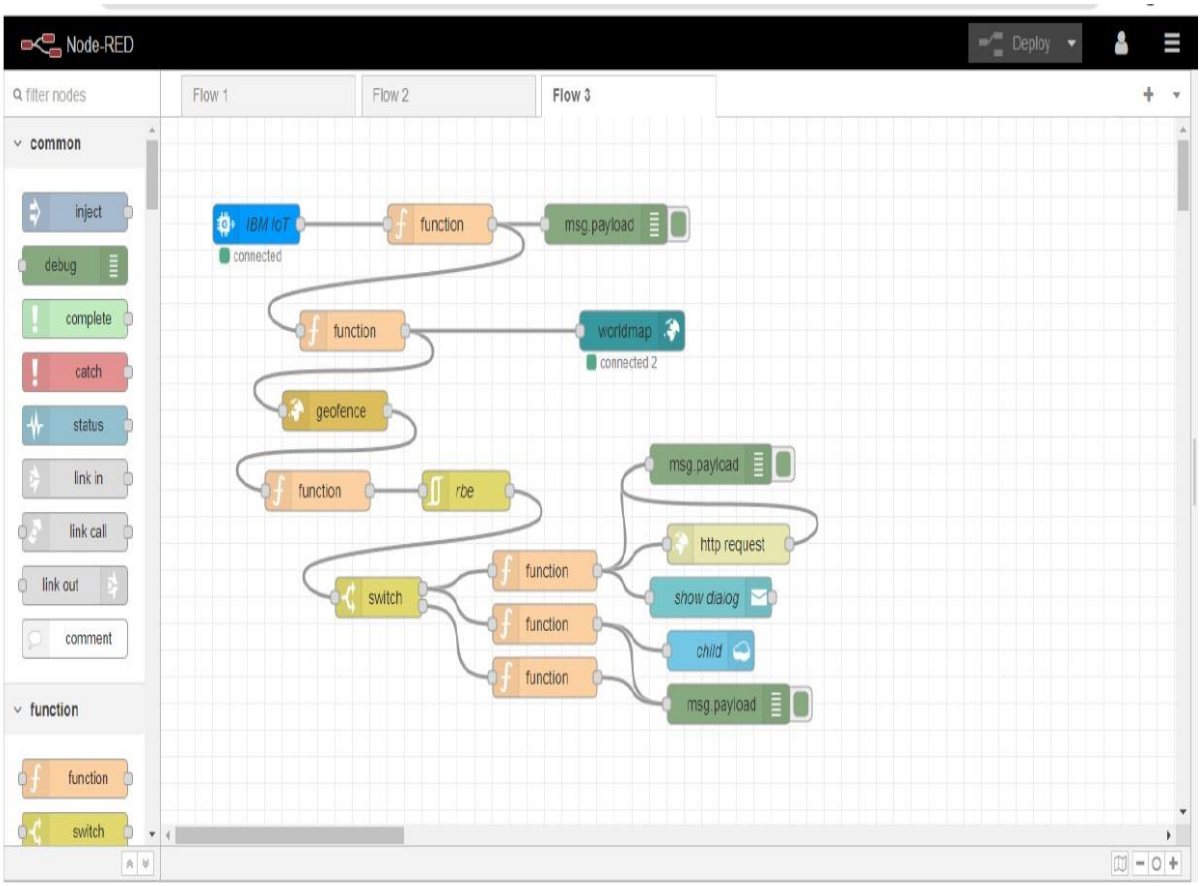
6. CODING & SOLUTIONING

Coding:

```
import json  import
wiotp.sdk.device
import time  myConfig
= {
"identity": {
"orgId": "9o069i",
"typeId": "manimd",
"deviceId": "manimd12"
},
"auth": {
"token": "manimd07"
}
}
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()  while True:  name = "mani"  #in area location  latitude=11.225894
longitude=76.980855  #out area location
#latitude = 11.226767
#longitude = 76.988299
```

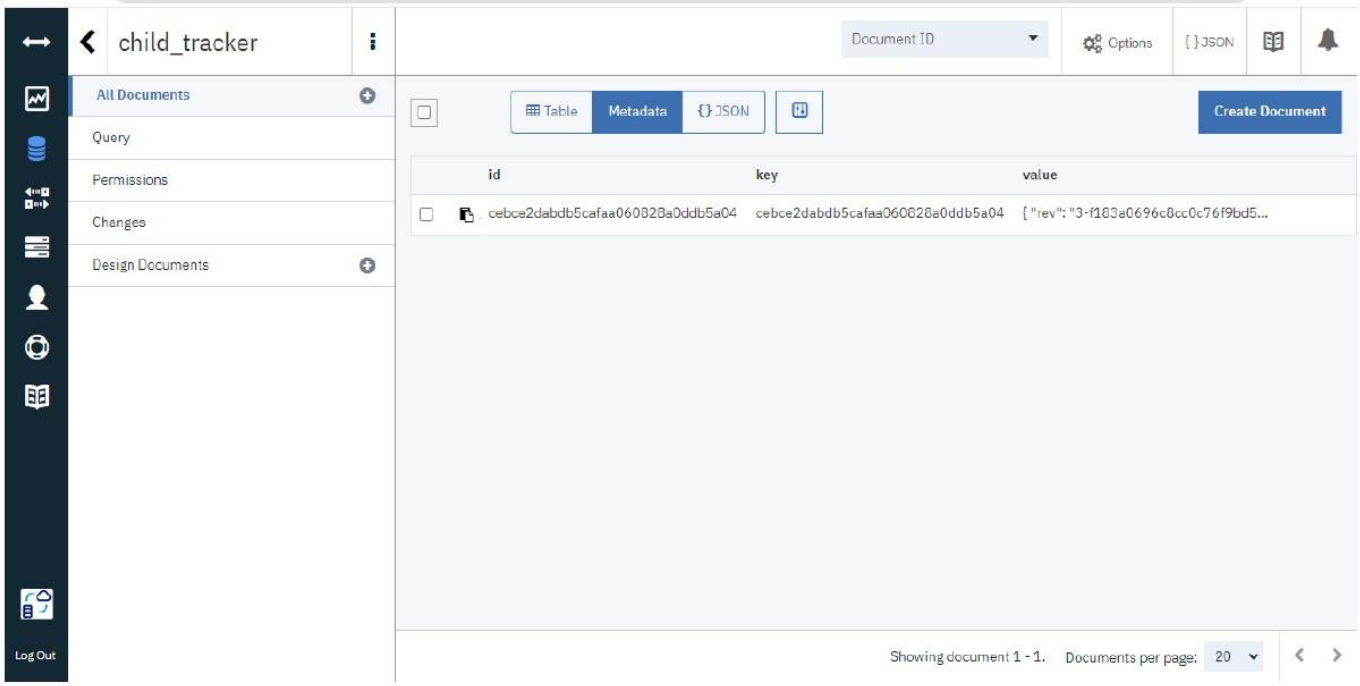
```
mydata = {'name': name, 'lat': latitude, 'lon': longitude}
client.publishEvent("Status", "json", data=mydata, qos=0, onPublish=None)
print("Data published to IBM IOT platform :", mydata)  time.sleep(5)
client.disconnect()
```

Node-red:


Node-RED
Deploy
filter nodes
Flow 1
Flow 2
Flow 3
common
inject
debug
complete
catch
status
link in
link call
link out
comment
function
function
switch
IBM IoT
connected
function
msg.payload
function
worldmap
connected 2
geofence
function
rbe
msg.payload
http request
function
switch
show dialog
function
child
function
msg.payload


Home
LIVE TRACKING
LOCATION HISTORY
RECENT EMERGENCY NOTIFICATIONS
CHANGE PASSWORD
LOGOUT
LiveTracker

Database:


child_tracker
All Documents
Query
Permissions
Changes
Design Documents
Log Out
Document ID
Options
{ } JSON
Table
Metadata
{} JSON
Create Document
id
key
value
cebce2dabdb5cafaa060828a0ddb5a04
cebce2dabdb5cafaa060828a0ddb5a04
{"rev": "3-f183a0696c8cc0c76f9bd5...
Showing document 1 - 1.
Documents per page:
20

7. ADVANTAGES

1. Save the life of the children.
2. Parent's do their work peacefully without worrying about their children.
3. Continously monitoring the children.
4. Saves time.
5. Recovery of the children is easy,if the children lost.

DISADVANTAGES

1. Young Children may refuse to cooperate unless allowed to play with their gadgets.
2. Easily misusing the device.
3. No water proof.

8. CONCLUSION

The child tracking system that helps parents track the movements of children with the help of GPS technology. The entire location data is stored in database. This proposed app can shows the whether the children inside the geofence or outside the geofence to the parent's mobile . Even if the software

is not running, the details are shown. It is because location access is available in the background and the software performs well on the mobile device. Based on the availability of the parent user, additional geofences may be required. Performance Requirements are summarized as follows: login, Location status, temperature ,Live on map etc. The system shall allow the user to create and/or log in to an account. The system shall allow the user to find the exact location of the children using GPS. The system shall allow the user to track the current location of the children using GPS.

9. FUTURE SCOPE

1. Childs surrounding can be located with the help of accurate and precise real time location.
2. Surrounding environment temperature, SOS light along with Distress buzzers are provided in this system.
3. If child crosses the geofence ,call goes to the registered mobile number's.
4. This gadgets will be modified that has been suitable for all environments.

10. APPENDIX

Source Code :

```
Import json

Import wiotp.sdk.device

Import time
myConfig = {
        "identity": {
                "orgId": "9o869i",
                "typeId": "pravnd", "deviceId":
                "pravn12"
        }.
        "auth": {
```

```
            "token": "pravn07"
            }
}

client=wiotp.sdk.device.DeviceClient(config=myConfig
, logHandlers=None) client.connect() While True:
name="pravn" latitude+11.225894
longitutde=76.980855 latitude=11.226767
longitude=76.988299
mydata={'name':name, 'lat':latitude, 'lon':longitude}
client.publishEvent("IotSensor", "json", data=mydata, qos=0,
onPublish=None)
print("Data published to IBM IoT platform :",mydata)
time.sleep(5)
client.disconnect()
```

GitHub:

https://github.com/IBM-EPBL/IBM-Project-33026-1660213849