

Project Report

- 1. INTRODUCTION**
 - 1.1 Project Overview
 - 1.2 Proposal
- 2. LITERATURE SURVEY**
 - 2.1 Smart IoT Device for Child Safety and Tracking
 - 2.2 Child Safety Wearable Device
- 3. IDEATION & PROPOSED SOLUTION**
 - 3.1 Empathy Map Canvas
 - 3.2 Ideation & Brainstorming
 - 3.3 Proposed Solution
 - 3.4 Problem Solution fit
- 4. PROJECT DESIGN**
 - 4.1 Data Flow Diagrams
 - 4.2 Solution & Technical Architecture
 - 4.3 User Stories
- 5. PROJECT PLANNING & SCHEDULING**
 - 5.1 Sprint Planning
- 6. CODING**
 - 6.1 Feature 1
- 7. RESULTS**
 - 7.1 Performance Metrics
- 8. CONCLUSION**
- 9. FUTURE ENHANCEMENT**

Source Code

GitHub & Project Demo Link

INTRODUCTION

1.

INTRODUCTION

1.1 PROJECT OVERVIEW

The overall percentage of child abuse field nowadays in the world is about 80%, Out of which 74% are girl children and the rest are boys. For every 40 seconds, a child goes missing in the world. Children are the backbone of one's nation, if the future of children was affected, it would affect the entire growth of that nation. Due to the abuse, the emotional and mental stability of the children gets affected which in turn affects their career and future. These innocent children are not responsible for taking care of their own children. So parents are responsible for taking care of their own children. But, due to economic condition and aims to focus on their child's future and career. Parents are focused to run for money. Hence, it becomes difficult to take care of their children all the time. In our system, we provided an environment where this problem can be resolved in an efficient manner. It makes parents to easily monitor their children just like staying beside them as well as focusing on their own career without any manual intervention.

1.2. PROPOSAL

The proposed system uses the Arduino kit. The Arduino kit forms the core of our proposed system. Arduino nano is connected with NRF transceiver module, Node MCU is connected with NRF transceiver module that complement the system and the arduinonano (powered up by lithium polymer battery) and NRF module (transmitter) act as the safety gadget. It will transmit data to the NRF module (receiver). All this setup is built in a Geo-fence. If the transmitter exits the geofence, the continuous transmission of data flow gets stopped and the LED connected in the receiver module will start to blink, and it will send a notification to the parents' mobile via notification. The safety device protects individuals from protection harms and danger. It provides a safe environment for the children to roam without any fear. Because of its features, it controls the risk of antisocial activities and it will make parents feel safe about their children. The safety device is based on the concept of Internet of things. Here the safety gadget is placed inside a geo-fence setup. If the gadget exits the geo-fence, it will notify the parents or caretakers via mobile notification.

LITERATURE SURVEY

LITERATURE SURVEY

2.1 Smart IoT Device for Child Safety and Tracking

In the Existing train tracks are manually researched. LED (Light Emitting Diode) and LDR (Light Dependent Resister) sensors cannot be implemented on the block of the tracks. The input image processing is a clamorous system with high cost and does not give the exact result. The Automated Visual Test Method is a complicated method as the video color inspection is implemented to examine the cracks in rail track which does not give accurate result in bad weather. This traditional system delays transfer of information. Srivastava et al., (2017) proposed a moving gadget to detect the cracks with the help of an array of IR sensors to identify the actual position of the cracks as well as notify to nearest railway station . Mishra et al., (2019) developed a system to track the cracks with the help of Arduino mega power using solar energy and laser. A GSM along with a GPS module was implemented to get the actual location of the faulty tracks to inform the authorities using SMS via a link to find actual location on Google Maps. Rizvi Aliza Raza presented a prototype in that is capable of capturing photos of the track and compare it with the old database and sends a message to the authorities regarding the crack detected. The detailed analysis of traditional railway track fault detection techniques is explained in table

2.2 Child Safety Wearable Device

This project focuses communication mode to be in SMS text form using GSM. The parent will send a keyword in form of SMS “SOS”, “BUZZ”, “LOCATION”, “TEMPERATURE” etc., to the devices. The device will reply back the real time accurate location of the child and will also provide the surrounding temperature, or any of the data asked by the parents. It helps parents to keep track if the temperature around their kid is not proper for their kid. The secondary idea implemented was distress alarm buzzer and a bright SOS Light on the device that can be activated by the guardians via sending the keywords in the SMS. Parents can text the keywords to ON the SOS signal brightly and can also send the keyword to sound an alarm which a people near child or bystander can instantly help the child's till the parents arrive. People around could also contact the parents and help them to reunite child with his or her parents. Hence this project provides parents a sense of protection for their kid in today's unsafe environment. The drawback of this system is that parent have to remember the keywords.

IDEATION AND PROPOSED SOLUTION

3. IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION & BRAINSTORMING

2

Brainstorm

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

🕒 10 minutes

TIP

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

Prem Kumar.M

Monitor kids when parents aren't there	Build an app	Build a wearable device for kids
Connect the device and the app	Build a geo fence	Get notification when the child crosses the geofence
The app must be easy to use	Get the child's parents contacts and connect the child's email alongside	Collecting the child's details and parents Occupation

Paneer Selvam.M

Get the parents details of the child	Setting a geofence	Set a recording device like mic
Establish a perfect connection between the parties	Get the daily routine habits of the child	Tracking all the activities of the child
Notify the parents about the child's location	Generate a notification if the child crosses the geofence	Enable the parents to fix the geofence for the child

Jijo.M

Store the recordings in the cloud	Store the child's activities in the cloud	Monitor the child's heart beat
Alert the parents with a notification	Get the occupation of the child parents	Tracking
Monitor the behaviours of the surroundings	Use GPS to access the location	Address the child in a crowded area

Aswin.M

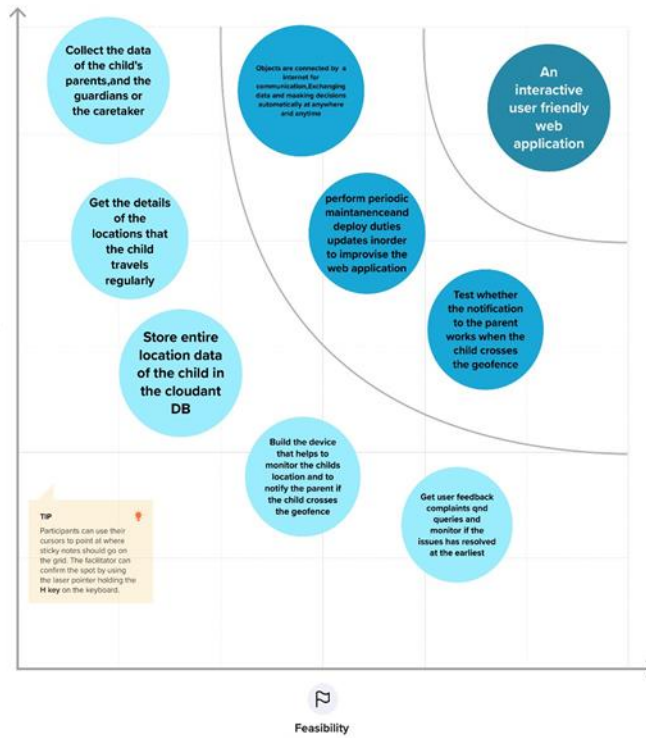
Setting a perfect chart to analyse the temperature of child	Track the child's location	Address the location of the Child
Alert the child's parents in the time of emergency	Always monitor the child with its features	Use a geofence
Set a closed place as a geofence	Advanced Tracking system	Enable the voice chat

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



5

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

- A Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- B Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

- Strategy blueprint**
Define the components of a new idea or strategy.
[Open the template →](#)
- Customer experience journey map**
Understand customer needs, motivations, and obstacles for an experience.
[Open the template →](#)
- Strengths, weaknesses, opportunities & threats**
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
[Open the template →](#)

[Share template feedback](#)

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

Data collection and preparation

Collect the data of the child's parents, and the guardians or the caretaker

Get the details of the locations that the child travels regularly

Store entire location data of the child in the cloudant DB

Connection, Testing, Implementation

Objects are connected by a internet for communication, Exchanging data and making decisions automatically at anywhere and anytime

Test whether the notification to the parent works when the child crosses the geofence

Build the device that helps to monitor the child's location and to notify the parent if the child crosses the geofence

Work and Deliverables

An interactive user friendly web application

Get user feedback complaints and queries and monitor if the issues has resolved at the earliest

perform periodic maintenance and deploy duties updates in order to improve the web application

TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

3.3 PROPOSED SOLUTION

S.NO	PARAMETERS	DESCRIPTIONS
1	Problem Statement (Problem to be solved)	Parents who are engaged with with busy lifestyle who have no time to monitor their children and nowadays the misbehaviours against children are increasing at an exponential rate.They are under the threat of easily being kidnapped.So the parents needs a way to monitor their children continuously and detect early if there is any abnormal behaviour in their children surroundings so that they can do their duties efficiently rather than worrying about their children, This will indeed reduce the worries of the parents and create a safe environment.

2	Idea / Solution description	Parents need a way to monitor their children continuously and detect early if there is any abnormal behaviour in their children's surroundings so that they can do their duties efficiently rather than worrying about their children. This will indeed reduce the worries of the parents and create a safe environment.
3	Novelty / Uniqueness	Even though there are many existing solutions for this problem they failed to satisfy the needs of customer. Some of the solutions are only detecting some particular issues where some other failed to alert the parents and other solution with some delays. Our solution not only notify the parents but also notify the persons who are nearer to the childlike teachers so that they can take control over the situation and our solution will alert the persons who are closer to the child's parents.
4	Social Impact / Customer Satisfaction	Our solution will be very helpful for the society and the people who are worrying about their child's safety. Our solution will prevent many problems which are faced by childrens and we can able to stop crime. Through this project the parents mental pressure will be reduced and it is very helpful to provide a safer environment for the children.

5	Business Model (Revenue Model)	The main target of our solution is Parents who are worrying about their children so we planned to visit workplaces and explain about the positives of our product. So that they can be aware of the importance of this solution and use it.
6	Scalability of the Solution	Our solution can be integrated for further future use because the solution we have provided will be lay on the basics or initial stage of any upgraded version

4 PROBLEM SOLUTION FIT

CUSTOMER SEGMENT(S)

Who is your customer?

CS

Customers are:-
Young parents of 0-5 y.o. Kids
Family members, caretakers, guardians and babysitters.

6. CUSTOMER CONSTRAINTS

CC

What constraints prevent your customers from taking action or limit their choices of solutions?

The possible constraints are
Spending power
Budget
No cash
Network connection
Available devices
Geo Positioning System (GPS)

5. AVAILABLE SOLUTIONS

Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have?
i.e. pen and paper is an alternative to digital notetaking

Whenever the child goes to a location other than its geofence, its parent gets a notification stating that his/her child is in danger.

Earlier the customer tried to contact their nearest police station.

Now the customer uses this application.

Pros and cons of previous solution:

Pro:

Human insight.

Con:

Unnecessary hassle and a cumbersome process.

Child's location is not easily accessible.

Pros and cons of current solution:

Pro:

Child's location is very easily accessible because the parent gets the notification.

Con:

Parents who don't have access to smart phone cannot make use of this application.

JOBS-TO-BE-DONE / PROBLEMS

J&P

1 jobs-to-be-done (or problems) do you address for customers? There could be more than one; explore different sides.

Setting a geofence around the child after monitoring activities.

With the help of geofence, the child's parent get a notification whenever the child crosses the geofence.

9. PROBLEM ROOT CAUSE

RC

What is the real reason that this problem exists? What is the back story behind the need to do this job?

i.e. customers have to do it because of the change in regulations
The root cause of this problem is that the child not informing its parents whenever it goes out.
More and more children go missing and only some children are recovered.
Child trafficking

7. BEHAVIOUR

What does your customer do to address the problem and get the job done?

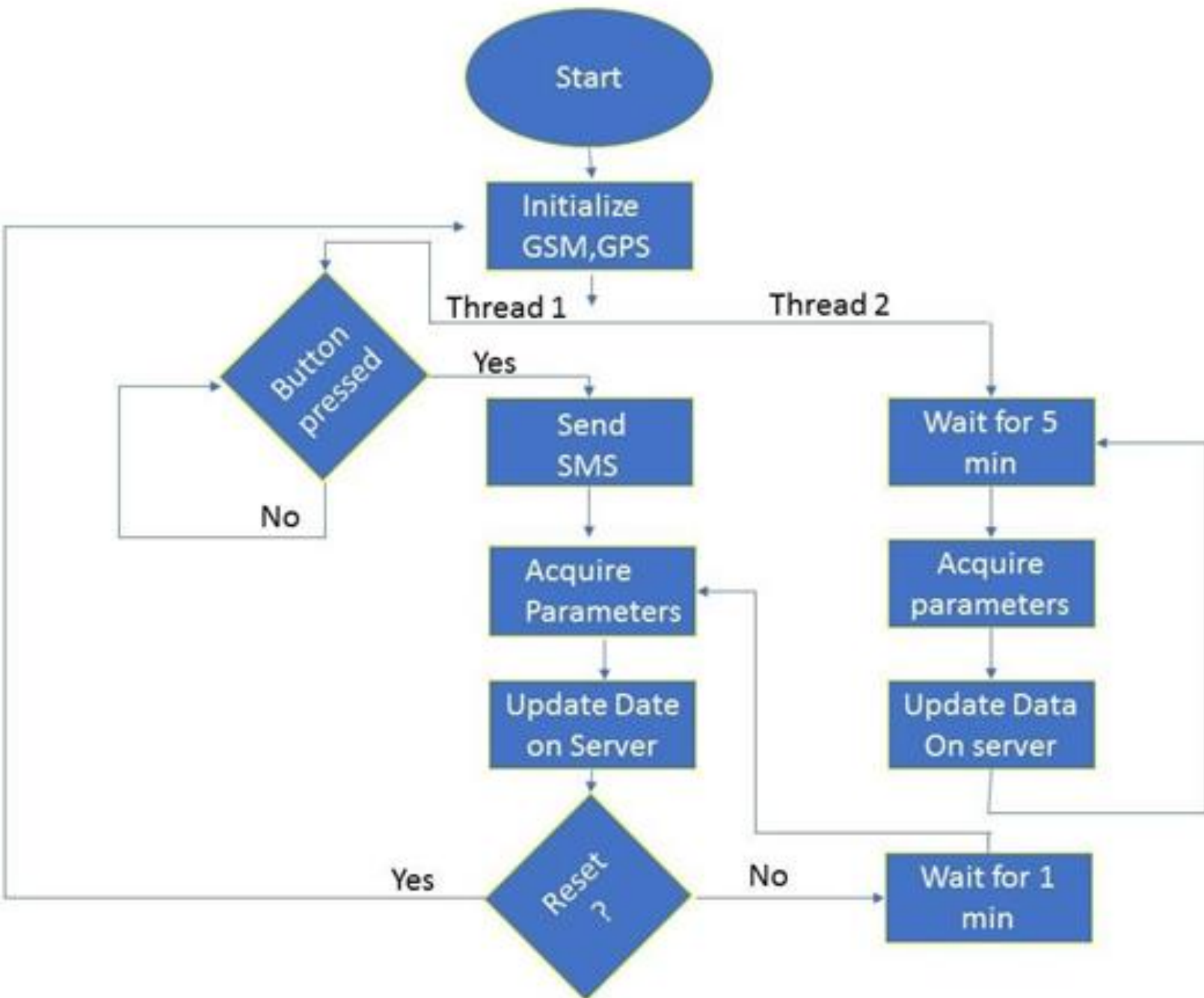
i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

After the customer gets access to the child's location, he/she comes to the specified location and find their child.

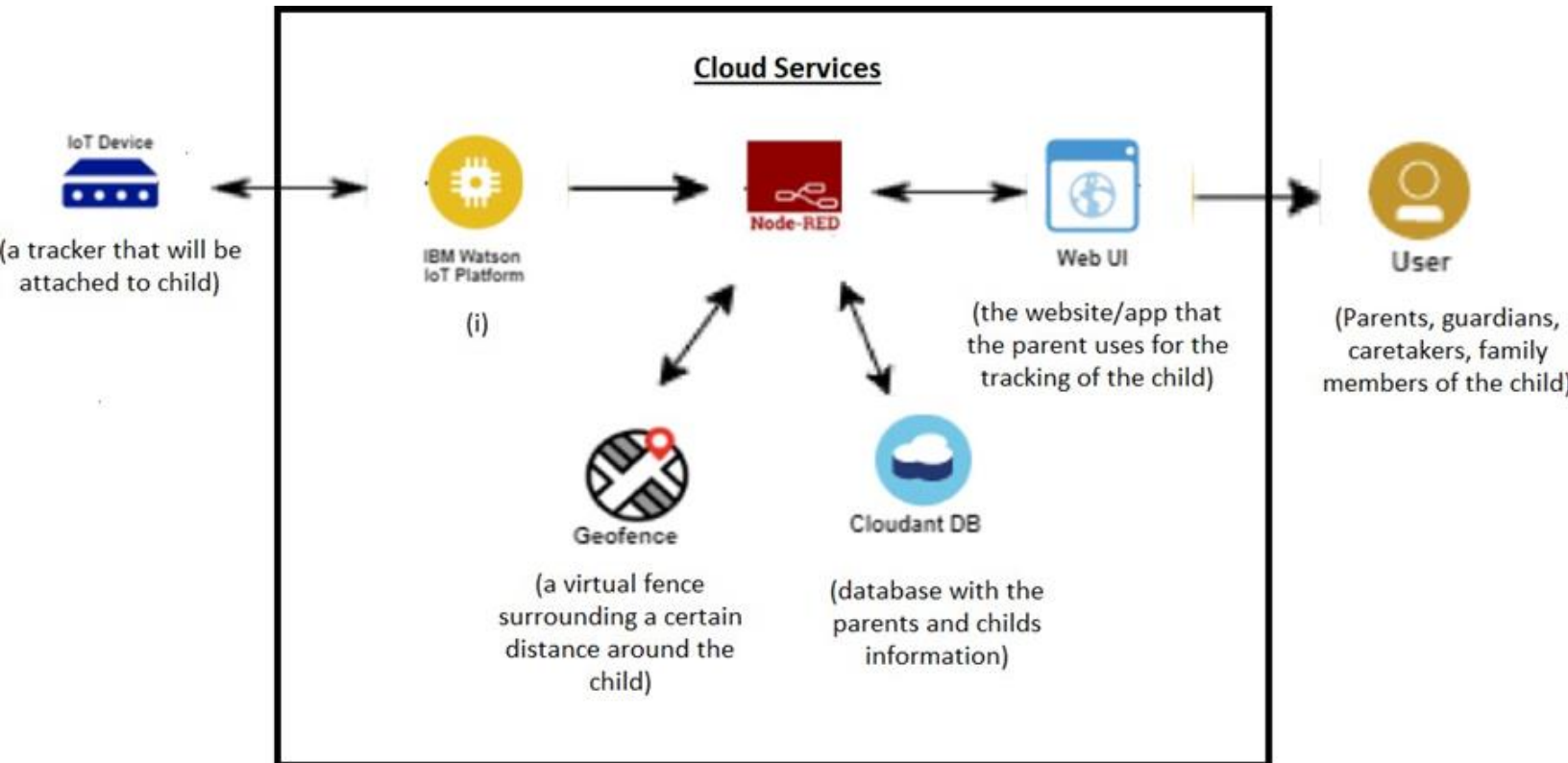
PROJECT DESIGN

4.PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS



5.2 SOLUTION & TECHNICAL ARCHITECTURE



5.3 USER STORIES

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

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

PROJECT PLANNING

5.PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING& ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
<i>Sprint-1</i>	<i>Connection</i>	<i>USN-1</i>	<i>Establish connection between the safety gadget and the device.</i>	<i>2</i>	<i>High</i>	<i>Premkumar Paneer selvam Jijo Aswin</i>
<i>Sprint-2</i>	<i>User Confirmation</i>	<i>USN-2</i>	<i>Confirmation via Email confirmation via OTP</i>	<i>1</i>	<i>High</i>	<i>Premkumar Paneer selvam Jijo Aswin</i>
<i>Sprint-3</i>	<i>Setting geo-fence</i>	<i>USN-3</i>	<i>User have to choose the Geo-fence according to their needs.</i>	<i>2</i>	<i>High</i>	<i>Premkumar Paneer selvam Jijo Aswin</i>
<i>Sprint-4</i>	<i>Notification</i>	<i>USN-4</i>	<i>Alert notification will pop-up.</i>	<i>2</i>	<i>High</i>	<i>Premkumar Paneer selvam Jijo Aswin</i>

CODING AND SOLUTIONING

CODING

7.1. FEATURE 1

- - IOT device
 - IBM Watson platform
 - Node red
 - Cloudant DB
 - Web UI
 - Geofence
 - Python code

Transmitter code

```
#include <SPI.h>
#include <nRF24L01.h>
#include <RF24.h>
RF24 radio(9, 10); // CE, CSN
const byte address[6] = "00001";
void setup()
{
    Serial.begin(9600);
    radio.begin();
    radio.openWritingPipe(address);
    radio.setPALevel(RF24_PA_MIN);
    radio.stopListening();
}
void loop()
{
    const char text[] = "HELLO WORLD! ";
    radio.write(&text, sizeof(text));
    delay(1000)

}
```

Receiver code

```
//lcd connected with i2c
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <SPI.h>
#include <nRF24L01.h>
#include <RF24.h>

RF24 radio(9, 10); // CE, CSN

const byte address[6] = "00001";
const int ENA = 6;
const int ENB = 5;

LiquidCrystal_I2C lcd(0x27,20,4);

void setup()
{
  pinMode(8, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(4, OUTPUT);
  pinMode(3, OUTPUT);
  pinMode (ENA, OUTPUT);
  pinMode (ENB, OUTPUT);

  Serial.begin(9600);

  radio.begin();
  radio.openReadingPipe(0, address); //Setting the address at
  which we will receive the data
```

radio.setPALevel(RF24_PA_MIN); //You can set this as minimum or maximum depending on the distance between the transmitter and receiver.

radio.startListening(); //This sets the module as receiver

lcd.init(); // initialize the lcd

lcd.init();

// Print a message to the LCD.

lcd.backlight();

}

void loop()

{

if (radio.available()) //Looking for the data.

{

char text[32] = ""; //Saving the incoming data

radio.read(&text, sizeof(text)); //Reading the data

Serial.println(text);

lcd.setCursor(0,0);

lcd.print(" CONNECTED ");

// Vehicle movement

digitalWrite(8,HIGH);

digitalWrite(7,LOW);

digitalWrite(4,HIGH);

digitalWrite(3,LOW);

analogWrite(ENA,150);

analogWrite(ENB,150);

}

else

{

digitalWrite(8,HIGH);

```
digitalWrite(7,LOW);  
digitalWrite(4,HIGH);  
digitalWrite(3,LOW);  
analogWrite(ENA,255);  
analogWrite(ENB,255);
```

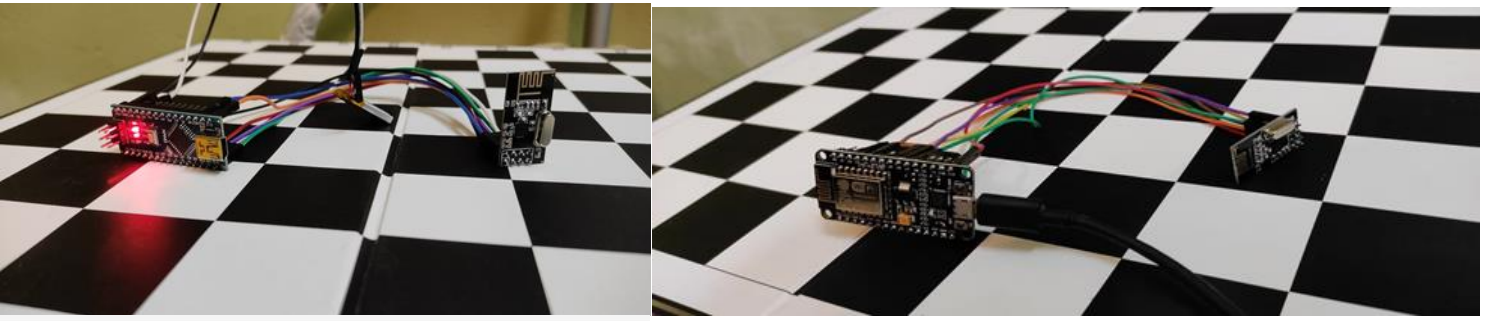
```
Serial.println("OUT OF RANGE");
```

```
lcd.setCursor(0,0);  
lcd.print("  CHECKING THE  ");  
lcd.setCursor(0,1);  
lcd.print("  SERVER  ");
```

```
}  
}
```

RESULTS

Performance metrics



! checkapp • now ^

My notification

Hello World!

YES NO

CONCLUSION

CONCLUSION

- Throughout the research, it is clearly explained the IoT concept, Child safety

issues and the need of using child security system .

- It assists parents to monitor their children remotely.
- In case situation happens, notification will be sent too parents so the action

Can be taken.

- Though this child safety can be ensured and crime rate will be reduced.
- However, the proposed method is not robust enough and does not contain

Sufficient functions to operate like a mobile phone.

- Hence the future enhancement will be adding some more features

FUTURE ENHANCEMENT:

- **Shows exact location of the child in the Geo-Fence with GPS.**
- **Indicate Heartbeat in the watch or band in child's hand.**
- **Display surrounding environment temperature.**
- **Long battery life.**
- **Use biochips instead of watch or band.**

Source code

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    lcd.setCursor(0,1);  
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