

**ALAGAPPA CHETTIAR GOVERNMENT COLLEGE OF
ENGINEERING AND TECHNOLOGY**

(An Autonomous Institution Affiliated to Anna University, Chennai)

KARAIKUDI – 630003

**PROFESSIONAL READINESS FOR INNOVATION
EMPLOYABILITY AND ENTREPRENEURSHIP**

IBM PROJECT REPORT

Submitted by

Team ID: PNT2022TMID06109

SUBASHINI S 91761915038

SUBALAKSHMI M 91762015216

SREE LAKSHMI N 91762015215

PRIYANKA K 91762015211

In partial fulfillment for the award of the degree

Of

**BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE AND ENGINEERING**

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**ALAGAPPA CHETTIAR GOVERNMENT COLLEGE OF
ENGINEERING AND TECHNOLOGY**

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BONAFIDE CERTIFICATE

Certified that this PROJECT REPORT “**IoT Based Safety Gadget for Child Safety Monitoring and Notification**” is the bonafide work of **SUBASHINI S(91761915038) SUBALAKSHMI M(91762015216) SREE LAKSHMI N(91762015215) PRIYANKA K(91762015211)** for **IBM NALAIYATHIRAN** in VII semester of B.E., degree course in Computer Science and Engineering branch during the academic year of 2022 - 2023.

Staff-In charge

Dr.C.Umarani

Evaluator

Mrs.K.Chandraprabha

Head of the Department

Mrs.K.Chandraprabha

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1.INTRODUCTION

Create the geofence around the particular location in school or parks. It assists parents to monitor their children remotely.in case situations happen notification will be sent to parents so that actions can be take Parents and their families are mentally disturbed.Parents are sad and very nervous when the child is missing. Then they search for the child if he has gone somewhere nearby. In those situations parents my think they have to Monitoring the child activities.Track the child location using GPS. Send the notification to them periodically.

1.1 Project Overview

The use of in this device motivated by the need of child safety security system in Malaysia due to child safety issues so we can use voice recognition module in which the alert commands from the child are stored and kept for further reference. If the same child delivers the same command, it will compare with the alert command which was previously stored and sets an emergency level according to the alert command. The GSM has a SIM which is used to send an alert message or an alert call to the trusted peoples. GPS is used to track the live location and it is used when needed. The server will search the respective device ID from the database and search for respective contacts according to that device ID and helps in alerting the registered guardians and track location use for the child.

1.2 Purpose

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 interventions. Basically, children cannot complain about abuselements which they face in their daily life to their parents.

2. LITERATURE SURVEY

2.1 Existing problem

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

2.2 References

Like articles, websites, blogs.

https://www.researchgate.net/publication/354877554_IoT-based_Child_Security_Monitoring_System

<https://www.ijraset.com/research-paper/monitoring-and-prevention-of-child-abuse-using-iot>

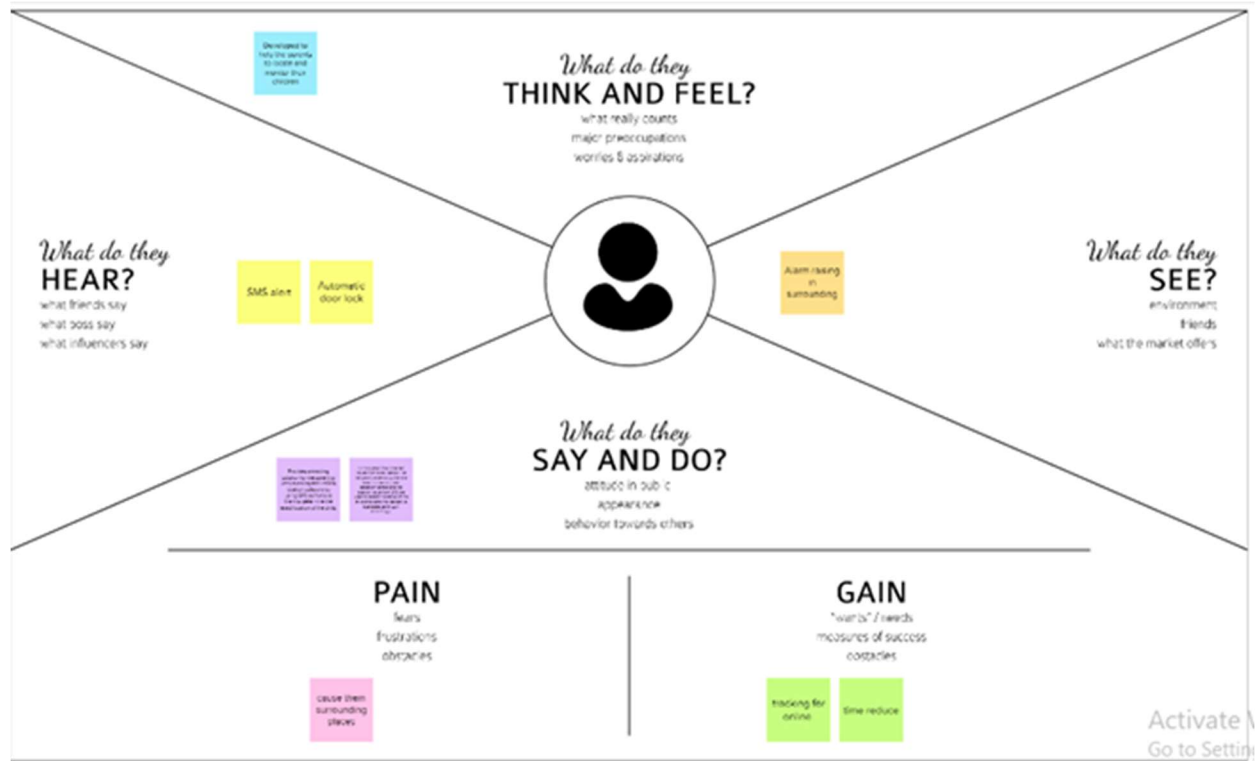
2.3 Problem Statement Definition

Crime rate associated with children keeps increasing which has been reduced by this Iot based child safety monitoring and notification.

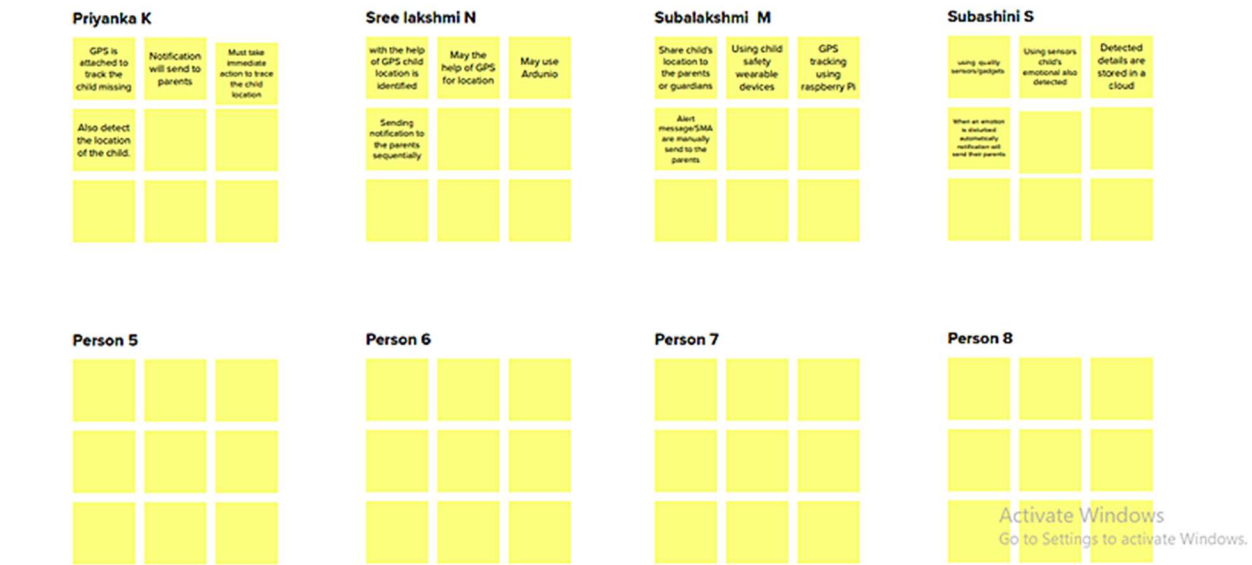
- 1.To avoid the kidnapping of childrens.
- 2.Monitoring the children activities.
3. If any problems arise to send the SMS notification, Alarm setting, Track the child location using GPS, Internet tracking.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



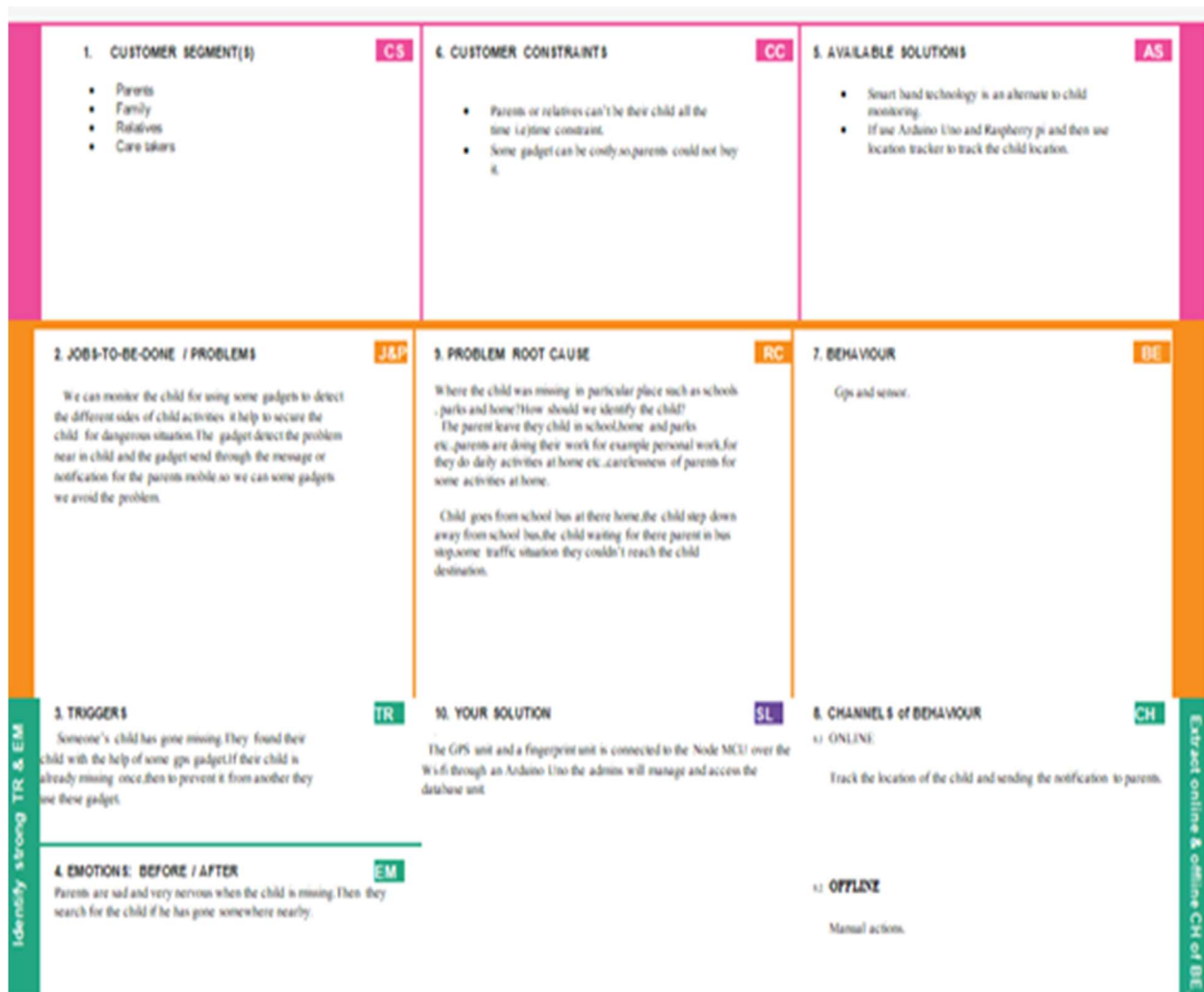
3.2 Ideation & Brainstorming



3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"> If the child leaves the schools or parks the location cannot be tracked Kidnapping of childrens.
2.	Idea / Solution description	<ul style="list-style-type: none"> Monitoring the child activities. Track the child location using GPS. Send the notification to parents.
3.	Novelty / Uniqueness	Our product gets the location of the child besides the mobile notification.
4.	Social Impact / Customer Satisfaction	It helps the parents in child care.
5.	Business Model (Revenue Model)	Application oriented with GPS tracker.
6.	Scalability of the Solution	It can be used at anyplace and anytime.

3.4 Problem Solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Location tracking	Track the child location using GPS.

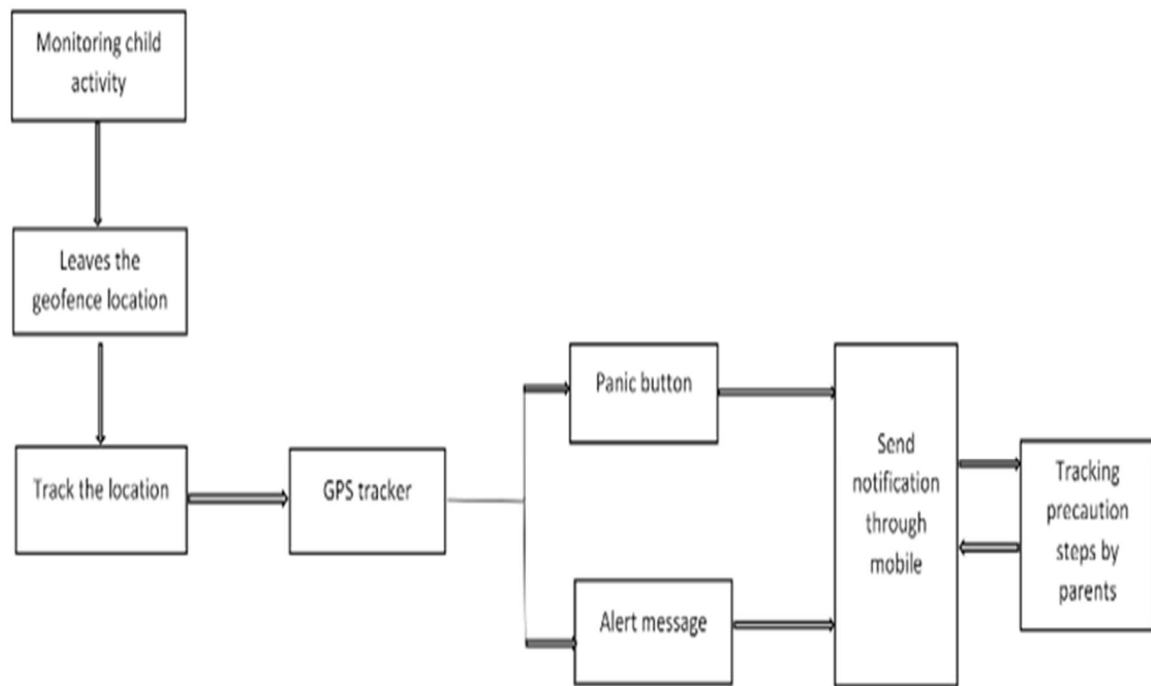
FR-2	Notification	1.Send the notification to parents. 2.Notification via email or SMS.
FR-3	Precaution steps	When child leaves the created geofence location the parents will be notified by alert message.
FR-4	Sending alert message	Sending the messages through Email or SMS.
FR-5	Safety of children	Track the child location within time,the child will be rescued by their parents after receiving the alert message
FR-6	Easy to implement	IOT application with GPS tracker

4.2 Non-Functional requirements

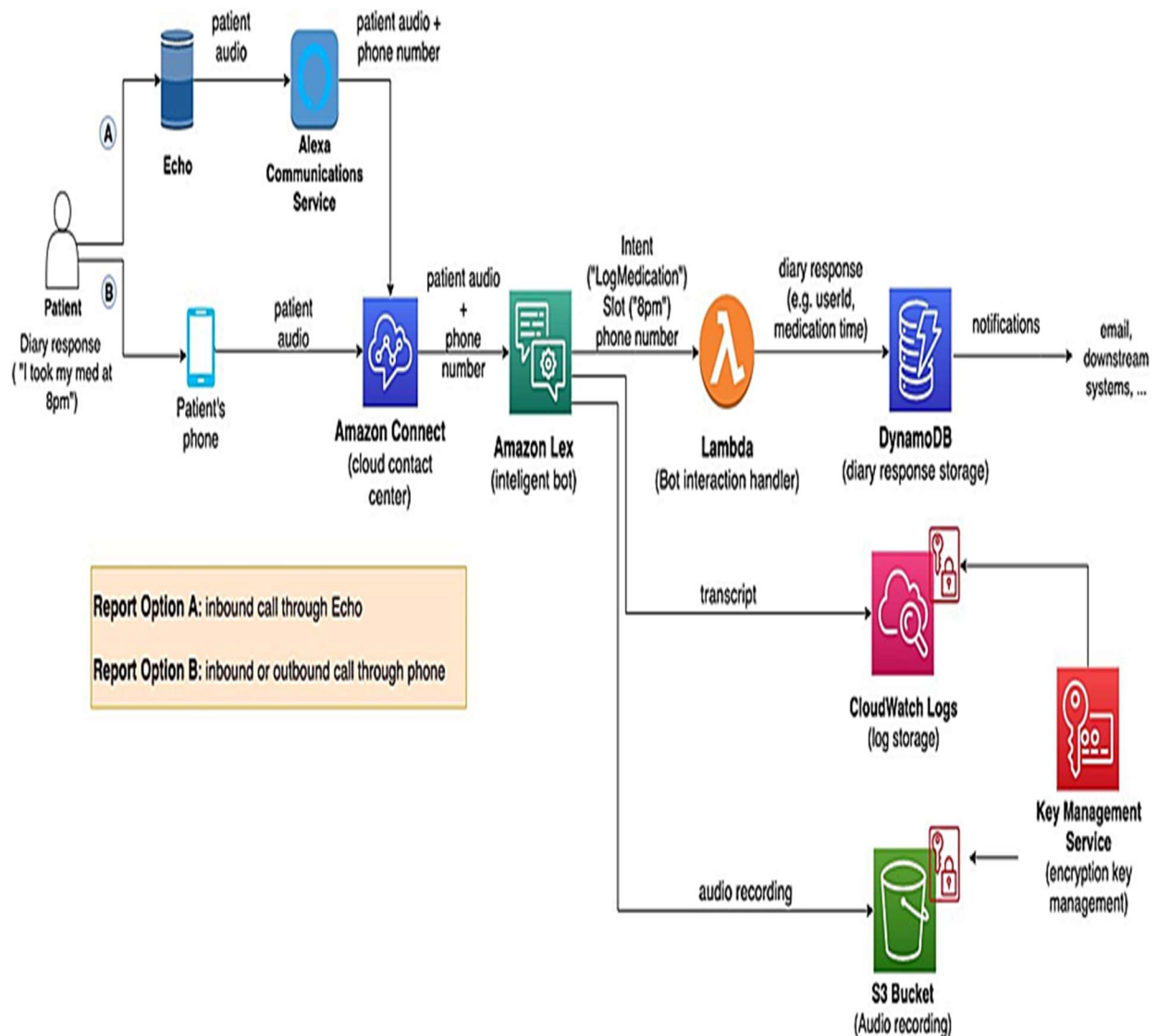
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Easily find the missing Child location .
NFR-2	Security	Information confidentiality.
NFR-3	Reliability	Safety of missing child
NFR-4	Performance	Track the child location using GPS ,send notification to parents and automatically takes precaution steps
NFR-5	Availability	We can track the child activities from anywhere.
NFR-6	Scalability	It can be used at anyplace and anytime.

5. 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 (Parents / Gaurdian)	Setting the geofence location	USN-1	As a user ,I need the proper setting thecreated geofence location.	I can the child locatio n	High	Sprint-1
		USN-2	As a user,I can monitor the child activities	I can trackthe child location	High	Sprint-1
		USN-3	As a user, I need the proper setting thecreated geofence location.	I can track the child location	high	Sprint-2
Customer(re latives / Caretaker)		USN-1	As a user ,I need the proper setting thecreated geofence location	I can get to knowthe child location accurately.	Mediu m	Sprint-1
		USN-2	As a user , I can trace the childlocation.	sends notificatio ns to parent	High	Sprint-1
		USN-3	As a user , I can getto know the childlocation	I can takes precaution stepsimme diately		
		USN-4	As a user , I cansave the child whenI receive the alert message	I can savethe child safely.	High	Sprint-1
Custom er CareEx ecutive	Awarenees	USN-1	As a peoplecare executive ,I can advertisetheproduct to childrens.	I can ensure the benefit of huge people	High	Sprint
Administrator	Creating product	USN-1	As a administrator ,I will designthe child safety monitoring .	I can ensure child safety monitoring.	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Title	Description	Date
Literature survey and Information gathering	Literature survey on the selected project& gathering information by referring thetechnical papers, research publications etc	11 September 2022
Prepare Empathy Map	Prepare empathy map canvas to capture the user pains and gains. Prepare list of problem statement	12 September 2022
Ideation	List the by organizing the brainstorming session and prioritize the top three ideas based on the feasibility and importance.	19 September 2022
Proposed solution	Prepare the proposed solution document which includes the novelty,	25 September 2022

6.2 Sprint Delivery Schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	code with simulation	USN-1	User track for the location	2	High	Subhashi ni subalaksh mi
Sprint-1	Location tracking with simulation	USN-2	Tracking the current location	1	High	Subhashi ni subalaksh mi
Sprint-2	IOT Watson platform	USN-3	Location tracking	2	medium	Subhashi ni subalaksh mi
Sprint-3	Nodered platform	USN-4	Child function	2	Medium	Sree Lakshmi priyanka
Sprint-4	Home page	USN-5	Child safety	1	medium	Sreelaksh mi priyanka
Sprint-4	Login page	USN-5	As a user, I might ensure login credential through gmail easy manner for the purpose of sending alert message to the parents informing through normal message.	2	medium	Subhashi ni subalaksh mi
Sprint-4	registration	USN-5	As a user I have to registered my details in a simple and easy manner by considering the safety of child this registered system sends notification to parents	3	high	Subhashi ni subalaksh mi

Velocity:

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

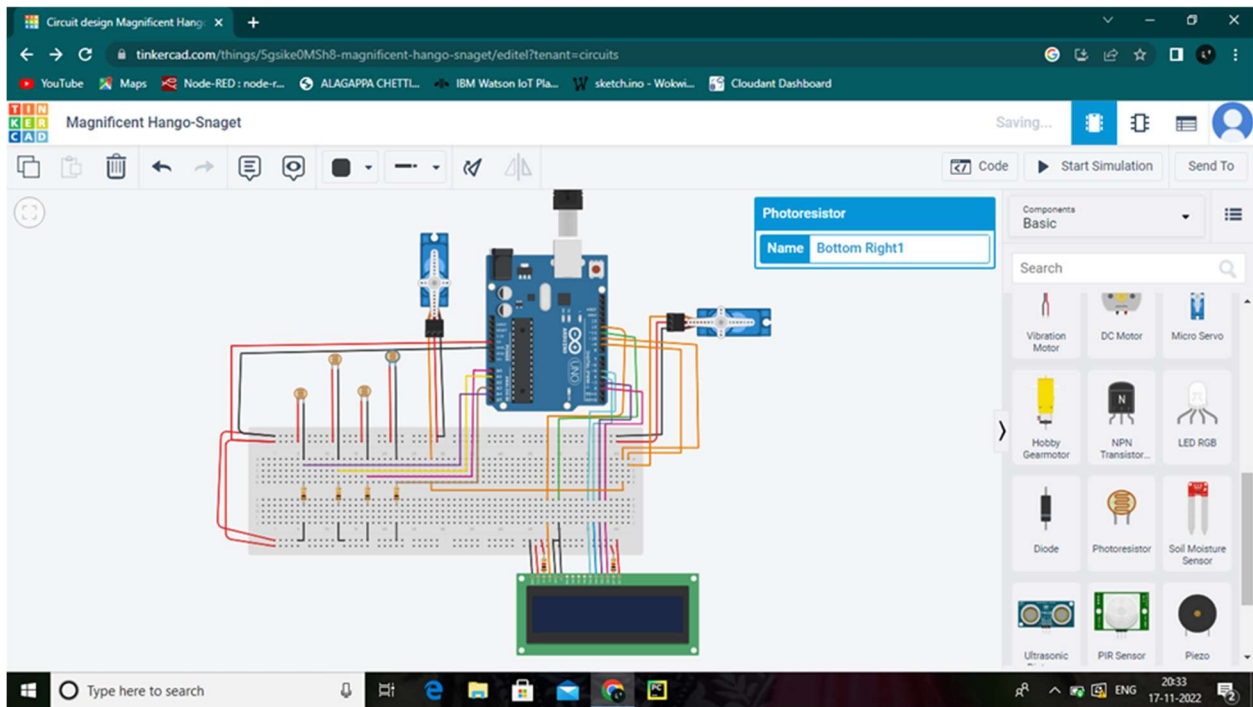
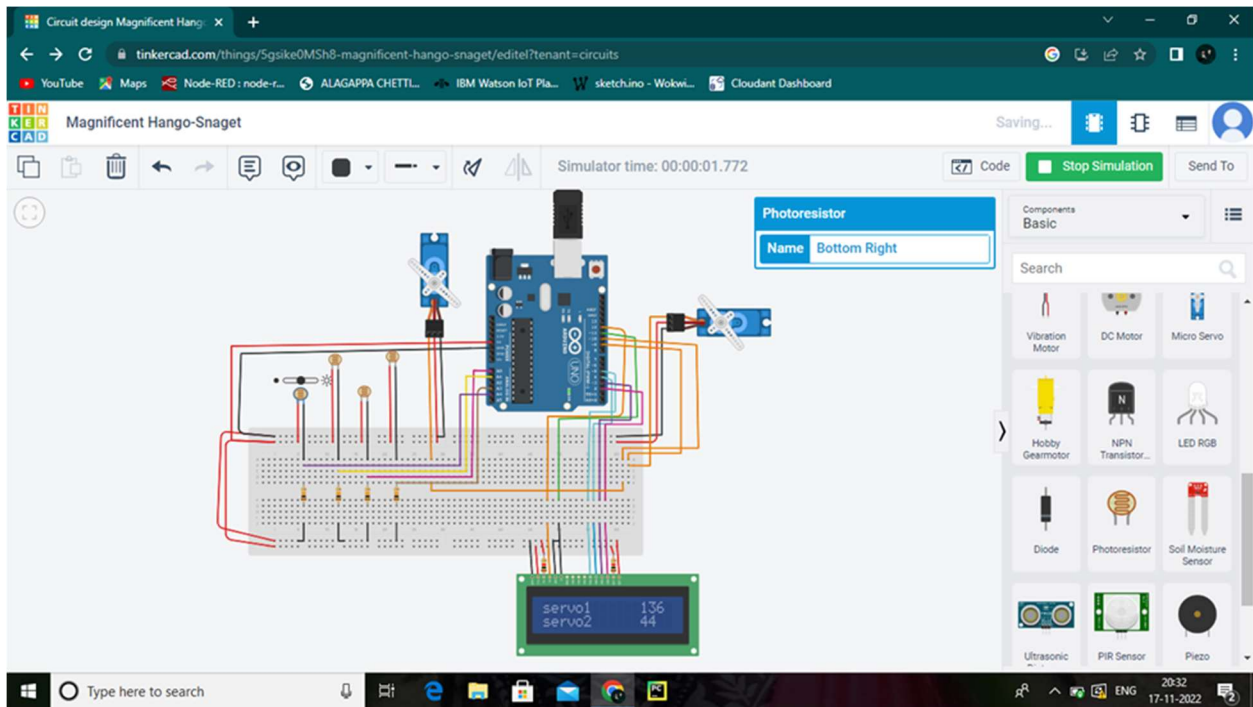
$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{10} = 2$$

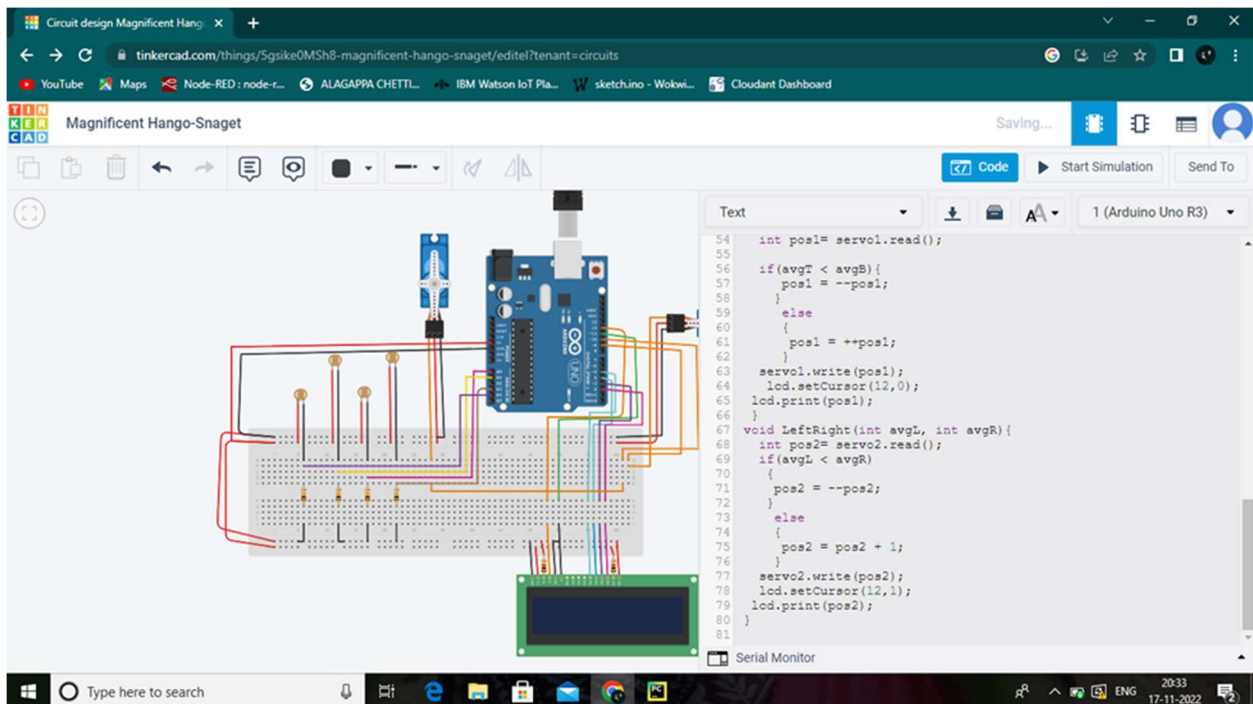
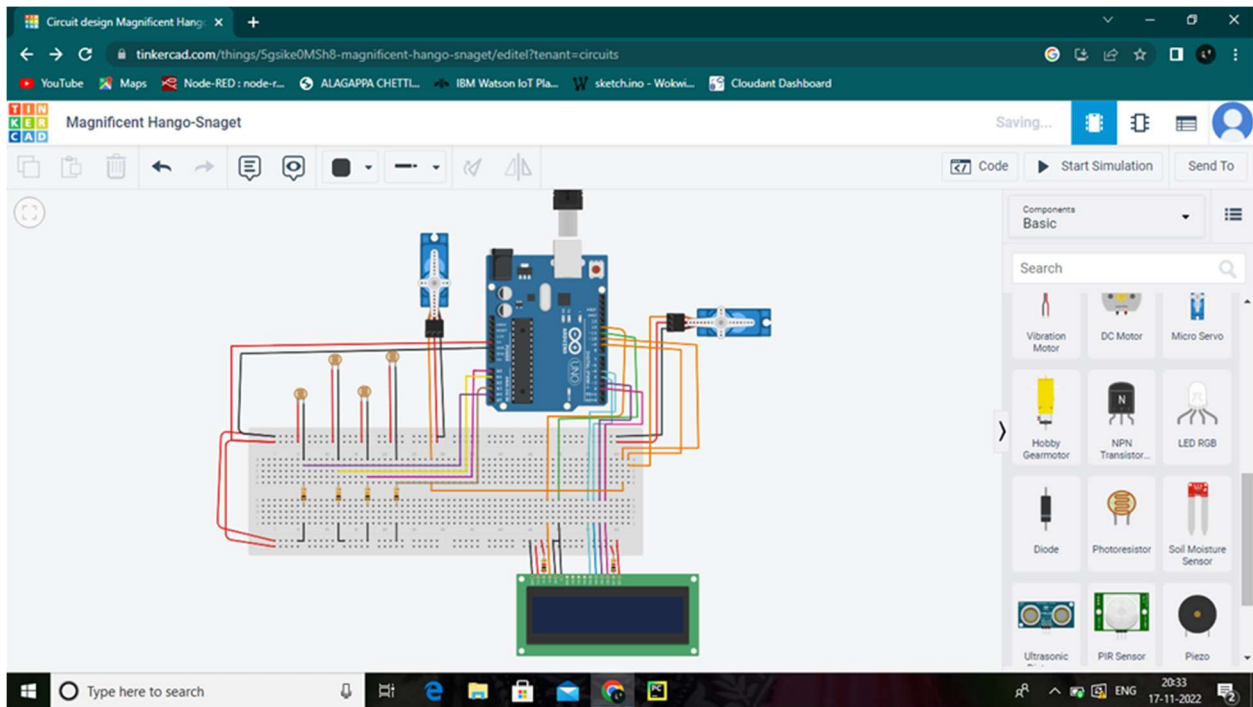
Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time

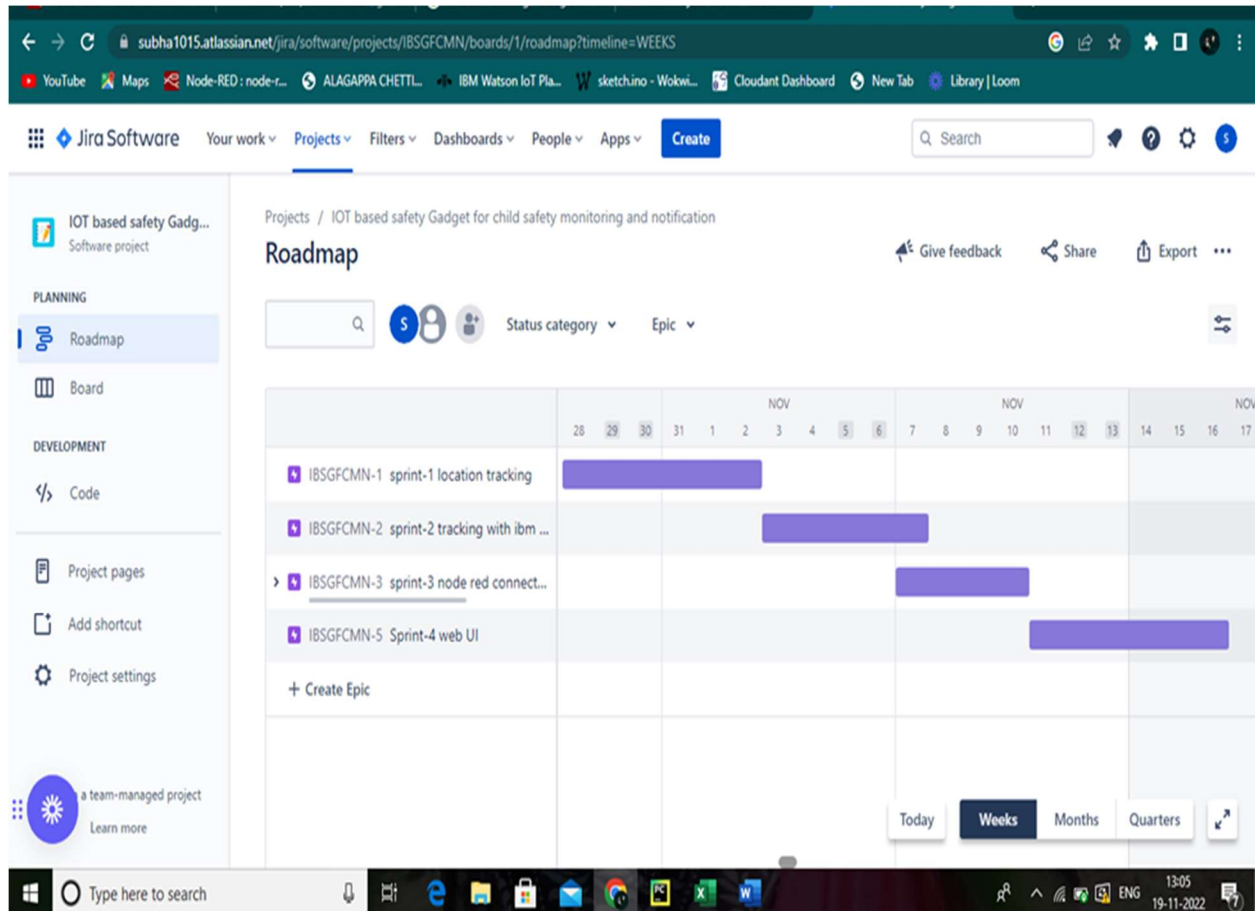
Sprint	T o t a l S t o r y P o i n t s	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on PlannedEnd Date)	Sprint Release Date (Actual)
Sprint-1	20	5Days	1 nov2022	4nov 2022	11	4nov2022
Sprint-2	20	5Days	4 nov2022	7 Nov 2022	15	7nov2022
Sprint-3	20	5Days	8 Nov 2022	15Nov 2022	16	15nov2022
Sprint-4	20	5 Days	15 Nov 2022	19 Nov 2022	12	19nov2022

LOCATIONTRACKING:





6.3 Reports from JIRA



7. CODING & SOLUTIONING

7.1.Feature 1

- IOT device
- IBM Watson Platform
- NODE Red
- Cloudant DB
- Web UI
- MIT App Inventor
- Python code

7.2.Feature 2

- Login
- Registration
- Tracking
- Notification

7.3.Database Schema

HTML FILE:

Step1.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<body>
```

```
<style>
```

```
h1 {
```

```
  color: darkred;
```

```
  text-align: center;
```

```
}
```

```
p {
```

```
  font-family: montserrat;
```

```
  font-size: 20px;
```

```
}
```

```
pre{
```

```
  font-family: Timesnewroman;
```

```
  font-size: 30px;
```

```
}
```

```
.container{
```

```
  height: 80vh;
```

```
  width: 50%;
```

```
  padding: auto;
```

```
  text-align: center;
```

```
  margin-left: 300px;
```

```
}
```

```
.button
```

```
{
```

```
  align-items: center;
```

```
  font-size: 15px;
```

```
  padding: 20px;
```

```
}
```

```
body
```

```
{
```

```
        background-color: lightcyan;
    }
</style>
```

```
<h1>
```

```
    IOT Based Safety Gadget for Child Safety Monitoring and Notification
```

```
</h1>
```

```
<div class="container">
```

```
<p style="font-size: 20px;text-align: justify;padding-top: 100px;padding-left: 55px;">
```

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.

```
</p>
```

```
<br>
```

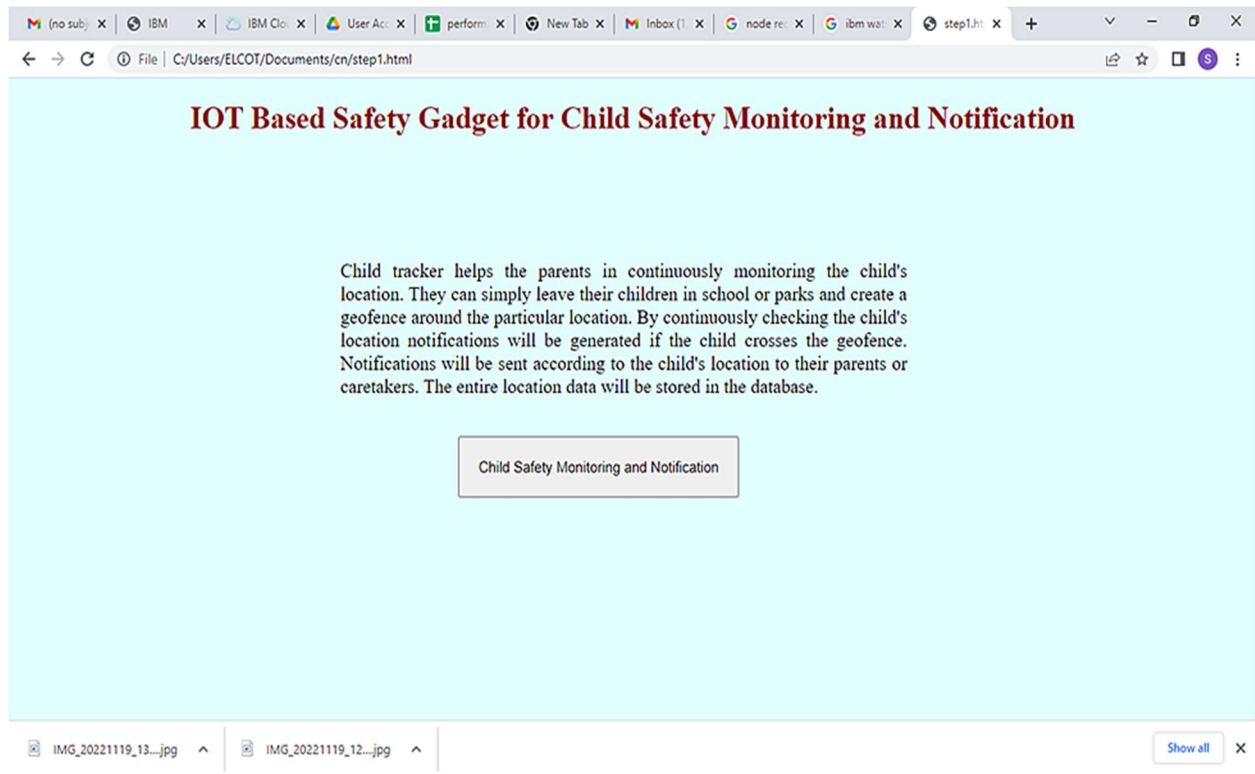
```
<a href="step2.html"><button type="submit" class="button">Child Safety Monitoring and  
Notification</button></a>
```

```
</div>
```

```
</body>
```

```
</html>
```

OUTPUT:



Step2.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<body>
```

```
<style>
```

```
h1 {
  color: black;
  text-align: center;
}
p {
  font-family: TimesNewRoman;
  font-size: 20px;
}
.container{
  height: 100vh;
  width: 80%;
  padding: auto;
  text-align: center;
  padding-left: 150px;
}
</style>
```

```
<h1>IOT Based Safety Gadget for Child Safety Monitoring and Notification</h1>
```

```
<div class="container">
```

```
<div>
```

```
  <a href="step3.html"></a>
```

```
</div>
```

```
<div>
```

```
  <a href="step4.html"></a>
```

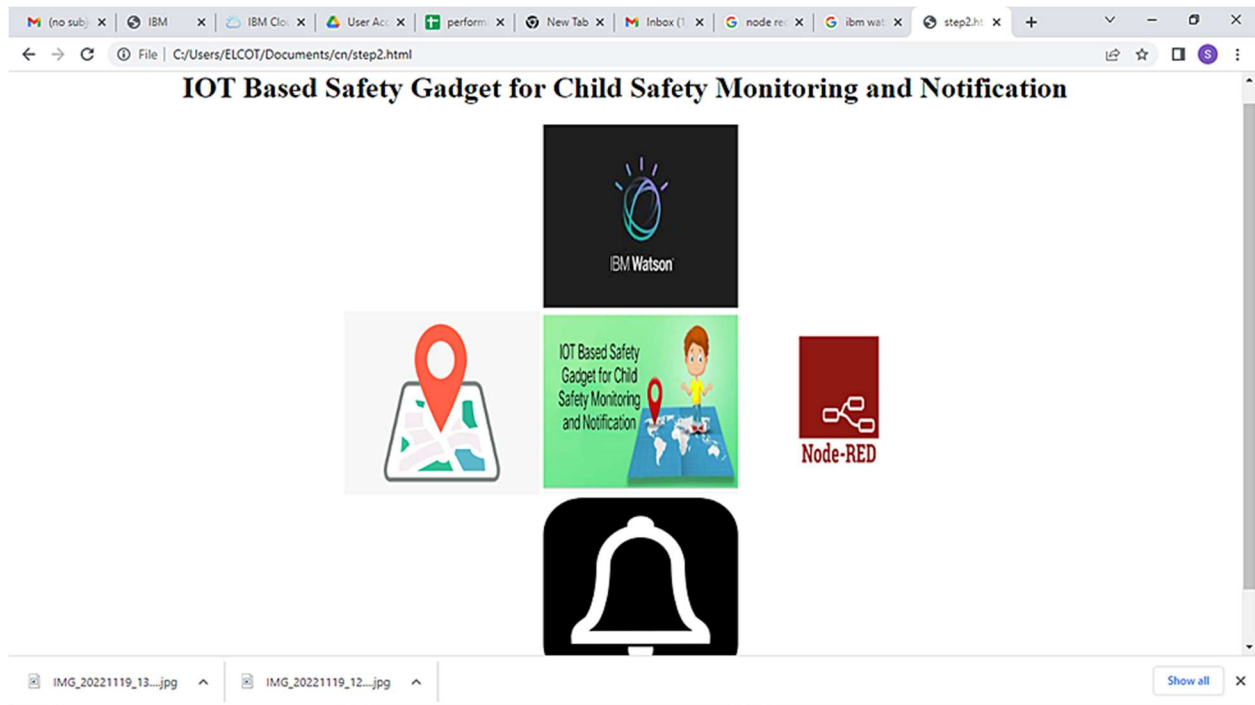
```
  <a href="step1.html"></a>
```

```
<a href="step6.html"></a>
</div>
```

```
<div>
  <a href="step5.html"></a>
</div>
```

```
</div>
</body>
</html>
```

OUTPUT :



Step3.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<body>
```

```
<style>
```

```
h1{
```

```
color: darkred;
```

```
text-align: center;
```

```
}
```

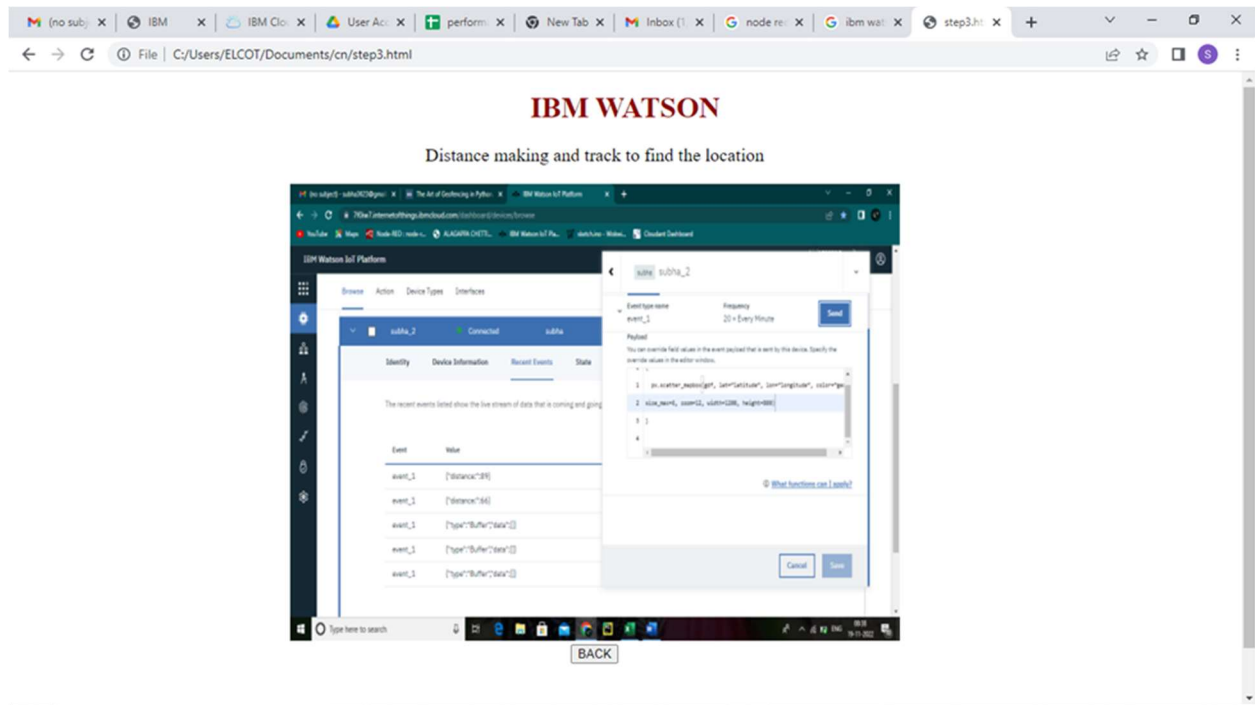
```
.container{
```

```

height: 80vh;
width: 50%;
padding: auto;
text-align: center;
margin-left: 300px;
}
p {
font-family: TimesNewRoman;
font-size: 20px;
}
.button
{
align-items: center;
margin-bottom: 100px;
}
</style>
<h1>
    IBM WATSON
</h1>
<div class="container">
<p>Distance making and track to find the location</p>
<a href="step3.html"></a>
<a href="step2.html"><button type="submit" class="button">BACK</button></a>
</div>
</body>
</html>

```

OUTPUT:



Step4.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<body>
```

```
<style>
```

```
h1 {
  color: darkred;
  text-align: center;
}
```

```
p {
```

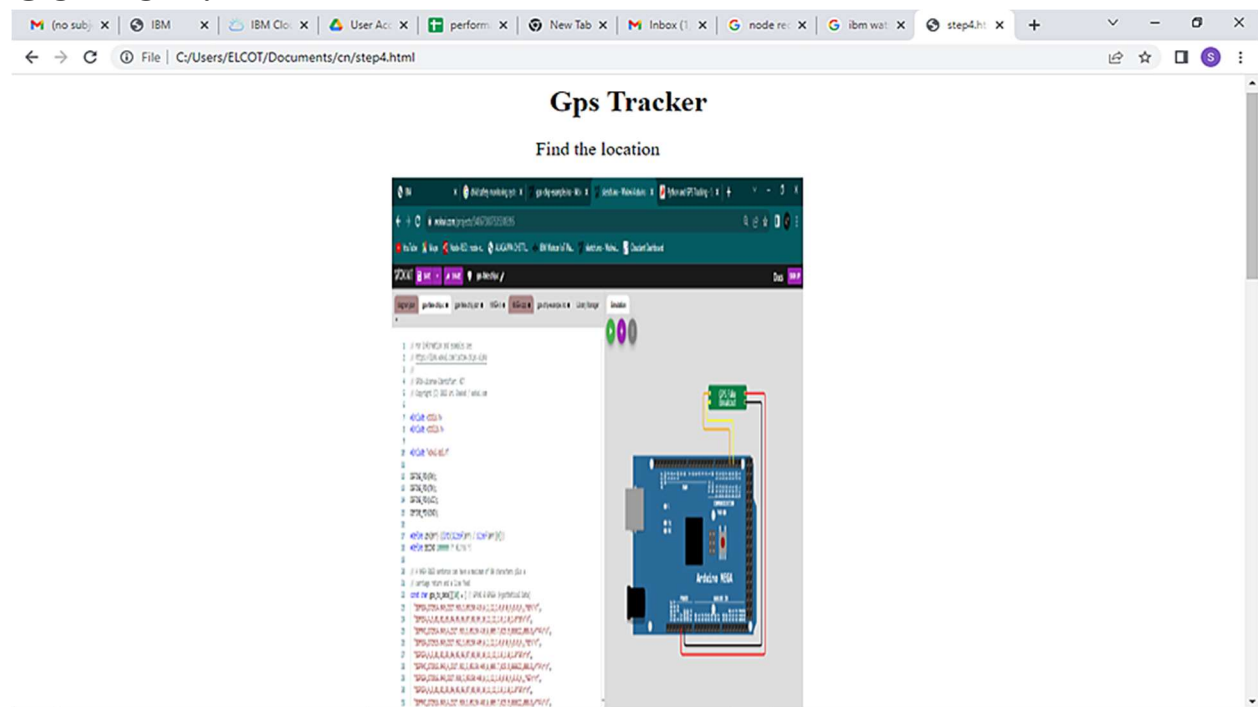
```
font-family: TimesNewRoman;
font-size: 20px;
}
.container{
height: 80vh;
width: 50%;
padding: auto;
text-align: center;
margin-left: 300px;
}
img
{
height: 700px ;
width: 450px;
}
#center
{
text-align: center;
}
</style>
<h1>
    Gps Tracker
</h1>
<div class="container">
<p>Find the location</p>
<div id ="center">
<a href="step2.html"></a>
<a href="step2.html"></a>
```

```

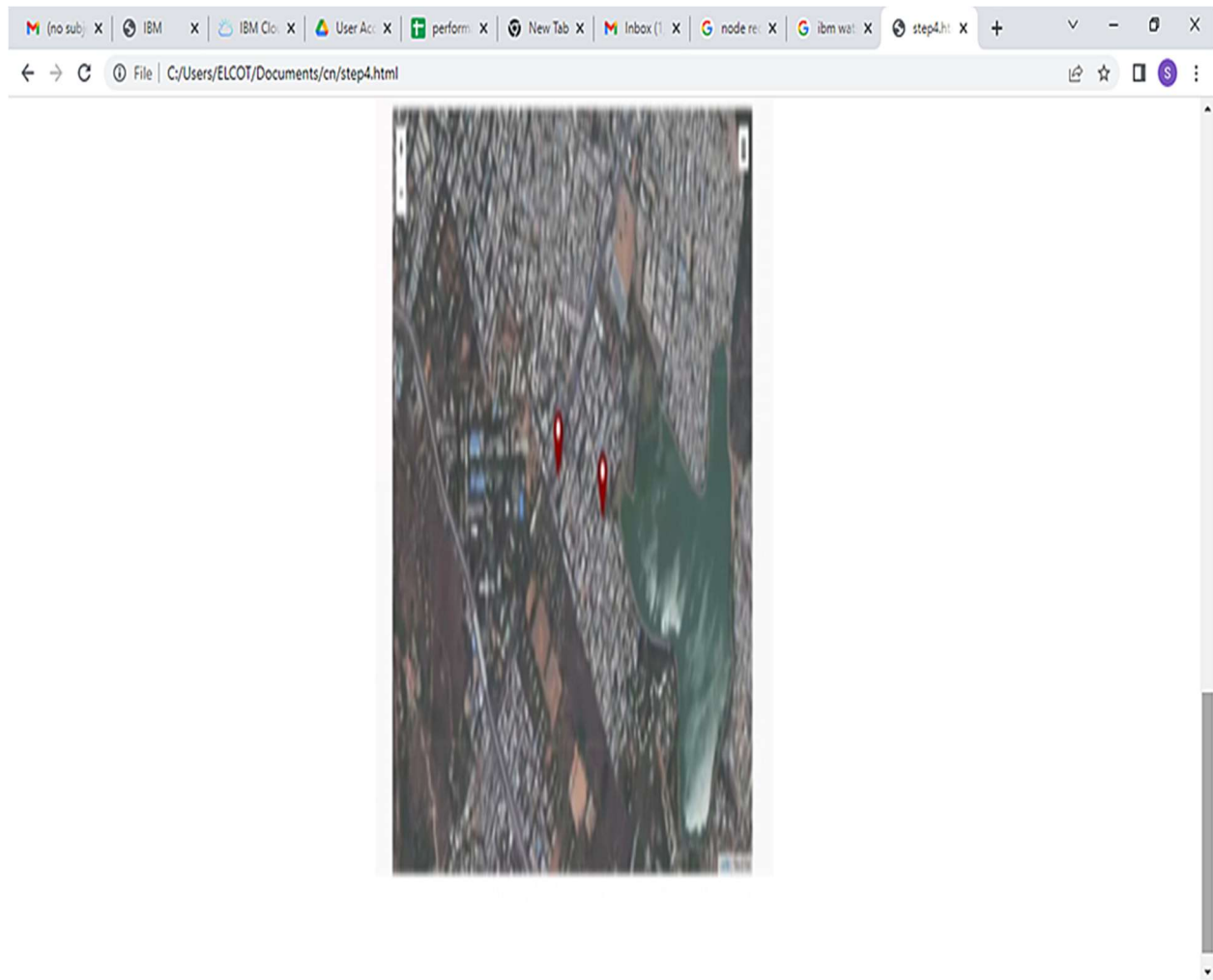
<a href="step2.html"></a>
</div>
<a href="step2.html"><button type="submit" class="button">BACK</button></a>
</div>
</body>
</html>

```

OUTPUT :







Step5.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<body>
```

```
<style>
h1 {
  color: darkred;
  text-align: center;
}
p {
  font-family: TimesNewRoman;
  font-size: 20px;
}
pre{
  font-family: TimesNewRoman;
  font-size: 20px;
}
.container{
  height: 80vh;
  width: 50%;
  padding: auto;
  text-align: center;
  margin-left: 300px;
}
.button
{
  align-items: center;
  font-size: 15px;
}
</style>
```

```
<h1>
  Child Safety Monitoring and Notification
</h1>
```

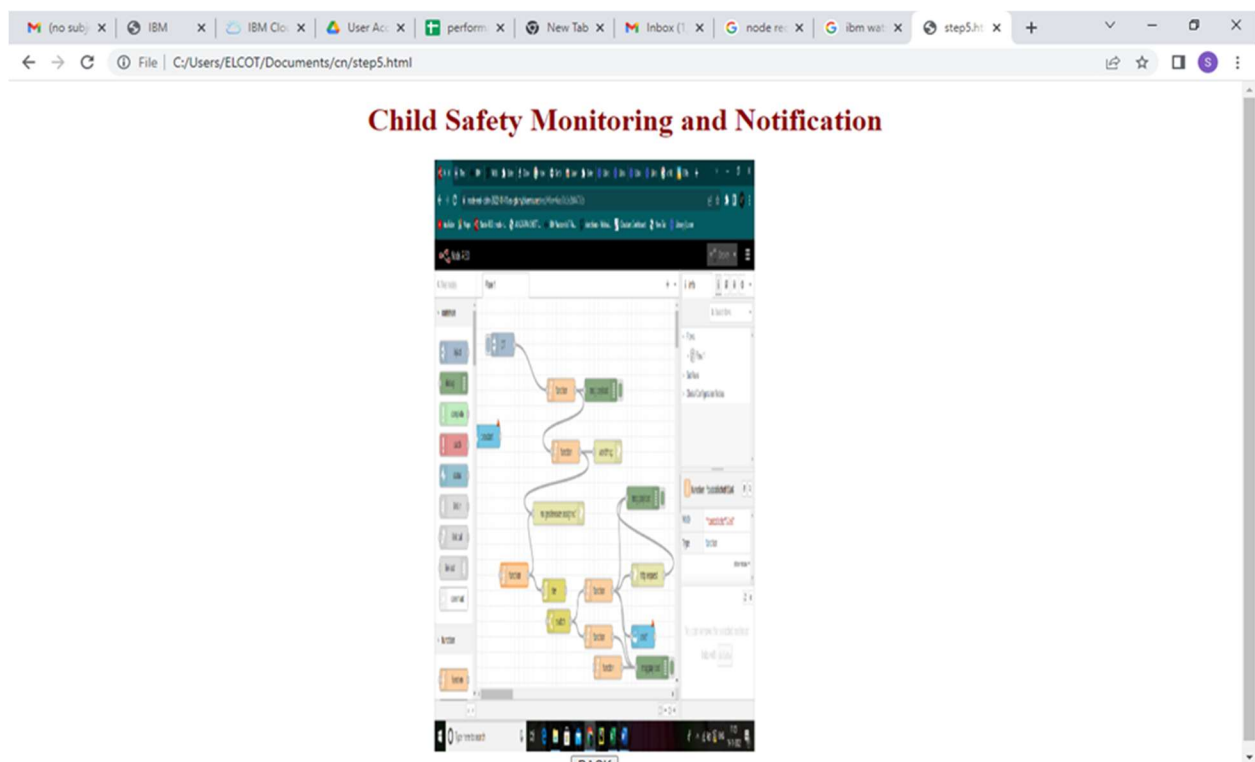


```

<div class="container">
    <a href="step6.html"></a>
<br><br><a href="step2.html"><button type="submit" class="button">BACK</button></a>
</div>
</body>
</html>

```

OUTPUT :



Step6.html

```
<!DOCTYPE html>
```

```
<html>
```

```
<body>
```

```
<style>
```

```
h1{
```

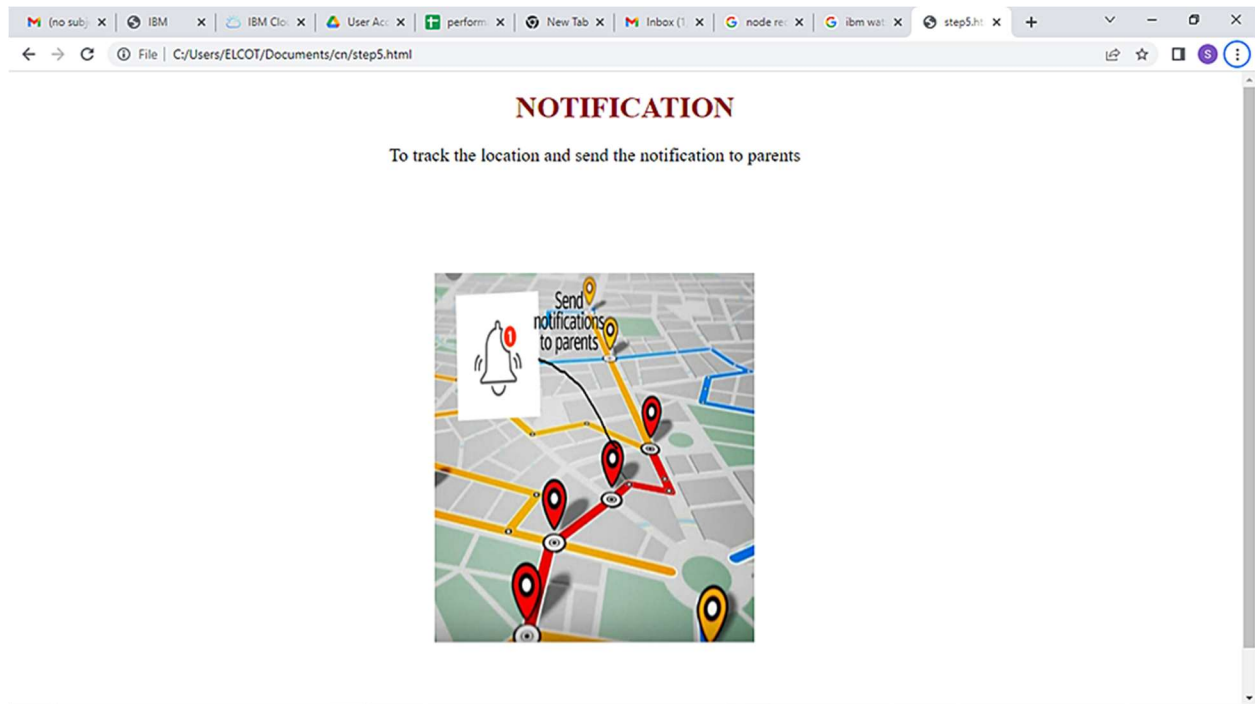
```
    color: darkred;
```

```
    text-align: center;
}
p {
    font-family: TimesNewRoman;
    font-size: 20px;
}
.container{
    height: 80vh;
    width: 50%;
    padding: auto;
    text-align: center;
    margin-left: 300px;
}
img
{
    height: 600px ;
    width: 350px;
}
#center
{
    text-align: center;
}
</style>
```

```
<h1>
    NOTIFICATION
</h1>
<div class="container">
<p>To track the location and send the notification to parents</p>
<div id ="center">
```

```
<a href="step2.html"></a>
</div>
<a href="step2.html"><button type="submit" class="button">BACK</button></a></div>
</body>
</html>
```

OUTPUT:



exiftool_gpx_creator.py

```
import os
```

```
import subprocess
```

```
root_vid_directory = r"/Users/fpolig01/Videos/dashcam_footage/"
```

```
for path, directories, files in os.walk(root_vid_directory):
    for video_file in files:
        if video_file.endswith("MP4"):
            full_mp4_path = os.path.join(path, video_file)
            full_gpx_output_path = full_mp4_path.replace(".MP4", ".GPX")
            print(f"Processing: {full_mp4_path}")
            with open(full_gpx_output_path, "w") as gpx_file:
                exiftool_command = ["exiftool", "-ee", "-m", "-p",
                                    "/Users/fpolig01/Videos/dashcam_footage/gpx.fmt", full_mp4_path]
                subprocess.run(exiftool_command, stdout=gpx_file)
            print(f"Successfully created: {full_gpx_output_path}\n")
```

exiftool_notes.txt

Notes on how to use Exiftool Command Line Interface (CLI)

<https://exiftool.org/Documentation>: https://exiftool.org/exiftool_pod.html

location of gpx.fmt file: https://github.com/exiftool/exiftool/blob/master/fmt_files/gpx.fmt

Print embedded metadata to screen:

```
"C:\Users\Administrator\Downloads\exiftool-12.30\exiftool.exe" -ee  
"C:\Users\Administrator\Desktop\exif_tool_example\GC1U1218.MP4"
```

Write embedded metadata to a text file:

```
"C:\Users\Administrator\Downloads\exiftool-12.30\exiftool.exe" -ee  
"C:\Users\Administrator\Desktop\exif_tool_example\GC1U1218.MP4" >  
"C:\Users\Administrator\Desktop\exif_tool_example\exiftool_output_test.txt"
```

Print embedded metadata to screen in .gpx format:

```
"C:\Users\Administrator\Downloads\exiftool-12.30\exiftool.exe" -p  
"C:\Users\Administrator\Desktop\exif_tool_example\gpx.fmt" -ee  
"C:\Users\Administrator\Desktop\exif_tool_example\GC1U1218.MP4"
```

Write embedded metadata to a file in .gpx format:

```
"C:\Users\Administrator\Downloads\exiftool-12.30\exiftool.exe" -p  
"C:\Users\Administrator\Desktop\exif_tool_example\gpx.fmt" -ee  
"C:\Users\Administrator\Desktop\exif_tool_example\GC1U1218.MP4" >  
"C:\Users\Administrator\Desktop\exif_tool_example\exiftool_gpx_output_test.gpx"
```

Create .gpx files for all .mp4 files in a given directory:

```
"C:\Users\Administrator\Downloads\exiftool-12.30\exiftool.exe" -p  
"C:\\Users\\Administrator\\Desktop\\exif_tool_example\\gpx.fmt" -ee -ext MP4 -w  
"C:\\Users\\Administrator\\Desktop\\exif_tool_example\\%f.gpx"  
"C:\Users\Administrator\Desktop\exif_tool_example"
```

used this to merge all gpx in a directory to a shapefile

for file in

```
/Volumes/FranArchives/Home_Media/Frans_Videos/2022/Dashcam_Footage/Lompac_Solvang  
_Partial/gpx/*GC1*.GPX; do ogr2ogr
```

```
/Volumes/FranArchives/Home_Media/Frans_Videos/2022/Dashcam_Footage/Lompac_Solvang  
_Partial/gpx.shp -append "${file}" track_points -fieldTypeToString DateTime; done
```

10.ADVANTAGES & DISADVANTAGES

10.1 ADVANTAGES:

1.Know the current location:

Our Kids GPS Tracker provides real-time location of your children. You can track the live locations of your kids, where they are and what they are doing.

2.Get travel details of kids at any time :

Parents will get all the details like their kid boarding/de-boarding school bus. Also, they can get emergency alerts when the child fails to board or de-board at the other stop.

3.Emergency call :

Our GPS trackers have an emergency call button. In case your kids are in any danger, just they need to do is press the button to connect to you. It will be on alert state, a call can be done & a notification will be sent to family members.

4.Alerts :

Both the parents and school authorities can receive alerts, notifications or messages about the child's whereabouts. Even if there is any traffic jam, break down, parents will get a warning helping to take necessary actions and precautions.

5.Track your child even in a crowd :

Prevent abduction and let your children play and walk around safely. Our personal GPD tracker for kids are great options for parents for monitoring their children 24 hours. Our device can track a children's location as well as allow parents to set up a safe zone for their kids.

10.2.Disadvantages

Excessive use of gadgets such as mobile phones, tablets, and computer desktops can cause physical and mental damage to children. According to a study, a child will likely to become overweight and develop seizure and vision problems when they spend too much time using gadgets. Excess use of electronic gadgets can lead to children spending less time outdoors and limiting their social interaction. It may lead to poor concentration in studies and lack of interest in day-to-day activities. Excessive gadgets use can lead to poor health, a sedentary lifestyle, and

11.CONCLUSION

child safety issues and the need of using child security system. Some previous studies have been included for designing the IoT-based child security smart band. It assists parents to monitor their children remotely. In case situations happen, notifications will be sent to parents so that actions can be taken. Through this, child safety can be ensured and crime rate will be reduced. However, the proposed device is not robust enough and does not contain sufficient functions to operate like a mobile phone. Hence, the future enhancements will be adding more features, software, applications, hardware to make the proposed system capable of working more intelligently, meanwhile guarantee the safety of children.

12FUTURE 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 sensor then 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 sdevice which ensures the complete solution for child safetyproblems

DEMO LINK

https://drive.google.com/file/d/11bETw143Le4AN-XJjAULhrEFUezZHw_W/view?usp=share_link

Github link:<https://github.com/IBM-EPBL/IBM-Project-15615-1659601617>

