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Team ID	PNT2022TMID01794
Project Name	IoT Based Safety Gadget for Child SafetyMonitoring and Notification
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## **1. Introduction**

### **1.1 Project Overview**

An IoT child safety device for monitoring the child safety giving instant notification to the parent. The invisible child safety gadget include many different features for various actions. The device will continuously share GPS location of the child to the synced mobile of the parent. There are different sensor attached to the device to sense and detect the accident and notify the parent by sending the alert message. A child safety application will be installed by the parents that consists of different controlling features of the wearable device for the child monitoring. The device also act as health monitor system that detects temperature, SPO2, oxygen level and number of steps of their child.

### **1.2 Purpose**

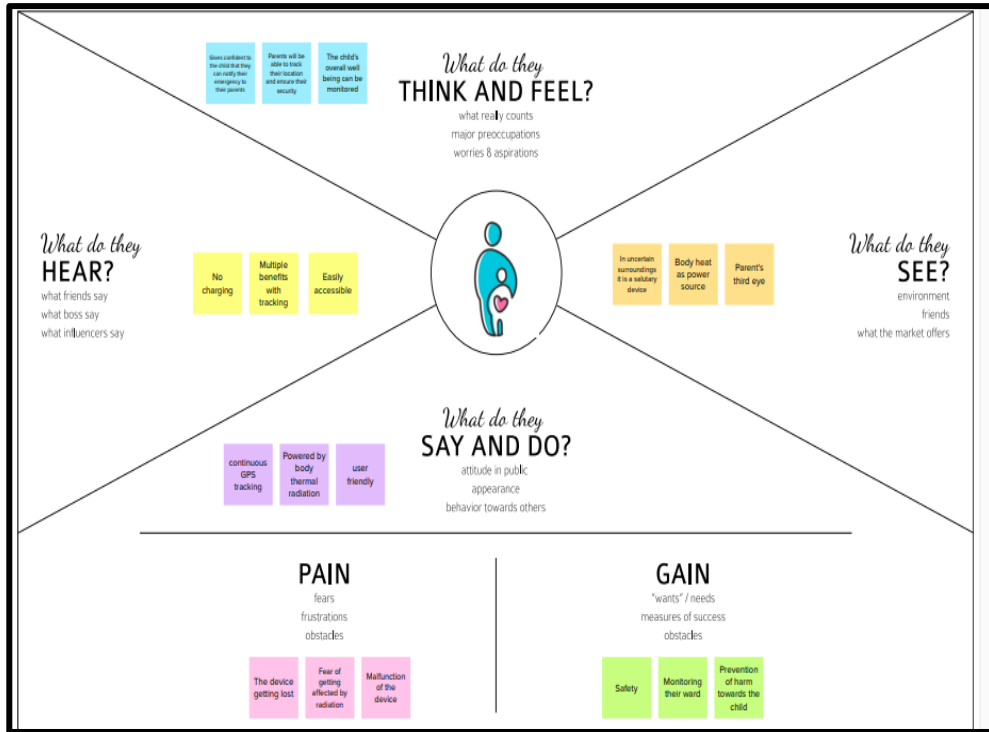
Approximately 80% of all reports of child abuse are made nowadays, with 74% of the victims being girls and the remaining 20% being males. In this world, a child goes missing every forty seconds. Children are the foundation of a country; if their future was threatened, it would have an effect on the development of the whole country. The emotional and mental stability of the children is compromised as a result of the abuse, ruining their futures and careers. The things that happen to these defenseless kids are not their fault. Therefore, parents are in charge of raising their own children. However, parents are compelled to seek money because of the state of the economy and their desire to concentrate on their child's future and job. Consequently, it becomes challenging for them to constantly cling to their kids. We have created a setting in our system where this issue can be effectively solved. It enables parents to keep a close eye on their kids in real time while concentrating on their own careers without having to take any physical action. In essence, kids cannot tell their parents about the abuse they experience on a regular basis. They are too young to really comprehend what truly occurs to them. Parents find it challenging to recognize when their children are being abused. So, the main objective of this module is to help working parents to be free from worry about their children by tracking their movements at any time. An autonomous real-time monitoring system is required for every child worldwide in order to stop attacks on children.

## **2. Literature Survey**

1. The parent module and child module make up the two modules that make up the planned system. When a violation of child safe is identified, a specific sensor in kid module will produce a signal. These sensors will send a signal to the controller, which will send it through the transmitter to the parent module, which will make the necessary determination and initiate the violation handling process. The parent can choose whether the system should operate indoors or outdoors, and depending on this choice, the parent module can determine the distance between each child and their parent at any given time. When determining distance indoors, variation in RF signal amplitude is used rather than the Global Positioning System (GPS). Additionally, the parent can set a safety distance for each child, and if that distance is crossed, the system will sound an alarm for both the parent and the child. The suggested hardware and software for this concept is straightforward and may be implemented on a low-cost, single-chip microcontroller.
2. The system is made with a LinkIt ONE board that has embedded C programming and is interfaced with temperature, heartbeat, touch, GPS, GSM, and digital camera modules. The work is innovative in that when a child is in need of rapid attention during an emergency, the system instantly notifies the parent or caregiver by sending an SMS. The child's touch, temperature, and heartbeat are employed as parameters for the parametric analysis, and the results are presented for the same. An SMS is sent to the parents' mobile phone and an MMS with a picture from the serial camera is also sent if the sensor detects any abnormal readings. Future work will involve implementing an IoT device that will provide a comprehensive answer to all child safety issues.
3. The major objective of this project is to develop a child-safe smart wearable device that makes use of cutting-edge technologies. This tactic is therefore seen as the children's wearable sending an SMS to their parents or guardians. Through the use of a GSM module, this initiative uses cutting-edge technology to protect the child, making sure that they do not feel alone as they cope with such societal difficulties. The wearable will have an Arduino Nano, GSM, GPS, temperature sensor, heartbeat sensor, and a panic button. The heartbeat sensor regularly notifies the parent of the child's heart rate after detecting it. The accelerometer detects a sudden fall by the youngster and notifies the parents. The parent feels secure as a result of this.
4. In an effort to overcome the shortcomings of existing systems, this study provides a tracking system that can identify numerous dangers when multiple children are present. The parent module and child module make up the two modules that make up the planned system. A special sensor in the child module will send out a signal if the child safe is violated. These sensors will send a signal to the controller, which will send it through the transmitter to the parent module, which will make the necessary determination and initiate the violation handling process. The parent can choose whether the system should operate indoors or outdoors, and depending on this choice, the parent module can determine the distance between each child and their parent at any given time. When determining distance indoors, variation in RF signal amplitude is used rather than the Global Positioning System (GPS). Additionally, the parent can set a safety distance for each child, and if that distance is crossed, the system will sound an alarm for both the parent and the child. The suggested hardware and software for this concept is straightforward and may be implemented on a low-cost, single-chip microcontroller.
5. For two common safety scenarios, namely going outdoors with their guardians and going outside without their guardians, respectively, the Mobile Children Security Monitoring (MCSM) system implements the software hand function and the danger zone function. The software hand function can use Bluetooth NFC to keep kids in view, and the safety zone function can use GPS, acceleration sensors, and mobile GIS to let parents know where their kids are at all times (Geographic Information System). Experiments demonstrate that the system possesses the qualities of high dependability, rapid responsiveness, and high accuracy, and that it is capable of meeting the demands necessary to protect the safety of children

### 3. Ideation and Proposed Solution

#### 3.1 Empathy map canvas



### **3.2 Ideation and brainstorming**

#### **Idea 1:**

Wearable device(necklace) for child safety Always on the pendant with gps enabled tracking facility. It contains 4-5 touch sensors that does specific functions. Two of the touch sensors enables flash light and buzzer when touched simultaneously. If any one of the touch sensor is touched it turns of the light and buzzer. When 3 sensors are touched it captures the scene and sends to the parent or guardian mobile connected to it

#### **Idea 2:**

The device is for monitoring the health of the child when stuck inside the borewell. Using the Millimeter wave technology, it detects the heartbeat of the child stucked inside the borewell. Thermal imaging camera used to find the condition of the child. It detects the condition when heat emit from the body. DHT11 sensor is used to detect the temperature of the child. MQ-4 methane gas sensor is used to detect the quantity of methane present inside the borewell. Additionally, we added the O2 oxygen gas sensor which helps to find amount of oxygen content present inside that well and provides O2 if its insufficient. RFID is used to transfer data from bore well to computer.

#### **Idea 3:**

Safety gadget can be considered as hand band. The safety hand consists of gps and gsm sensor for location tracking and notification. Thus by syncing the sensor with the mobile by considering the layers of Iot. The smart child safety band will be more effecient for traking and monitoring of children, This would be helpful for the parents to track their children activities through mobile phone.

#### **Idea 3:**

The idea is to design the gadget in the form of wearables which uses body's heat energy for its functioning. Thermoelectric generators can convert heat energy to electrical energy. Skin is curved surface which is soft and easy to deform and self healable. Human body has complex geometries and hence require the use of flexible and strechbleTEG's. This also includes provision for oxygen monitoring, temperature monitoring, stress monitoring to analyse the state of the child especially for monitoring in case of emergency situations and give alert to the parentsviabuzzer.

### 3.3 Proposed solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The child safety monitoring system via mobile phones is a current growing smart technology among the society. But still the awareness and its importance is not wide spread due to its complexity and high cost.
2.	Idea / Solution description	The invisible child safety band consists of a GPS sensor to track the live location and send the information to the synced mobile phone. <ul style="list-style-type: none"><li>● The vibration sensor attached to invisible child safety band detects the accident</li></ul>
3.	Novelty / Uniqueness	<ul style="list-style-type: none"><li>● The child safety band is considered to be invisible as the outer material of the band is similar to the skin color of the child, which is customized by the users.</li><li>● The child safety band is a user friendly gadget as its functionalities can be controlled via the synced mobile phone like setting the distance range, buzzer indication.</li><li>● The band is also efficient and faster in communication as the device always synced with the mobile phone</li></ul>
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"><li>● The device guarantees the child safety through constant monitoring via mobile phones, thus reducing the safety concern among the parents.</li><li>● It reduces the risk of the child during emergency situations as the device notifies immediately to the parent when unexpected events happen.</li><li>● Thus the action is taken immediately and the child is protected from further consequences.</li></ul>
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"><li>● The device can be sold in different ways like selling in stores , online purchase etc as the device is small with customizable options.</li><li>● The device can be manufactured in different forms according to the convenience of the users, which thereby increases the productivity and sales.</li><li>● As child safety bands are low costs, the awareness of the device will be spread among the entire society creating an impact.</li><li>● This increases the number of users hence the profit also increases, as number of users is directly proportional to the profit of the manufacturer</li></ul>



### 3.4 Problem solution fit

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> <p>Working and non-working parents of kids who are 3 years and above</p>	<b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span> <p>Battery retention is the only customer constrain so far and this can be overcome by our new advancement which allows the battery to charge itself with the help of body heat. If this is possible then there can be no customer constrain for our solution.</p>	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> <p>A Multipurpose Child Tracking System Design and Implementation-  Smart IOT Device for Child Safety and Tracking  Wearable Safety Device for Children  Bracelet for Remote Surveillance of People Deprived of their Freedom  A Mobile  Safety Monitoring System for Children</p>	Explore AS, differentiate
Focus on J&P, fit into BE, understand RC	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span> <p>The invisible child safety band is efficient and low cost, the awareness of the child safety monitoring system can be spread among the society.  The invisible child safety band can be customized into different ornamental forms according to the requirement of the user.  The device also acts as a health monitoring system by sensing the radiation from the human body</p>	<b>9. PROBLEM ROOT CAUSE</b> <span>RC</span> <p>Recent news about child abuse and trafficking put parents in anxiety and create an insecure atmosphere for children. In order to provide a secure environment for children this solution was developed.</p>	<b>7. BEHAVIOUR</b> <span>BE</span> <p>The device guarantees the child safety through constant monitoring via mobile phones, thus reducing the safety concern among the parents.  It reduces the risk of the child during emergency situations as the device notifies immediately to the parent when unexpected events happen.  Thus, the action is taken immediately and the child is protected from further consequences.</p>	Focus on AS, explore BE, understand RC
Identify strong TR & EM	<b>3. TRIGGERS</b> <span>TR</span> <p>The device can be sold in different ways like selling in stores, online purchase etc. as the device is small with customizable options.</p> <b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span> <p>BEFORE:  Insecure  AFTER:  Secure and confident  USE:  Monitoring, surveillance and security</p>	<b>10. YOUR SOLUTION</b> <span>SL</span> <p>The invisible child safety band consists of a GPS sensor to track the live location and send the information to the synced mobile phone. The vibration sensor attached to invisible child safety band detects the accident.  The device guarantees the child safety through constant monitoring via mobile phones, thus reducing the safety concern among the parents. It reduces the risk of the child during emergency situations as the device notifies immediately to the parent when unexpected events happen. Thus the action is taken immediately and the child is protected from further consequences</p>	<b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span> <p>The invisible child safety band consists of a GPS sensor to track the live location and send the information to the synced mobile phone. The vibration sensor attached to invisible child safety band detects the accident. The child safety band is considered to be invisible as the outer material of the band is similar to the skin color of the child, which is customized by the users. The child safety band is a user-friendly gadget as its functionalities can be controlled via the synced mobile phone like setting the distance range, buzzer indication. The band is also efficient and faster in communication as the device always synced with the mobile phone</p>	Identify strong TR & EM

#### 4. Requirement analysis

##### Functional requirements

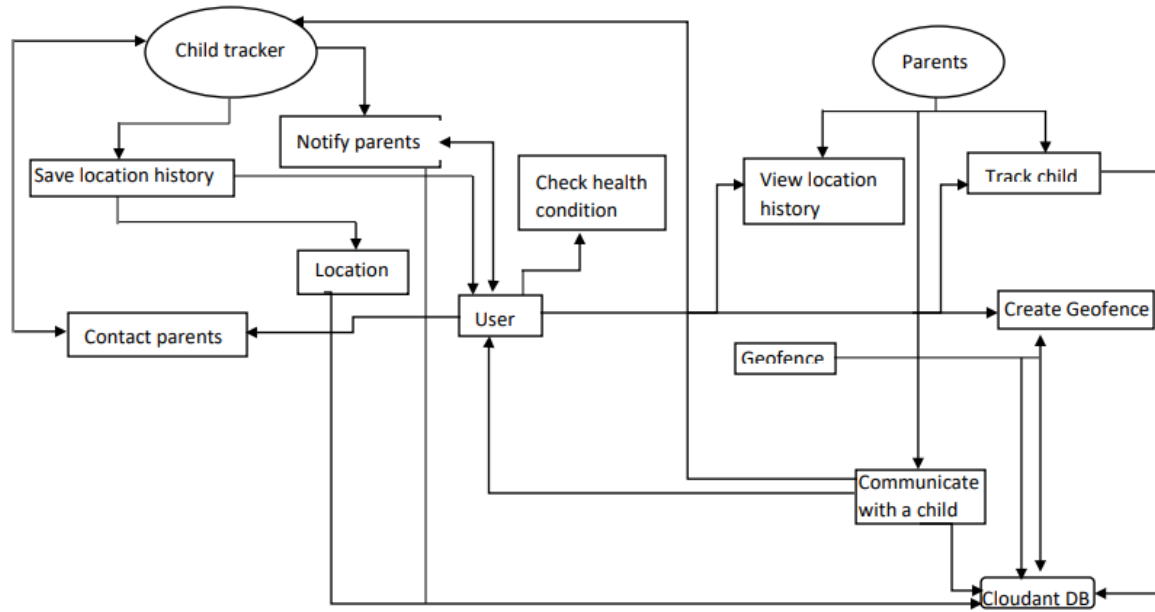
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-3	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-1	Object identification	Detection of nearby devices and showing their names to select the desired device
FR-4	Location tracking	A gps sensor tracks the live location of the child. Sends information about the location to synced mobile phone.
FR-5	Detection	Vibration sensors detects accidents Sends report to the synced mobile phone.
FR-6	External control	Synced mobile phone can control the buzzer indication, distance range for operation etc.

##### Non-Functional requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The use of the device demands operating it through mobile phones.
NFR-2	Security	For security concerns the device is locked with the parent's and the child's identification (like finger print). This devices prevents other persons from operating.
NFR-3	Reliability	Use of gps makes it more reliable for the user.
NFR-4	Performance	Extended battery life oh 24 hrs Can be well operated with solar powered battery.
NFR-5	Availability	It is advised to use the device specifically for a particular kid.
NFR-6	Scalability	The light weight, wearable and invisible band is a user friendly gadget. Can be controlled by synced mobile phone.

## 5. PROJECT DESIGN

### 5.1 Data Flow Diagrams



## **5.2 Solution & Technical Architecture**

### **Existing problems:**

- The child safety monitoring system via mobile phones is a current growing smart technology among the society. But still the awareness and its importance is not wide spread due to its complexity and high cost.
- Another cause for the invention of this safety gadget is due to the recent news about child abuse and trafficking put parents in anxiety and create an insecure atmosphere for children.

### **Solution for existing problems:**

- The invisible child safety band consists of a GPS sensor to track the live location and send the information to the synced mobile phone.
- The vibration sensor attached to the invisible child safety band detects the accident.
- The invisible child safety band is efficient and low cost, the awareness of the child safety monitoring system can be spread among the society.
  - The child safety band is a user friendly gadget as its functionalities can be controlled via the synced mobile phone like setting the distance range, buzzer indication.

### **Structure of the gadget:**

- The gadget is designed as a wearable band.
- The child safety band is considered to be invisible as the outer material of the band is similar to the skin color of the child, which is customized by the users.
- This child safety band notifies the parent or guardians if something unusual happens around the child or to the child. Characteristics of the gadget:
  - The invisible child safety band consists of a GPS sensor to track the live location and send the information to the synced mobile phone.
  - The vibration sensor attached to the invisible child safety band detects the accident.
  - This child safety band contains 4-5 touch sensors that do specific functions.
  - Two of the touch sensors enable flash light and buzzer when touched simultaneously.
  - If any one of the touch sensors is touched it turns off the light and buzzer.
  - When three sensors are touched it captures the scene and sends it to the parent or guardian mobile connected to it.
- The device guarantees the child safety through constant monitoring via mobile phones, thus reducing the safety concern among the parents.
- The child safety band is a user-friendly gadget as its functionalities can be controlled via the synced mobile phone like setting the distance range, buzzer indication.

### **Behavior of the gadget:**

- The device guarantees the child safety through constant monitoring via mobile phones, thus reducing the safety concern among the parents.
- It reduces the risk of the child during emergency situations as the device notifies immediately to the parent when unexpected events happen.

- Thus, the action is taken immediately and the child is protected from further consequences. Features of the gadget:

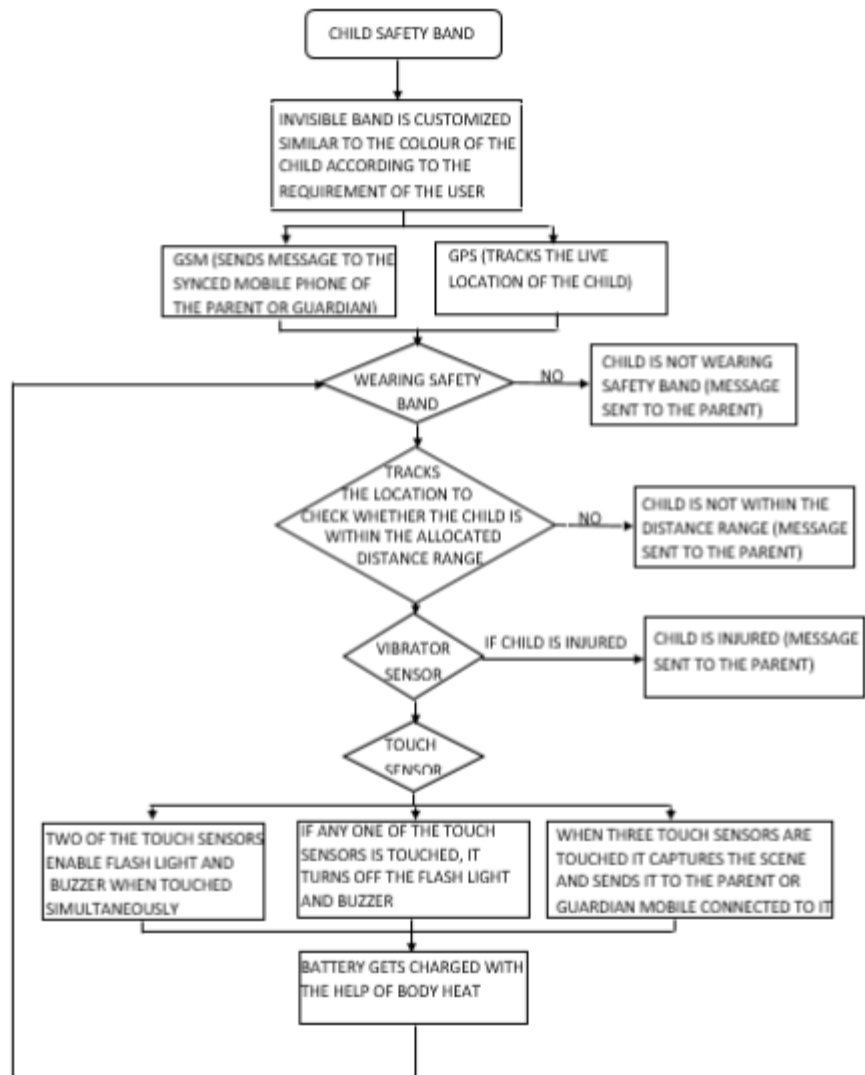
- The device can be manufactured in different forms according to the convenience of the users, which thereby increases the productivity and sales.
- As child safety bands are low costs, the awareness of the device will be spread among the entire society creating an impact.
- This increases the number of users hence the profit also increases, as the number of users is directly proportional to the profit of the manufacturer.
- The child safety band is a user-friendly gadget as its functionalities can be controlled via the synced mobile phone like setting the distance range, buzzer indication.
- The band is also efficient and faster in communication as the device always synced with the mobile phone.

#### **Development phases:**

- The child safety band is flexible and can be designed in any form according to the convenience of the user.
- The invisible child safety band can be customized into different ornamental forms, skin color according to the requirement of the user.
- The child safety band has GSM, a module which sends the message from the child to the parent or guardian.
- GPS is a global navigation satellite system that provides location, velocity and time synchronization. GPS is used to track the live locations and send the information to the synced mobile phone.
- The child safety band has vibrator sensor which detects the accident.
- The battery power in the gadget can be recharged with the help of body heat.
- The child safety band has 4-5 touch sensors which contain flash light, buzzer and camera to capture the scene.
- If the child presses the touch sensor then immediately the information will be notified by the parent or guardian.

#### **Solution requirements:**

- The invisible child safety band is efficient and low cost, the awareness of the child safety monitoring system can be spread among the society.
- The invisible child safety band can be customized into different ornamental forms according to the requirement of the user.
- The battery gets charged with the help of body heat.

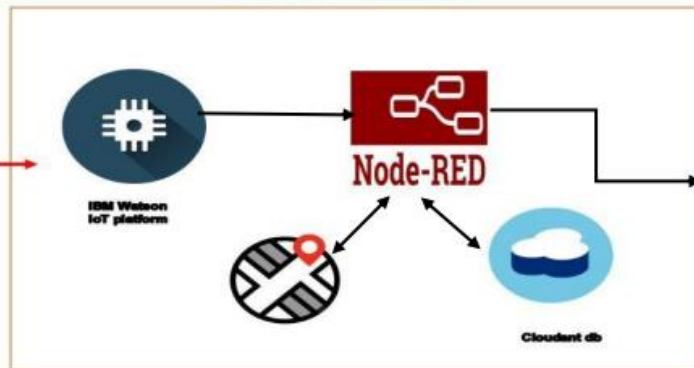


#### Technical Architecture:

USER (CHILD)



CLOUD SERVICES



ADMIN



S.No	Component	Description	Technology
1	User Interface	The user communication with the model is done with the help of the mobile application, where the user can control the features and gets notified for all the action done by the model.	Python
2	Application Logic	The model consists IBM Watson IoT platform whose main purpose is to communicate from main user(child) via GSM by passing the GPS coordinates information through the cloud to the control user(parent)	IBM Watson STT service ,Python
3	Database	The entire data from the user details to user actions are stored in the form of tables for easy access, manipulation, updation etc.	MySQL
4	Cloud Database	Cloud plays the major role for storage of the consumer database. And entire consumer communication is done via cloud.	IBM Cloudant
5	File Storage	The model requires local cache memory for accessing the data in easier and faster way.	Local Filesystem
6	External API-1	To access the child's location for monitoring	GPS sensor API
7	External API-2	To connect from the main user(child) to the control user(parent) for communication.	GSM sensor API
8	External API-3	To detect the child's heat radiation for monitoring the health and notifies depends on the pattern of the sensor.	Touch Sensor API
9	External API-4	To detect the child's motion and movement speed to alert the parent.	Vibration Sensor API
1	Infrastructure ( Cloud)	Application Deployment on Cloud Cloud Server Configuration	Cloud Foundry

Child safety gadget

Storyboard  
Browsing, product demo, customer help, purchasing, rating of child safety gadget



- Steps**  
What does the person (or group) typically experience?
- Interactions**  
What interactions do they have at each step along the way?  
• **People:** Who do they see or talk to?  
• **Places:** Where are they?  
• **Things:** What digital touchpoints or physical objects would they use?
- Goals & motivations**  
At each step, what is a person's primary goal or motivation? ("Help me..." or "Help me avoid...")
- Positive moments**  
What steps does a typical person find engaging, productive, fun, motivating, delightful, or exciting?
- Negative moments**  
What steps does a typical person find frustrating, confusing, annoying, costly, or time-consuming?
- Areas of opportunity**  
How might we make each step better? What ideas do we have? What have others suggested?

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, and 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 a confirmation email & click confirm	High	Sprint-1
		USN-2 (MOTHER)	As a user, I can register by entering my email, and 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 a confirmation email & click confirm	High	Sprint-1



		USN-3 (GUARDIAN/ CARETAKER)	As a user, I can monitor the children's activities using a safety gadget monitoring system.	I can access my account/dashboard and receive a confirmation email & click confirm	Medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering my email & password.	I can access my account/dashboard.	Medium	Sprint-2

	Dashboard	USN-5	As a user, I can fix the geo-fence for my child's location so that I will receive alerts if my child crosses the geo-fence and monitor the child's pulse and check whether the device is plugged in or not.	I can monitor the current location of my child.	High	Sprint-2
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## 6. PROJECT PLANNING & SCHEDULING

### 6.1 Sprint planning and estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a Parent/Guardian, I can register for the application by entering my email, password, and confirming my password.	2	High	Padam Satya Reshma
Sprint-1		USN-2	As a Parent/Guardian, I can register for the application through Gmail	1	Medium	Preethiga
Sprint-1	User Confirmation	USN-3	As a parent I will receive connection, location in sms / email once I have entered this	1	High	Logapriya

			application			
Sprint-1	Login	USN-4	As a parent/guardian , I can log into the application by entering email and password.	2	High	Subalakshmi

## 6.2 Sprint delivery schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned Date)	Sprint Release Date (Actual)
Sprint-1	20	4 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	5 Days	28 Oct 2022	05 Nov 2022	20	04 Nov 2022
Sprint-3	20	8 Days	02 Nov 2022	12 Nov 2022	20	11 Nov 2022
Sprint-4	20	9 Days	10 Nov 2022	19 Nov 2022	20	19 Nov 2022

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

```
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 waston 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(79.129113,79.1340)

#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","jso

n",data=x,qos=0,on\_publish=myOnPublishCallb

ack) print(x) print("\n") else:

deviceCli.publishEvent("IoTSensorgpsdata","jso

n",data=y,qos=0,on\_publish=myOnPublishCallb

ack) print(y) print("\n") if (temperature>35):

deviceCli.publishEvent("IoTSensorgpsdata","jso

n",data=z,qos=0,on\_publish=myOnPublishCallb

ack) print(c) print("\n") else:

deviceCli.publishEvent("IoTSensorgpsdata","jso

n",data=w,qos=0,on\_publish=myOnPublishCall

back) print(d) print("\n") if not success:

print("Not connected to IoTf") print("\n")

time.sleep(3) # Disconnect the device and

application from the cloud

deviceCli.disconnect()

## **8. TESTING**

### **8.1 Test Cases**

Test Case ID	Feature Type	Component	Test Scenario	Pre-Conditions	Steps To Execute	Test Data	Expected Results	Actual Results	Status	Comments	TC for Automation(Y/N)	SQG ID	Executed By
LogInPgU_TC_001	Functional	Home Page	Verify user is able to view the Login/Signup page when user clicked on logo.		1. Enter App 2. Verify login/signup page displayed as expected.		login/signup page should display	Working as expected	Pass		Y		Shubham, Swathi
LogInPgU_TC_002	UI	Home Page	Verify the UI standards in Login/Signup page		1. Enter App 2. Verify login/signup page with below UI elements: a. valid email box b. password field box c. login button d. New customer? Register		Application should show below UI elements: a. valid email box b. password field box c. login button with enable/disable after customer Register	Working as expected	Pass		Y		Shubham, Swathi
LogInPgU_TC_003	Functional	Home page	Verify user is able to login into application with valid credentials		1. Enter App 2. Enter valid email/username in Email/username box 3. Enter valid password in password field box 4. Click on login button.	Username: shubham@gmail.com password: Testing123	User should navigate to user account homepage	Working as expected	Pass		Y		Shubham
LogInPgU_TC_004	Functional	Login page	Verify user is able to login into application with invalid credentials		1. Enter App 2. Enter invalid email/username in Email/username box 3. Enter valid password in password field box 4. Click on login button.	Username: shubham@gmail.com password: Testing123	Application should show "Login error. There is no user record corresponding to the identifier"	Working as expected	Pass		Y		Shubham
LogInPgU_TC_005	Functional	Login page	Verify user is able to login into application with valid credentials		1. Enter App 2. Enter valid email/username in Email/username box 3. Enter invalid password in password field box 4. Click on login button.	Username: shubham@gmail.com password: Testing12345678901234567890	Application should show "the password is invalid"	Working as expected	Pass		Y		Shubham, Swathi, Swathi
LogInPgU_TC_006	Functional	Login page	Verify user is able to login into application with invalid credentials		1. Enter App 2. Enter invalid email/username in Email/username box 3. Enter invalid password in password field box 4. Click on login button.	Username: shubham@gmail.com password: Testing12345678901234567890	Application should show "Login error. There is no user record corresponding to the identifier"	Working as expected	Pass		Y		Shubham
Dashboard	Functional	Dashboard	Adding profiles in the location and		1. Enter App 2. Enter the valid username and password		Application show a red circle around the location	Working as expected	Pass		Y		Swathi (M)
Alert Notification	Functional	Notification	Notification when the user entered the graphics		1. Enter App 2. Enter the valid username and password 3. Add the Graphics		Application send the notification "Entered the location"	Working as expected	Pass		Y		Shubham, Swathi
Alert Notification	Functional	Notification	Notification when the user visited the graphics		1. Enter App 2. Enter the valid username and password		Application send the notification "Visited the location"	Working as expected	Pass		Y		Shubham, Swathi

## 8.2 User Acceptance Testing

### 1 .Defect Analysis

Resolution	Severity 1	Severit y2	Severit y3	Severit y4	Subtotal
By Design	11	4	2	2	19
Duplicate	1	1	2	0	4
External	2	3	0	1	6
Fixed	10	2	3	20	35
Not Reproduc ed	0	0	2	0	2
Skipped	0	0	2	1	3
Won't Fix	0	5	2	1	8
Totals	24	15	13	25	77



## **2. Test Case Analysis**

<b>Section</b>	<b>Total Cases</b>	<b>Not Tested</b>	<b>Fail</b>	<b>Pass</b>
Print Engine	5	0	1	4
Client Application	47	0	2	45
Security	3	0	0	3
Outsource Shipping	2	0	0	2
Exception Reporting	11	0	2	9
Final Report Output	5	0	0	5
Version Control	3	0	1	2

## **9. RESULTS**

## Connecting IBM Watson and python Code:

```

Python 3.7.4 Shell
File Edit Shell Debug Options Window Help

# Example 1: Check whether your child is Inside the geofence or Outside geofence
# For:
# org:
# dev:
# aut:
# aut:
# temp_status: 'High temperature'
# temp: Published Temperature = 43 C latitude = 12.130 longitude = 78.195 to IBM Watson
# temp:

try:
    check wheather your child is Inside the geofence or Outside geofence

except:
    ('your_child_zone': 'Outside the geofence')

    ('temp_status': 'High temperature')
    Published Temperature = 39 C latitude = 12.131 longitude = 78.195 to IBM Watson

# C
print
print check wheather your child is Inside the geofence or Outside geofence
time
dev:
print ('your_child_zone': 'Outside the geofence')
print ('temp_status': 'High temperature')
name
while: Published Temperature = 36 C latitude = 12.130 longitude = 78.197 to IBM Watson

    check wheather your child is Inside the geofence or Outside geofence

    ('your_child_zone': 'Inside the geofence')

    ('temp_status': 'High temperature')

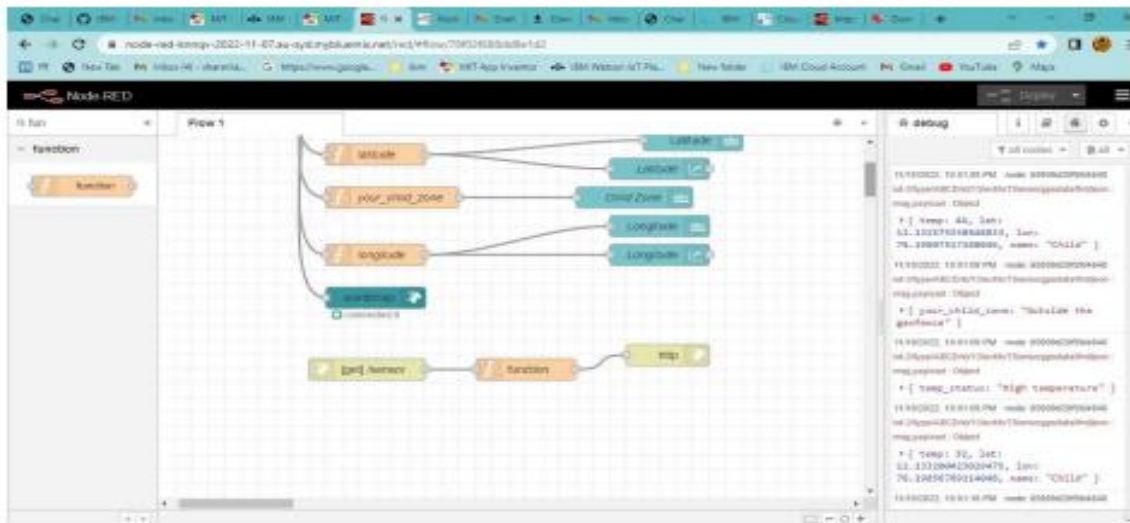
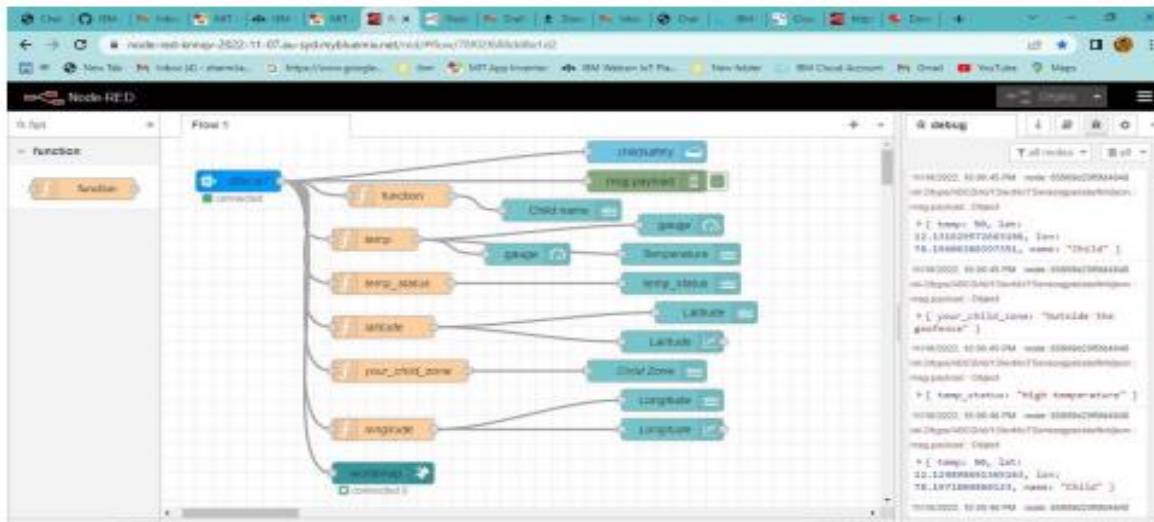
```

The screenshot shows the IBM Watson IoT Platform interface. At the top, there's a navigation bar with 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search bar is on the left. The main content area displays a device named 'ABCD' with a status of 'Connected'. Below the device header, there's a tabbed interface with 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. The 'Recent Events' tab is active, showing a list of events. The events are as follows:

Event	Value	Format	Last Received
IoTSensororgo...	["temp_status":"High temperature"]	json	a few seconds ago
IoTSensororgo...	["your_child_zone":"Outside the geofence"]	json	a few seconds ago
IoTSensororgo...	["temp":50,"lat":12.132819998043411,"lon":78...	json	a few seconds ago
IoTSensororgo...	["temp_status":"Low temperature"]		
IoTSensororgo...	["your_child_zone":"Outside the geofence"]		

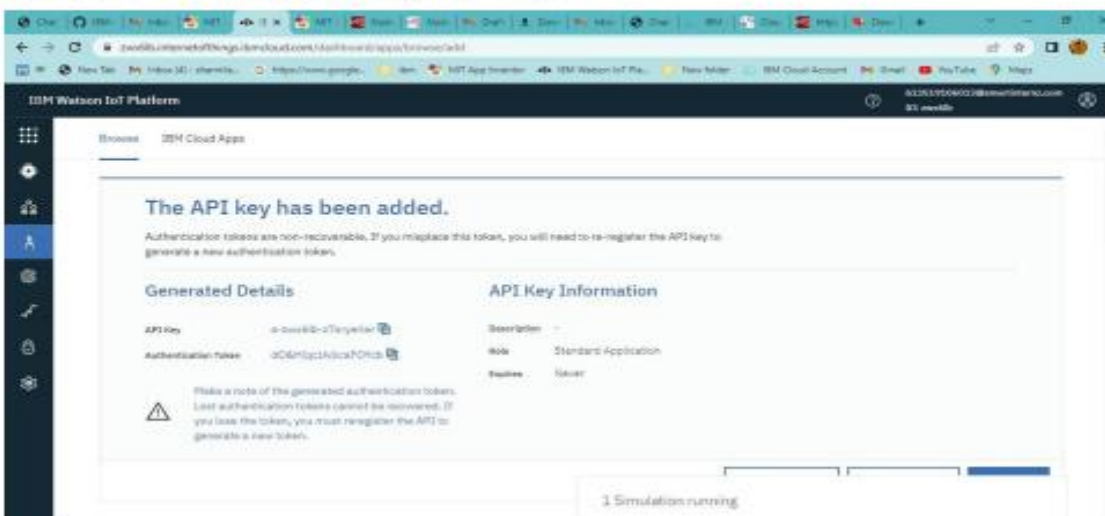
At the bottom right, there's a notification that says '1 Simulation running'.

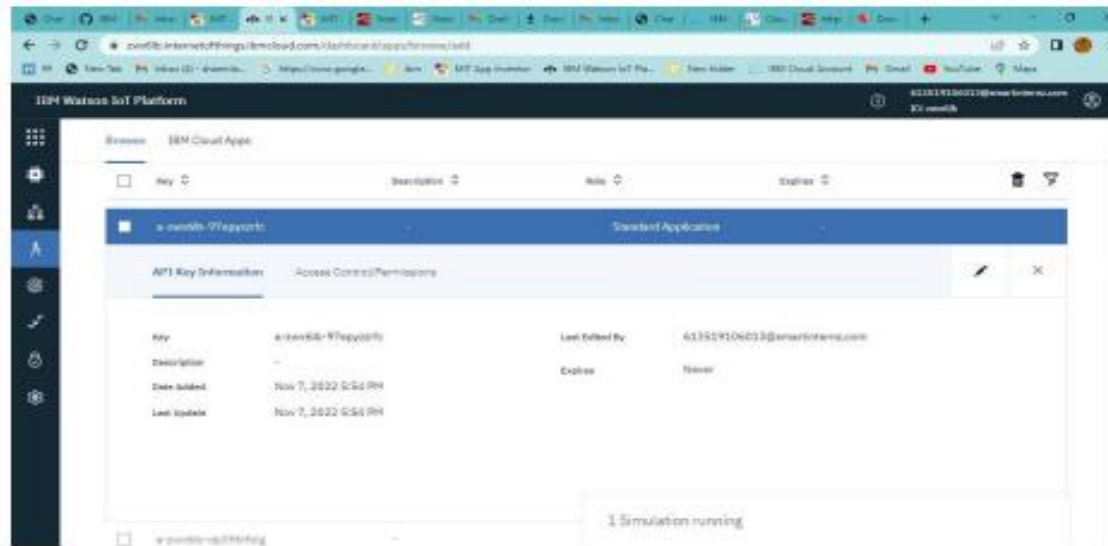
## Creating Node-Red service:



## Connecting with IBM Cloud:

### Using IBM IOT node through API key





## Transferring values from Python Code:

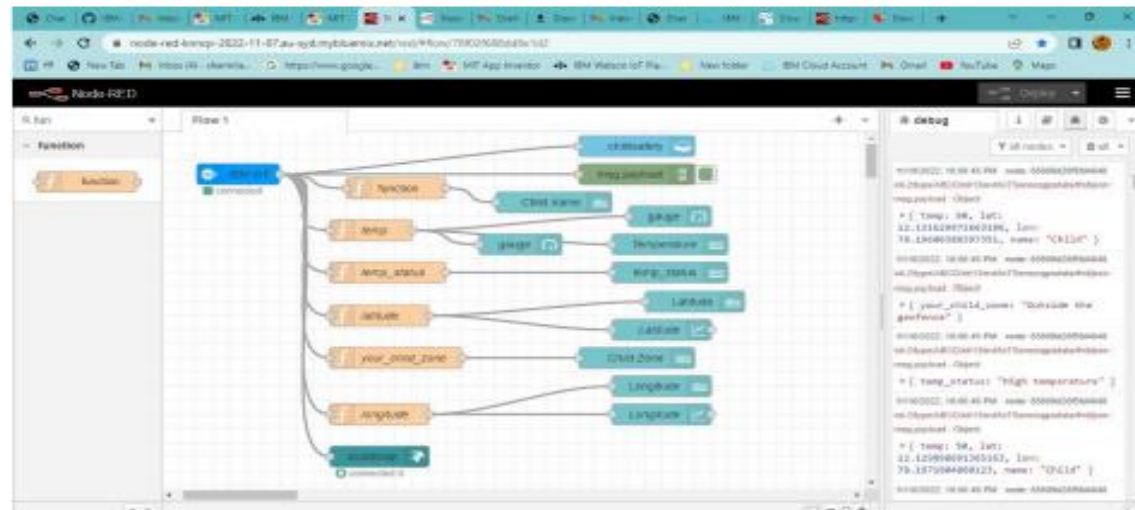
```

C:\Users\user> cd C:\Users\user\Documents\Python\Wat-IoT\Child-Locality\Locality
Python 3.7.4 Shell
File Edit Shell Debug Options Window Help
Python 3.7.4 (tags/v3.7.4:409590126, Jul 8 2019, 20:34:20) [AMD64] on win32
Type "help()", "copyright()", "credits()" or "license()" for more information.
>>>
===== RESTART: C:/Users/user/Desktop/Wat-IoT/Child-Locality/locality.py =====
checking connection to Watson IoT...
2022-11-10 22:14:01.178 -> Watson-Device-Client [INFO] Connected successfully
liya: 4112345678901234567890
data user ... welcome to IBM-IOT
I can provide your children live location and temperature

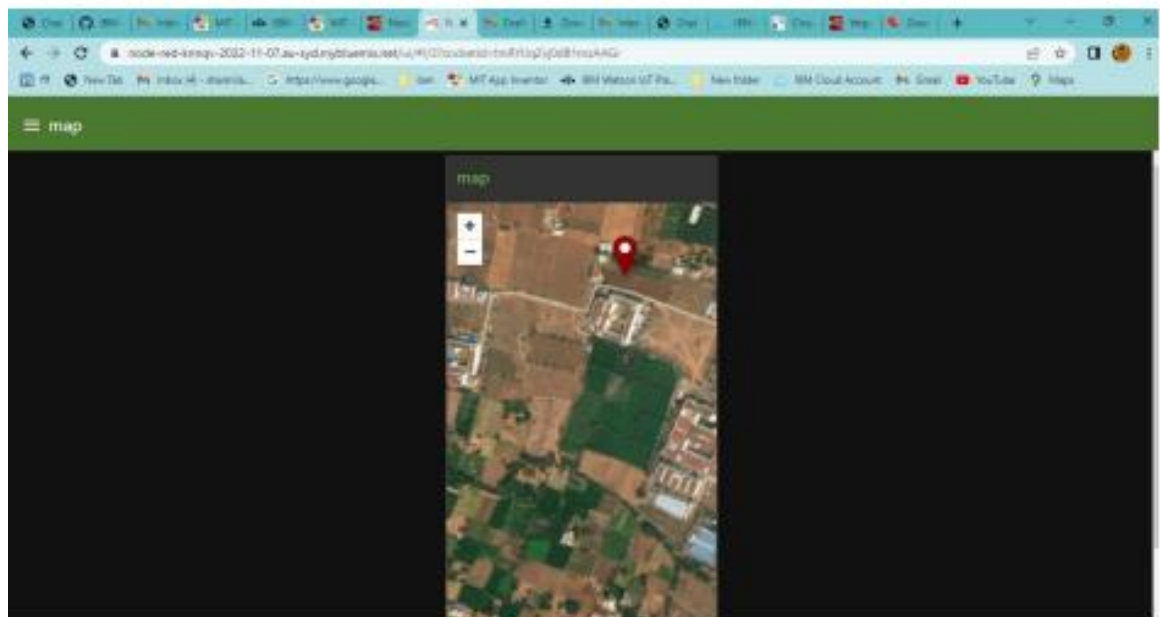
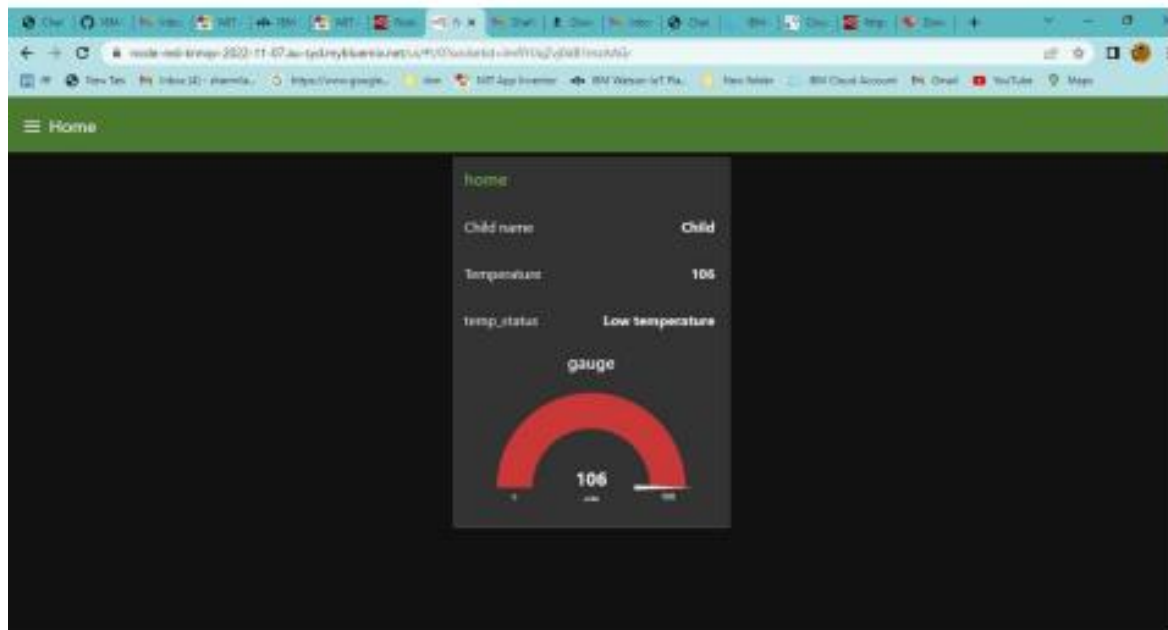
enter your child name:child
Published Temperature = 39 C Latitude = 20.762790426152027 & Longitude = 79.
647232122 & to IBM Watson
Published Temperature = 39 C Latitude = 20.762649248109494 & Longitude = 79.
1255840076 & to IBM Watson
Published Temperature = 43 C Latitude = 20.761761104688790 & Longitude = 79.
677667970 & to IBM Watson
Published Temperature = 30 C Latitude = 20.764955936490013 & Longitude = 79.
2046713787 & to IBM Watson
Published Temperature = 31 C Latitude = 20.76481088978824 & Longitude = 79.
6117553915 & to IBM Watson
Published Temperature = 31 C Latitude = 20.763949502820024 & Longitude = 79.
3493847949 & to IBM Watson
Published Temperature = 34 C Latitude = 20.764200990430203 & Longitude = 79.
6422906942 & to IBM Watson
Published Temperature = 23 C Latitude = 20.768240088882888 & Longitude = 79.
450598964 & to IBM Watson
Published Temperature = 27 C Latitude = 20.763805407214419 & Longitude = 79.
61892729 & to IBM Watson
Published Temperature = 43 C Latitude = 20.76450424910465 & Longitude = 79.
745663965 & to IBM Watson
Published Temperature = 49 C Latitude = 20.764200990430203 & Longitude = 79.
2192551409 & to IBM Watson
Published Temperature = 45 C Latitude = 20.763805407214419 & Longitude = 79.
504425061 & to IBM Watson

```

## Node-Red:



## Node-Red Dashboard:





## Create Cloudant DB:

← →

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🗄️

🔍

👤

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🔑

Log Out

Databases

Database name ▾

Create Database

{ } JSON

🔔

Your Databases

Name	Size	# of Docs	Partitioned	Actions
childsafety	0.6 MB	15767	No	<div>🔍</div> <div>🔒</div> <div>🗑️</div>
nodaredknnqv20221107	34.3 KB	4	No	<div>🔍</div> <div>🔒</div> <div>🗑️</div>

Showing 1-2 of 2 databases. Databases per page: 20 ▾

< 1 >

← →

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Log Out

< childsafety

Document ID ▾

Options

{ } JSON

🔔

All Documents

Query

Permissions

Changes

Design Documents

Table

Metadata

{ } JSON

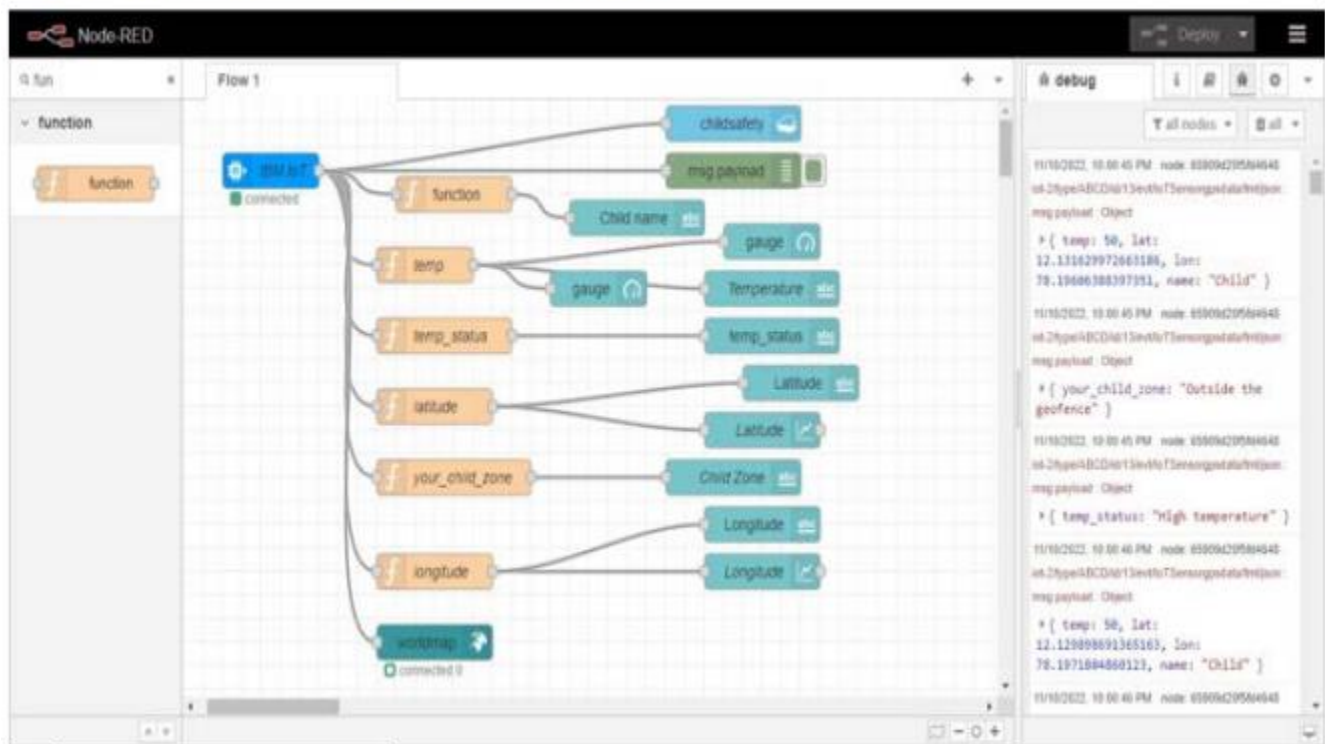
Create Document

	Id	key	value
<input type="checkbox"/>	000245d59da9ac61433e5f634f209...	000245d59da9ac61433e5f634f209...	{ "rev": "1-e6b811f57ea970b95eac7...
<input type="checkbox"/>	000245d59da9ac61433e5f634f213...	000245d59da9ac61433e5f634f213...	{ "rev": "1-5bd67a9dc5077c26203a...
<input type="checkbox"/>	000245d59da9ac61433e5f634f4fe7df	000245d59da9ac61433e5f634f4fe7df	{ "rev": "1-fadff57c99ea860cde31c3...
<input type="checkbox"/>	000245d59da9ac61433e5f634f506...	000245d59da9ac61433e5f634f506...	{ "rev": "1-57b844b01fae28e70630e...
<input type="checkbox"/>	000245d59da9ac61433e5f634f508...	000245d59da9ac61433e5f634f508...	{ "rev": "1-83bac72c450237855a7...
<input type="checkbox"/>	000245d59da9ac61433e5f634f50f...	000245d59da9ac61433e5f634f50f...	{ "rev": "1-452b9a0e1fe9db26c9264...
<input type="checkbox"/>	000245d59da9ac61433e5f634f512...	000245d59da9ac61433e5f634f512...	{ "rev": "1-476cd41ad5e8c74f5b2c6...
<input type="checkbox"/>	000245d59da9ac61433e5f634f514...	000245d59da9ac61433e5f634f514...	{ "rev": "1-38b023705962b5ee4cdf...
<input type="checkbox"/>	000245d59da9ac61433e5f634f51d...	000245d59da9ac61433e5f634f51d...	{ "rev": "1-63bac72c450237855a7...
<input type="checkbox"/>	00078610ea6fd9b443a4b58549619...	00078610ea6fd9b443a4b58549619...	{ "rev": "1-476cd41ad5e8c74f5b2c6...

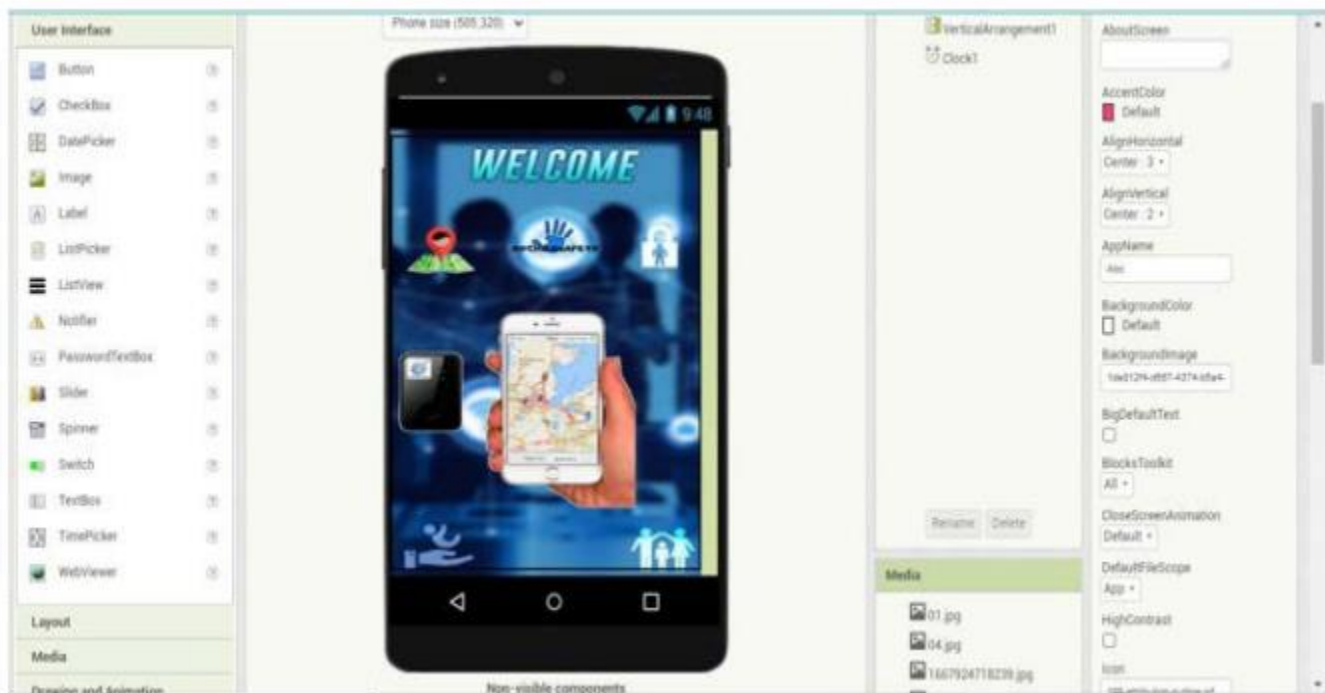
Showing document 1 - 20. Documents per page: 20 ▾

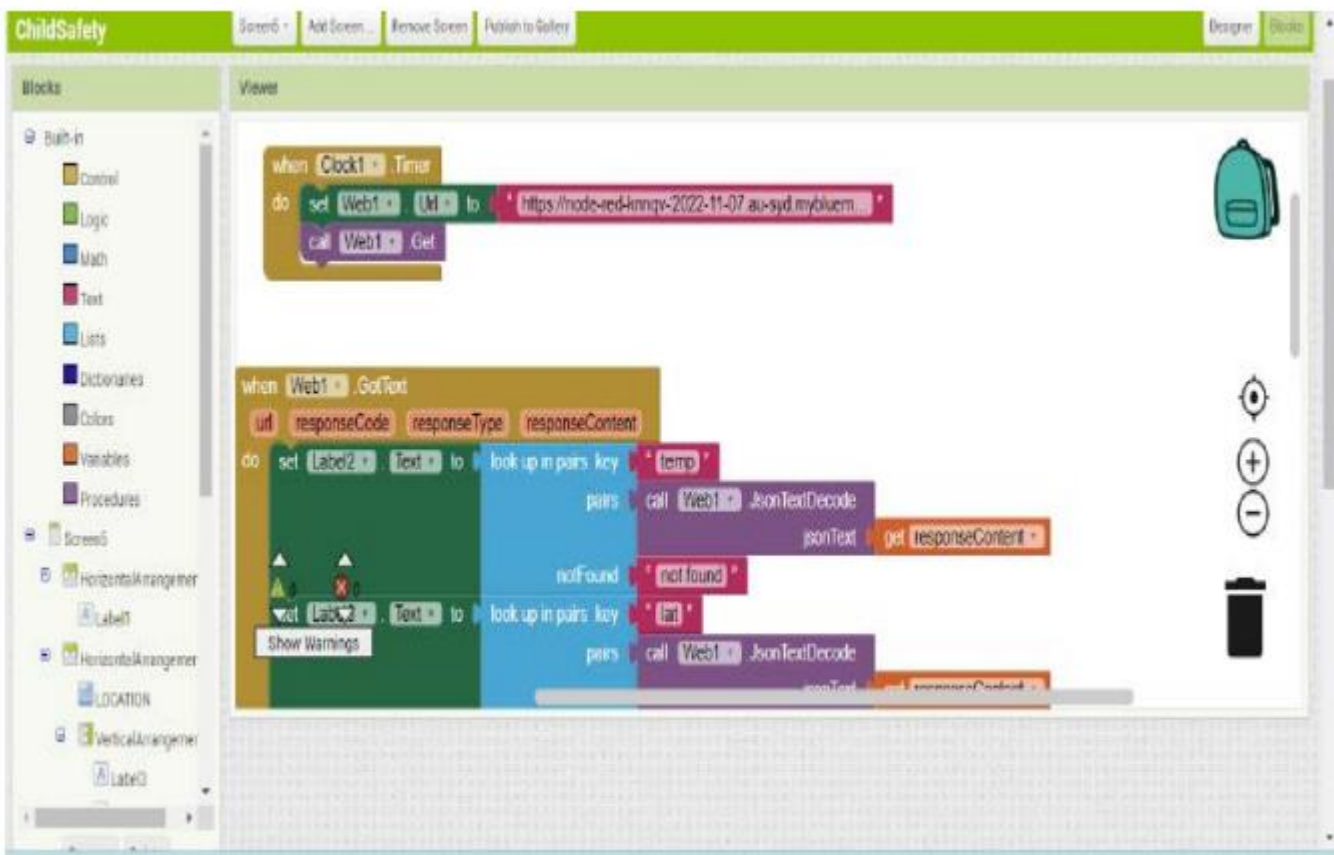
< >

## Node-Red Service with Cloudant DB:



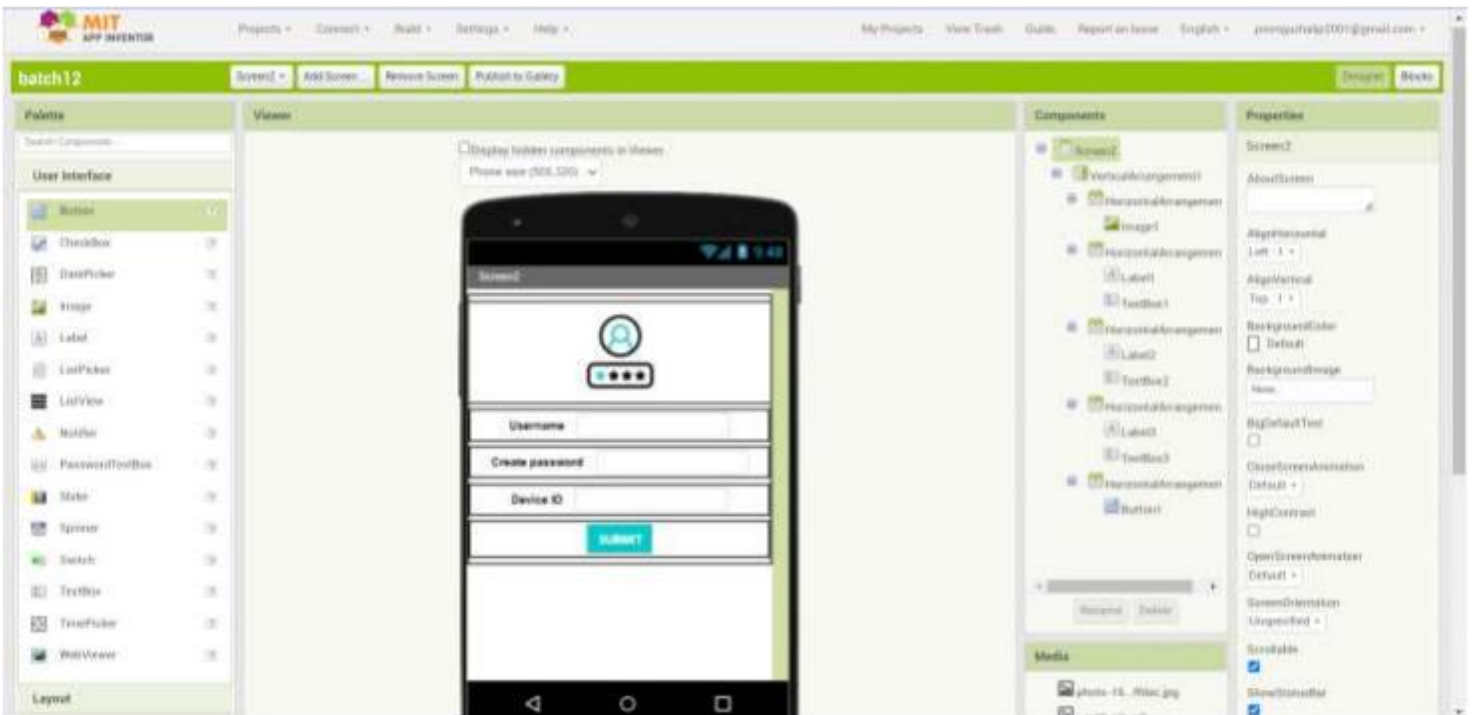
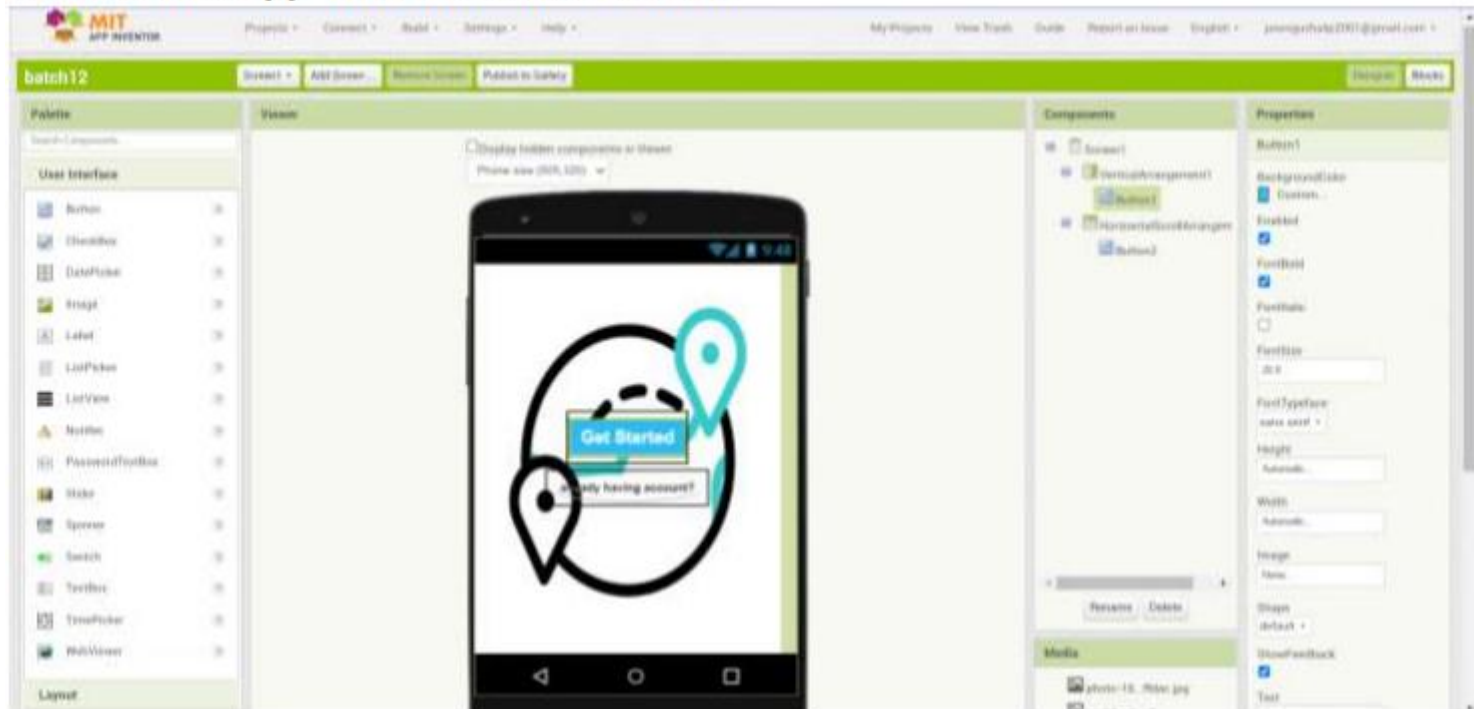
### Create App in MIT app inventor:







## Connect the app with Node-Red Service:



## **10. Advantages and Disadvantages**

The parent can monitor their child from anywhere at any time, and also get a notification when the child goes away from the permitted radius. It also allows the parent to know if their child is in any dangerous situation. The invisible child safety device is an user friendly device that to both safety and comfortness to both the parent and child. The disadvantages of this system as they consists of different sensor which makes the device costly to design and manufacture.

## **11. Future Scope**

In our system, we use the Internet of Things, GPS, GSM, and Raspberry Pi to automatically monitor the youngster in real time. When we utilize GPS to actively monitor, this system needs network connections, satellite communication, and a high-speed data connection. It is challenging to keep an eye out for any network problems or satellite connection problems.

## **12. Conclusion**

Future is similar to the word children. Young people are the future pillars of one's nation, as Dr. A.P.J. Abdul Kalam once said, thus it is important to protect today's children's dreams and lives in order to give them a better future. Therefore, every parent should take good care of their own children to prevent them from being victims of abuse that will completely harm them on a physical, mental, and emotional level, wrecking our future. Due to the significance of our future, our product makes it simple for parents to track their kids and regularly visually monitor them, enabling them to assure their safety and lowering the incidence of child abuse. This device give an invisible effect and also monitors the health condition of the child and notifies immediately to the parent by sending the alert message and live tracking of the child.

