IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING & NOTIFICATION

A IBM NALAIYATHIRAN PROJECT REPORT

Submitted by

Team ID - PNT2022TMID17225

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1. INTRODUCTION

Child safety is a challenging problem nowadays due to antisocial Elements in the society. The crime rate is day by day increasing. Schools and working places need high surveillance for ensuring the Safety among children. Smart Gadget major role for ensuring the Safety, where some mobile based applications provide alert systems. During the emergency, Application alert the control room of nearby Police station or caretakers of children. The literature shows that Location tracking devices are available in the market, but it does not Provide the complete solution to the problem. The solution to this problem is to design an IoT device, which senses the child's location And environment and during emergency, it should send the alert to the Parents automatically.

1.1. PROJECT OVERVIEW

Child tracker helps the parents in continuously monitoring the Child's location. They can simply leave their children in school or parks And create a geofence around the particular location. By continuously Checking the child's location notifications will be generated if the child Crosses the geofence. 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.

1.2. PURPOSE

IoT Based Safety Gadget for Child Safety Monitoring & Notification Plays a key role in providing better care for the lost children until they Reconvene with the parents. In this present era, most of the wearable Devices today are designed based on the location, activity temperature, Pressure, etc of the child and in form the parents via GPS. Therefore it Is intended to use voice call as the way of communication between the Parent mobile and child' s wearable device. The system operates on the Microcontroller board and the functions of sending and receiving Notifications ,calls, voice messages via GPS.

2.LITERATURE SURVEY

2.1. EXISTING SOLUTION

The overall percentage of child abusements filed 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 this world. Children are the backbone of one's nation, if the future of children was affected, it would impact the entire growth of that nation. Due to the abusements, the emotional and mental stability of the children gets affected which in turn ruins their career and future. These innocent children are not responsible for what happens to them. 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 forced to crave for money. Hence, it becomes difficult to cling on to their children all the time. In our system, we provide an environment where this problem can be resolved in an efficient manner. It makes parents to easily monitor their children in real time just like staying beside them as well as focusing on their own career without any manual intervention. Many family's spends their time for work and social duties but since they need care of family. The current situation of our country is not comfortable for monitoring children in school. child safety is the major concern for many of the parents. Lack of child monitoring in school affect the child's behaviour. Under age children may be premature in the way they act and planes to be most of the human behaviour is shaped in childhood stage,in order to get acceptable behaviour child monitoring system is necessary. 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.

2.2. REFERENCE

[1] M. Madhuri, A. Q. Gill and H. U. Khan, "IoT-Enabled Smart Child Safety Digital System Architecture," *2020 IEEE 14th International Conference on Semantic Computing (ICSC)*, 2020, pp. 166-169, doi: 10.1109/ICSC.2020.00033.

[2] A. Srinivasan, S. Abirami, N. Divya, R. Akshya and B. S. Sreeja, "Intelligent Child Safety System using Machine Learning in IoT Devices," *2020 5th International Conference on Computing, Communication and Security (ICCCS)*, 2020, pp. 1-6, doi: 10.1109/ICCCS49678.2020.9277136.

[3] B. Ranjeeth, B. S. Reddy, Y. M. K. Reddy, S. Suchitra and B. Pavithra, "Smart Child Safety Wearable Device," *2020 International Conference on Electronics and Sustainable Communication Systems (ICESC)*, 2020, pp. 116-120, doi: 10.1109/ICESC48915.2020.9156001.

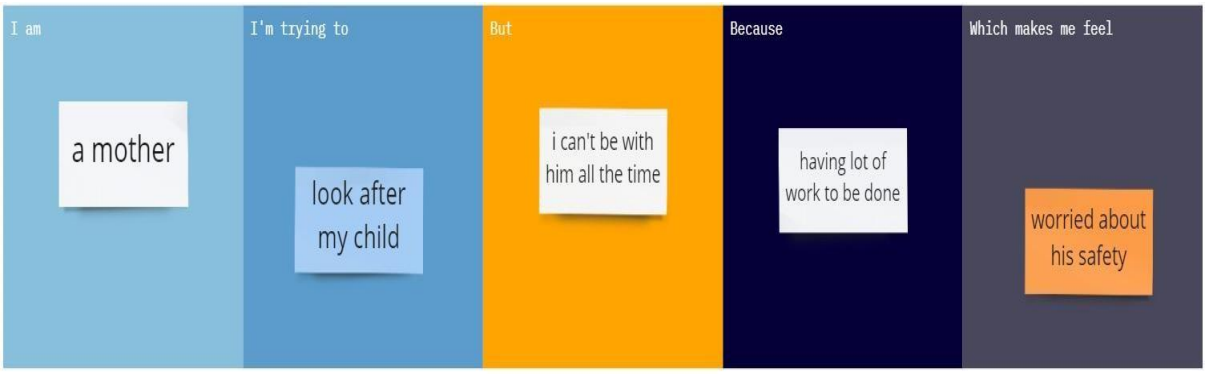
[4] M. Benisha *et al*., "Design of Wearable Device for Child Safety," *2021 Third International Conference on Intelligent Communication Technologies and*

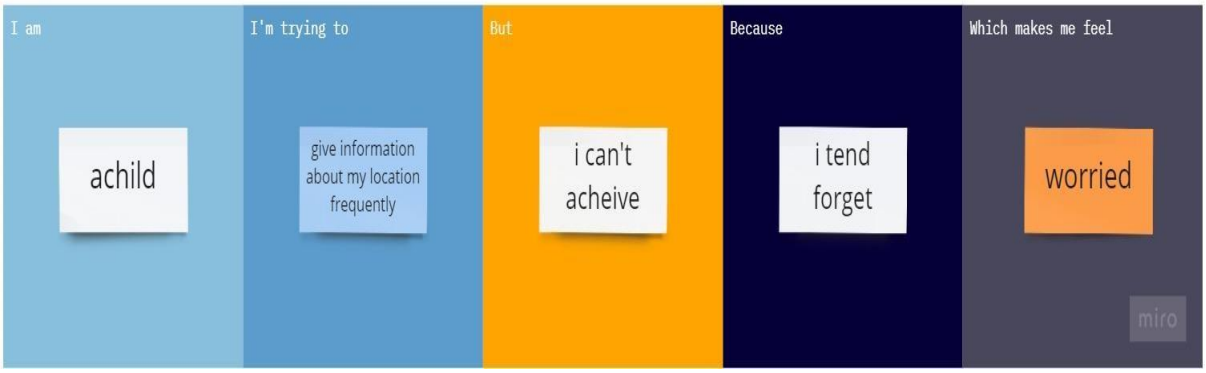
Virtual Mobile Networks (ICICV), 2021, pp. 1076-1080, doi: 10.1109/ICICV50876.2021.9388592

2.3. PROBLEM STATEMENT DEFINITION

Customer Problem Statement:

The child needs to be monitored even when the parents are distracted. A momentary lack in parental supervision should be combated with an appropriate IT solution in context. The child needs to stay generally within the line of sight. It is necessary for the proposed system to alert the parents when the child walks too far away and outside the circle of safety‟ (generally the parents‟ line of vision), even if the parents are distracted. If the child does go missing, the aid of technology can increase efficiency and decrease the time necessary to locate the child. The child needs to be located, only at the will of the authorized persons (the parents). Once there is data available about the location of the missing child, this data needs to be displayed as information that the parents can easily understand and use.

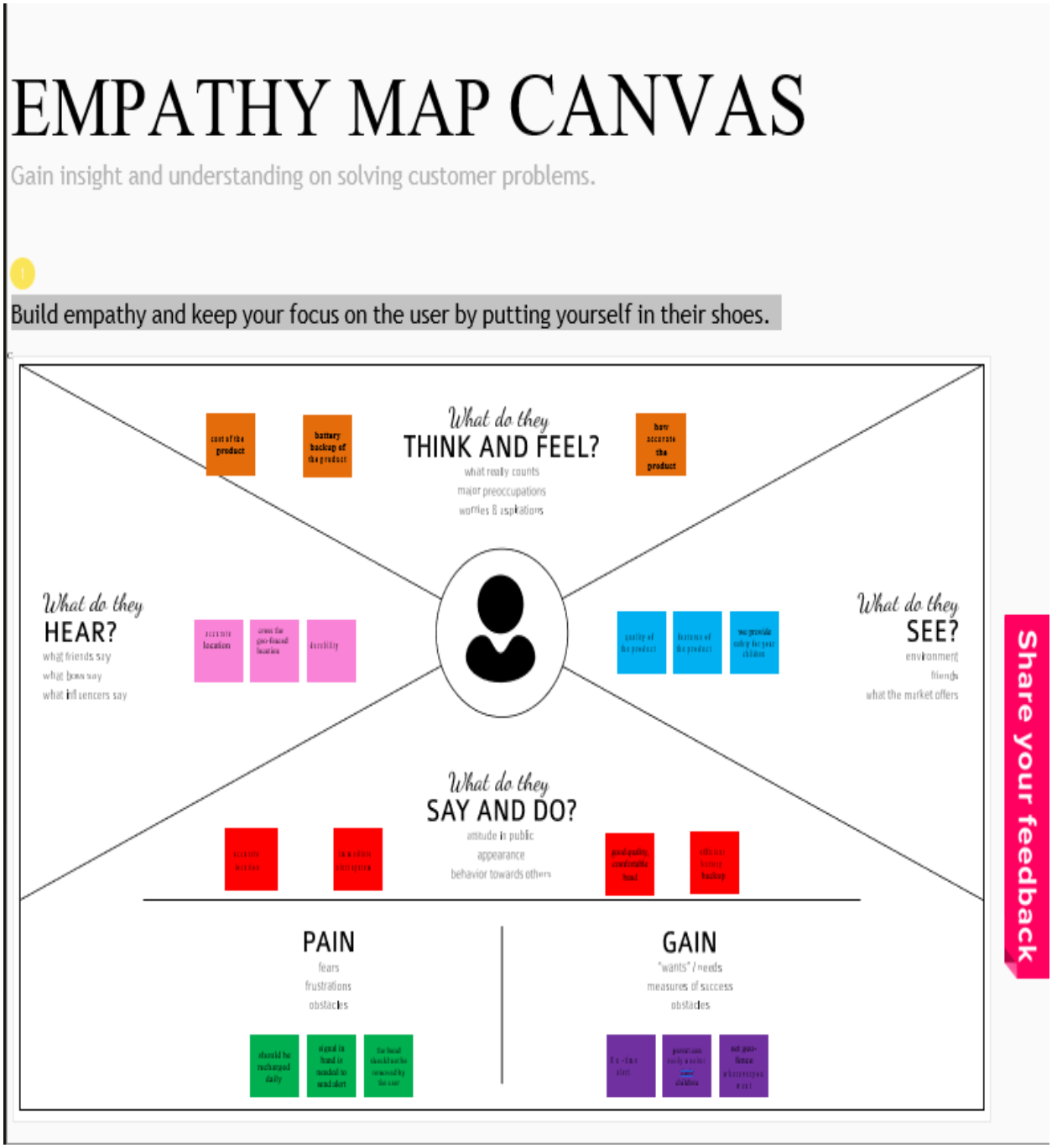




Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Mother	Look after my child	I can't be with him	Having lots of work to be done	Worried about safety provided prior on him
PS-2	child	Give information about my location frequently	I can't achiev e	I	Feel worried

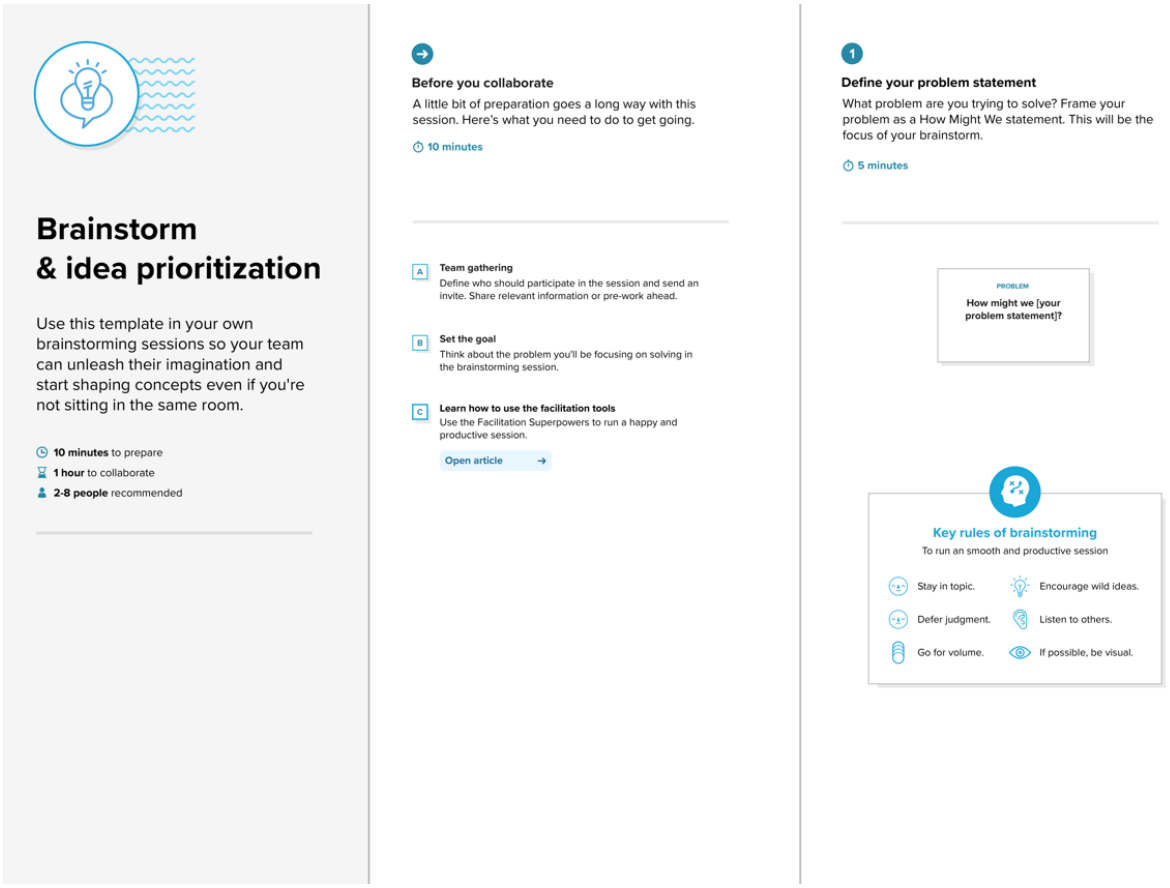
3. IDEATION & PROPOSED SOLUTIONS

3.1. EMPATHY MAP

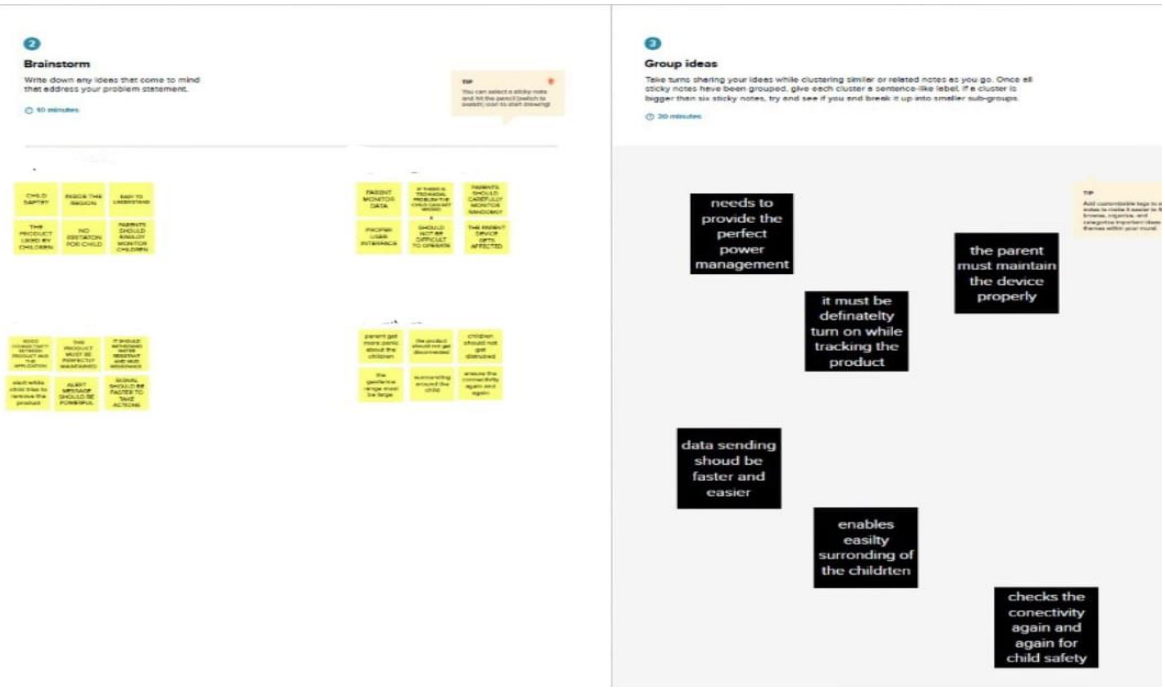


3.2. IDEATION & BRAINSTORMING

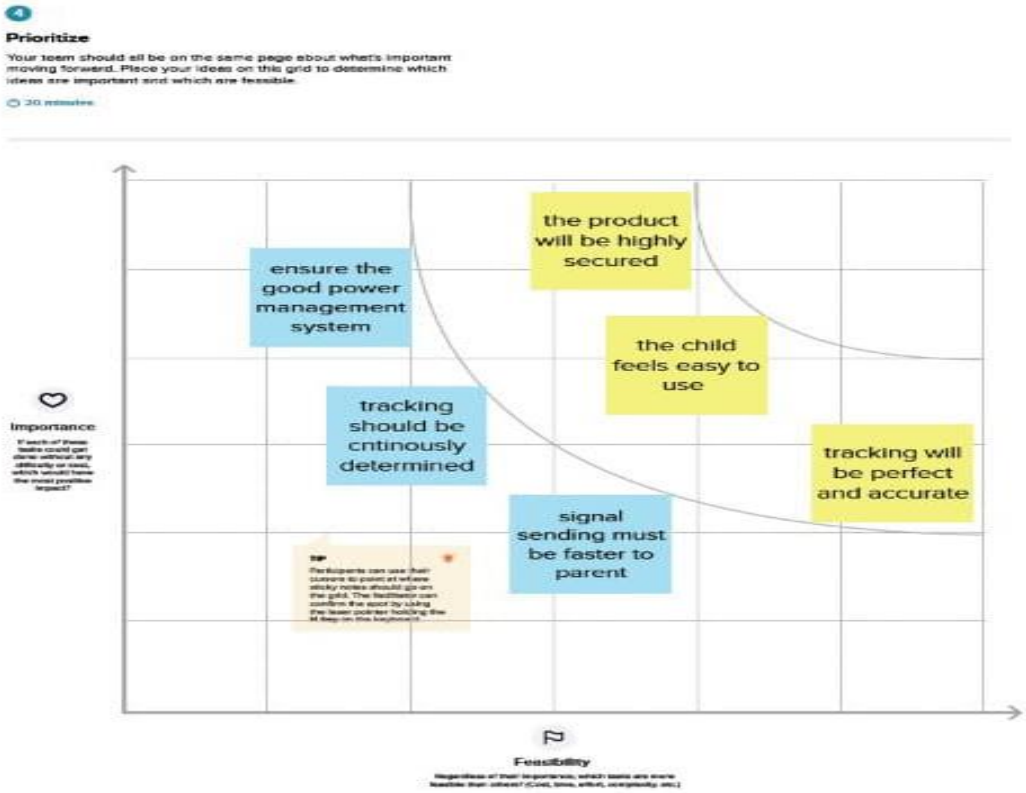
Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization

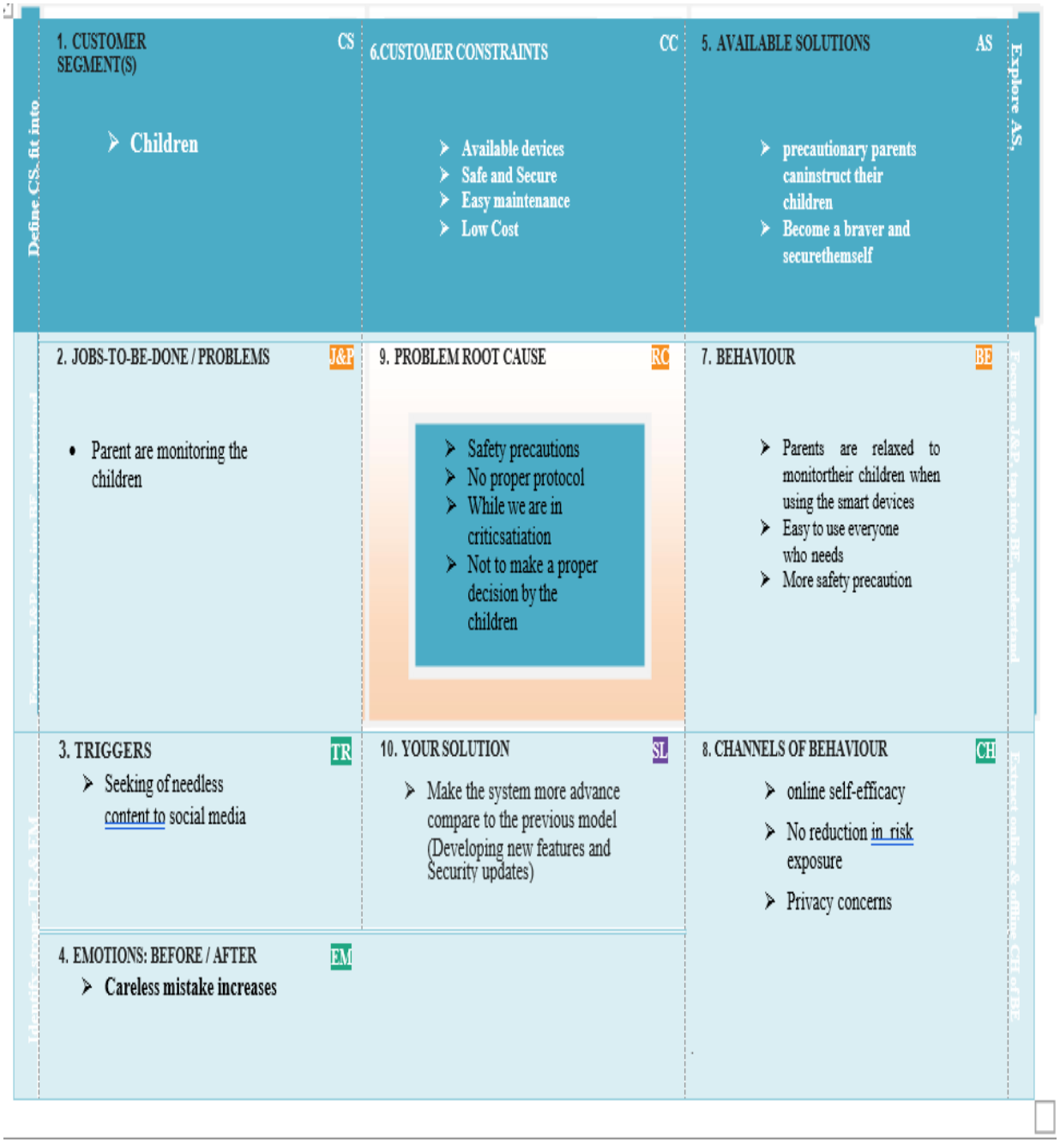


3.3 PROPOSED SOLUTION

S.NO.	PARAMETER	DESCRIPTION
1.	PROBLEM STATEMENT (PROBLEM TO BE SOLVED)	Parents are often worried about their children when they are out of sight, The aim of this project is to help parents to monitor their children's location and to see whether their child is safe or not. This system provides a tracking solution for the parent to keep tracking their child's location outdoors by using GPS as it allows them to determine the exact location of the child.
2.	IDEA / SOLUTION DESCRIPTION	It has always been a troublesome process for the parents to look after their children with their busy schedules, so this system sends a notification message to parents and stores the data of the child's movement and geo space periodically. At times the notification may not hear or be received to the parents, We aim to develop and provide a good interface that would give a tremendous output. The technology used here is PYTHON IDLE and CLOUD for storing data.
3.	NOVELTY / UNIQUENESS	This project is basically for the parents who cannot balance their children and work at the same time and also for nonworking parents. The uniqueness of our project is about geofencing, high noise alert, and location monitoring.
4.	SOCIAL IMPACT / CUSTOMER SATISFACTION	The parents will have the satisfaction that their child is safe and not involved in any critical situation even in their absence.
5.	BUSINESS MODEL (REVENUE MODEL)	The business model is in such a way that everyone can afford it. We can generate revenue by offering subscription-based applications to the people.

6.	SCALABILITY OF THE SOLUTION	Child safety monitoring is a guardian angel for the parents who can have the exact location of their child which helps to protect the child from any critical situations. So we resolve the problems like low noise notification, high standard geofencing and since we store data in the cloud it can be retrieved when needed.

3.4. PROBLEM SOLUTION FITS



4. REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3		
FR-4		

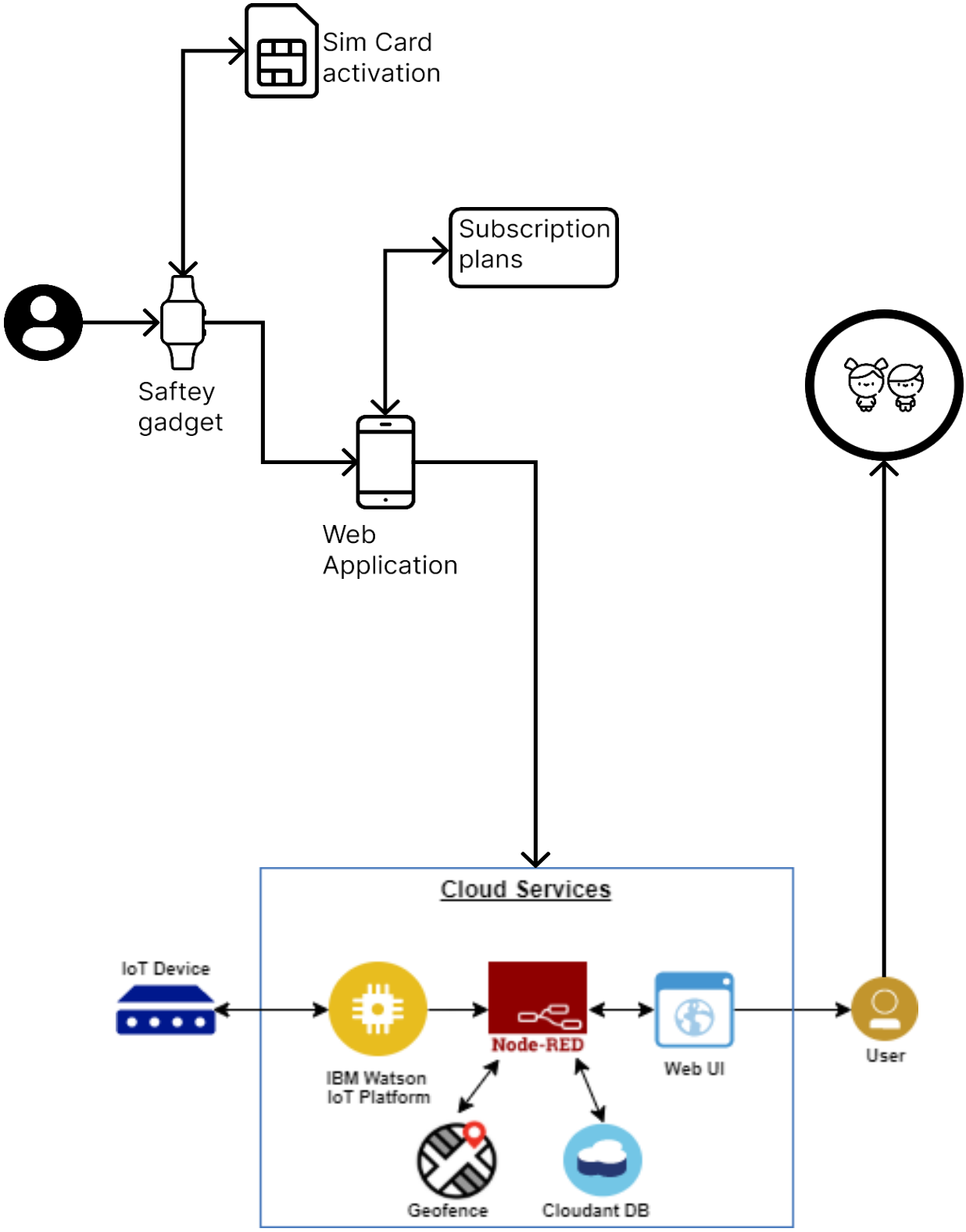
4.2. FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The parents will have the satisfaction that their child is safe and not involved in any critical situation even in their absence.
NFR-2	**Security**	Location of the child is tracked only by the authorised people(Parents).
NFR-3	**Reliability**	It would definitely be easier for parents if they get reliability on safety of children. This would encourage them to work vigorously on other application components so that the safety of the child would enhance more.
NFR-4	**Performance**	able to detect location properly and device sends notifications properly.

NFR-5	**Availability**	Device tracks and sends the location within 10 seconds and sends notification in case of any emergency within 30 seconds
NFR-6	**Scalability**	Child safety monitoring is a guardian angel for the parents who can have the exact location of their child which helps to protect the child from any critical situations. So we resolve the problems like low noise notification, high standard geofencing and since we store data in the cloud it can be retrieved when needed.

5. PROJECT DESIGN

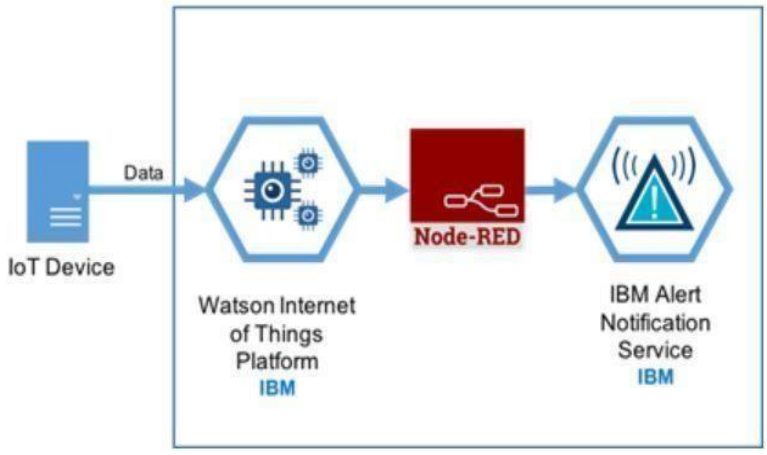
5.1. DATA-FLOW DIAGRAM



5.2. SOLUTION & TECHNICAL ARCHITECTURE

SOLUTION ARCHITECTURE:

- The safety device protects individuals from potential harms and dangers.
- Research done was proposed by the child safety wearable device using raspberry pi 3.
- The raspberry pi 3 gathers data from pi camera, pulse sensor and sound sensors. Then, send collected data to parents' smartphones by SMS using GSM shield.
- Images captured from pi camera and children's location detected by GPS will also be sent to parents' devices. In another study, designed a wearable smart watch for women security.
- Sensor inside the smartwatch senses the heartbeat of a child or woman who wears it.
- When he/she is exposed to attacks, heartbeat rate will be high. When this is detected, alarm sound will be triggered. It will then automatically make calls to registered contact and to the nearest police station.
- Based on the location provided by GPS, police will arrive soon at the correct destination.



NOTIFICATION ALERT

SCALABILITY:

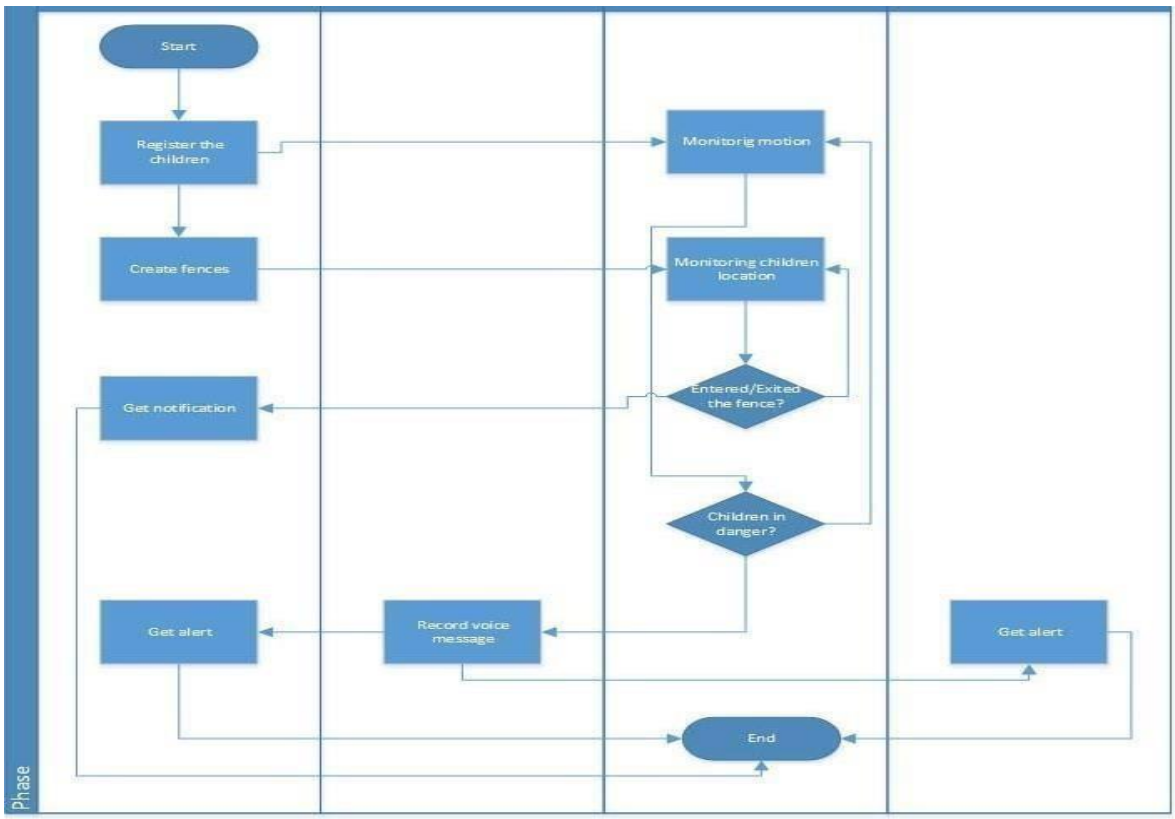
- To show the child's actual data with reference values.
- Enable sending of notification if the child is out of location or when the

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.

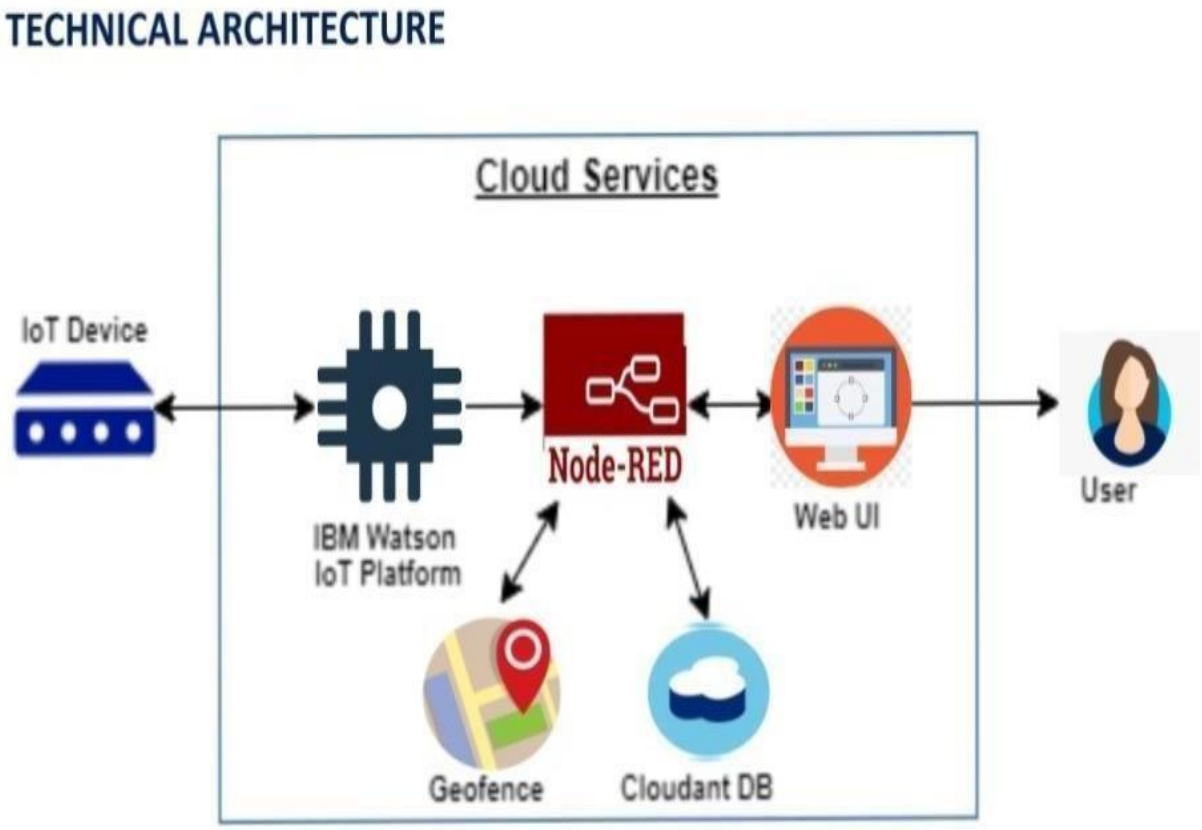
RELIABILITY:

- University Application process itself being a tedious task students needs lots of endeavour and determination for completing overall application process. Parents have to work on lots of things when both of them work to run the family.
- It would definitely be easier for parents if they get reliability on safety of children. This would encourage them to work vigorously on other application components so that the safety of the child would enhance more.
- This system shall be completely operational all hours of the day unless system failure or upgradation work is to be performed.

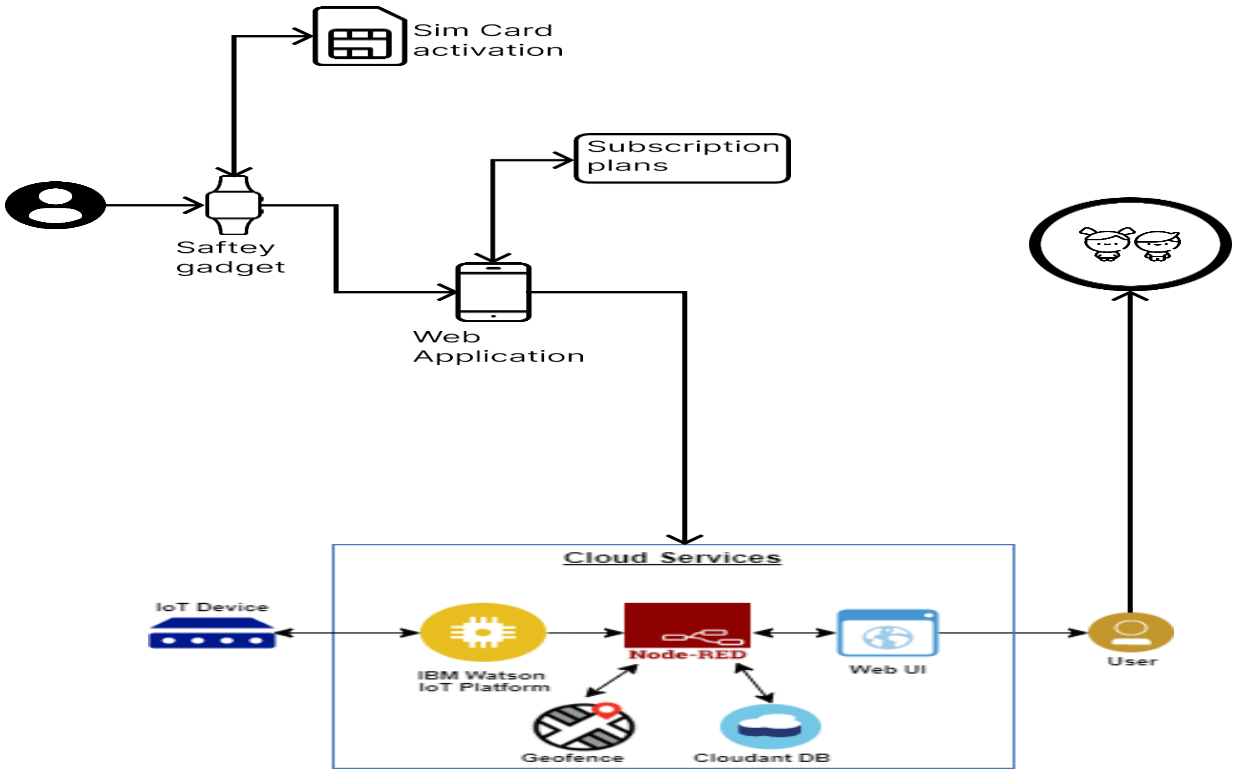


FLOW DIAGRAM

TECHNICAL ARCHITECTURE



TECHNOLOGY 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	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint -1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint -1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint -2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint -1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint -1
	Dashboard					
Customer (Web user)						
Customer Care Executive						
Administrator						

6.PROJECT PLANNING & SCHEDULING

6.1. SPRINT PLANNING & 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 byentering my email, and password, and confirming my password.	4	High	JYOTI PRAKASH
Sprint-1	Confirmation Email	USN-2	As a user, I will receive a confirmation email once I have registered for the application	4	High	KISOR KUMAR
Sprint-1	Authentication	USN-3	As a user, I can register for the application through Gmail and mobile app.	4	Medium	KABIL DEV
Sprint-1	Login	USN-4	As a user, I can log into the application by entering email & password	4	High	LAKSHMANAN
Sprint-1	Dashboard	USN-2	As a user, I need to be able to view the functions that I can perform	4	High	KISOR KUMAR
Sprint-2	Notification	USN-1	As a user, I should be able to notify my parent and guardian in emergency situations	10	High	JYOTI PRAKASH
Sprint-2	Store data	USN-3	As a user, I need to continuously store my location data into the database.	10	Medium	KABL DEV
Sprint-3	Communication	USN-1,3	I should be able to communicate with my parents	6	Low	JYOTI PRAKASH & KABIL DEV

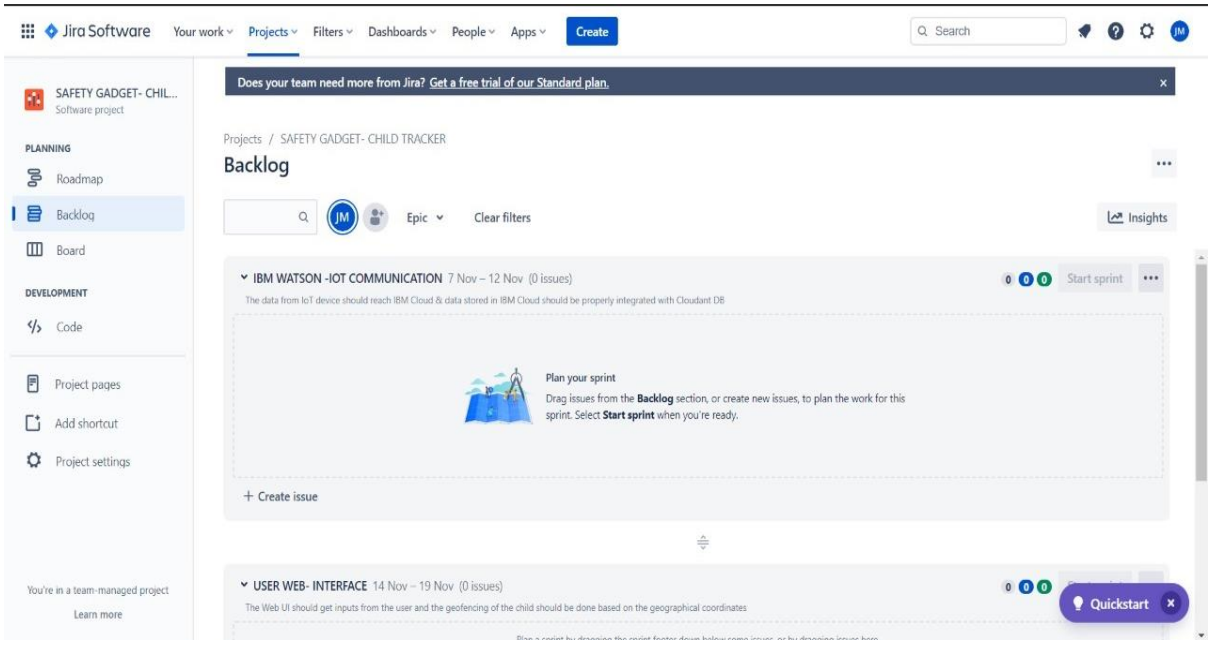
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	IoT Device – Watson communication	USN-1,4	The data from IoT device should reach IBM Cloud	7	Medium	JYOTI PRAKASH & LAKSHMANAN
Sprint-3	Node RED-CloudantDB communication	USN-2,3	The data stored in IBM Cloud should beproperly integrated with Cloudant DB	7	High	KISOR KUMAR & KABIL DEV

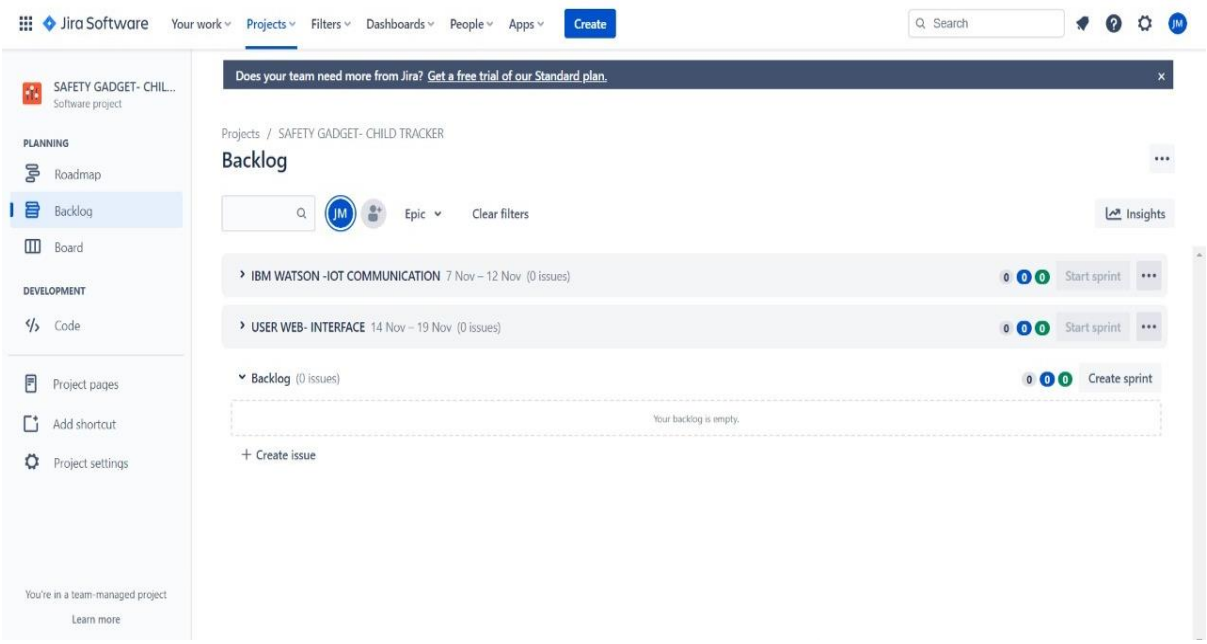
Sprint-4	User – WebUI interface	USN-3,4	The Web UI should get inputs from the user	6	High	KABIL DEV & LAKSHMANAN
Sprint-4	Geofencing	USN-1,2,3,	The geofencing of the child should be donebased on the geographical coordinates	7	High	JYOTI PRAKASH & KISOR KUMAR & KABIL DEV

6.2. SPRINT DELIVERY SCHEDULE

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

6.3. REPORTS FROM JIRA




Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
SAFETY GADGET- CHIL...
Software project
PLANNING
Roadmap
Backlog
Board
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / SAFETY GADGET- CHILD TRACKER
Backlog
JM
Epic
Clear filters
Insights
IBM WATSON -IOT COMMUNICATION 7 Nov – 12 Nov (0 issues)
Start sprint
USER WEB- INTERFACE 14 Nov – 19 Nov (0 issues)
Start sprint
Backlog (0 issues)
Create sprint
Your backlog is empty.
+ Create issue

7. CODING & SOLUTION

7.1 FEATURE- 1

In this system we uses the Node-Red to create a web Application for finding the location of the Child.The Parent has to create the username and password for the child.If the Parent enters the childsInformations on the Node-Red App ,The Geofence will search for the location and shows on the Screen.

Coding :

HTML

```
<!DOCTYPEhtml>

<htmllang="en">
<head>
<metacharset="UTF-8">

<metahttp-equiv="X-UA-Compatible"content="IE=edge">
<metaname="viewport"content="width=device-width,initial-
scale=1.0">
<linkrel="stylesheet"href="/css/login.css">

<title>SignUp</title>
<script>
if (window.location.hostname !== "localhost")
{if(location.protocol!=="https:"){
location.replace(
`https:${location.href.substring(location.protocol.length
)}`
)
}
}
```

```
</script>
<scriptsrc="./localforage.js"></script>
</head>
<body>
<divclass="wrapper">
<divclass="loginContainer">
<span>LogintoContinue</span>
<divclass="traditionalLoginContainer">
<formclass="signupForm"action="/"method="post">
<inputtype="text"name="firstName"placeholder="FirstName"i
d="firstName">

<inputtype="text"name="lastName"placeholder="LastName"id
="lastName">
<inputtype="text"name="username"placeholder="UserName"id
="username">
<inputtype="email"name="email"placeholder="Email"id="ema
il">
<inputtype="password"name="password"placeholder="Passwor
d"id="password">
<inputclass="loginButton"type="submit"value="SignUp">
</form>
</div>
<divclass="loginWithFireContainer">
<button type="button" class="fire" title="Login with SAFETY"
id="fire">Login withSAFETY</button>
</div>
<aclass="hyperLink"href="/login">AlreadyhaveanAccount?Log
in↗</a>
</div>
</div>
<script>
//NecessaryforFireOAuthtoFunction
```

```
const fireBroadcastingChannel = new BroadcastChannel('fireOAuthChannel');fireBroadcastingChannel.addEventListener('message',asyncevent=>{

letdata =event.data
/**
*      @typedef{Object<string,any>}Data
*      @property{boolean}success-Whetherthebloginwassuccessful
*      @property{string}token-Thedata returnedfromthelogini.e.FireToken
*/
//data.tokenisthemessagesentfromthefireOAuthChannelafterverification
//data.successisabooleanthatindicateswhethertheverificationwassuccessful
//data.tokenisthefire token
//What todowiththeFireToken?
// * Fire Token is an unique token which uniquely identifies the user who authorized your login attemptwithFire
//*
YoucanusethistokenONLYONCEasitwillbedestroyedafterthefirst use
//1.SendthefiretokentotheFireServertoverifythe user

//-Youcandothatclientsidedorserversided
//-YouneedtosendaPOSTRequesttotheFireServerwiththefiretoken
//      attheURL:http://localhost:3003/api/tokens/verify
//-The FireServerwillverifythefiretokenandreturnaresponse
//      - If the verification was successful - CODE (200), the Fire Server will return a response with theuser'sdata
//      - If the verification was unsuccessful - CODE (400) or CODE (401), the Fire Server will return aresponsewithanerror'message'
//-YoucanusethedatareturnedfromtheFireServertocreate a newuserinyour database
```

```
// This example will send the token to Fire Servers and console.log the
responseconsole.log("%c"+`FireToken:${data.token}`,`color:#f1c40f;font-weight:bold;`);
const response = await fetch('https://fire.adaptable.app/api/tokens/verify',
{method:'POST',
headers:{


'Content-Type':'application/json'
},
body: JSON.stringify({token:data.token
})
})
//get theresponse
constresponseData=awaitresponse.json()
// console.log the responseconsole.log(responseData)
awaitlocalforage.setItem('userData',{...responseData,isFire:true})
//Addingtheuserdatatotheuserdatabase

let database = await localforage.getItem("userDatabase")if(database ==null) {
database=[]
}
database.push(responseData)
awaitlocalforage.setItem("userDatabase",database)
// redirect to the home pagewindow.location.href
function popupwindow(url, title, w, h) {varleft=(screen.width/2)-(w/2);
vartop=(screen.height/2)-(h/2);

return window.open(url, title, 'toolbar=no, location=no, directories=no, status=no,
```

```
menubar=no,scrollbars=no,resizable=no,copyhistory=no,width='
+w+',height='+h+',top='+top+',left='+left);
}
document.getElementById("fire").addEventListener("click",
function() {popupwindow("/fireoauth.html","Fire
OAuth",450,600)
})
</script>
<script>

// this.Website's Scripts / App
Logicdocument.querySelector(".signupForm").addEventListener
("submit",async(e)=>{
e.preventDefault()
let firstName =
document.getElementById("firstName").valueletlastName =
document.getElementById("lastName").valueletusername=docu
ment.getElementById("username").valueletemail=document.getE
lementById("email").value
let password =
document.getElementById("password").valueletprofilePic=`https
://avatars.dicebear.com/api/adventurer
neutral/${firstName}${lastName}.svg?backgroundColor=variant0
3`
let data = { firstName, lastName, username, email, password,
profilePic }awaitlocalforage.setItem("userData",data)
let database = await
localforage.getItem("userDatabase")if(database ==null) {
database=[]
}
database.push(data)
await localforage.setItem("userDatabase",
database)window.location.href= "/"
})
```

</script>
</body>
</html>

7.2 FEATURE- 2

This system also consists of Wifi Module used to implement IOT and send all the monitored parameters to the cloud for android app monitoring on the parental device. Notification System also used in child Device to send the Alert message to the parental device through SMS.

Adding the geofence and changing the geofence when needed:

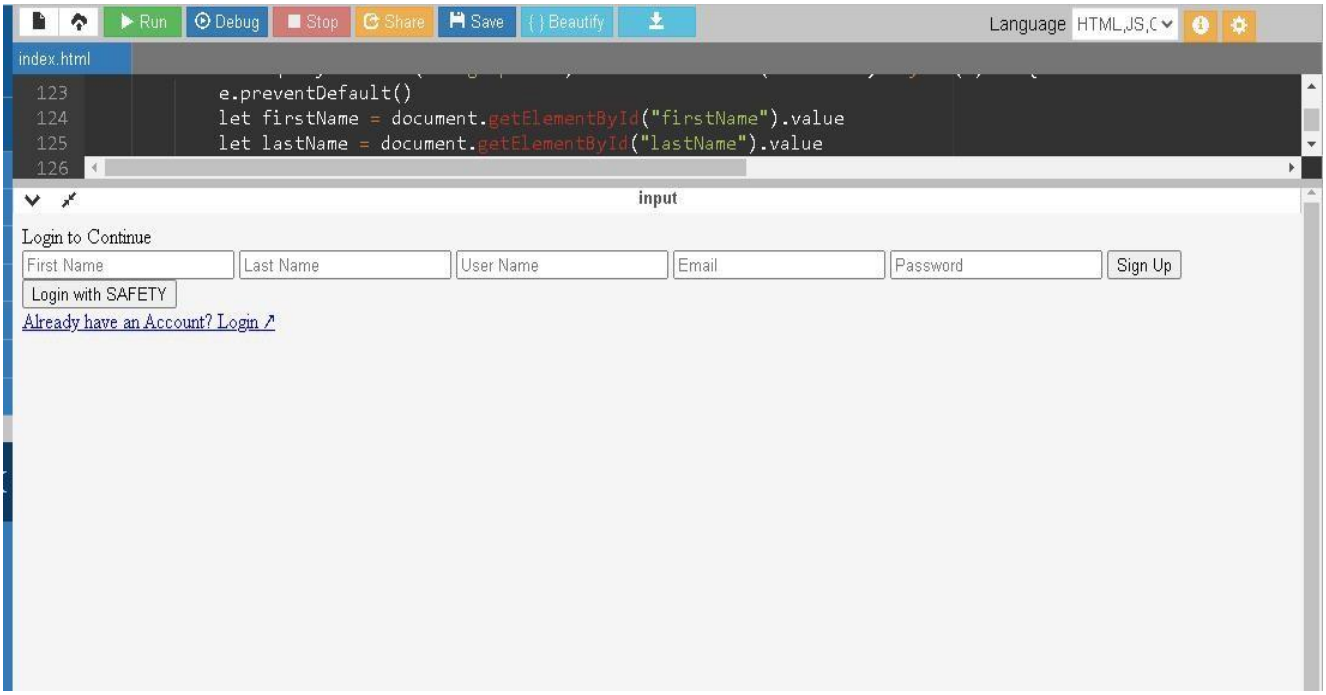
```
package com.example.geofence;
import
android.app.PendingIntent;
import android.content.Context;
import
android.content.ContextWrapper;
import android.content.Intent;
import android.widget.Toast;
import
com.google.android.gms.commo
n.api.ApiException; import
com.google.android.gms.location
.Geofence; import
com.google.android.gms.location
.GeofenceStatusCodes; import
com.google.android.gms.location
.GeofencingRequest; import
```

```
com.google.android.gms.maps.model.LatLng; public class GeofenceHelper extends ContextWrapper { private static final String TAG = "GeofenceHelper"; PendingIntentpendingIntent; public GeofenceHelper(Context base) {super(base); } public GeofencingRequestgetGeofencingRequest(Geofence geofence) {return new GeofencingRequest.Builder() .addGeofence(geofence) .setInitialTrigger(GeofencingRequest.INITIAL_TRIGGER_ENTER) .build(); } public Geofence getGeofence(String ID, LatLnglatLng, float radius, int transitionTypes) { return new Geofence.Builder() .setCircularRegion(latLng.latitude, latLng.longitude, radius) } .setRequestId(ID) .setTransitionTypes(transitionTypes) .setLoiteringDelay(5000) .setExpirationDuration(Geofence.NEVER_EXPIRE) .build(); public PendingIntentgetPendingIntent() {if (pendingIntent != null) { return pendingIntent; } Intent intent = new Intent(this,
```

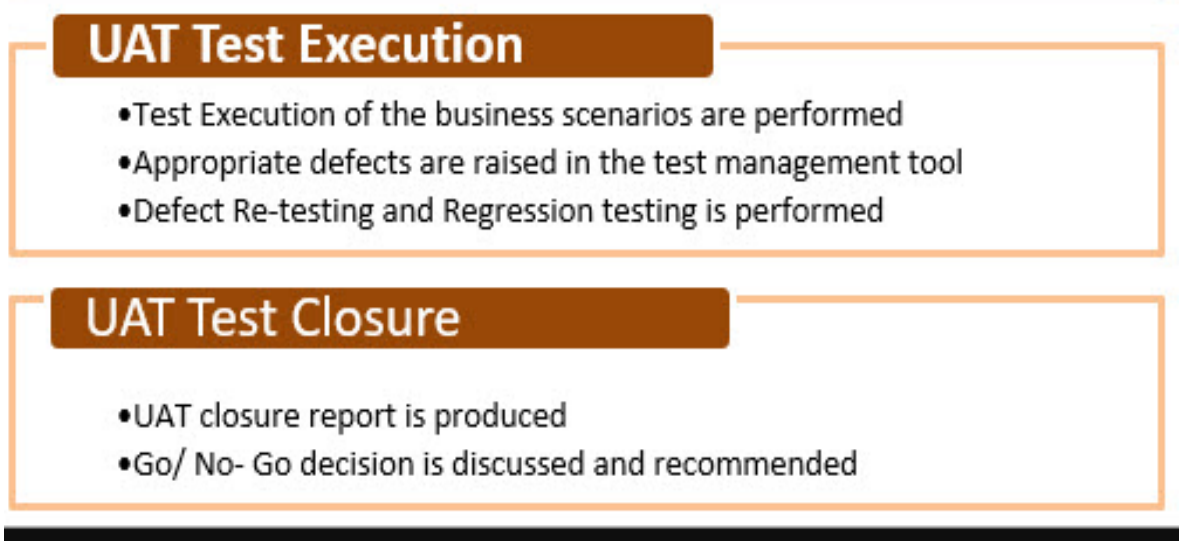
```
GeofenceBroadcastReceiver.class); pendingIntent = PendingIntent.getBroadcast(this, 2607, intent, PendingIntent.FLAG_IMMUTABLE); return pendingIntent; } public String getErrorString(Exception e) {if (e instanceofApiException) { ApiExceptionapiException = (ApiException) e; switch (apiException.getStatusCode()) { case GeofenceStatusCodes .GEOFENCE_NOT_AVAILABLE: return "GEOFENCE_NOT_AVAILABLE"; case GeofenceStatusCodes .GEOFENCE_TOO_MANY_GEOFENCES: return "GEOFENCE_TOO_MANY_GEOFENCES"; case GeofenceStatusCodes .GEOFENCE_TOO_MANY_PENDING_INTENTS: return "GEOFENCE_TOO_MANY_PENDING_INTENTS"; } } return e.getLocalizedMessage()
```

8.TESTING

8.1.TEST CASE

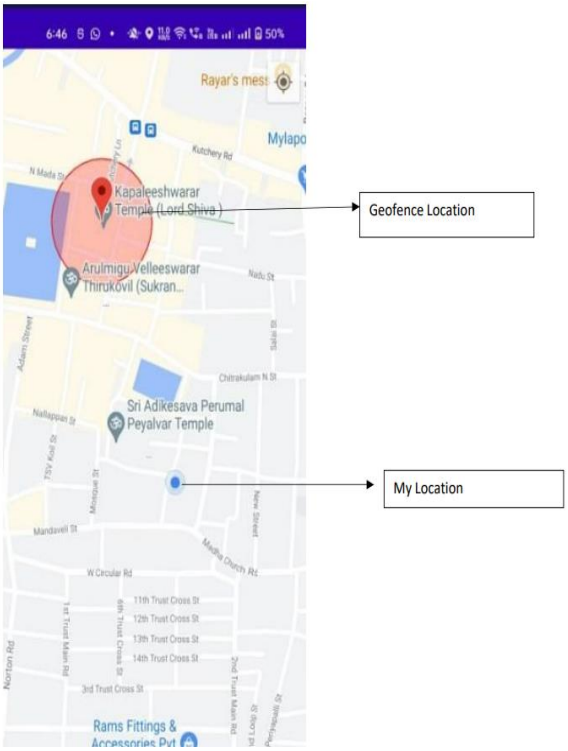


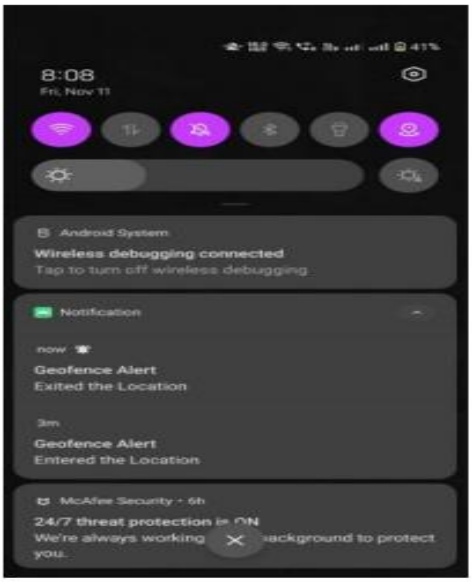
8.2. USER ACCEPTANCE TESTING



9.RESULTS

9.1. PERFORMANCE TESTING






```
package com.example.geofence;

import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.location.Location;
import android.os.CountDownTimer;
import android.util.Log;
import android.widget.Toast;

import com.google.android.gms.location.Geofence;
import com.google.android.gms.location.GeofencingEvent;

import java.util.List;
import android.os.Handler;


public class GeofenceBroadcastReceiver extends BroadcastReceiver {

    private static final String TAG = "GeofenceBroadcastReceiv";

    @Override
    public void onReceive(Context context, Intent intent) {
        // TODO: This method is called when the BroadcastReceiver is
receiving
        // an Intent broadcast
        //.
     /*Toast.makeText(context, "GEOFENCE_ENTERED",
Toast.LENGTH_SHORT).show();

        final Toast mToastToShow;
        int toastDurationInMilliSeconds = 1200000;
        mToastToShow = Toast.makeText(context, "GEOFENCE_EXITED",
Toast.LENGTH_LONG);


        // Set the countdown to display the toast
        CountDownTimer toastCountDown;
        toastCountDown = new CountDownTimer(toastDurationInMilliSeconds,
100000) {
            public void onTick(long millisUntilFinished)
                {mToastToShow.show();
            }

            public void onFinish()
                { mToastToShow.cancel()
                ;
```

10.ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- Heart-beats, temperature is monitored and the values are updated to cloud continuously for parent app monitoring.
- Boundary monitoring system is implemented on safety gadget with the help of BEACON technology, as soon as the safety gadget moves far away from the binding gadget an alert is provided to parent on binding gadget. the system is used to monitor the health parameters and also used for location tracking during necessary situations in safety concern

DISADVANTAGES:

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

11. CONCLUSION

Throughout the research, it is clearly explained theIoT 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 toparents so that actions can be taken. Through this, childsafety 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

12. FUTURE SCOPE

This research demonstrates Smart IoT device for child safety and tracking helping the parents to locate and monitor their children. If any abnormal values are read by the sensorthen an SMS is sent to the parents mobile and an MMS indicating an image captured by the serial camera is also sent. The future scope of the work is to implement the IoT device which ensures the complete solution for child safety problems.

13. APPENDIX

GITHUB LINK

IBM-EPBL/IBM-Project-35737-1660288227: IoT Based Safety Gadget for Child Safety Monitoring & Notification (github.com)

PROJECT DEMO LINK

https://drive.google.com/file/d/1OMH-1bfe9G_2kl7VEV-l-xdMXC8TpmJw/view?usp=share_link