

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

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**PSN ENGINEERING COLLEGE,TIRUNELVELI**  
**ANNA UNIVERCITY : : CHENNAI 600 025**  
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# PROJECT REPORT

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### **1.INTRODUCTION :**

#### **1.1 Project overview :**

Basically, children cannot complain about abusements 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 abused. 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 values 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.

#### **1.2 Purpose :**

This system is used to the purpose of children safety.Because now a days the children kidnaping and sexual violence ,that problems are increased in our society.so the parents have fear to go outside to their children.

But this Device is more helpful them.It is a wearable device such as a Smart Watch. if the children wearing that device they are monitored by their parents.so the device has more chances to avoided that problems.

### **LITERATURE SURVEY :**

## **A. 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 facilitates its management and provides useful information about the children to authorized personnel. A complete prototype of the proposed system was implemented and tested to validate the system functionality. The results show that the system is promising for daily transportation safety.

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

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.

### **2.1 Existing System:**

#### **Real-Time Child Abuse and Reporting System**

In the existing system, we use a voice recognition module in which the alert commands from the child are stored and kept for further reference. If the same child delivers the same command, it will compare with the alert command which was previously stored and sets an emergency level according to the alert command. The GSM has a SIM which is used to send an alert message or an alert call to the trusted people. GPS is used

to track the live location and it is used when needed. The server will search the respective device ID from the database and search for respective contacts according to that device ID and helps in alerting the registered guardians.

**The disadvantage of this project are,**

- i. The child could not produce the exact alert command during a panic condition.
- ii. The command produced may not match with the previously stored command.
- iii. This project requires manual intervention.

## **2.2. REFERENCES**

[1] Akash Moodbidri, Hamid Shahnasser, "Child Safety Wearable Device", Department of Electrical and Computer Engineering San Francisco State University.

[2] Anwaar Al-Lawati, Shaikha Al-Jahdhami

[3] " RFID-based System for School Children Transportation Safety Enhancement ", Proceedings of the 8th IEEE GCC Conference and Exhibition, Muscat, Oman, 1-4 February 2015.

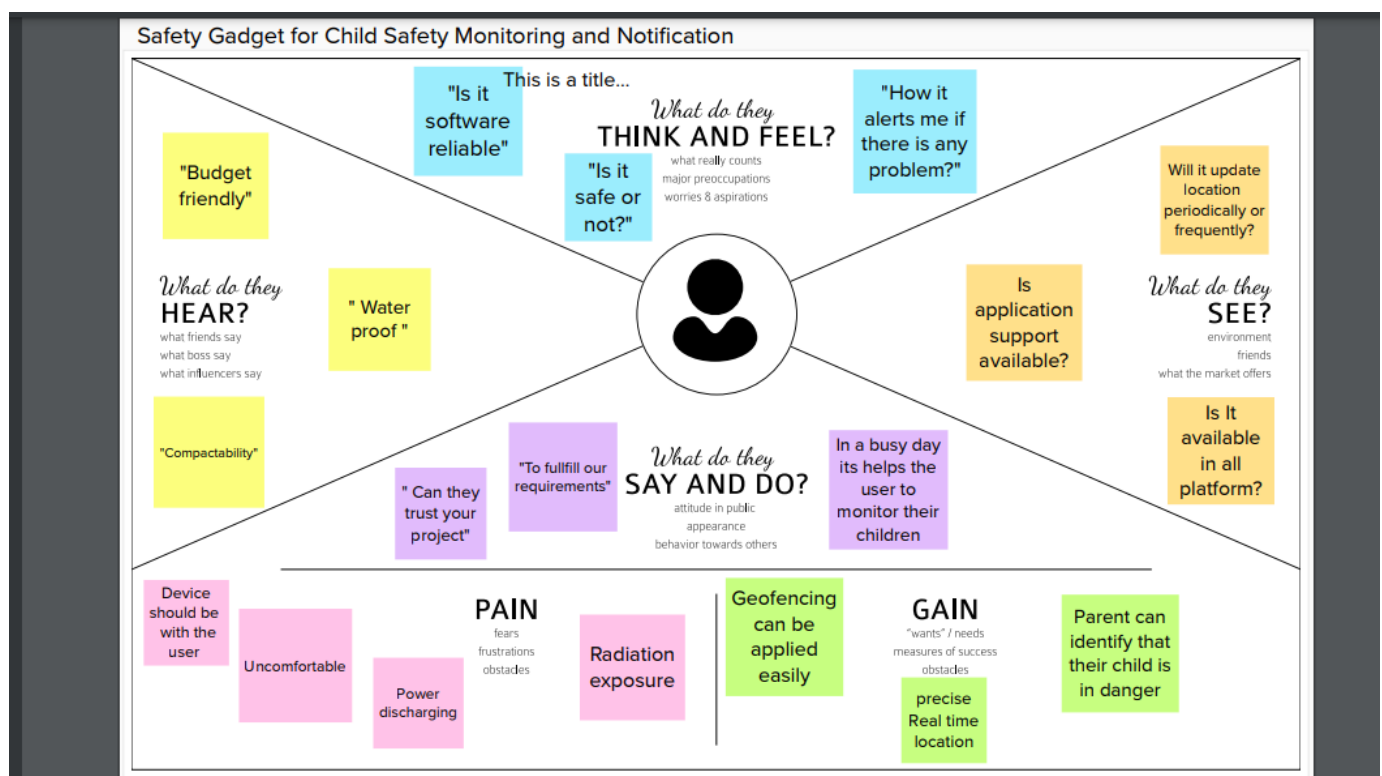
## **2.3 PROBLEM STATEMENT DEFINITION**

- 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.
- D. Smart Intelligent System for Women and Child Security
- A portable device which will have a pressure switch. As soon as an assailant is about to attack the person or when the person senses any insecurity from a stranger, he/she can then put pressure on the device by squeezing or compressing it.

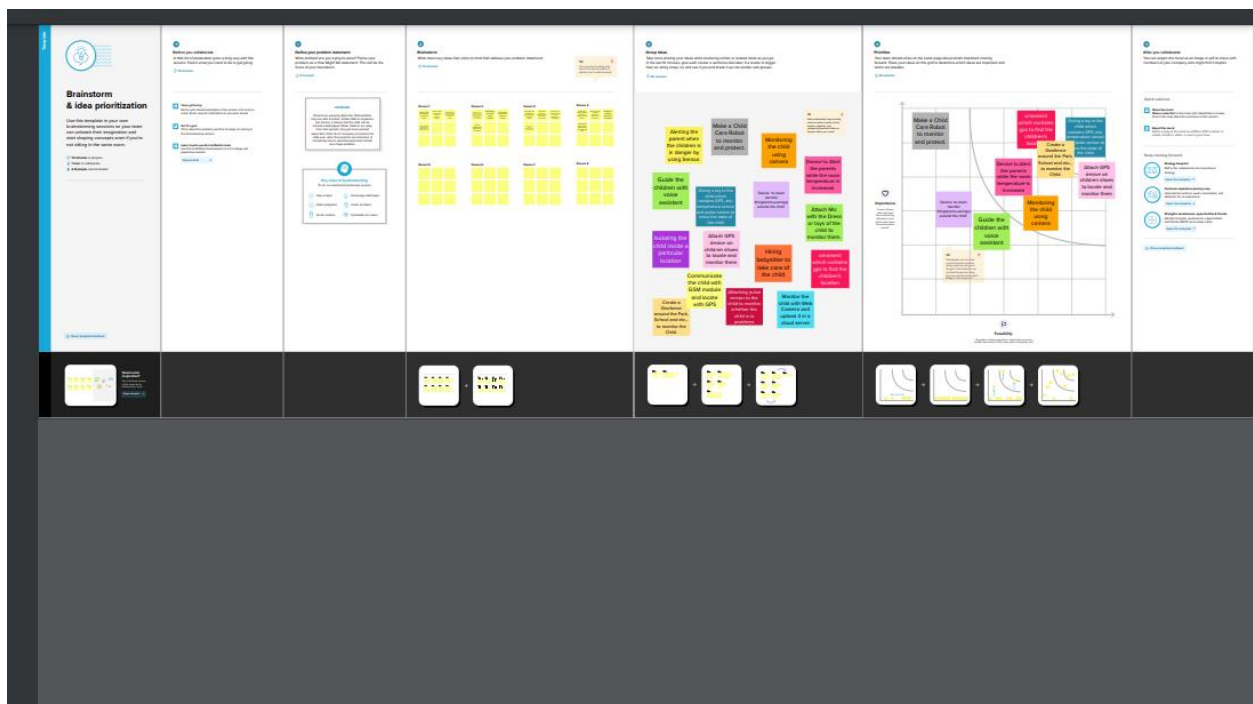
- Instantly the pressure sensor senses this pressure and a conventional SMS, with the victim's location will be sent to their parents/guardian cell phone number stored in the device while purchasing it, followed by a call.
- If the call is unanswered for a prolonged time, a call will be redirected to the police and the same message will be sent.
- Additionally, if the person crosses some area which is usually not accessed by the person then a message with the real-time
- location is sent to the parent/guardian's phone via conventional SMS. ENT

## IDEATION & PROPOSED SOLUTION :

### 3.1 Empathy Map Canvas:



## 3.2 IDEATION & BRAINSTORMING :



## 3.3 Proposed Solution :

S.No.	Parameter	Description
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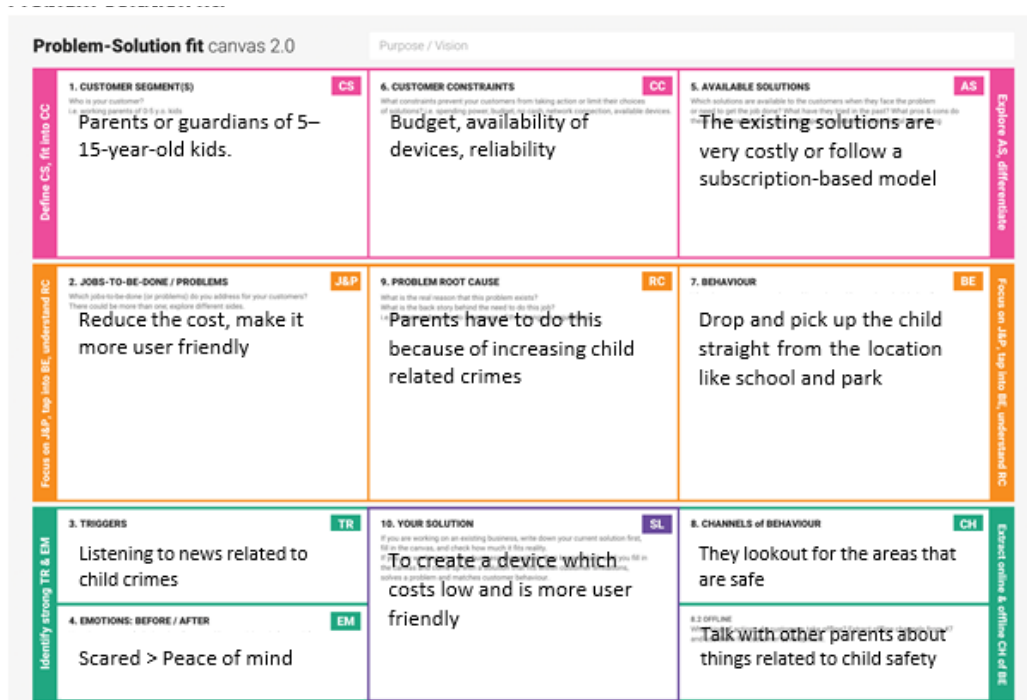
1.	Problem Statement (Problem to be solved)	Kids are the lifeblood of all parent, as we all know, and parents need to take particular care with children who have special needs. If parents have jobs, they cannot watch over their children all the time.
2.	Idea / Solution description	<ul style="list-style-type: none"> <li>• Our approach involves monitoring the child and creating a wearable device that can track their location.</li> <li>• Temperature, feelings, and moist detection utilizing the appropriate sensors. These are all parameters.</li> <li>• An alert message with a location and a phone call is initiated and sent to neighbors and the end user based on the sensor results.</li> </ul>
3.	Novelty / Uniqueness	<ul style="list-style-type: none"> <li>• Our system delivers a wearable GPS tracking device that can provide real-time notification and location data.</li> </ul>
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> <li>• Improves more safety and freedom for kids to meet their needs.</li> </ul>

5.	Business Model (Revenue Model)	Our system offers a futuristic framework so that new technologies on the market that are compatible with it may be quickly incorporated, increasing revenue and providing several advantages at a reasonable price for users.
6.	Scalability of the Solution	<ul style="list-style-type: none"> <li>• It is a mobile device.</li> <li>• It is less expensive and more effective.</li> </ul>



		<ul style="list-style-type: none"> <li>It doesn't need a lot of maintenance.</li> </ul>
--	--	---

### 3.4 PROPOSED SOLUTION FIT:



## 4.REQUIREMENT ANALYSIS

### 4.1 Functional requirement:

Following are the functional requirements of the proposed solution.

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 personfor 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

## **4.2 Non-functional Requirements:**

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

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 any time and versatile.

## **5.PROJECT DESIGN**

### **5.1 Data Flow Diagram**

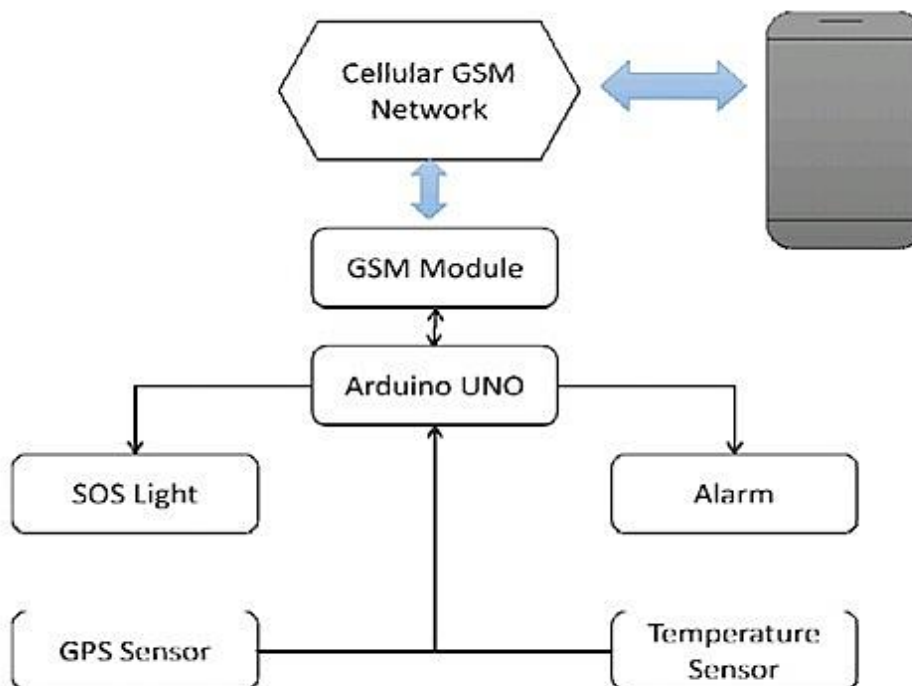


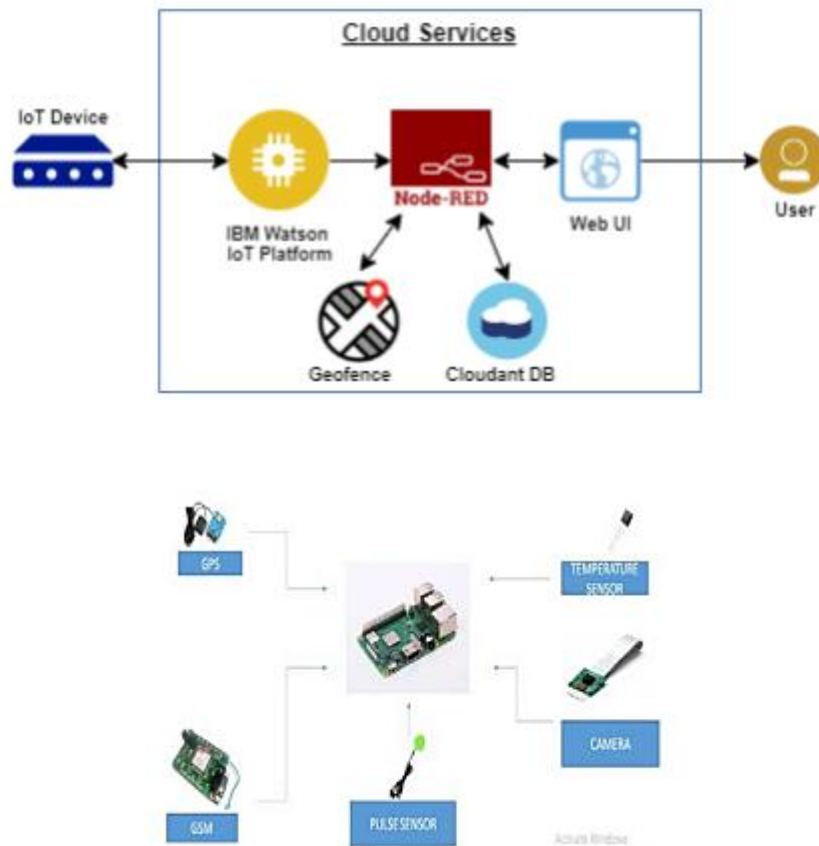
Fig. 1 System overview of the wearable device.

### **5.2 Solution & Technical Architecture :**

- Solution Architecture: Solution architecture is a complex process – with many sub-processes – that bridges the problems and technology solutions. Its goals are to: • Find the best tech solution to solve existing problem •
- The IoT device is there used esp32, the esp 32 collects the information and it shares the information • A geofence is a virtual perimeter for a real world geographic area. It is dynamically generated

- • We have a data base is used the IBM cloud data base ,there we store a information (data's) • We are using IBM Watson IoT platform to share the data node red the node red is create a web UI •
- The web UI is connect the user the IOT data is shows the user • The user have a application ,it notification and live location provided by web UI

### Technical Architecture:



**Fig. 8: Architecture diagram of the proposed system**

### 5.3 User Stories :

Now a days the children kidnapping and the sexual violence at home and in school, that are increasing in our society.so the parents have the fear to go out their children.so they expect the solution for their children safety .

## **6.PROJECT PLANNING & SHEDULING**

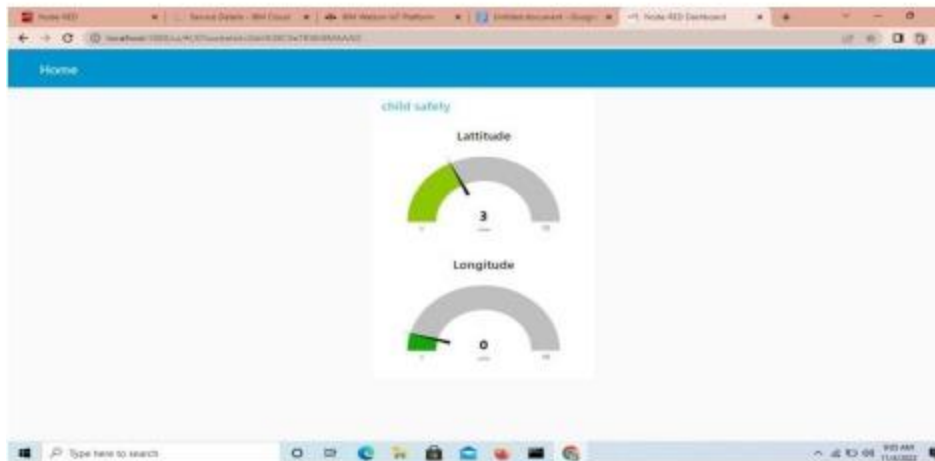
### **6.1 Sprint Planing & Estimation:**

A Burndown Chart titled "Burndown Chart" comparing Planned and Actual progress. The Y-axis represents a value from 0 to 7. The X-axis shows six dates, all labeled "Oct-22". The "Planned" series (blue line with circles) starts at 6, drops to 5, then 4, 3, 2, and ends at 1. The "Actual" series (red line with circles) starts at 6, drops to 4, rises to 5, drops to 2, stays at 2, and ends at 1.

Date	Planned	Actual
Oct-22	6	6
Oct-22	5	4
Oct-22	4	5
Oct-22	3	2
Oct-22	2	2
Oct-22	1	1

## 6.2 SPRINT DELIVERY SHEDULE :





### **6.3 REPORTS FROM JIRA:**

One part of ensuring the success and smooth operations of your projects in JIRA is reporting. It involves gaining the knowledge about the health, progress and overall status of your JIRA projects through Gadgets, report pages or even third party applications. The goal of this guide is to provide an overview of the tools available to JIRA users today and how they can be used to fulfill the different types of reporting needs that users face today.

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

#### **CODING:**

#### **7.1CODING:**

```
#!/usr/bin/python3
import RPi.GPIO as GPIO
import time
import os
import glob
from twilio.rest import Client

def main():
    """Determine the address of your temperature data on the RPi, which will always begin
    with a "28." In my case, my `device_folder` is
    `/sys/bus/w1/devices/28-83185055b9ff/w1-slave`. That is the location on my RPi of
```

where the raw temperature data is being saved. The numbers following the 28 prefix will be different for you.

```
"""
```

```
base_dir = '/sys/bus/w1/devices/'
device_folder = glob.glob(base_dir + '28*')[0]
device_file = device_folder + '/w1_slave'
```

```
#Define your Twilio credentials
account_sid = 'TWILIO_ACCOUNT'
auth_token = 'TWILIO_TOKEN'
```

```
client = Client(account_sid, auth_token)
```

```
#GPIO Setup. The code needs to tell the RPi which GPIO pins to read data from.
```

```
temp_channel = 4
temp = GPIO.setmode(GPIO.BCM)
temp = GPIO.setup(temp_channel, GPIO.IN)
```

```
#Function to open the device file and read the raw temperature data
```

```
def read_temp_raw():
    f = open(device_file, 'r')
    lines = f.readlines()
    f.close()
    return lines
```

```
#Function to extract and parse the raw temp data, and convert Celsius to Fahrenheit.
```

```
def read_temp():
    lines = read_temp_raw()
    while lines[0].strip()[-3:] != 'YES':
        time.sleep(0.2)
        lines = read_temp_raw()
    equals_pos = lines[1].find('t=')
    if equals_pos != -1:
```



```

temp_string = lines[1][equals_pos+2:]
temp_c = float(temp_string) / 1000.0
temp_f = temp_c * 9.0 / 5.0 + 32.0
temp_f = round(temp_f)
return temp_f

#Function to create a text message string if the temperature is too warm.
def warm_message():
    client.messages.create(
        to='ALERT_PHONE',
        from_='TWILIO_PHONE',
        body="It's currently " + str(read_temp()) + " degrees in my crib, how about " \
            "turning up the air conditioning or opening a window?")

#Function to create a text message string if the temperature is too cold.
def cold_message():
    client.messages.create(
        to='ALERT_PHONE',
        from_='TWILIO_PHONE',
        body="It's currently " + str(read_temp()) + " degrees in my crib, how about " \
            "turning the heat up a little bit?")

#Run perpetually. Send the message based on the temperature.
while True:
    if read_temp() > 82:
        warm_message()
    if read_temp() < 60:
        cold_message()
    time.sleep(300)

main()

```

```

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```

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f.close()
return lines

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        temp_f = round(temp_f)
        return temp_f

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def cold_message():
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#Run perpetually. Send the message based on the temperature.
while True:

```

```

    if read_temp() > 82:
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    time.sleep(300)

main()

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def cold_message():
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```

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#Run perpetually. Send the message based on the temperature.

```
while True:
```

```
    if read_temp() > 82:
```

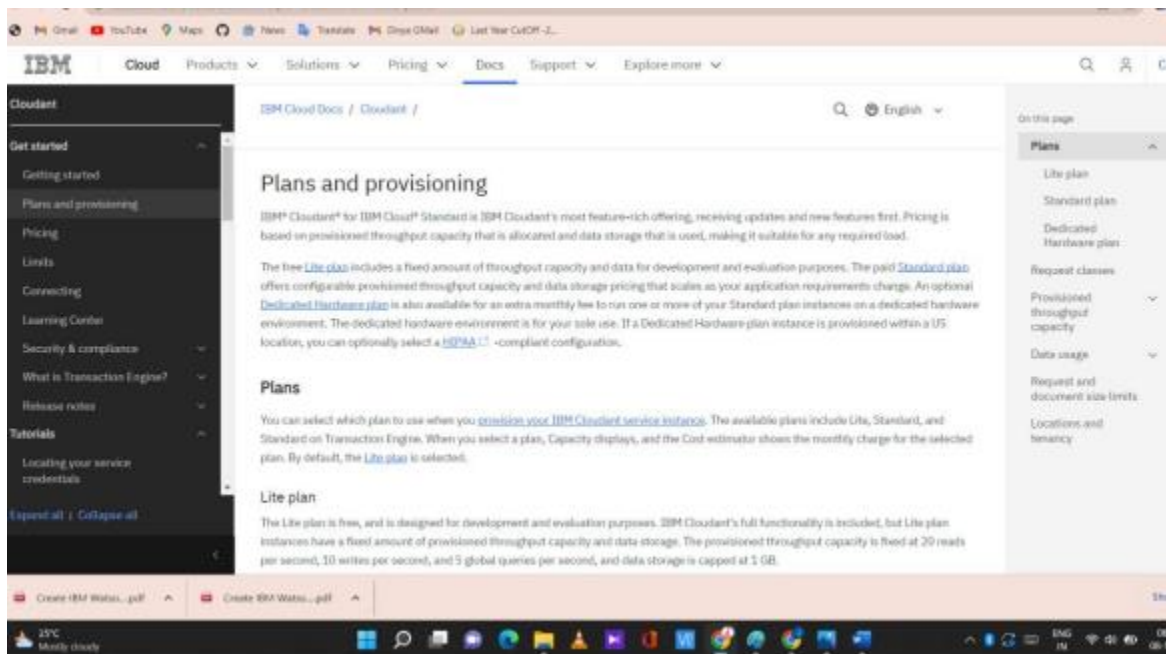
```
        warm_message()
```

```
    if read_temp() < 60:
```

```
        cold_message()
```

```
    time.sleep(300)
```

main(7.3 Database schema(if Applicable))



## 7.2 DATABASE SCHEMA :



**Fig.2: GPS**



**Fig.3: GSM**



**Fig.6 :PULSE SENSOR**



**Fig.4 : TEMPERATURE SENSOR**



**Fig.7 : WEB CAMERA**

## **8.TESTING**

### **8.1 TESTING & CASES :**

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.

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.

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

- 1.Temperature sensor
- 2.Pulse sensor
- 3.GPS
- 4.GSM
- 5.Web camera
- 6.Raspberry pi microprocessor

The Temperature sensor is used to sense the surrounding temperature of the device. If the temperature level exceeds the room temperature then the alert message will be sent using GSM to the specified users.

The Pulse sensor is used to detect any abnormal feelings experienced by the child like fear, anxiety, nervousness, drowsiness and several other illnesses which manipulates the normal heart rate.

## **8.2 User Acceptance Testing :**

- If the device moves, out of that boundary the server transfers an alert call by activating the GSM, to the user. The live location of the device will be updated in the server and pinged in the website for every few seconds. The server side coding was written in PHP and the controller side coding was written in Python.
- The user will receive an alert call and after entering the login ID and password, they can check the live location through GPS, which was updated in the application. When giving boundary for the school unit, we can also maintain attendance by updating the entry and exit of the child, in and out, of school in the application. We feed specific threshold values for sensors like temperature and pulse in which, if the device exceeds those threshold values or if the device gets exposed to abnormal condition then those values tend to be updated in the server.
- The server compares the currently obtained values with the coded threshold values, if they are beyond the threshold value, it generates an alert message through GSM. The alert messages are delivered to specified users in the form of SMS and the user can be able to login to the application to check the status and updated information.
- After receiving the alert messages, if the user wants to visually check the status of the child, they are required to enter specific IP address of that camera for the first time before syncing and can be able to watch the live streaming videos which are updated to the server, for further uses they can directly view. The microprocessor is used to control all these actions and the alert was done by checking for specific user of that device in the database





## **9.RESULT :**

### **9.1 Performance Metrics:**

One of the module in our project is temperature sensor which is used to detect the temperature of the child as well as the surrounding temperature. If there occurs any abnormal rise or fall in temperature in the body of the child or in the surrounding it will notify the user as per the coded time delay as shown in the picture. It will show the temperature and humidity values notifies the user based on the predefined value abnormal fall or rise scenarios.

## **10.ADVANTAGES & DISADVANTAGE :**

### **ADVANTAGE:**

- If the child in any critical situation it was easily detected by this device.
- This device is not only used to child .it more useful to women and children.

## **DISADVANTAGE :**

It's cost is cannot suitable to all people.

## **11 .CONCLUSION :**

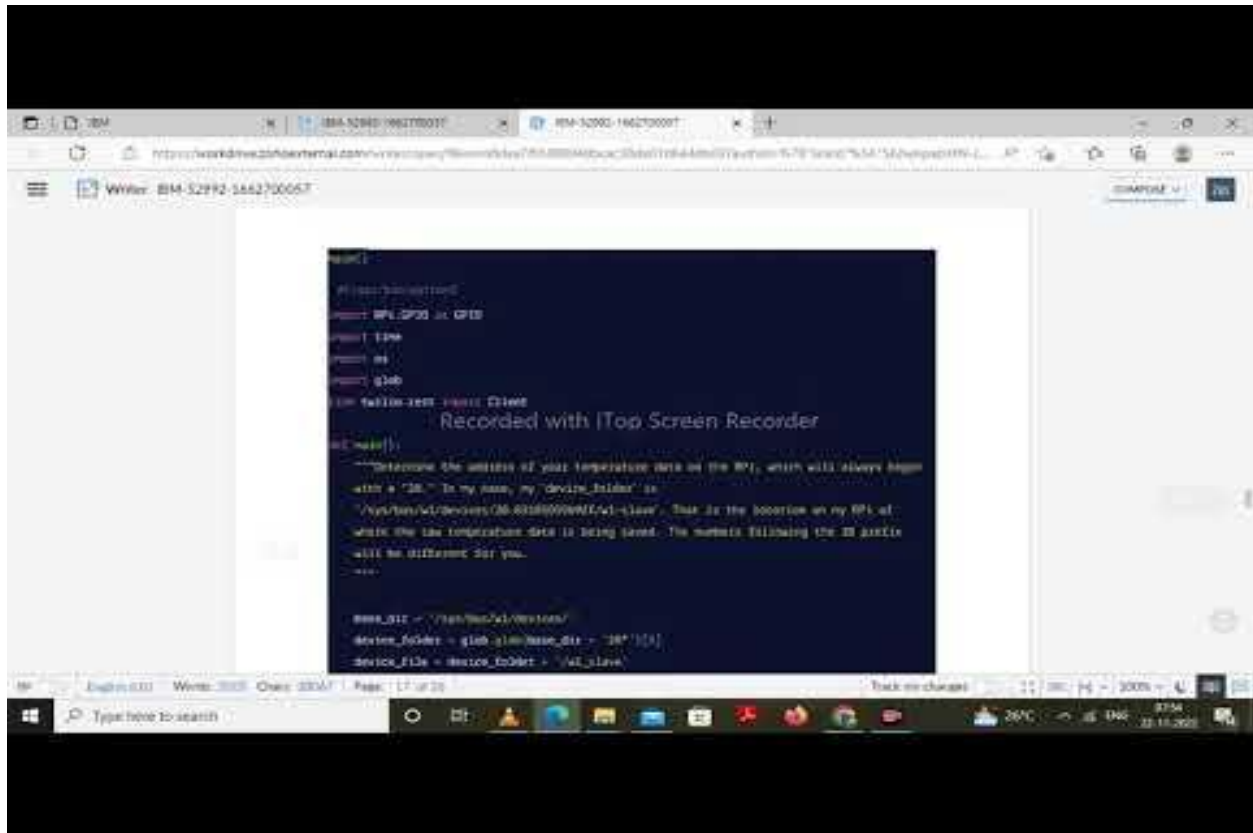
The word Future resembles the word Children. As Dr. A.P.J Abdul Kalam's words "Youngsters are the future pillars of one's nation", today's children are tomorrow's youngsters, preserving their dreams and life for a better future is necessary. Therefore, each and every parent should take care of their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

## **12.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 live 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.

## **13.APPENDIX:**

**GitHub&Project Demo Link:**



project Demo Link : <https://youtu.be/P70wZNvv6hw>

