HINDUSTHAN INSTITUTE OF TECHNOLOGY

(An Autonomous Institution, Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai, Accredited with "A" Grade by NAAC) Valley Campus, Pollachi Main Road, Coimbatore 641 032.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REPORT ON

HX 8001 PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP
(Naalaiya Thiran Program)

PROJECT TITLE

IoT - Based Safety Gadget for Child SafetyMonitoring and Notification

TEAM ID: PNT2022TMID10467

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ABSTRACT

This paper is mainly streamed towards child safety solutions by developing a gadget which can be tracked via its GPS locations and also a panic button on gadget is provided to alert the parent via GSM module calling for help. Parental android app is developed to manage and track the device anytime. Smart gadget device is always connected to parental phone which can receive and make phone calls and also receive SMS on gadget via GSM module, also a wireless technology is implemented on device which is useful to bound the device within a region of monitoring range, if device is moving out of monitoring range then an alert will be triggered on binding gadget, this helps you keep a virtual eye on child. Health monitoring system on gadget checking for parameters like heart beat/pulse rate and temperature is included which can be monitored on parental app. Gadget also monitors whether it is plugged on hand or not using contact switch and alert the parent as soon as it is unplugged.

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LIST OF ABBREVIATIONS

IoT   : INTERNET OF THINGS

GPS   : GLOBAL POSITIONING SYSTEM

FR   : FUNCTIONAL REQUIREMENTS

NFR   : NON-FUNCTIONAL REQUIREMENTS

DFD   : DATA FLOW DIAGRAM

SQL   : STRUCTURED QUERY LANGUAGES

STT   : SECURITY TRANSACTIONS TAX

DB   : DATABASE

UAT   : USER ACCEPTANCE TESTING

WIFI   : WIRELESS FIDELITY

CHAPTER 1

INTRODUCTION

1.1 Project Overview

A tracker that helps parents track a child's location so that the child does not get intodangerous situations.

The inspiration for this wearable comes mainly from the ever-increasing need of safety for small children in present times because there may be a chances of child lost in the major crowded areas.

This main script mainly focuses on the key features of missing child can be helped by the individuals present around the child and plays an important role in the child's safety until reunite the parent to that location.

1.2 Purpose

Now a day's Parents have more responsibility than older about their children's. Because Crimes rates are increasing day by day in our country, Crimes such as Child Amusement, Rapes, Murders, Illegal Relationship to avoid these kinds of crimes parents must watch their children every step. Eventually mobile phones cause major allegations on our society. Many teens must be noticed by their own parents; it is our duty. But sometimes children are arguing with their parents for watching their steps, to overcome these issues, we need to watch them through online.

CHAPTER 2

LITERATURE SURVEY

2.1 Existing Problem

Authors: M Nandini Priyanka, S Murugan, K. N. H. Srinivas, T. D. S. Sarveswararao, E. Kusuma Kumari. Title: Smart IoT Device for Child Safety and Tracking. Published in: 2019 IEEE. The system is developed using Link-It ONE board programmed in embedded C and interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & digital camera modules. The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during emergency.

Merits: The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same.

Demerits: To implement the IoT device this ensures the complete solution for child safety problems.

Authors: Akash Moodbidri, Hamid Shahnasser Title: Child safety wearable device. Published in: 2017 IEEE. The purpose of this device is to help the parents to locate their children with ease. At the moment there are many wearables' in the market which helps to track the daily activity of children and also helps to find the child using Wi-Fi and Bluetoothservices present on the device.

Merits: This wearable over other wearable is that it can be used in any phone and it is not necessary that an expensive smartphone is required and doesn't want to be very tech savvyindividual to operate.

Demerits: As, this device's battery gives short life-time.

Authors: Aditi Gupta, Vibhor Harit. Published in: 2016 IEEE. Title: Child Safety & Tracking Management System by using GPS. This paper proposed a model for child safety through smart phones that provides the option to track the location of their children as well as in case of emergency children is able to send a quick message and its current location via Short Message services.

Authors: Dheeraj Sunehera, Pottabhatini Laxmi Priya. Title: Children Location Monitoring on Google Maps Using GPS and GSM. Published in: 2016 IEEE. This paper provides an Android based solution for the parents to track their children in real time. Different devices relate to a single device through channels of internet. The concerned device is connected to server via internet. The device can be used by parents to track their children in real time or for women safety. The proposed solution takes the location services provided by GSM module. It allows the parents to get their child's current-location via SMS. Merits: A child tracking system using android terminal and hoc networks.

Demerits: This device cannot be used in rural areas.

2.2 REFERENCES
Paper 1: Smart IOT Device for Child Safety and Tracking

Child safety and tracking is a major concern as the number of crimes on children are reported nowadays.With this motivation, a smart IoT device for child safety and tracking is developed to help the parents to locate and monitor their children. The system is developed using LinkIt ONE board programmed in embedded C and interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & digital camera modules. The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during an emergency. The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same. The above system ensures the safety and tracking of children.

Paper 2: Child Safety Monitoring System Based on IoT

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 conditions and the aim 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 allows 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.

Paper 3: IoT-based Child Security Monitoring System

Nowadays, the crime rate associated with children keeps increasing due to which draws peoples' attention regarding child safety. This research is conducted to propose a child security smart band utilizing IoT technology. Online questionnaires and semi-structured interviews are methodologies used to collect data. The online questionnaire gains feedback by sending questions electronically, where answers need to be submitted online. In the semi structured interview, researchers meet and ask respondents some predetermined questions while others being asked are not planned in advance. Through information obtained, a smart band has been proposed to monitor the safety of children. By this, parents know what is happening remotely and can take actions if something goes wrong. The future improvements of this device will be adding functions and software to make it works like a phone such as messaging, gallery, Google, YouTube, meanwhile, adding more child security features so that child safety is guaranteed.

Paper 4: IOT Based Smart Gadget for Child Safety and Tracking

This paper is mainly streamed towards child safety solutions by developing a gadget which can be tracked via its GPS locations and also a panic button on gadget is provided to alert the parent via GSM module calling for help. Parental android app is developed to manage and track the device anytime. Smart gadget device is always connected to parental phone which can receive and make phone calls and also receive SMS on gadget via GSM module, also a wireless technology is implemented on device which is useful to bound the device within a region of monitoring range, if device is moving out of monitoring range then an alert will be triggered on binding gadget, this helps you keep a virtual eye on child. Health monitoring system on gadget checking for parameters like heart beat/pulse rate and temperature is included which can be monitored on parental app. Gadget also monitors whether it is plugged on by hand or not using contact switch and alert the parent as soon as it is unplugged.

PROBLEM STATEMENT DEFINITION

Create a problem statement to understand your customer's point of view.

The Customer Problem Statement template helps you focus on what matters

to create experiences people will love.

A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS
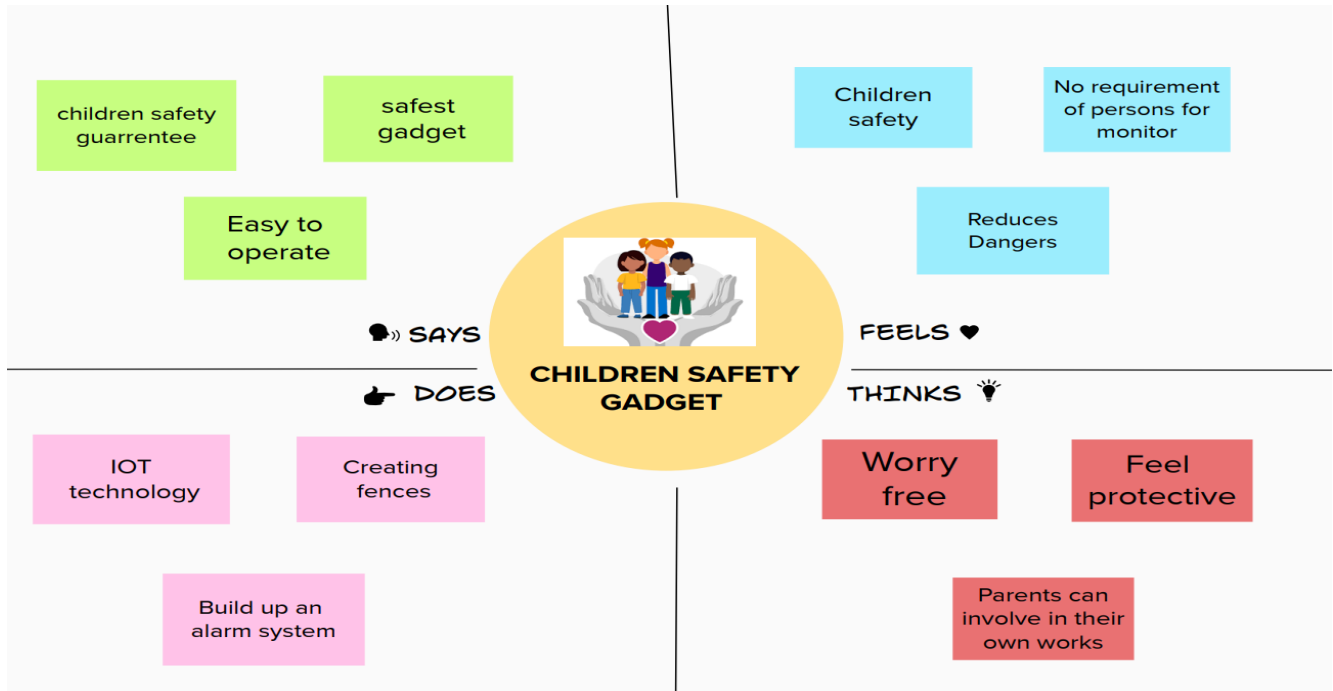
Fig 3.1.1 Empathy Map

This project was created to help parents keep track of their children's whereabouts. Children are more readily influenced by their peers these days, and they may be duped or abducted by strangers. This method may be developed to track a child's current position. After a specific period, the Web application on the device will update the location of the kid to the application. By pushing the distinct button that has been introduced, parents may even take action if their kid is unstable or in an inappropriate area. WFPS, a WIFI positioning system that doesn't connect to the internet but connects to Wi-Fi access points, will be used to track the child's whereabouts

3.1 IDEATION & BRAINSTORMING

BRAINSTORMING

HARI BHAGYA SRI

- battery backup when low charge so location can be sent even device in low charge and can't function
- pulse detection for monitoring if child in emergency situation by the raise in pulse
- parents can call device even without child attending the call for emergency
- panic button for emergency
- monitor child daily routine with schedules
- monitoring device whether it is working properly
- voice recognition access for child to operate
- sleep time alert for child
- GSM technogy used for stable internet

SRAVANTH NAGA SUNIL

- A firewall feature to block any strangers or unknown numbers from calling your child.
- Implementing SOS system in child device.
- fast charging
- Blood pressure for monitoring if child in emergency situation by raise in blood pressure
- battery saver mode
- A smart watch for kids helps you limit your child's exposure to potential online predators by completely blocking internet browsing access
- person voice are interacting recorded with with child using voice recognition
- Limited texting- a great deextremely distracting. way to keep in touch but The best kids smatwatches alow this types of messages your child can send.
- Utilizing the chip, the smartwatch's GPS accompanying smartphone app can safe zones using your set up geo-fenced kids smart watch.

BHARATH

- buzzer sound for protecting child from animals
- using nylon matrial for staps for skin sensitivity
- stainless steel is used as a material so easy to be a wearable one
- user friendly interface
- thermal detection for body temperature
- water resistent
- Anker Astro E1 6700 use this battery to high capasity and low weight
- heat resistent
- notifing while watch removal of

BALA YOGESH

- child helpline intimation
- health checkup of child with heartbeat detection
- software upgrades for device efficiency
- Fiber screen for strong display
- video recording facility
- microphone for hearing bystranders
- wireless charging
- Get feedback from parents and resolve queries
- voice encyption others except with child voice,so parents and child device can't access the device

Fig 3.2.1 Ideation & Brainstorming

IDEATION PRIORITIZATION

Fig 3.2.1 Ideation Prioritization

3.3 PROPOSED SOLUTION

S.No	Parameter	Description
1	Problem Statement (Problem to be solved)	• Parents tend to be paranoid about leaving children alone at home, fearing for their safety. • Leaving children at home without adult supervision puts them at greater risk of accident or injury.
2	Idea / Solution Description	• Keep your children guarded 24 hours a day. The first parental control app with real time functions • Know. Prevent. Protect. 24/7 remotely of anywhere.
3	Noveity / Uniqueness	• Live camera • Video Recording • GPS Tracking • Record Surrounding • Caution Notification
4	Social Impact / Customer Satisfaction	• Now you can access all features directly on your phone and control the device easily and directly.

		8	• See all activity of yours Children, easy and quickly in the app from your Android phone without Worries • All features in one Android application. Make you monitoring more comfortable and easy. This new feature will allow you stay informed 24 hours a day in real time.
5	Business Model (Revenue model)	• This is a powerful monitoring solution that provides you an excellent level of service. • The application has been designed with the view of Advanced IOT Technology, Node Red and other Powerful Technologies.
6	Scalability of the Solutions	• Take pictures, record surrounding and view all activity of your Children , directly with our Android App. • You will Receive in your phone notifications in real time, every time when the device detects new information. Also you can configure alerts of your interest.

Table 3.3.1 Proposed Solution

3.4 PROBLEM SOLUTION FIT

CUSTOMER SEGMENT:
A parent who is afraid of their child's safety whenever they are not with the child.

PROBLEMS/PAINS:
Sometimes the children can prone to dangers. This device can protect them from those situations.

TRIGGERS TO ACT:
After noticing that child entering the danger zone the device triggers the alarm.

CUSTOMER LIMITATIONS:
- Should be affordable.
- Device should be weight less
- Easy to operate.

PROBLEM ROOT/CAUSE:
- Balancing office works and children safety is tough.
- Sometimes we miss watching out children

AVAILABLE SOLUTIONS:
Ensuring the children's protection by using the IOT technology and smart sensors.

BEHAVIOUR:
Child's moment is always notified to parents through their smart phones.

EMOTIONS:
- Worry
- Anxiety
- Frustration
- Angry

OUR SOLUTION:
A gadget needs to be invented which monitors the child and activates buzzer when need.

Fig 3.4.1 Problem Solution Fit

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement(Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through FormRegistration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Notification	Notification send to Mobile Number Notification send through message/ call
FR-4	User Location Check	Check through Account

Table 4.1.1 Functional Requirements

4.2 NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Accessed through Mobile App Showing location (latitude and longitude) of child
NFR-2	Security	Database security must meet HIPAA requirements
NFR-3	Reliability	Once logged in webpage is available until logging OUT
NFR-4	Performance	Each page must load within 2 secondS
NFR-5	Availability	Once logged in webpage is available until logging OUT

Table 4.2.1 Non-Functional Requirements

NFR-6	**Scalability**	Increase in scalability

Table 4.2.1 Non-Functional Requirements

CHAPTER 5

PROJECT DESIGN

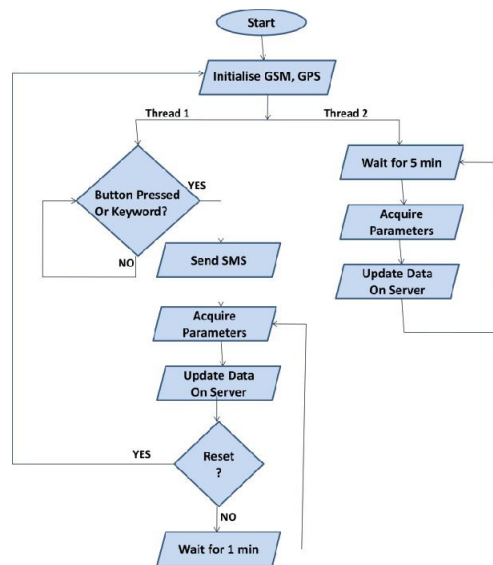## 5.1 DATA FLOW DIAGRAMS

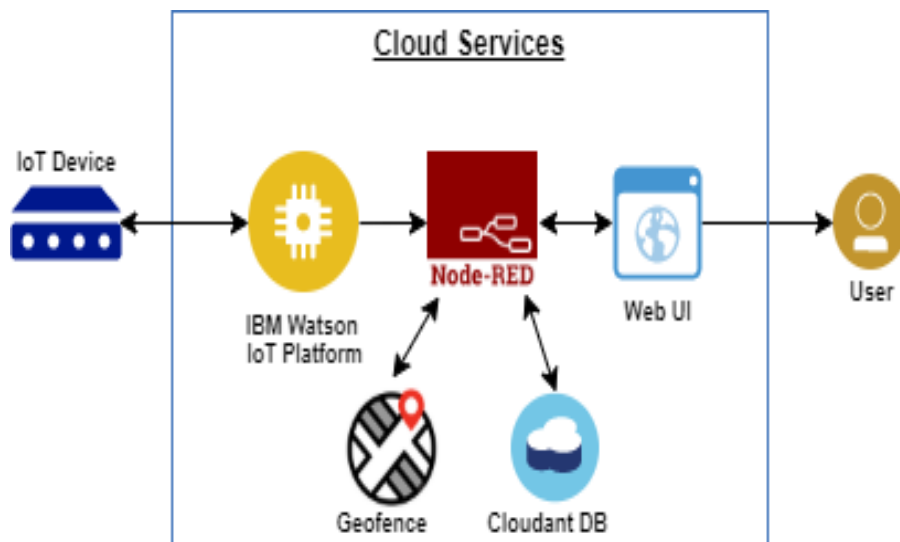Fig 5.1.1 Data Flow Diagrams

5.2 Solution & Technical Architecture

Fig 5.2.2 Technical Architecture

5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer(Parents Mobile user)	Registration	USN-1 (FATHER)	I can access the location of my children using the credentials provided as a Father.	I can access my account / dashboard and receive confirmation email & click confirm	High	Sprint-1
		USN-2 (MOTHER)	I can access the location of my children using the credentials provided as a Mother.	I can access my account / dashboard and receive confirmation email & click confirm	High	Sprint-1
		USN-3 (GUARDIAN)	I too can monitor the children's activities using safety gadget monitoring system.	I can access my account / dashboard and receive confirmation email & click confirm	Medium	Sprint-2
	Login	USN-4 (if required)	Same function to be performed as in previous cases.	Same function to be performed as in previous cases.	Not Yet Determined	----
	Dashboard	USN-5 (if required)	Same function to be performed as in previous cases.	Same function to be performed as in previous cases.	Not Yet Determined	----

Fig 5.3.1 User Stories

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CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & 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	HARI BHAGYA SRI B
Sprint-1		USN-2	As a Parent/ Guardian, I can register for the application through Gmail	1	Medium	BHARATH SANKARAN J
Sprint-1	User Confirmation	USN-3	As a parent I will receive connection , location in sms / mail once I have entered this application	1	High	BALA YOKESH P

Sprint-1	Login	USN-4	As a parent/ guardian , I can log into the application by entering mail and password.	2	High	SRAVANTH NAGA SUNIL B

Table 6.1.1 Sprint Planning & Estimation

6.2 SPRINT DELIVERY SCHEDULE

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	20	High
		USN-2	As a user, I will receive confirmation email once I have registered for the application	20	High
		USN-3	As a user, I can register for the application through Facebook	5	Low
		USN-4	As a user, I can register for the application through Gmail	10	Medium
	Login	USN-5	As a user, I can log into the application by entering email & password	20	High
Dashboard					
Customer (Web user)	Login		When I enter I can view the working of applications, scan and monitor the operationsand check if all the users are authorized	10	Medium
Customer Care Executive	Login		Maintaining and accessing the database containing the locations are secure and accurate and update constantly	20	High
Administrator	Login		As a user I can register for the application by entering my correct credentials	20	High

Table 6.2.1 Sprint Planning & Estimation
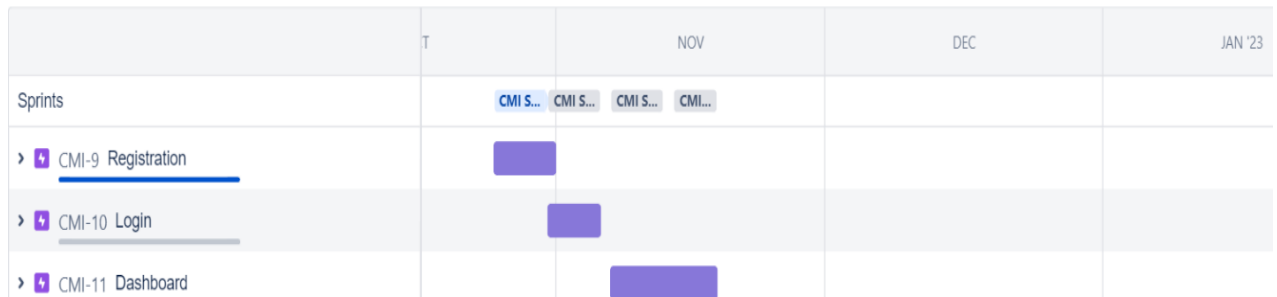
6.3 REPORTS FROM JIRA

ROADMAP

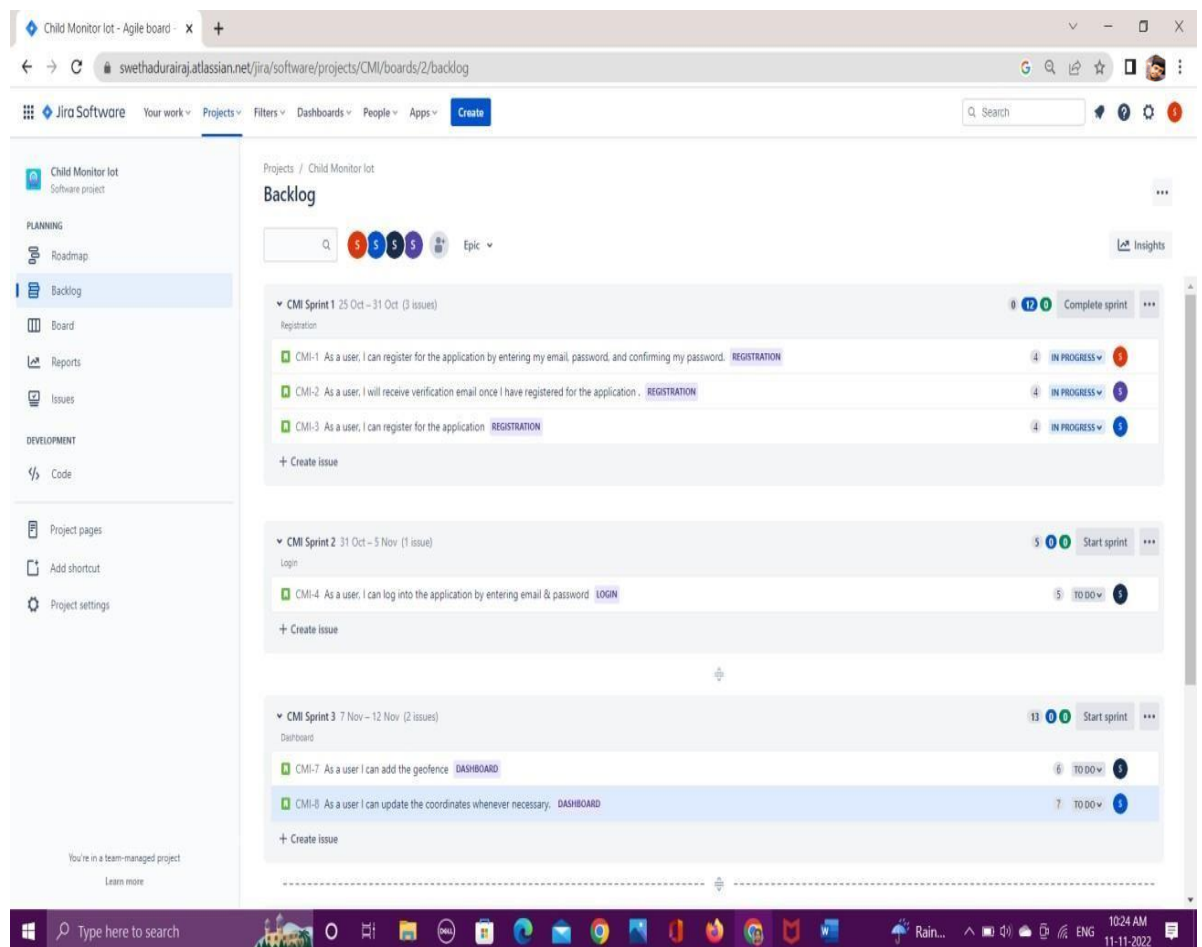Fig 6.3.1 Road Map

BACKLOG

Fig 6.3.2 Backlog

CHAPTER 7

CODING & SOLUTIONING

7.1 FEATURE 1 (ADDING GEOFENCE)

☐ Geofence is like a round wall covering the given location. So parents can use them to mark the locationwhere their children are going.

```java
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.common.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";PendingIntent pendingIntent;

        public GeofenceHelper(Context base) {
                super(base);
        }
        public GeofencingRequest getGeofencingRequest(Geofence
geofence) {return new GeofencingRequest.Builder()
                                .addGeofence(geofence)

                .setInitialTrigger(GeofencingRequest.INITIAL_TRIGGER_ENTER)
                                .build();
        }
```

```java
        public Geofence getGeofence(String ID, LatLng latLng, 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 PendingIntent getPendingIntent() {
        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 instanceof ApiException) {
        ApiException apiException = (ApiException) e;
        switch (apiException.getStatusCode()) {
                case GeofenceStatusCodes
.                   GEOFENCE_NOT_AVAILABLE:
                return "GEOFENCE_NOT_AVAILABLE";
case GeofenceStatusCodes
```

```java
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";}}
```

7.2 FEATURE 2 (ALERT NOTIFICATION)

☐ Once geofence is added, when the child enters the geofence a notification will be sent
☐ When the child leaves the geofence a notification will be sent.

```java
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();
                }
        };
// Show the toast and starts the countdown
        mToastToShow.show();
        toastCountDown.start();*/
```

```java
    NotificationHelper notificationHelper = new NotificationHelper(context);
notificationHelper.sendHighPriorityNotification("GEOFENCE_TRANSITION_EN
TER",
 "", MapsActivity.class);

GeofencingEvent geofencingEvent = GeofencingEvent.fromIntent(intent);
If (geofencingEvent.hasError())

        Log.d(TAG, "onReceive: Error receiving geofence event...");
            return;
}

        List<Geofence> geofenceList =
geofencingEvent.getTriggeringGeofences();
        for (Geofence geofence: geofenceList) {
                Log.d(TAG, "onReceive: " + geofence.getRequestId());
        }
//        Location location = geofencingEvent.getTriggeringLocation();
         int transitionType = geofencingEvent.getGeofenceTransition();

        switch (transitionType) {
                case Geofence.GEOFENCE_TRANSITION_ENTER:

        notificationHelper.sendHighPriorityNotification("Entered the
Location", "", MapsActivity.class);
                break;

        case Geofence.GEOFENCE_TRANSITION_EXIT:
notificationHelper.sendHighPriorityNotification("Exited the Location ", "",
MapsActivity.class);
                break;}  }  }
```

7.3 DATABASE SCHEMA

We assume that only one child can leave the set maximum distance at a time. The beacons take 20 seconds to update the previous location data, hence we assume the notification trigger has a 20-40 seconds' lag in updating the right location. We assume that Wi-Fi is readily available since the backend server is located in the cloud and then to use the mobile devices' location services.

Moto Xplay Mobile Device	1	Communication Hardware	OS:Android Qualcomn Snapdragon 615 Octa-core Memory:32GB
Google Asus Table	1	Communication Hardware	OS:Android Quad-core 1.2GHZ Cortex-A9 Bluetooth 3.0 Memory:1GB
Sony Xperia D5803	1	Communication Hardware	OS:Android Qualcomm MSM8974AC snapdragon RAM:2GB Memory:16GB Bluetooth 4.0
Cloud Storage Amazon EC2	1	Communication Hardware	OS:Ubuntu Memory:1GB RAM:2GB

CHAPTER 8

TESTING

8.1 TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_001	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on App		1.Enter App 3.Verify login/Singup popup displayed or not		Login/Signup popup should display	Working as expected	Pass		Y		SnehaShri , Swetha
LoginPage_TC_002	UI	Home Page	Verify the UI elements in Login/Signup popup		1.Enter App 2.Verify login/Singup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Register		Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Register	Working as expected	Pass		Y		Shanmugapriya , Shwetha
LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials		1.Enter App 2..Enter Valid username/email in Email text box 3.Enter valid password in password text box 4. Click on login button	Username: abcd@gmail.com password:Testing123	User should navigate to user account homepage	Working as expected	Pass		Y		Shakthi
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with InValid credentials		1.Enter App 2..Enter InValid username/email in Email text box 3.Enter valid password in password text box 4. Click on login button	Username: abcd@gmail password:Testing123	Application should show "Login error. There is no user record corresponding to the identifier"	Working as expected	pass		Y		Shakthi , Shanmugapriya
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Valid credentials		1.Enter App 2..Enter Valid username/email in Email text box 3.Enter Invalid password in password text box 4. Click on login button	Username: sec19ec020@sairamtap.edu.in password: Testing123678686786876	Application should show "the Password is invalid "	Working as expected	Pass		Y		Shwetha B, SnehaShri
LoginPage_TC_005	Functional	Login page	Verify user is able to log into application with InValid credentials		1.Enter App 2..Enter InValid username/email in Email text box 3.Enter Invalid password in password text box 4. Click on login button	Username: abcd password: Testing123678686786876876	Application should show "Login error. There is no user record corresponding to the identifier"	Working as expected	Pass		Y		Swetha
Dasboard	Functional	Dashboard	Adding geofecne in the location need		1.Enter App 2.Enter the valid username and password		Application show a red circle around the location	Working as expected	Pass		Y		Sneha Shri
Alert Notification	Functional	Notification	Notification when the user entered the geofence		1.Enter App 2.Enter the valid username and password 3.Add the Geofence		Application sent the notifcation " Entered the location"	Working as expected	Pass		Y		Shanmugapriya , Shwetha
Alert Notification	Functional	Notification	Notification when the user exited the geofence		1.Enter App 2.Enter the valid username and password		Application sent the notifcation " Exited the location"	Working as expected	Pass		Y		Shakthi , Swetha

Fig 8.1.1 Test Cases

8.2 USER ACCEPTANCE TESTING

1. DEFECT ANALYSIS

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	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 Reproduced	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

Table 8.2.1 Defect Analysis

2. TEST CASE ANALYSIS

Section	TotalCases	Not Tested	Fail	Pass
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

Table 8.2.2 Test Case Analysis

CHAPTER 9

RESULTS

9.1 PERFORMANCE METRICS
1. USER REGISTRATION:

User gets registered to the app using their mail and create their password. On the user is registered a verification mail will be sent to the user mail id. The user needs to verify the account. All user details are stored in the firebase and verification mail is sent by firebase authentication.

Registration Page:

Fig 9.1.1 User Registration

Verification mail
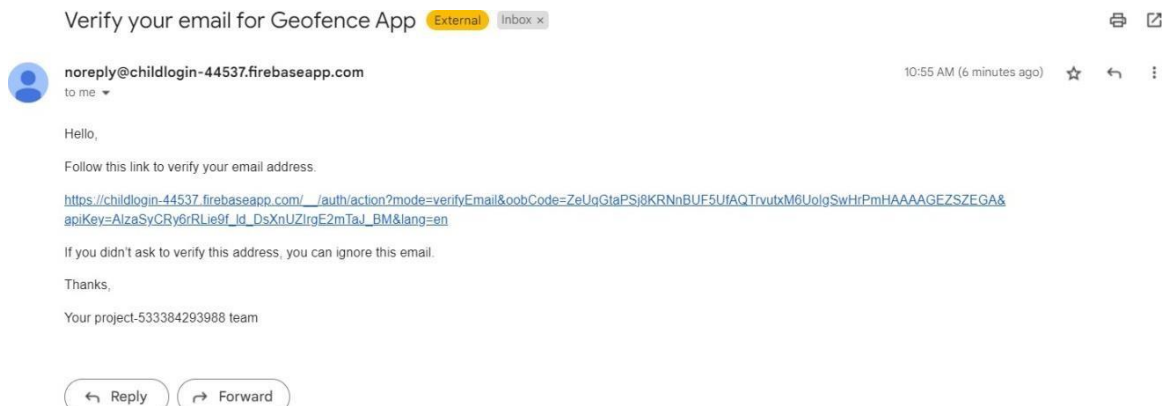
Fig 9.1.2 Verification Mail

2. USER LOGIN

User with their registered mail and password will login to the account. As the details are stored in firebase, when invalid mail or password is entered a message say invalid mail or password occur
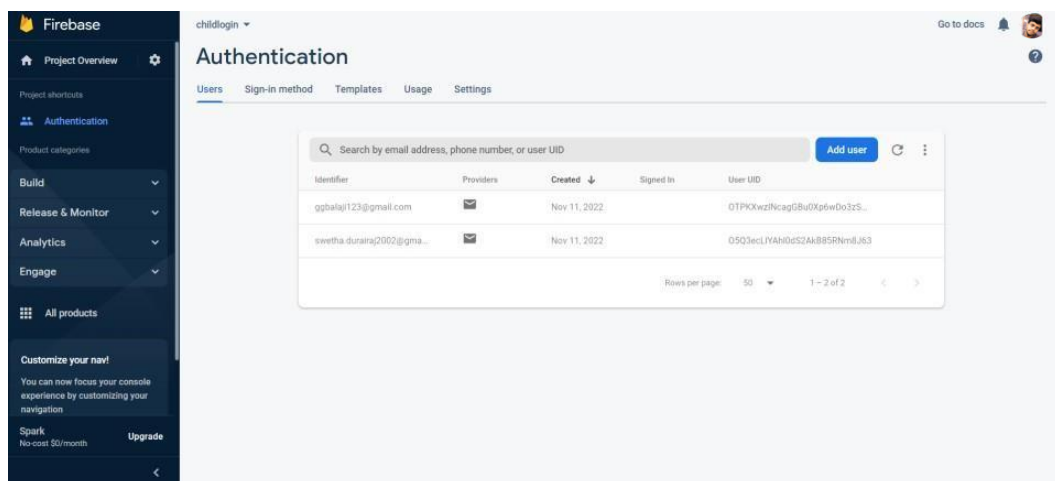
Login page:

Fig 9.2.1 User login

User Details

Fig 9.2.2 User Details

3. ADDING GEOFENCE AND ALERT NOTIFICATION

User can add geofence in the location where they want to add or where their child is going play so they can monitor the child location. Once the child enters the geofence alert notification says entered the location will be displayed. When the child leaves the geofence alert notification says exited the location will have displayed.
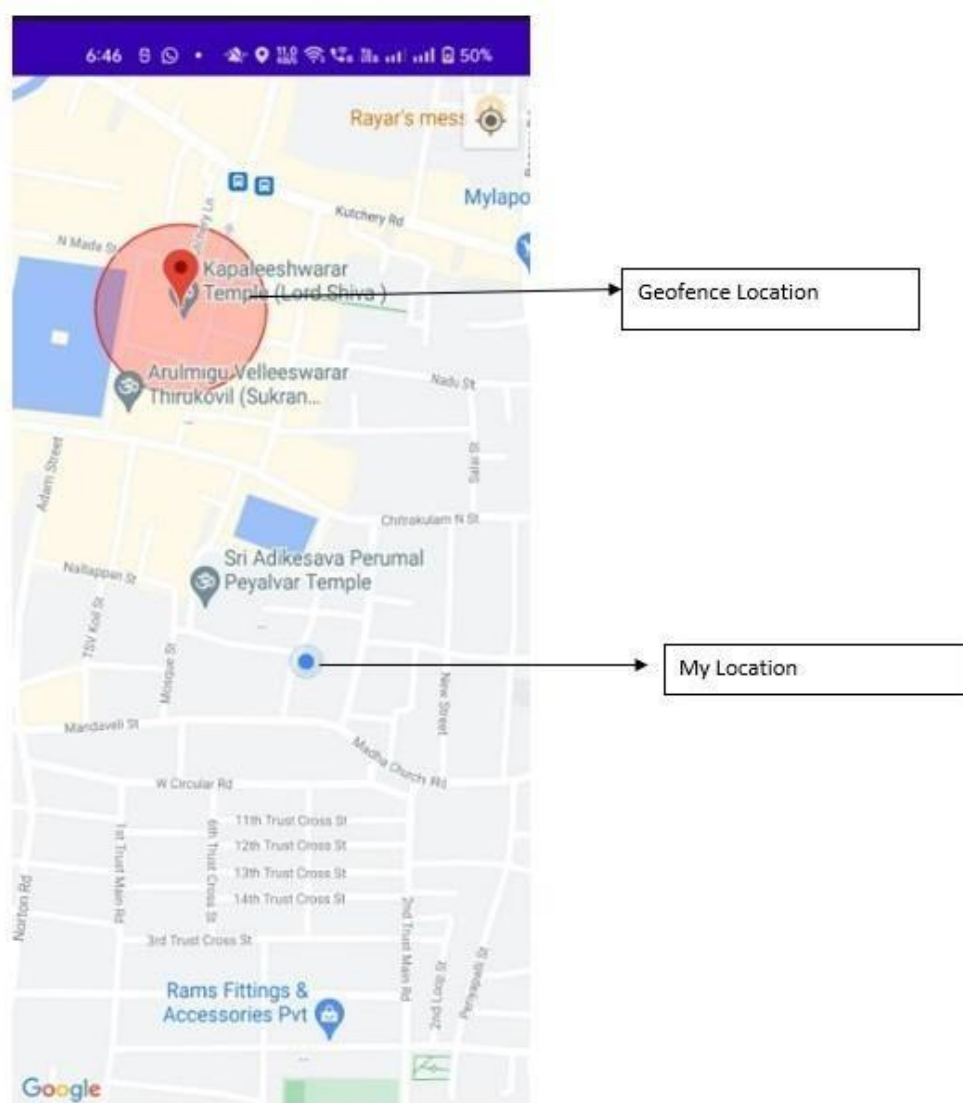
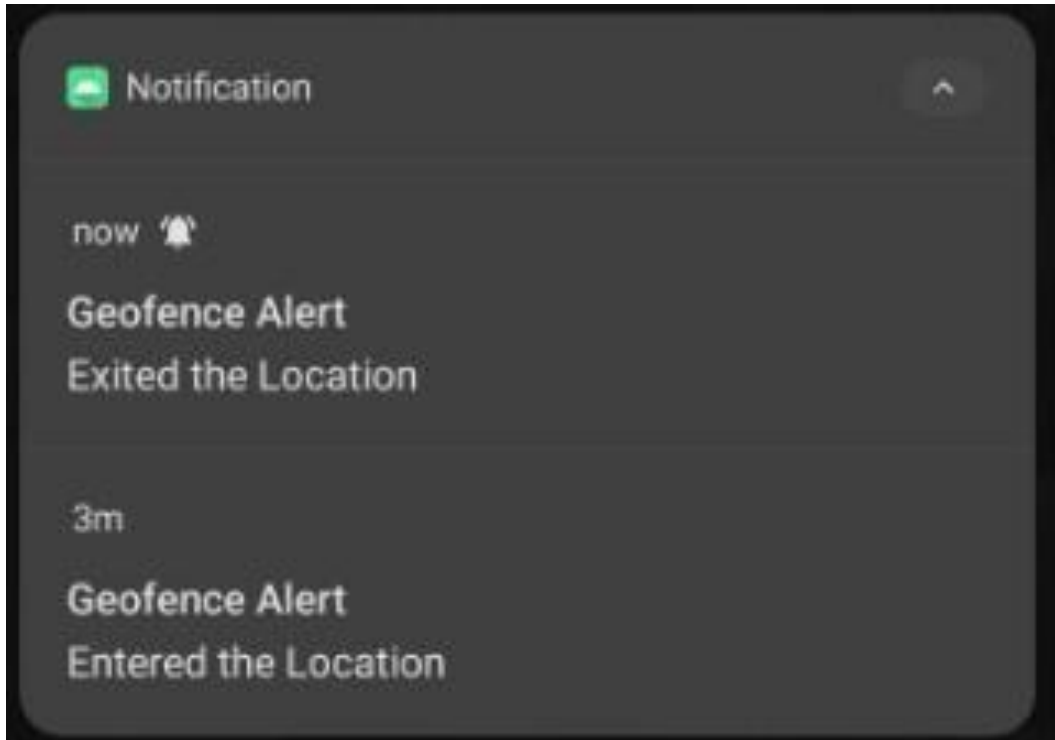**Geofence**

Fig 9.3.1 Adding Geofence

NOTIFICATION

Fig 9.3.2 Alert Notification

CHAPTER 10

ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- ✓ Simple and easy to use
- ✓ Parents can feel secure because if the child leave the desired location and immediately anotification will be sent.
- ✓ Geofence can be added easily.
- ✓ Accurate real-time data.
- ✓ Efficient use of resources.
- ✓ Accountability and Safety.
- ✓ Process automation

DISADVANTAGES:

- ✓ Multiple geofence can be a problem.
- ✓ Maintenance can be time-consuming.
- ✓ Pushback due to privacy concerns.
- ✓ Battery and data draining.
- ✓ Lack of formal policies.

CHAPTER 11

CONCLUSION

This research demonstrates Smart IoT device for child safety and tracking, to help the parents to locate and monitor their children. Through this device, the parent can track and monitor their child with just a simple app. It is not possible to always stay beside children as most of the parents need to go for work. With this project, parents can track the location of their children and get alerts whenever the child out of the geofence. It becomes easy for parents to look after their child while working. This device is efficient to use. Thus, by keeping in mind the advantages and applications we are developing a child monitoring device. In order to avoid kidnapping cases, the child monitoring system is needed.

CHAPTER 12

FUTURE SCOPE

The future work would be to further develop and implement the safety wearable device so thatit could be watch or sown into a fabric that could be worn, using synthetic fibers. When a violation of child safety is identified, a certain sensor in the child module will emit a signal, which is the main function of the suggested child tracking system. These sensors and WFPS will send this signal to the microcontroller, which will then send it to the transmitter, which will then send it to the parent module. The decision will be made by the parent module, and the violation handling procedure will begin. The kid tracking system's functionality necessitates hardware between the child and parent models, which comprises a drive circuit for the sensors' activation.

CHAPTER 13

APPENDIX

GitHub link

https://github.com/IBM-EPBL/IBM-Project-27137-1660047438