

PROJECT REPORT

IOT BASED SAFETY GADGETS FOR CHILD SAFETY MONITORING AND NOTIFICATION

**NALAIYA THIRAN PROJECT BASED LEARNING ON
PROFESSIONAL READLINESS FOR
INNOVATION,EMPLOYMENT AND
ENTERPRENEURSHIP**

SUBMITTED BY

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1.INTRODUCTION

1.1:PROJECT OVERVIEW

The location is displayed to the user and the messages are saved in the Cloudant database and the web UI is connected to the user where the app is. The IoT device is connected to the cloud services where the IBM Watson IoT platform should be connected to the web application developed using Node-RED where IBM IoT and World Map is connected to each other and a geofence is set where when the child crosses the specified limit the location will be tracked and the app is handy and displays the location of the child.

1.2:PURPOSE

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.LITERATURE SURVEY

2.1:EXISTING PROBLEM

Lack of Child Monitoring: Child Monitoring refers to parental awareness,watchfulness andsupervision of the activities of the children in multiple domains which leads to health problems,safety issues and behavioural issues.

What does the problem affect? – Lack of intake of healthy supplements,poor nutrition,unhygienic involvement of activities,unaware spread of diseases among their colleagues,less safety regarding the children.

What are the Boundaries of the problem? – Disobedience among the children towards the elders,intake of toxic substances,babies in the trolley can run to the road side traffic areas,children reaching hazardous areas

What is the Issue: Children intaking poisonous substances and other chemical substances which are in common in our household items.Children nearing the furnaces,reaching and opening the fridges and threat of getting locked into closets,cupboards and even approaching electronic gadgets in which some may harm them.

When does the issue occurs? Above issues arise when there is no proper monitoring of the children and lack of surveillance of children by the parents

Where is the issue occurring? This issue is more common in city areas where both parents are working and they lack time to have an eye on their children activities.This case is mre common in advanced and developing cities more

common in areas where both parents are in software based jobs and IT fields

2.2:REFERENCES

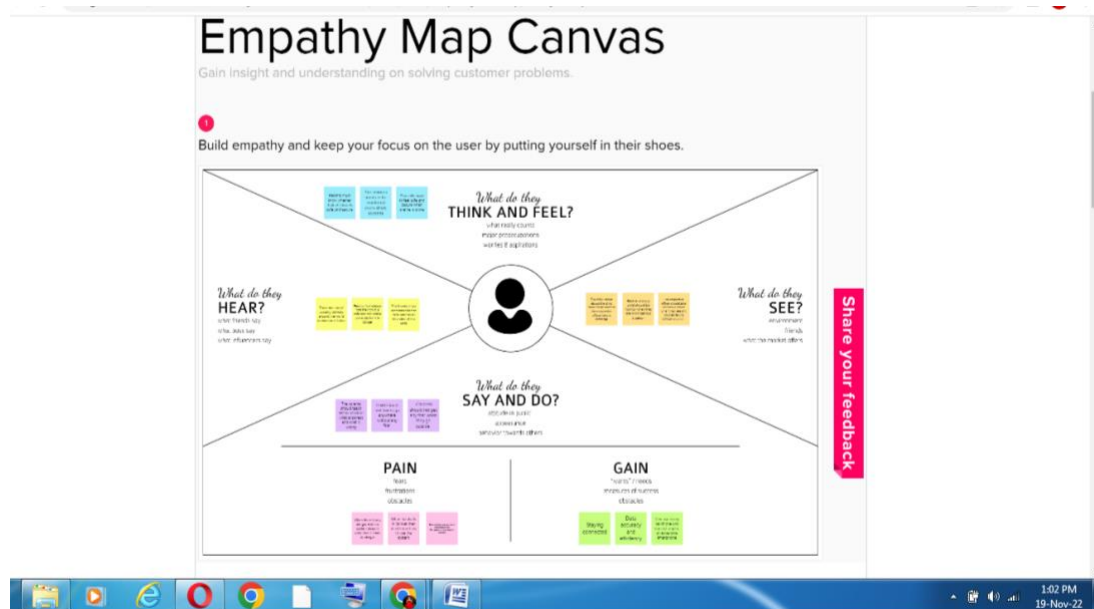
{\rtf1\ansi\ansicpg1252\deff0\nouicompat\deflang1033{\fonttbl{\f0\fnl\fcharset0 Times New Roman;}{\f1\fnl\fcharset0 Comic Sans MS;}{\f2\fnl Times New Roman;}{\f3\fnl Comic Sans MS;}}

2.3:PROBLEM STATEMENT DEFINITION

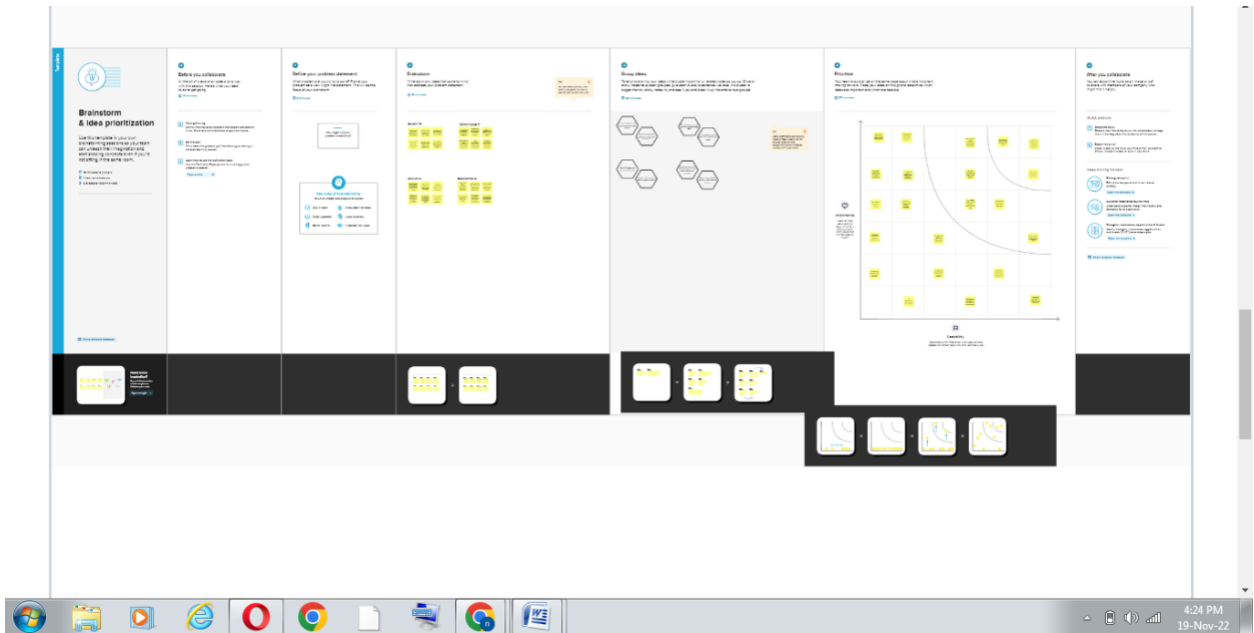
Why is it important that we fix problem:It is very important to fix this problem because children are the main assets of every parent but due to their working environment and lifestyle they are unable to always have a eye on their children so to assist their growth and ensure their safety child safety lot gadgets are very much helpful in fulfilling every parents needs of taking care and giving a parental surveillance support to the children

3.IDEATION AND PROPOSED SOLUTION

3.1:EMPATHY CANVAS



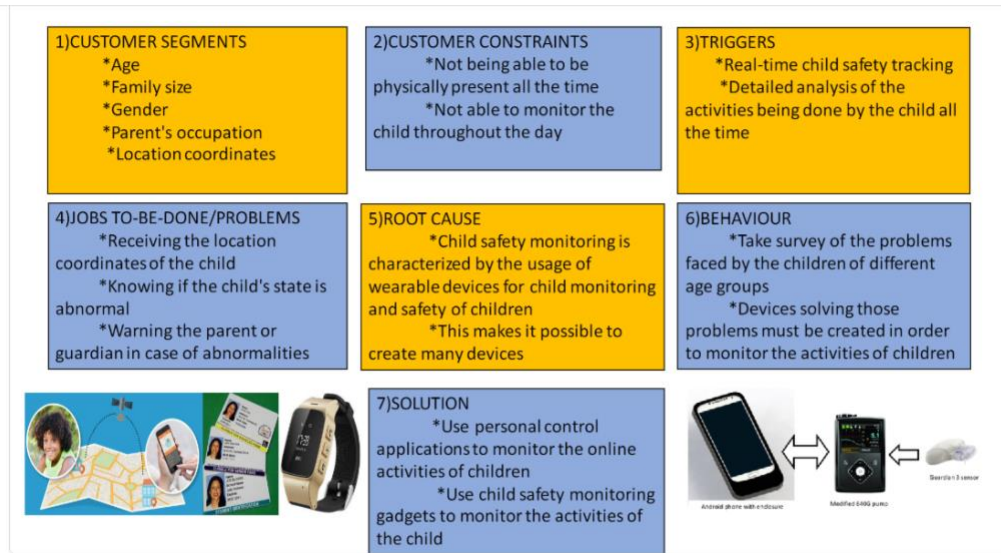
3.2: IDEATION AND BRAINSTORMING



3.3:PROPOSED SOLUTION

PROPOSED SOLUTION	
PARAMETERS	DESCRIPTION
Problem Statement(Problem to be solved)	One of the major problems in today's world is that parents are not able to their children all the time. technological solution for this will be wearable devices for so that parents will come about all the activities of
A problem children to know their children	
Idea/Solution/Description	Aiming at the increasing risk of children, Mobile Children Security Monitoring(MCSM) can be developed. This can keep children in guardian's view by using Bluetooth Near Field Communication.
Novelty/Uniqueness	IoT enables to automate the child monitoring and it also reduces cost. It eradicates the situation that the parent should be physically present in the particular place to monitor the child. It has high reliability, short response time and high accuracy.
Social Impact/Customer satisfaction	Due to the abusements the emotional and mental stability of the children gets affected. It would create an impact on the entire growth of the nation.
Business Model(Revenue model)	Focuses on capturing and delivering value. Leverages the unique characteristics of IoT products of having 24/7 connectivity to children by the parents innovative and
and produces differential value.	
Scalability of Solution	Scalability issues can be sorted out using IoT provided that the wireless network is wide range with high speed and flexible software infrastructure.
data	

3.4:PROBLEM SOLUTION FIT



4.REQUIREMENT ANALYSIS

4.1:FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

FR.NO	FUNCTIONAL REQUIREMENTS	SUB REQUIREMENTS
1	External Interfaces	These requirements include interaction logic between software and user, screen layouts, buttons, functions on every screen, hardware interfaces (here a team describes what devices the software is created for), and other relevant particularities.

2	Reporting	Reporting Requirements means any applicable laws, rules, regulations, instruments, orders or directives and any requirements of a regulatory or supervisory organization that mandate reporting and/or retention of safety and similar information.
3	Authentication	The system sends an approval request after the user enters personal information.
4	User Interface	It should be the connector between the various systems or between other part or unit of the system.
5	Software interface	This includes embedded application that will used in supporting the various functions of the system Eg: GPS, Web Server and Database.

4.2:NON-FUNCTIONAL REQUIREMENTS:

Following are the non-functional requirements of the proposed solution.

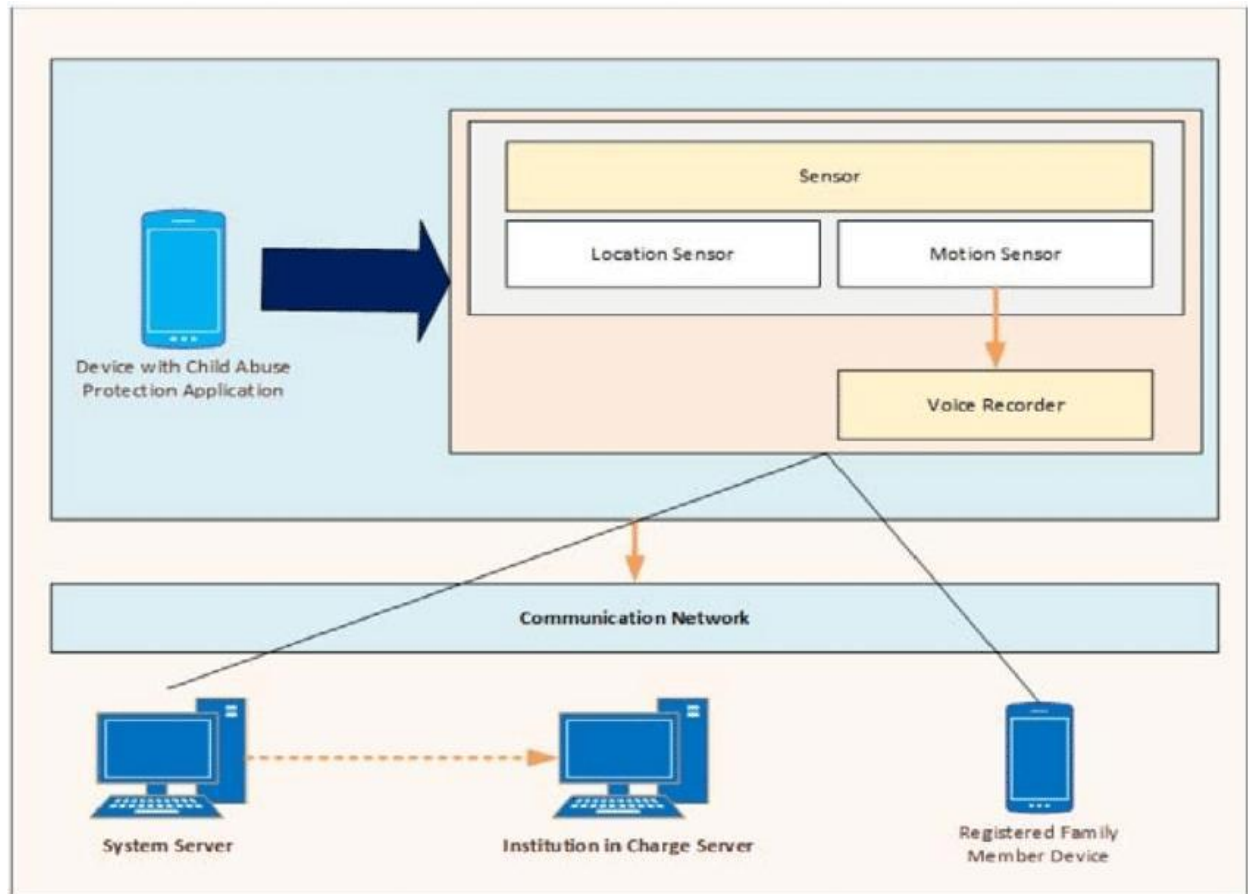
NFR.NO	NON FUNCTIONAL REQUIREMENTS	EXPLANATION
1	Usability	Usability is a non-functional requirement, because in its essence it doesn't specify parts of the system functionality, only how that functionality is to be perceived by the user, for instance how easy it must be to learn and how efficient it must be for carrying out user tasks.

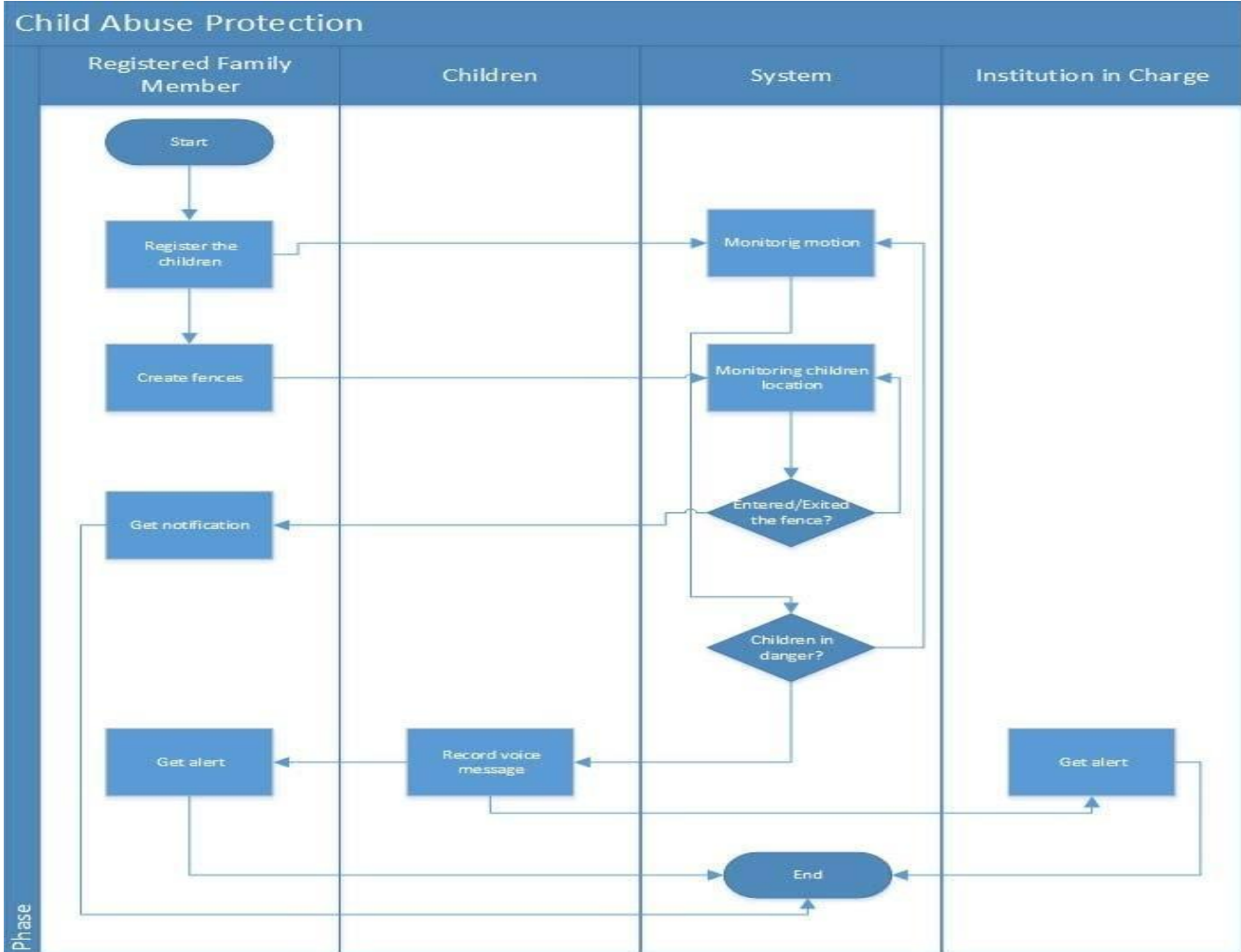
2	Security	Security is a non-functional requirement assuring all data inside the system or its part will be protected against malware attacks or unauthorized access.
3	Reliability	Reliability is the extent to which the software system consistently performs the specified functions without failure. ELICITATION: Reliability requirements address the user concern for the system's immunity to failure.
4	Performance	The website's load time should not be more than one second for users.
5	Availability	Employers can post jobs on the website throughout the week at any time during the day.
6	Scalability	Scalability is the ability of the application to handle an increase in workload without performance degradation, or its ability to quickly enlarge.

5.PROJECT DESIGN

5.1:Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.





5.2:SOLUTION AND TECHNICAL ARCHITECTURE

Technical Architecture:

The Child safety shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Child safety using wearable devices

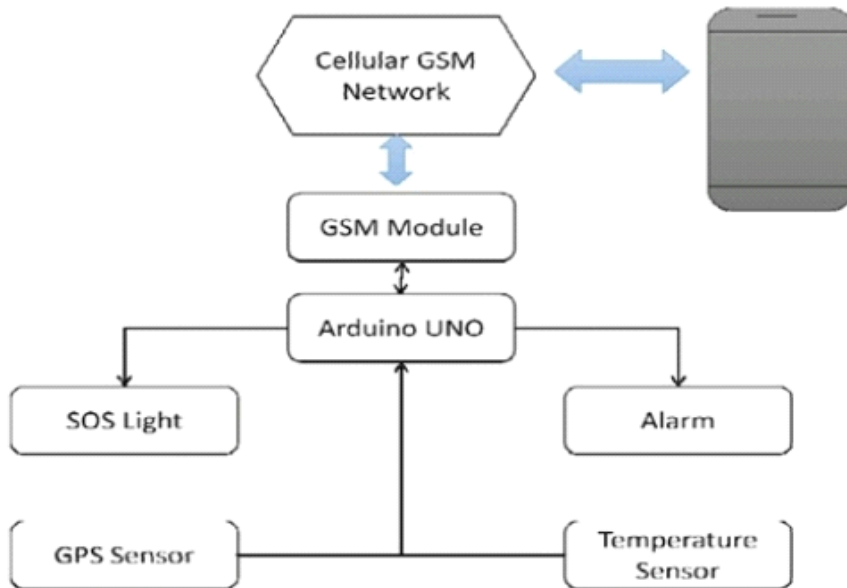


Fig. 1 System overview of the wearable device.

Table-1&2 : Components & Technologies,Application Characteristics

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Sensors, processing power, software etc.	Temperature sensor, ultrasonic sensor, Arduino controller, c programming etc
2.	Application Logic-1	Logic for a process in the safety application	Assets acquisition.
3.	Application Logic-2	Logic for a process in the safety application	Sensors like flex sensor, temperature sensors
4.	Application Logic-3	Logic for a process in the safety application	GSM,GPS,buzzer
5.	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
6.	Cloud Database	Database Service on Cloud	IBM DB2, websocket communications etc.
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local File system
8.	External API-1	Purpose of External API used in the application	IBM Weather API, etc.

9.	External API-2	Purpose of External API used in the application	JSON and Xml etc.
10.	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, etc.

Guidelines:

- Include all the processes like sensors, gps, alarm buzzer etc
- Temperature sensor senses the temperature of the child
- Indicate external interfaces (Arduino controller)
- At the same time gps also track the location and sends to Arduino ,this makes to ring alarm buzzer that the child is in danger.

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	Justify the scalability of architecture (3 – tier, Micro-services)	Technology used
4.	Performance	Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN's) etc.	Technology used
5.	Availability	Justify the availability of application (e.g. use of load balancers, distributed servers etc.)	Technology used

5.3:User Stories

User Type	Functional Requirement (Epic)	User StoryNumber (USN)	User Story / Task	Acceptance criteria	Priority	Release
End user (Customer)	Registration	USN - 1	As a user, I am able to register with theProduct using my valid emailaddress	I should be able to register with my account credentials	High	Sprint - 1
End User (Customer)	Authentication	USN - 2	As a user, I am able to login into the system with my credentials	It should ensure smooth login capabilities withoutdelay	High	Sprint - 1
End User (Customer)	Designation ofRegion	USN - 3	I can select the regionof interest to be monitored and analyzed	I mustbe able to choose certain specific places without error	High	Sprint - 1
End User (Customer)	Analysis of Required Phenomenon	USN - 4	I am able to monitor certain factors that influence the actions ofthe phenomenon	It should consider and monitor most of the factors involved in the action	High	Sprint - 2
End User (Customer)	Accumulation of required Data	USN - 5	I am able to gather data regarding past events and a detailed report on past analysis	It shouldallow the storage of data ofpast events for certain extent	Medium	Sprint - 2
End User (Customer)	Organizing Unstructured data	USN - 6	I am able to organizeand restructure the raw data	It should ensureeasy and efficient	Low	Sprint - 3

			into refined data	processing methods		
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End User (Customer)	Algorithm selection	USN - 7	I am able to choose the required Algorithm for a specific analysis	It must provide various options for the algorithm to be used	High	Sprint - 2
End User (Customer)	Prediction and analysis of data	USN - 8	I am able to easily predict and visualize the data	It should allow easy to use prediction and visualization techniques	High	Sprint - 3
End User (Customer)	Report generation	USN - 9	I am able to generate a clear and detailed report on the analysis	Report generation must be fast and efficient and should not be complex	Medium	Sprint - 4

6.PROJECT PLANNING AND SCHEDULING

6.1:SPRINT PLANNING AND ESTIMATION

Sprint	Functional Requirement	User Story Number	User Story /Task	Story Points	Priority	Team Members
Sprint-1	Registration	US1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Gayathri G
Sprint-1		US2	As a user, I will receive confirmation email once I have registered for the application.	2	High	Dhanam C
Sprint-2		US3	As a user, I can register for the application through Facebook.	2	Low	Esakkiammal S
Sprint-1		US4	As a user, I can register for the application through Gmail.	2	Medium	Gothai Nayagi P
Sprint-1	Login	US5	As a user, I can log into the application by entering email & password.	2	High	Gayathri G
Sprint-1	Dashboard	US6	As a user, I can easily navigate through dashboard and I can use the dashboard to get details about app and instruction to use the app.	2	High	Dhanam C

Sprint-1	Login and Dashboard	US7	As a web app user, I can login into application by using my email and password and I can access all resources same as mobile users.	2	High	Gothai Nayagi P
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Sprint-1	Login	CCE1	As a CCE I can login to app using my id and password and I can interact with user.	2	High	Esakkiammal S
Sprint-1	Dashboard	CCE2	As a CCE I can access dashboard using id and password and I can see all user queries, explain app usage and attend their queries.	2	High	Gayathri G
Sprint-1	Login and Dashboard	A1	As an administrator, I can login and access dashboard and manage and direct activities.	2	High	Dhanam C Gothai Nayagi P

6.2:SPRINT DELIVERY SCHEDULE

Project Tracker, Velocity & Burndown Chart: (4 Marks)

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

SPRINT DELIVERY PLANS

1) Identifying the Problem

2) Prepare an abstract and a problem statement

3) List the required objects needed

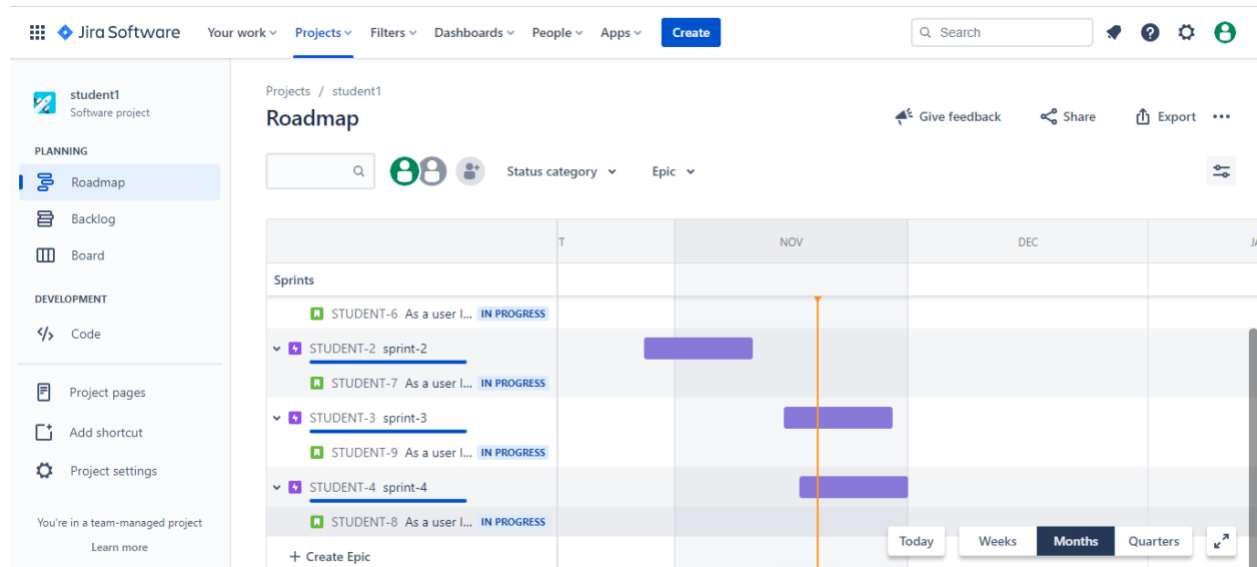
4) Create a code and run it

5) Make a prototype

6) Test with the created code and check the designed prototype

7) Solution for the problem is found

6.3:REPORTS FROM JIRA



7.CODING AND SOLUTIONING

7.1:FEATURE 1

```
python script.py - C:\Users\KRISHNA KUMAR\AppData\Local\Programs\Python\Python310\python script.py (3.10.7)
File Edit Format Run Options Window Help

import json
import wiotp.sdk.device
import time
myConfig={"identity":{"orgid":"hj5fmy","typeId":"NodeMCU","deviceId":"12345"},
          "auth":{"token":"12345678"}
        }

client=wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect()
while True:
    name="Smartbridge"
    #in area location
    #latitude-17.4225176
    #longitude 78.5450842
    #out area location
    Latitude=17.4219272
    Longitude=70.5400783
    myData={"name" : name,"lat":latitude,"lon":longitude}
    client.publishEvent(eventId="Status",msgformat="json",data=myData,qos=0,onPublish=None)
    print("Data published to IM Iot platform:",myData)
    time.sleep(5)
client.disconnect()
```

Output screen


```
{
tone(12,30);
delay(1000);
}
else
{
  noTone(12);
  delay(1000);
}
/*The PIR sensors are used to detect the presence of humans or any other animals which are
very close to the child*/
digitalWrite(11,LOW);
int a = digitalRead(4);
if(a==1)
{
  Serial.println("Motion Detected");
  digitalWrite(11,HIGH);
}
}
```

8.TESTING

8.1:TESTING CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps Executed	Test Data	Expected Result	Actual Result	Status	Comments	TC Automat	Forecast
LoginPage_TC_001	Functional	Home Page	Verify user is able to see the tracked location		1.Enter URL and click go 2.Click on My Account dropdown button 3.Give turn on location	http://ai2.appinventor.mit.edu/	Login/Signup popup should display	Working as expected	Pass			
LoginPage_TC_002	UI	Home Page	Verify the user and giving the access		1.Enter URL and click go 2.Click on My Account dropdown button 3.Give turn on location	MIT App Inventor	Application should show below UI elements: a.showing the location b.showing the address of the location c.Notification of the	Working as expected	Fail	Steps are not clear to follow		
LoginPage_TC_003	Functional	Home Page	Verified user is able to track the location		1.Enter URL and click go 2.Click on My Account dropdown button 3.Give turn on location 4.Note the address of the location and turn off the location	Username: esakkiammals5630@gmail.com password: Testing333	Notifying the parents about the child's location					

LoginPage_TC_004	Functional	Login page	Verified user is able to track the location		1.Enter URL and click go 2.Click on My Account dropdown button 3.Give turn on location	1.Scan the QR code in MIT app companion and go into the app 2.The connections are uploaded from the app companion 3.Track the location and spot the child's location	Username: esakkiammals5630@gmail.com password: Testing333	Application shows the tracked location to verified user				
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LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL and click go 2.Click on My Account dropdown button 3.Give turn on location	Username: esakkiammals5630@gmail.com password: Testing333	Showing the child is within the limit of the specified region				
LoginPage_TC_005	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL and click go 2.Click on My Account dropdown button 3.Give turn on location	Username: esakkiammals5630@gmail.com password: Testing333	Showing the child is out of the specified region				

8.2:USER ACCEPTANCE TESTING

1. Purpose of Document:

The purpose of this document is to briefly explain the test coverage and open issues of the **SAFETY GADGETS FOR CHILD SAFETY MONITORING** project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis:

Section	Total Cases	Not Tested	Fail	Pass
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Print Engine	3	0	0	3
Client Application	4	0	0	4

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Sub Total
By Design	6	8	7	7	28
Duplicate	9	8	6	8	31
External	7	6	4	6	23
Fixed	7	6	9	7	29
Not Reproduced	2	2	3	0	7
Skipped	4	3	3	0	10
Won't Fix	0	1	0	0	1
Totals	35	34	32	28	129

3. Test Case Analysis:

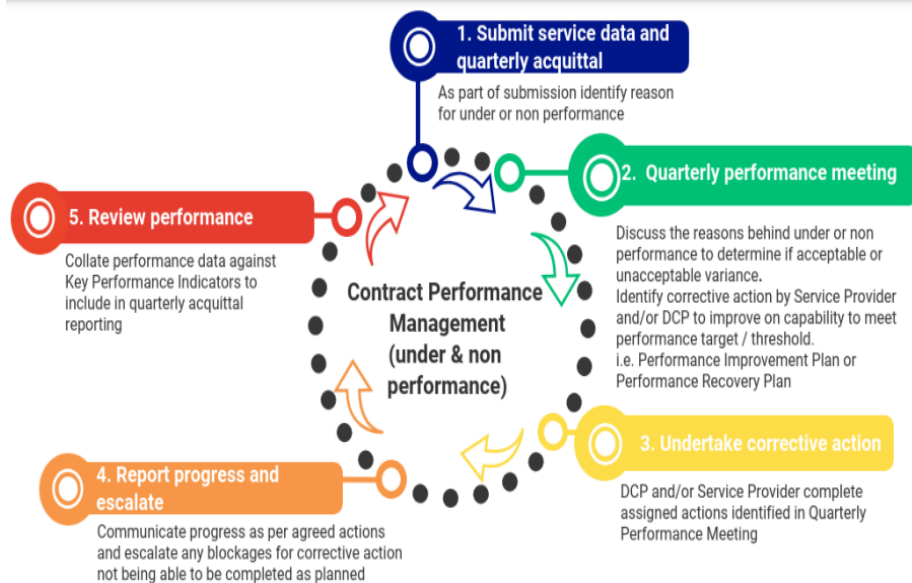
This report shows the number of test cases that have passed, failed, and untested

Security	4	0	0	4
Outsource Shipping	3	0	0	3
Exception Reporting	2	0	0	2
Final Report Output	4	0	0	4

Version Control	4	0	0	4
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9.RESULTS

9.1:PERFORMANCE METRICS



10.ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- Child safety app used for the parents to monitor their children remotely.
- In case any undesirable situations happen it will send alert notification to parents so that actions

can be taken immediately.

- Through this child safety can be ensured and crime rate can be reduced.

DISADVANTAGES:

- The main disadvantages of this app is network issues .
- The people with the internet knowledge can only use.
- It is only applicable for only particular location.

11.CONCLUSION

Child safety monitoring gajets using IOT includes Arduino,location sensors, ultrasonicsensors,GPSand panicbuttontotrackthechild'smovement,position,location etc.This app sends notification to thir parents whenever their children are in trouble.This can reduce the crime rate and ensures the child safety.As in the busy schedule both parents are working so their full attention towards their children safety is not that much effective so,adopting to such technology can make them feel better relief towards their children safety.

12.FUTURE SCOPE

- We can use IR sensors in future for detecting the movement of vehicles which can avoid the road accidents
- The future scope of this project can be also used for women safety
- This technology can also be implemented not only for children but also for the prisoners in future inorder to monitor their activities.
- This can also used for monitoring school students and also for sending notification to their parents about their misbehaviour

13.APPENDIX

SOURCE CODE

```
import json
import wiotp.sdk.device
import time
myConfig={"identity":{"orgId":"bj2yxw",
                    "typeId":"Testdevice",
                    "deviceId":"12345678"
            },
          "auth":{"
            "token":"Gayathri@09"
          }
        }
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()
while True:
    name="Child-In area"
    #in area location
```

```
latitude=8.7045
longitude=77.73999
#name="Child-Out of area"
#out area location

#latitude=8.7052
#longitude=77.74002
myData={"name" : name,"lat":latitude,"lon":longitude}
client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,
onPublish=None)
print("Data published to IBM lot platform",myData)
time.sleep(5)
client.disconnect()
```

GITHUB&PROJECT DEMO LINK

https://drive.google.com/uc?id=1X7NYKLFpCumycLA_q6bQYrp-TQkaofrS&export=download

