

PROJECT REPORT

Project Name: Based on IOT Safety gadgets and child monitoring system

APPLICATION:

Team ID: PNT2022TMID49428

Team lead : PRIYADHARSINI S

Team mem: V.PREETHI

M.MUGUNTHARAJAN

K.NITHYA

1.INTRODUCTION

1.1 Project overview

1.2 Purpose

2. LITERATURE SURVEY

2.1 Existing problem

2.2 References

2.3 Problem statement definition

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy map canvas

3.2 ideation and brainstorming

3.3 proposed solution

3.4 Problem solution fit

4. REQUIREMENT ANALYSIS

4.1 Functional requirements

5. PROJECT DESIGN

5.1 Data flow Diagrams

5.2 Solution and technical architecture

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint planing ,schedule and Estimation

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

7.1 Feature

8. TESTING

8.1 Test cases

8.2 User acceptance Testing

9. RESULTS

9.1 Performance metrices

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

Source Code

GitHub & Project Demo Link

INTRODUCTION

1.1 Project overview :

IoT Based Safety Gadget For Child Safety Monitoring & Notification.

Category: Internet Of Things

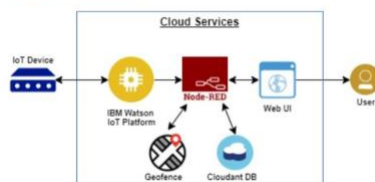
Skills Required: IBM Cloud,IBM IoT Platform,IBM Nodered,IBM Cloudant DB

Project Description:

1. Child tracker helps the parents in continuously monitoring the child's location.
2. They can simply leave their children in school or parks and create a geofence around the particular location.
3. By continuously checking the child's location notifications will be generated if the child crosses the geofence.
4. 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.

Technical architecture:

Technical Architecture:



1.2 PURPOSE:

- The child monitoring system main aims is to avoid the child unawareness.
- It is low cost and efficient system and easy accessibility to common people.
- It includes Arduino,sensors like moisture detector, temperature detection and so on.

2.IITERATURE SURVEY

2.2 EXISTING PROBLEM:

Existing System:

1.2.1. Existing Systems:

- Some of the systems that have been implemented to make the IoT based Children Monitoring System in School used as literature survey.
- IOT Based Smart GPS Device for Child and Women Safety Applications“Android based solution to aid parents to track their children in real time.
- Different devices are connected with a single device through channels of internet.
- The concerned device is connected to server via internet.
- The device can be used by parents to track their children in real time or for women safety.
- The proposed solution takes the advantage of the location services provided by GSM.
- It allows the parents to get their child's location on real time by SMS.
- This device will also have the facility of Emergency help key (SOS), if anyone presses the key, automatic help message will be sent to 3 registered mobile numbers on Server.
- ”Children Tracking System using ARM7 on Android Mobile Terminals
- “The proposed system includes a child module and two receiver modules for getting the information about the missed child on periodical basis.
- The child module includes ARM7 microcontroller (I pc 2378), Global positioning system (GPS), Global system for mobile communication (GSM), Voice playback circuit and the receiver module includes Android mobile device in parent's hand and the other as monitoring database in control room of the school.

Crossbow Motes technology:

- “Crossbow Motes are very small devices that contain a microprocessor, radio transceiver, and interfaces to connect simple sensors such as smoke, temperature.
- The Crossbow Motes device; these Motes are a new and quickly-growing technology. But there are some disadvantages to use these devices such as: Finite Coverage, affected by trees & walls High cost.”

Gotcha system:

- “Gotcha it is child monitor that helps parents to protect their children at malls, supermarkets, parks, or everywhere.
- Gotcha alerts the children and parent whenever they wonder farther than a safe distance. Gotcha is an invisible electronic leash between parents and their kids.”

Global positioning system technology:

solved)

Description:

- Basically, children cannot complain about abusement 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. Child goes missing in this world.
- To protect them in school , outside the house, when crossing road and respective environment .

2. Parameter:

Idea / Solution

description:

- 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.

- This paper presents a system to monitor pickup/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 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 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.

- 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 numbers 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 parent/guardian's phone via conventional SMS.

3. Parameter:
Novelty / Uniqueness

Description:

- **RFID-based System for School Children Transportation Safety Enhancement. Design and Development of an IOT based wearable device for the Safety and Security of women**

and girl children.

- **Smart Intelligent System for Women and Child**

4. Parameter:

Social Impact / Customer Satisfaction

Description:

- **increased fear, guilt and self-blame. distrust of adults or difficulty forming relationships with others. disrupted attachments with those who are meant to keep them safe. mental health**

disorders such as anxiety, attachment, posttraumatic stress and depression disorders.

5. Parameter:

Business Model (Revenue Model)

Description:

The model of the gadget is wearable device. Like watch , pendent and other models. That consist the GPS to track the location of the person . If it is business model we first consider about cost and the gadget is not harmful to health. Because the device was used by the person in 24 hours.

6. Parameter:

Scalability of the Solution

Description:

The scalability we can use the gadget in 24 hours. That sense and sends the information to the parents and guardians to the right ways. To ensure that it works in the day full. This is the scalability of the gadget .

Date	19 September 2022
Team ID	PNT2022TMID49428
Project Name	IoT Based safety gadget for child safety monitoring and notifications.
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Basically, children cannot complain about abuse 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. Child goes missing in this world. To protect them in school, outside the house, when crossing road and respective environment.

2.	Idea / Solution description	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. 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 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. 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 numbers 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.
3.	Novelty / Uniqueness	RFID-based System for School Children Transportation Safety Enhancement. Design and Development of an IoT based wearable device for the Safety and Security of women and girl children. Smart Intelligent System for Women and Child Security

4.	Social Impact / Customer Satisfaction	Increased fear, guilt and self-blame, distrust of adults or difficulty forming relationships with others, disrupted attachments with those who are meant to keep them safe, mental health disorders such as anxiety, attachment, post-traumatic stress and depression disorders.
5.	Business Model (Revenue Model)	The model of the gadget is wearable device. Like watch, pendant and other models. That consist the GPS to track the location of the person. If it is business model we first consider about cost and the gadget is not harmful to health. Because the device was used by the person in 24 hours.
6.	Scalability of the Solution	The scalability we can use the gadget in 24 hours. That sense and sends the information to the parents and guardians to the right ways. To ensure that it works in the day full. This is the scalability of the gadget.

3.4 problem solution fit:

Problem-Solution Fit

Date	16 October 2022
Team ID	PNT2022TMID49428
Project Name	Project-IOT Based Safety Gadget For Child Safety Monitoring And Notification
Maximum Marks	2 Marks

Problem-Solution fit canvas 2.0 Purpose: To create an child safety gadget

1. CUSTOMER SEGMENT Caretaker • Parent	6. CUSTOMER CONSTRAINTS Easy to use compatible and weightless low cost	5. AVAILABLE SOLUTION • Knowledge about setting geofence • Device • Internet
2. JOBS -TO- BE-DONE/ PROBLEMS • To manage data store • network connectivity? To alert the parents in case of emergency	9. PROBLEM ROOT CAUSE • Crimes missing children • Irresponsible parents	7. BEHAVIOUR Tracking devices for kids provide you with real-time GPS details of your child's location. This is extremely useful tool when your child is walking to a friend's house from any instant distance where your child's current whereabouts could be ascertain.
3. TRIGGERS social media, neighbor, director of the child	10. YOUR SOLUTION Gadget ensure the safety and tracking of children. The android app use GPS and mobile service to find the child location and security stored accurate location without knowing	8. CHANNELS OF BEHAVIOR RE ONLINE web applications/GPS module communication sms Distance Calculations gadget using time
4. NOTIONS BEFORE AFTER • Parents are panic that they lost the child They left home after they find their child		

4. Required analysis:

SOLUTION REQUIREMENTS

Date: 17-10-2022

Team ID: PNT2022TMD49428

Topic: IoT Based safety gadget for child safety monitoring and notification.

Functional Requirements:

Following are the functional requirements of the proposed solution.

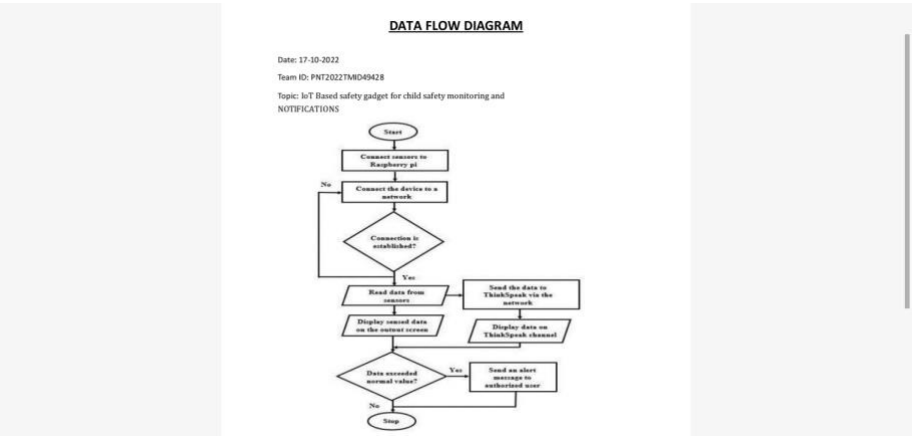
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Notification	Notified via Mobile App
FR-4	User Interface	Mobile App- MIT App Inventor Able to see location of children when they are out of geofence

Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Accessed through Mobile App Showing location (latitude and longitude) of child
NFR-2	Security	Database security must meet HIPAA requirements
NFR-3	Reliability and Availability	Once logged in ,webpage : is available until logging out of the app
NFR-4	Performance	Each page must load within 2 seconds
NFR-6	Scalability	The process must finish within 3 hours so data is available by 8 a.m. local time after an overnight update

5.Product design:
5.1 data flow diagram:

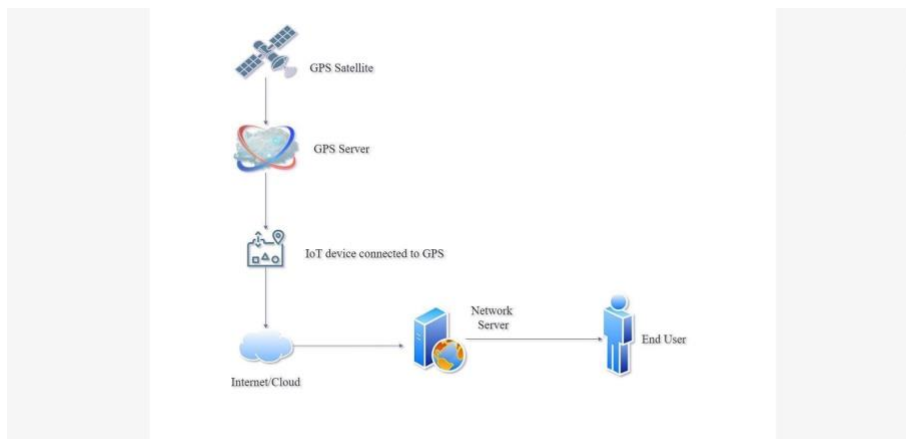


5.2 solution and architecture:

Solution Architecture:

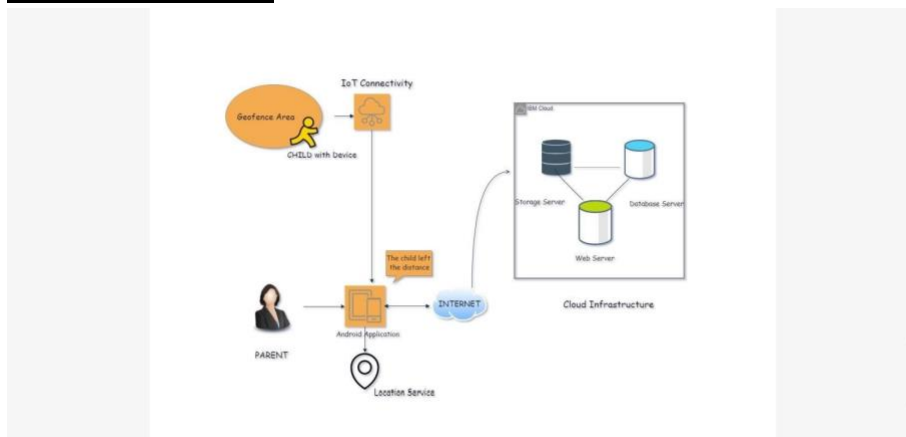
➤ Using the Minimum Viable Architecture model can ultimately result in a highly polished end product as it relies on testing assumptions with small experiments and guiding development using the findings of said experiments.

➤ Providing a flexible framework that can help achieve target business objectives, MVA responds to evolving customer requirements and technologies and can go a long way in promoting agility.



- The safety of a child at a large public event is a major concern for event organizers and parents. We address this important concern and propose 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.
- The proposed architecture model describes the people, information, process, and technology architecture elements, and their relationships for the complex IoT-enable smart child safety tracking digital system.

Outline Architecture:



6.project planning and scheduling:

Project Planning Phase
Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	14 NOVEMBER 2022
Team ID	PNT2022TMD49428
Project Name	Project – IOT-Based Safety Gadget for Child Safety Monitoring and Notification
Maximum Marks	8 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create a product backlog and sprint schedule

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	PRIYADHARSINI S
Sprint-1	Confirmation Email	USN-2	As a user, I will receive a confirmation email once I have registered for the application	4	High	PREETHI V
Sprint-1	Authentication	USN-3	As a user, I can register for the application through Gmail and mobile app.	4	Medium	NITHYA K
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High	MUGUNTHARAJAN M
Sprint-1	Dashboard	USN-5	As a user, I need to be able to view the functions that I can perform	4	High	PRIYADHARSINI S
Sprint-2	Notification	USN-1	As a user, I should be able to notify my parent and guardian in emergency situations	10	High	PREETHI V
Sprint-2	Store data	USN-2	As a user, I need to continuously store my location data into the database.	10	Medium	NITHYA K

Sprint-3	Communication	USN-3,1	I should be able to communicate with my parents	6	Low	PRIYADHARSINI S PREETHI V
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Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	IoT Device – Watson communication	USN-1,4	The data from IoT device should reach IBM Cloud	7	Medium	PRIYADHARSINI S, MUGUNTHARAJAN M
Sprint-3	Node RED- Cloudant DB communication	USN-5,2	The data stored in IBM Cloud should be properly integrated with Cloudant DB	7	High	NITHYA K PREETHI V
Sprint-4	User – WebUI interface	USN-1,4	The Web UI should get inputs from the user	6	High	PRIYADHARSINI S MUGUNTHARAJAN M
Sprint-4	Geofencing	USN-2,3,5	The geofencing of the child should be done based on the geographical coordinates	7	High	PRIYADHARSINI S PREETHI V NITHYA K MUGUNTHARAJAN M

Project Tracker, Velocity & Burndown Chart: (4 Marks)

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

Velocity:

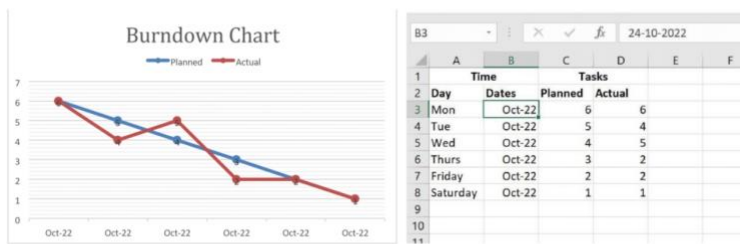
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day) .

AV=sprint duration/velocity

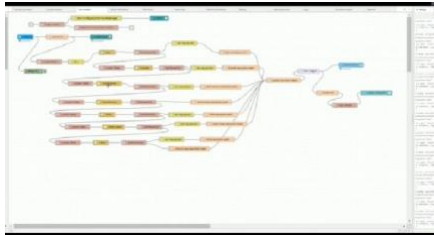
$$=20/10$$

$$=2$$

Burndown Chart:



7. Testing:



8. coding:

```

import time import sys
import ibmiotf.application
import ibmiotf.device import random
#Provide your IBM Watson Device Credentials organization = "zwx6lb" deviceType =
"ABCD" deviceId = "13" authMethod = "token" authToken = "12345678"
#api key {a-illza1-mbdxqo6z0s}
#api token {zSYzISuAWF&F x7GkT}

try: deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method":
authMethod, "auth-token": authToken}
deviceCli = ibmiotf.device.Client(deviceOptions)
#..... except Exception as e:
print("Caught exception connecting device: %s" % str(e))
sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type
"greeting" 10 times print("power on ") print("checking connection to wason iot...")
time.sleep(2) deviceCli.connect()
print("dear user ... welcome to IBM-IOT ")
print("i can provide your children live location and temperature ") print()
name=str(input("enter your child name:")) while True:

temperature=random.randint(20,50)#random temperature for your child
latitude=random.uniform(10.781377,10.78643)#random latitude for your child
longitude=random.uniform(79.129113,79.134014)#random longitude for your child
a="Child inside the geofence" b=" Child outside the geofence" c="High

```

```
temperature" d="Low temperature" x={'your child Zone':a}  
y={'your child Zone':b} z={'temp condition':c} w={'temp condition':d}
```

```
data = { 'temp' : temperature, 'lat': latitude, 'lon':longitude, 'name':name }  
#print data def myOnPublishCallback(): print ("Published Temperature =  
%s C" % temperature, "latitude  
= %s %" % latitude,  
"longitude = %s %" % longitude, "to IBM Watson") print("\n")  
success = deviceCli.publishEvent("IoTSensorgpsdata", "json", data, qos=0,  
on_publish=myOnPublishCallback)  
if latitude>=10.78200 and latitude<=10.786000 and longitude >=79.130000 and  
longitude <=79.133000:
```

```
deviceCli.publishEvent("IoTSensorgpsdata","json",data=x,qos=0,on_publish=myOnPublishC  
allb ack)  
print(x)  
print("\n") else:
```

```
deviceCli.publishEvent("IoTSensorgpsdata","json",data=y,qos=0,on_publish=myOnPublishC  
allb ack)  
print(y) print("\n")
```

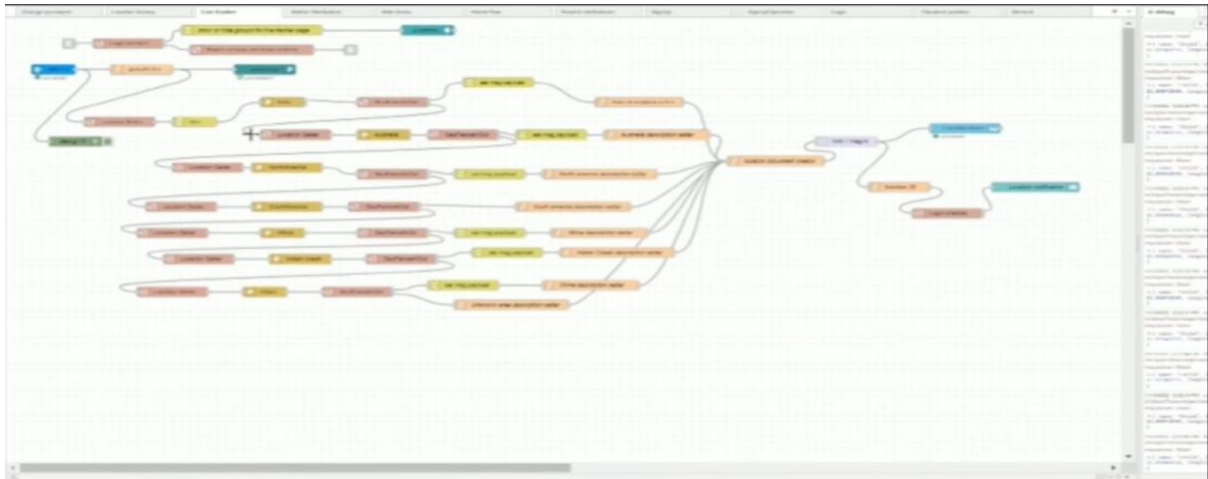
```
if (temperature>35):
```

```
deviceCli.publishEvent("IoTSensorgpsdata","json",data=z,qos=0,on_publish=myOnPublishC  
allb ack)  
print(c)  
print("\n") else:
```

```
deviceCli.publishEvent("IoTSensorgpsdata","json",data=w,qos=0,on_publish=myOnPublishC  
all  
back)  
print(d) print("\n") if not success: print("Not  
connected to IoTTF") print("\n") time.sleep(3)  
# Disconnect the device and application from the cloud deviceCli.disconnect()
```

8.TESTING

Web application using Node Red:



Action Device Types Interfaces

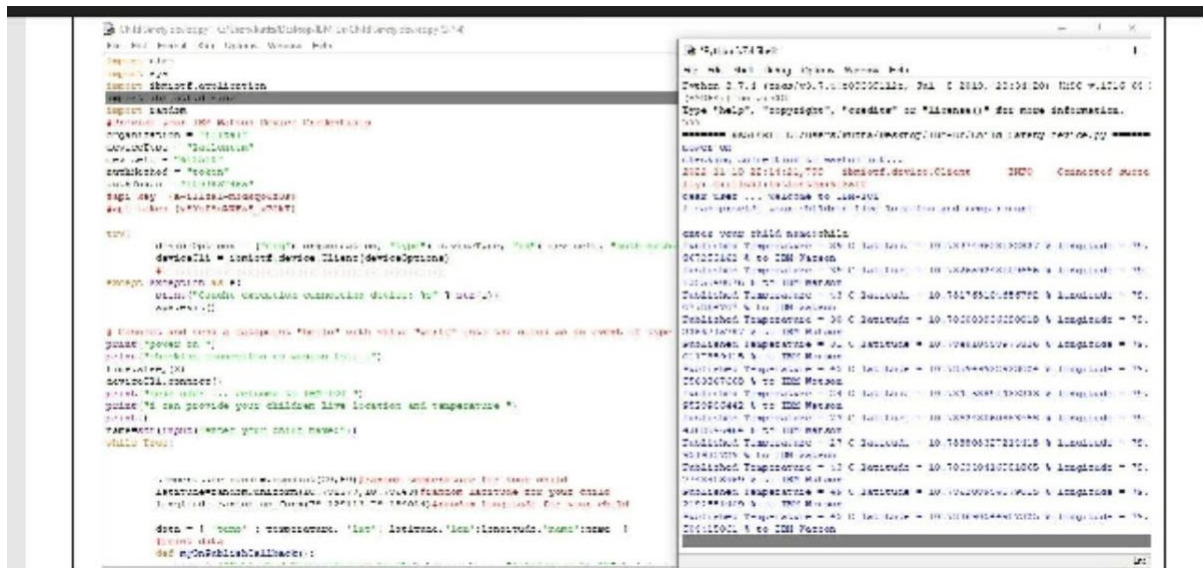
Unknowns Disconnected

shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different filters. To get started, you can add devices by using the Add Device button, or by using API.

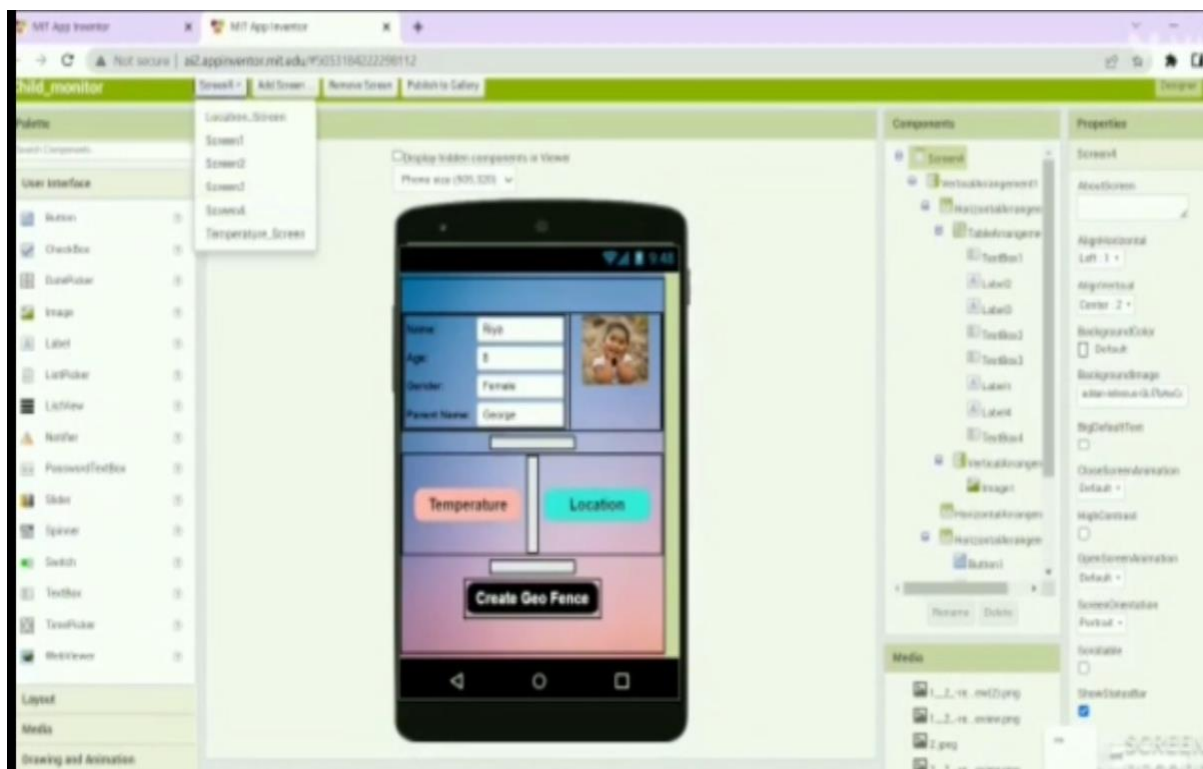
Search by Device ID Device Simulator

	Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
<input type="checkbox"/>	Light1	Disconnected	Light	Device	Oct 31, 2022 4:01 PM	
<input type="checkbox"/>	PD1	Disconnected	Medhi123	Device	Oct 31, 2022 12:30 PM	
<input type="checkbox"/>	childTrackerButton1	Disconnected	Button	Device	Nov 7, 2022 6:06 PM	
<input checked="" type="checkbox"/>	gps1	Disconnected	Tracker	Device	Nov 6, 2022 5:23 PM	

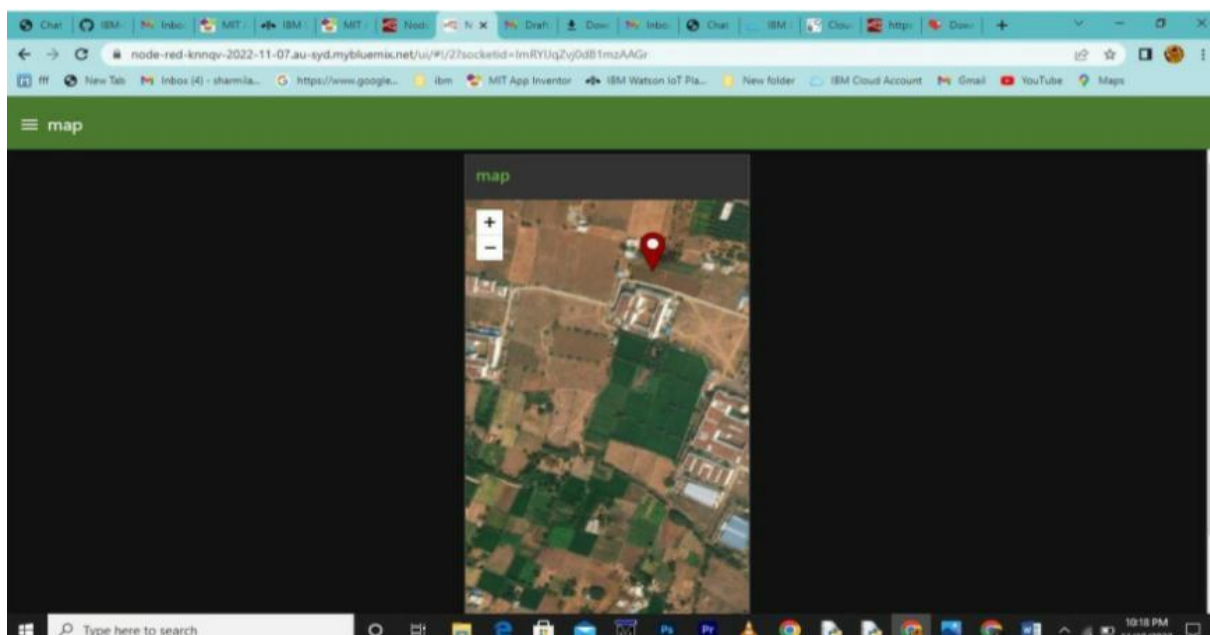
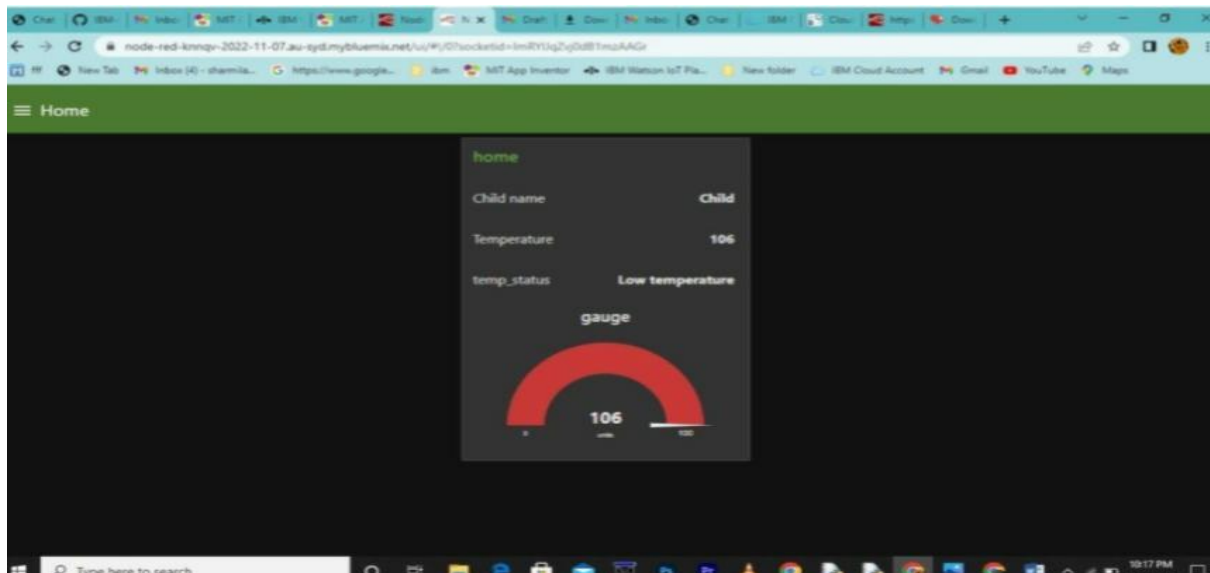
Identity Device Information Recent Events State Logs



USER ACCEPTANCE TESTING:



9.Result:



10. Advantages and disadvantage

Advantages:

- The device can be used by stockholders to track children and get real time data.
- The main Advantage of the proposed system is send location by using mobile network (GSM). Here a prototype model (device) is created which is hardware based.
- The work comprises ARDUINO UNO as microcontroller, along with GPS and GSM module.

Disadvantage :

- Security and privacy.
- Keeping the data gathered and transmitted by IoT devices safe is challenging, as they evolve and expand in use. ...
- Technical complexity. ...
- Connectivity and power dependence. ...
- Integration. ...
- Higher costs (time and money)

Conclusion:

- Throughout the research, it is clearly explained the IoT concept, child safety issues and the need of using child security system.
- Some previous studies have been included for designing the IoT-based child security smart band. 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 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.

- Hence, the future enchantments will be adding more features, software, applications, hardware to make the proposed system capable of working more intelligently, meanwhile guarantee the safety of children.

Future scope:

- In fact, IoT has been applied in domains such as smart home, smart city, smart factory, supply chain, retail, agriculture, lifestyle, transportation, emergency, health care, environment, energy, culture and tourism .
 - However, it is seldom used to monitor child's safety in Malaysia. Actually, there is a need to use IoT-based child security system since the safety of children has become a major concern .
 - In fact, crimes on children keep
- increasing despite actions have been taken by the government. Revealed by [9], the overall percentage of child abasements worldwide is about 80% nowadays, out of which 74% are girls and the remaining are boys. For every 40 seconds, a child is gone missing in the world.

- Due to that, parents are worried for their children and perhaps, a hard challenge for them to guarantee safety of their children when they are out.
- To cope with the issue, the system is proposed with these objectives:

Enable tracking of the child's location and capturing of data remotely such as temperature, pulse, respiratory rate, quality of sleep and many more.

To show the child's actual data with reference values.

- Enable sending of notification if the child is out of location or when the device realizes abnormal conditions/situations.

To trigger the alarm and enable automatic video recording whenever the emergency button is pressed.

- Then, emergency notification along with real-time video will be sent to and display in the parents' mobile apps. Develop a prototype of IoT wearable smart band connected to parents' mobile apps so that they can monitor the actual condition of children at anytime and anyplace.
- Atlantis Highlights in Computer Sciences, volume 4 Proceedings of the 3rd International Conference on Integrated Intelligent Computing Communication & Security .

GitHub link: <https://github.com/IBM-EPBL/IBM-Project-9513-1659014997>

Project demo link:

https://drive.google.com/file/d/155riwy4uyLGX95zQ_9E66PTANlirLwxT/view?usp=drivesdk

