



NALAIYA THIRAN PROJECT BASED LEARNING



MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE
Kodambakkam, Chennai-600024.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TOPIC: IoT Based Safety Gadget for Child Safety Monitoring & Notification

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ABSTRACT

As we know in present era everything is based on digital technology. Human being is going to connect each other by using mobile network. This project proposes an SMS based solution to reduced parents insecurity and to track children's in real time. Different devices are connected with a single device. The concerned device is connected to mobile via SMS. 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 geo-fence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geo-fence. 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. An Android app was designed and developed to collect the location data from cloud database to compute the relative distance location of a child when he or she leaves the maximum set distance, using node-red devices. Finally, a user study was conducted to analyze the user experience of the system developed.

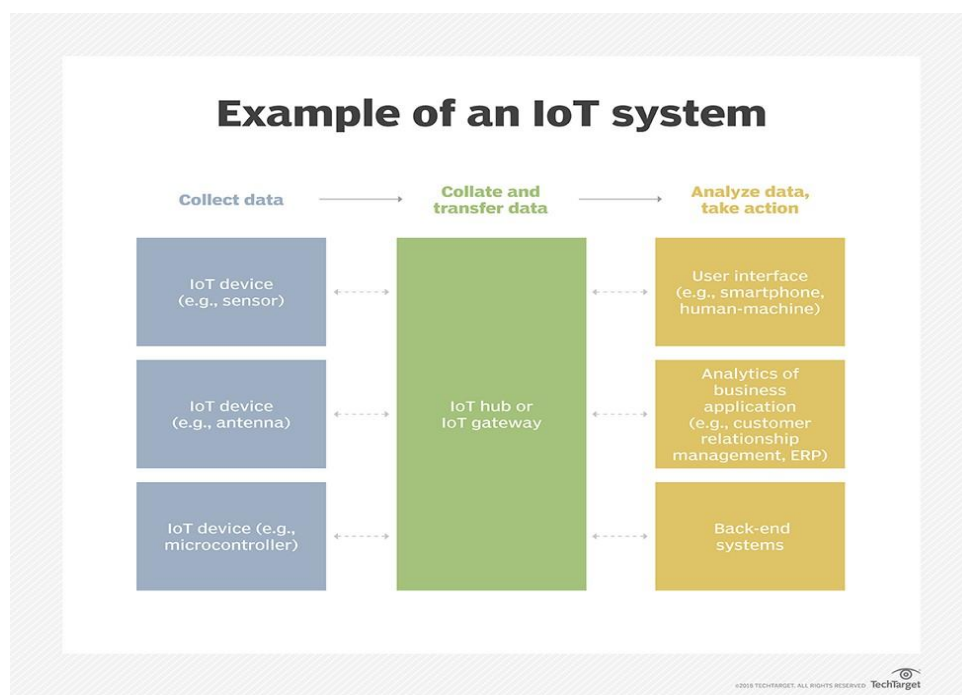
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INTRODUCTION

Internet of Things (IOT) is a network of physical objects or people called “things” that are embedded with software, electronics, network, and sensors that allows these objects to collect and exchange data. The goal of IOT is to extend to internet connectivity from standard devices like computer, mobile, tablet to relatively dumb devices like a toaster. IOT makes virtually everything “smart,” by improving aspects of our life with the power of data collection, AI algorithm, and networks. The thing in IOT can also be a person with a diabetes monitor implant, an animal with tracking devices, etc.

How IOT works?



An IOT ecosystem consists of web-enabled smart devices that use embedded systems, such as processors, sensors and communication hardware, to collect, send and act on data they acquire from their environments. IoT devices share the sensor data they collect by connecting to an IOT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally. Sometimes, these devices communicate with other related devices and act on the information they get from one another. The devices do most of the work without human intervention, although people can interact with the devices -- for instance, to set them up, give them instructions or access the data.

PROJECT OVERVIEW

Child safety is a major concern in any society due to the vulnerability of a child and consequently, higher rates of crimes against children. With this issue on our hands, a smart wearable Internet of Things sensor network for monitoring the environment of a child can be developed to help parents ensure the safety of their children. It must also necessarily include a mechanism for tracking the child. An advantage of this wearable device is that, according to its design, it can be accessed from any mobile device and does not mandate a lot of technical knowledge from the user to operate.

PROJECT FLOW

- 1.The GPS coordinates of the child will be sent to the IBM IOT platform.
- 2.Location can be viewed in the Web Application.
- 3.A parent can create a geo-fence in the web application.
- 4.The web application will check if the child is inside or outside the geo-fence.
- 5.Notifies the parents if the child goes out of the geo-fence.

To accomplish this, we have to complete all the activities and tasks listed below:

- 1.Create and configure IBM Cloud Services
- 2.Create IBM Watson IOT Platform
- 3.Create a device & configure the IBM IOT Platform
- 4.Create Node-RED service
- 5.Create a database in Cloudant DB to store location data

Develop a web application using Node-RED Service:

- 1.Integrate the geo-fence & google map.
- 2.Develop a python script to publish the location details to the IBM IOT platform.

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 geo-fence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geo-fence. Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in database.

LITERATURE SURVEY

EXISTING PROBLEM AND REFERENCES

Problem Statement Definition

The increasing need for protection of children at present times and also when child can be lost in crowded areas. Using Bluetooth and Wi-Fi it is not possible to track larger distance.

2016

Title: Children Location Monitoring on Google Maps Using GPS and GSM.

Published in: 2016 IEEE.

Authors: Dheeraj Sunehera, Pottabhatini Laxmi Priya.

This paper provides an Android based solution for the parents to track their children in real time. Different devices are connected with 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.

Title: Child Safety & Tracking Management System by using GPS.

Published in: 2016 IEEE.

Authors: Aditi Gupta, Vibhor Harit.

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.

Merits: The advantages of smart phones which offers rich features like Google maps, GPS, SMS etc.

Demerits: This system is unable to sense human behavior of child.

2017

Title: Child safety wearable device.

Published in: 2017 IEEE.

Authors: Akash Moodbidri, Hamid Shahnasser.

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 Bluetooth services 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 savvy individual to operate.

Demerits: As, this device's battery gives short life-time. High power efficient model will have to be used which can be capable of giving the battery life for a longer time.

2019

Title: Smart IoT Device for Child Safety and Tracking.

Published in: 2019 IEEE.

Authors: M Nandini Priyanka, S Murugan, K. N. H. Srinivas, T. D. S. Sarveswararao, E. Kusuma Kumari.

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 which ensures the complete solution for child safety problems.

2020

Title: IoT Based Smart Gadget for Child Safety and Tracking.

Published in: 2020 IJRESM.

Authors: Angeline Reeba Karkada, Vaishnavi M Shetty, Preethi Salian.

This research demonstrates Smart IoT device for child safety and tracking, to help the parents to locate and monitor their children. If any abnormal readings are detected by the sensor, then an SMS and phone call is triggered to the parent's mobile. Also, updated to the parental app through the cloud. The system is equipped with GSM and GPS modules for sending and receiving call, SMS between safety gadget and parental phone. The system also consists of Wi-Fi module used to implement IoT and send all the monitored parameters to the cloud for android app monitoring on parental phone. Panic alert system is used during panic situations alerts are sent to the parental phone, seeking for help also the alert parameters are updated to the cloud. 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 BLE listener gadget an alert is provided to itself.

Merits: Live location tracking , Panic alert systems, stay connected feature, health monitoring system, gadget plug and unplug monitoring, boundary monitoring system.

Demerits: The system is dependent on communication signal/network signal for the smart gadget to trigger automatic phone call/SMS during panic situation. It can be difficult to detect when network signal is not reachable/weak/when the smart gadget moves outside the boundary range. Hence, it can be improved by increasing the range.

2021

Title: IoT-based Child Security Monitoring System

Published in: 2021 Atlantis Press

Authors: Lai Yi Heng¹, Intan Farahana Binti Kamsin

Throughout the research, it is clearly explained the IoT 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 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 operates like a mobile phone. Hence, the future enchantments will be adding more features, software,

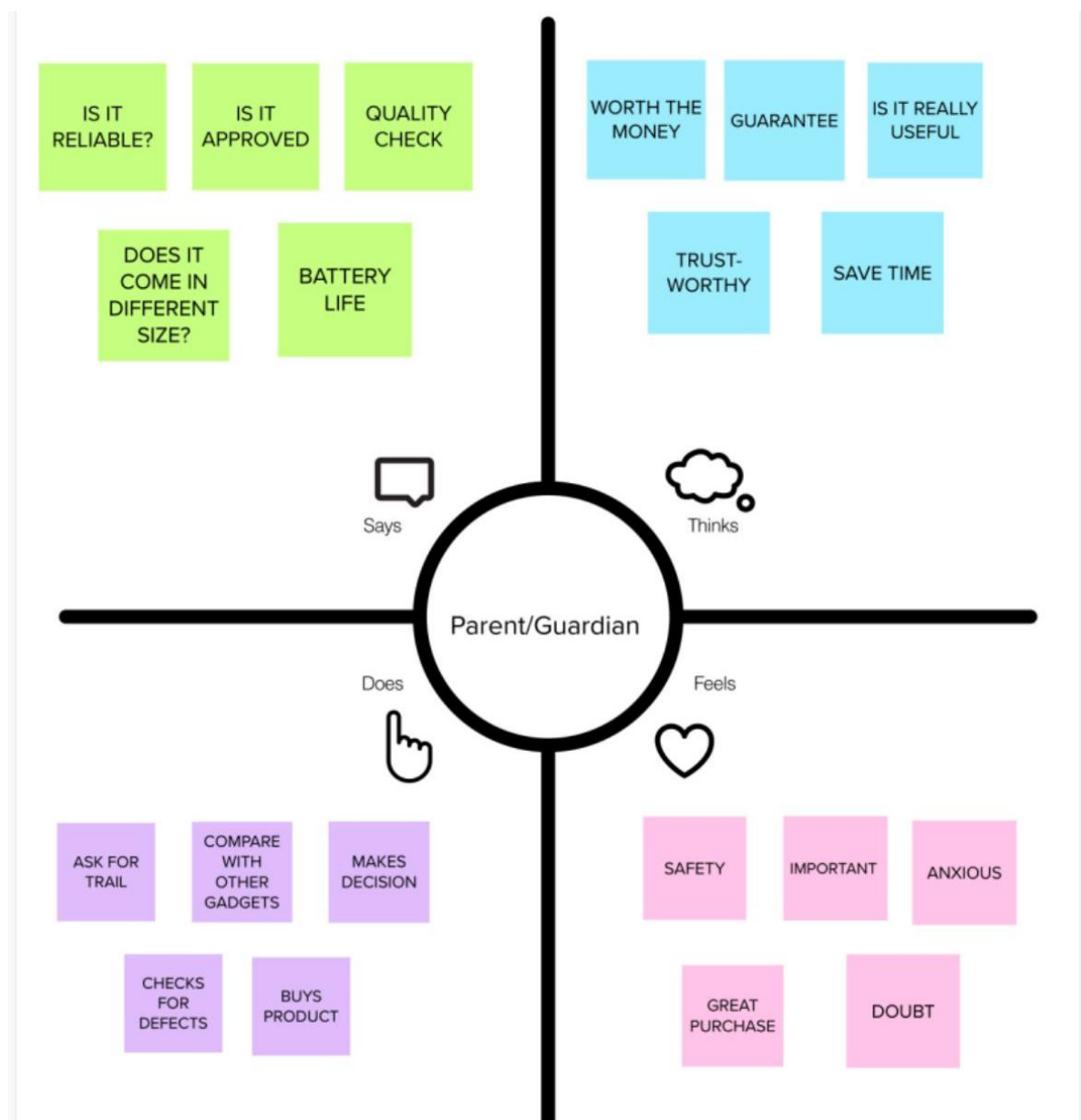
applications, hardware to make the proposed system capable of working more intelligently, meanwhile guarantee the safety of children.

Merits: Live location tracking , Panic alert systems, stay connected feature, health monitoring system, gadget plug and unplug monitoring, boundary monitoring system.

Demerits: The system is dependent on communication signal/network signal for the smart gadget to trigger automatic phone call/SMS during panic situation. It can be difficult to detect when network signal is not reachable/weak/when the smart gadget moves outside the boundary range. Hence, it can be improved by increasing the range.


IDEATION & PROPOSED SOLUTION

Empathy Map Canvas



Ideation & Brainstorming

Template



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
🗣️ 1 hour to collaborate
👥 2-8 people recommended

[Share template feedback](#)

➔

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

A

Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B

Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

C

Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) ➔

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM

Increasing rate of child kidnapping due to lack of tracking technology for child.



Key rules of brainstorming

To run a smooth and productive session

⌚ Stay in topic.

💡 Encourage wild ideas.

⌚ Defer judgment.

👂 Listen to others.

🗣️ Go for volume.

👁️ If possible, be visual.



Need some inspiration?

See a finished version of this template to kickstart your work.

[Open example](#) ➔

2

Brainstorm

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

⌚ 10 minutes

BADRINATH

Cloud storage	Microphone	Send location once in every hour
Speedometer	Geofencing	Motion sensor

CHANDHINI.JB

GPS tracking	Smart torch	Cyber security
Gsm module	Creating app	Water resistance

HARINI.S

Video telematics system	Remote access	Noise sensor
Wearable devices	Work on wifi at home	Heart rate and bp sensor

HARINI SREE.S

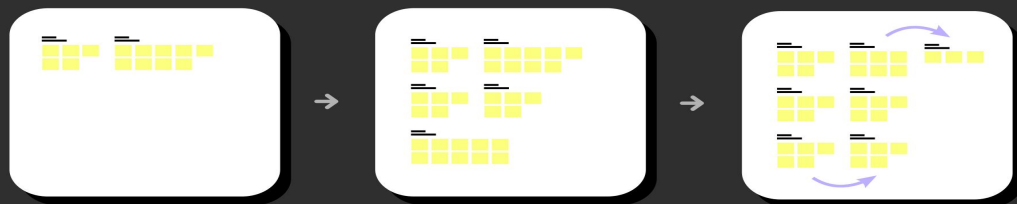
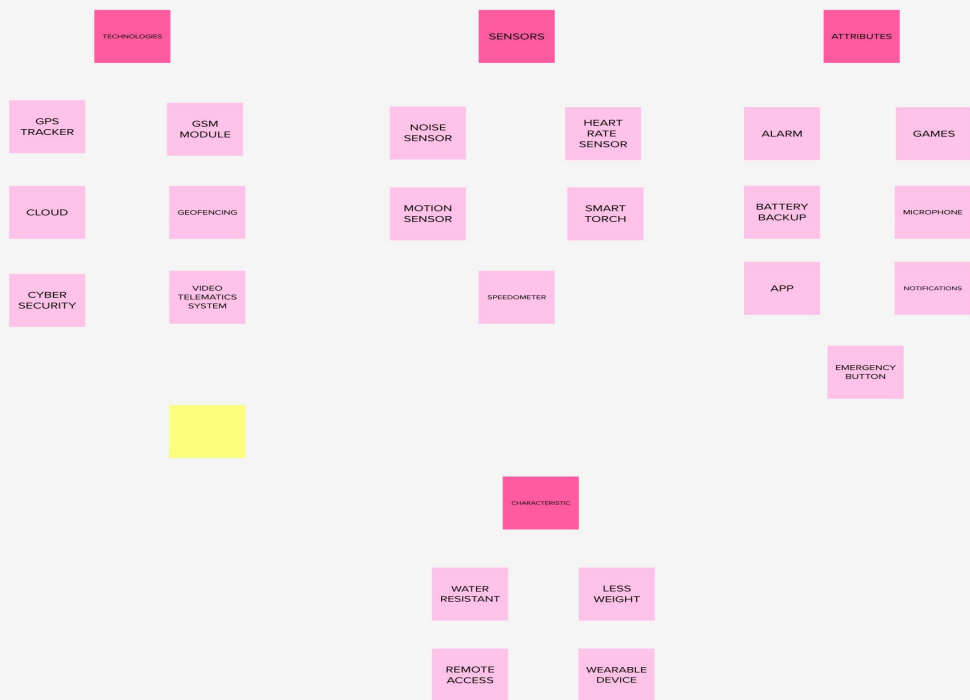
Emergency button inbuilt	Less weight	Notify to get home on time
Battery backup	Alarm	Games

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

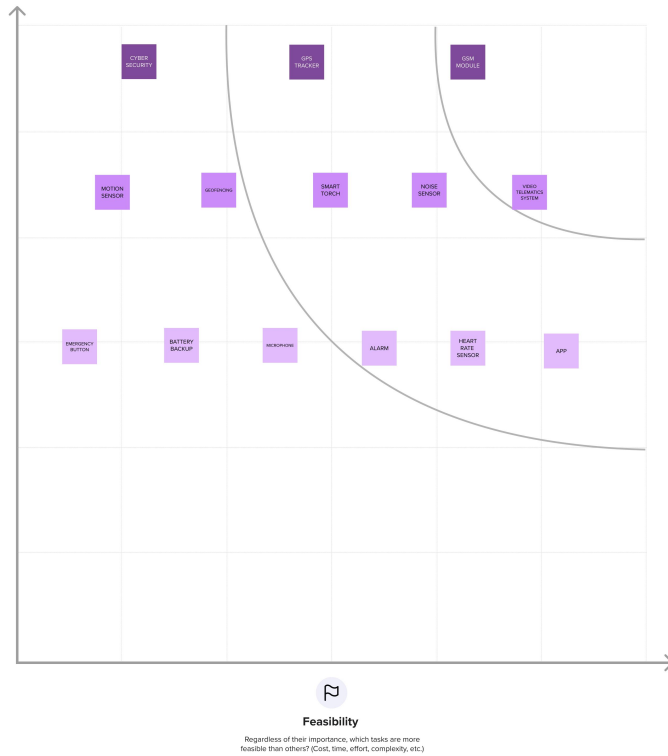


4

Prioritize

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

🕒 20 minutes



➔

After you collaborate

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

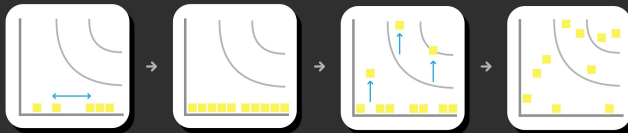
Quick add-ons

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

Keep moving forward

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

[Share template feedback](#)



PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement	Increasing rate of child kidnapping due to lack of tracking technology for child
2.	Solution description	Device is used by the parent/guardian to monitor their children
3.	Novelty/Uniqueness	Wearable device
4.	Social impact/ Customer satisfaction	<ul style="list-style-type: none"> ✓ Real time information ✓ GPS tracking
5.	Business/ Revenue model	Durable and small in size
6.	Scalability of the solution	Reliable and cost effective

PROBLEM SOLUTION FIT

Define CS, fit into CL	1. CUSTOMER SEGMENT(S) CS Who is your customer? eg. working parents of 0-5 y.o. kids	6. CUSTOMER LIMITATIONS EG. BUDGET, DEVICES CL What limits your customers to act when problem occurs? Spending power, budget, no cash in the pocket? Network connection? Available devices?	5. AVAILABLE SOLUTIONS PLUSSES & MINUSES AS Which solutions are available to the customer when he/she is facing the problem? What had he/she tried in the past? Pluses & minuses?	Explore AS, differentiate
	2. PROBLEMS / PAINS + ITS FREQUENCY PR Which problem do you solve for your customer? There could be more than one, explore different sides. eg. existing solar solutions for private houses are not considered a good investment (1).	9. PROBLEM ROOT / CAUSE RC What is the root of every problem from the list? eg. People think that solar panels are bad investment right now, because they are too expensive (1.1), and possible changes to the law might influence the return of investment significantly and diminish the benefits (1.2).	7. BEHAVIOR + ITS INTENSITY BE What does your customer do about / around / directly or indirectly related to the problem? eg. directly related: tries different "green energy" calculators in search for the best deal (1.1), usually chooses for 100% green provider (1.2). indirectly related: volunteering work (Greenpeace etc)	
Identify strong TR & EM	3. TRIGGERS TO ACT TR What triggers customer to act? eg. seeing their neighbor installing solar panels (1.1), reading about innovative, more beautiful and efficient solution (1.2)	10. YOUR SOLUTION SL If you are working on existing business - write down existing solution first, fill in the canvas and check how much does it fit reality. If you are working on a new business proposition then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.	8. CHANNELS of BEHAVIOR CH ONLINE Extract channels from Behavior block	Extract online & offline CH of BE
	4. EMOTIONS BEFORE / AFTER EM Which emotions do people feel before/after this problem is solved? Use it in your communication strategy. eg. frustration, blocking (can't afford it) > boost, feeling smart, be an example for others (made a smart purchase)		OFFLINE Extract channels from Behavior block and use for customer development	

REQUIREMENT ANALYSIS

Functional requirements

FRNo.	Functional Requirement (Epic)	Sub Requirement(Story/Sub-Task)
FR-1	User Registration	Registration in person. Registration through email Registration through phone number
FR-2	User Confirmation	Email SMS message Otp
FR-3	Notifications	Email SMS message Alert messages
FR-4	User Interface	Mobile app created for parents to track the gadget

Non-Functional requirements

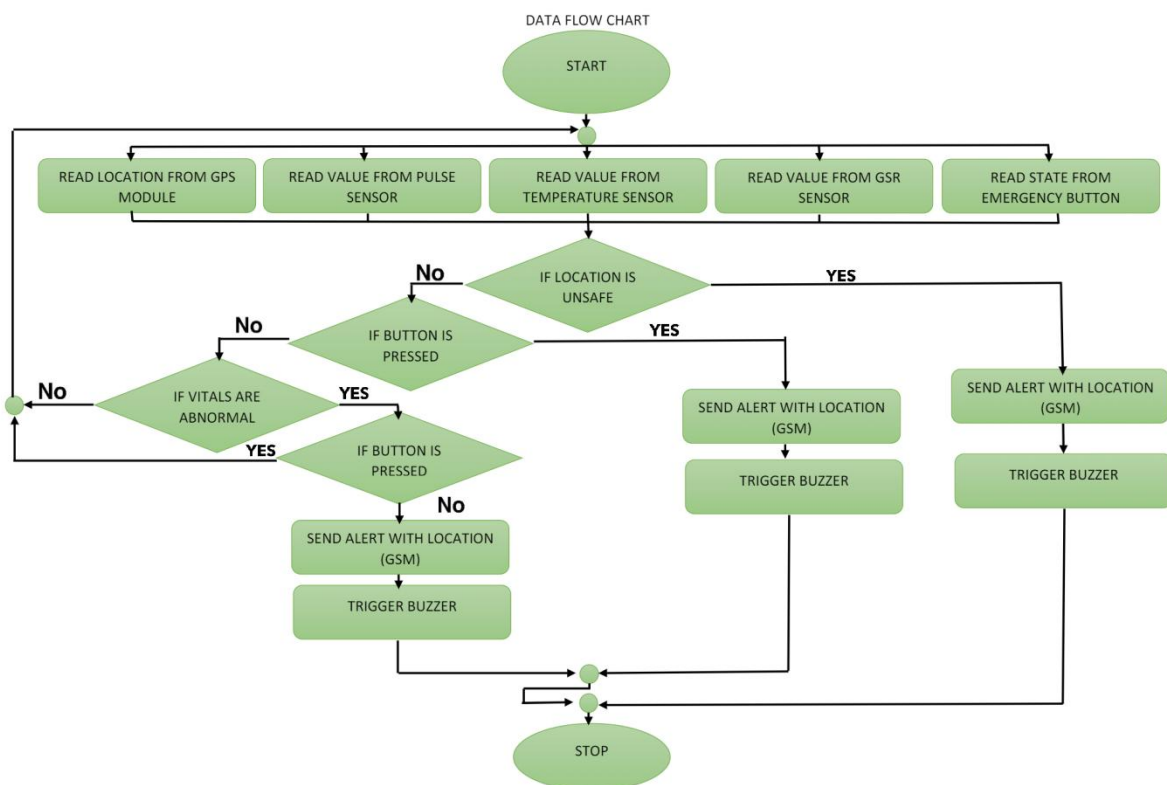
FRNo.	Non-Functional Requirement	Description
NFR-1	Usability	To track the child and monitor it's movements geographically and notify the parents.
NFR-2	Security	Highly secure protocols are applied to safeguard the information passed to the parent regarding the location. App is secured using password and is automatically logged out
NFR-3	Reliability	.Incase of crash in the application, the cloud saves all the important information.
NFR-4	Performance	The location is updated on real time and is reliable.
NFR-5	Availability	Available worldwide and can be bought over the internet.
NFR-6	Scalability	Provides location along with heart rate sensing and alert message sending options.

PROJECT DESIGN

Data Flow Diagrams

FLOWS:

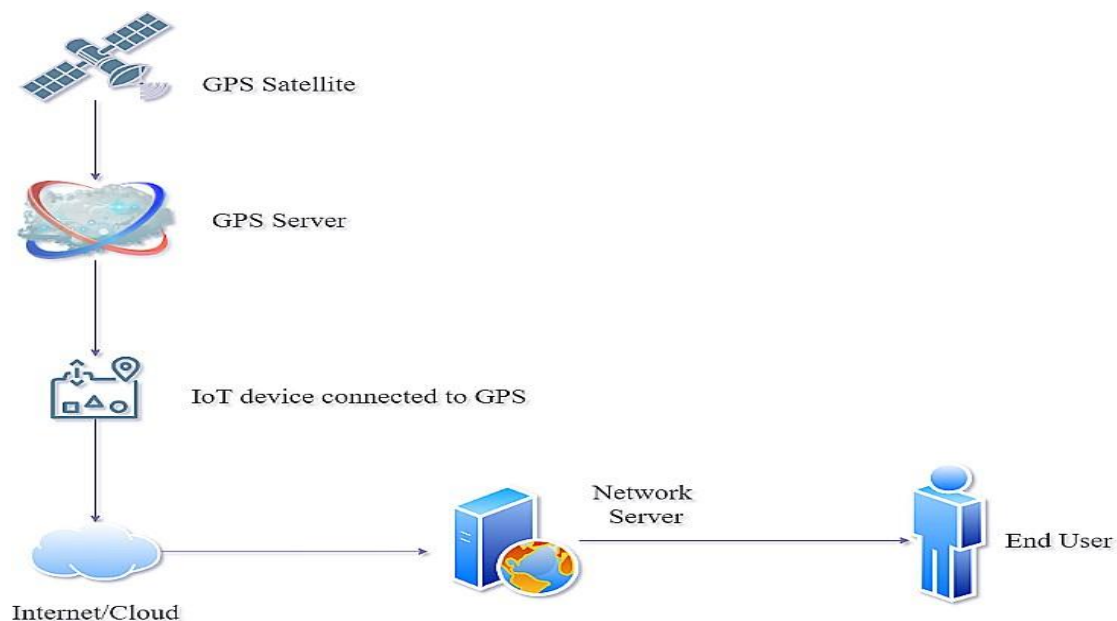
- 1.Connecting IoT devices to the Watson IoT platform and exchanging the sensor data.
- 2.The GPS coordinates of the child location will be sent to the IBM IoT platform
- 3.Creates a database in Cloudant DB to store location data.
- 4.Develop a web Application using Node RED Service.
- 5.The web application will check if the child is inside or outside the geofence 6.Notifies and alerts the parents if the child goes out of the geofence.



SOLUTION AND TECHNICAL ARCHITECTURE

SOLUTION ARCHITECTURE

1. Using the Minimum Viable Architecture model can ultimately result in a highly polished end product as it relies on testing assumptions with small experiments and guiding development using the findings of said experiments.
2. Providing a flexible framework that can help achieve target business objectives, MVA responds to evolving customer requirements and technologies and can go a long way in promoting agility.
3. The safety of a child at a large public event is a major concern for event organizers and parents. We address this important concern and proposes an architecture model of the IoT-enabled smart child safety tracking digital system.
4. 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.
5. The proposed architecture model describes the people, information, process, and technology architecture elements, and their relationships for the complex IoT-enable smart child safety tracking digital system.



Solution Architecture

TECHNICAL ARCHITECTURE:

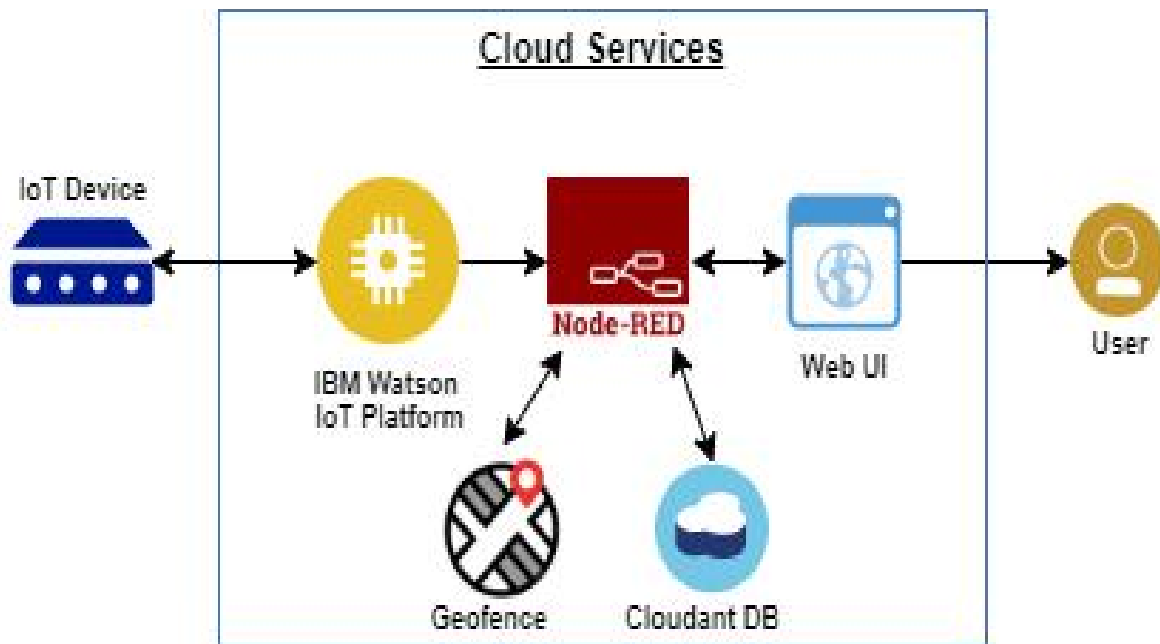



Table-1 :**Components & Technologies:**

S.No	Component	Description	Technology
1.	User Interface	Web UI	node JS
2.	Application -1	To publish location details in IBM Watson Platform	Python
3.	Application -2	Process in the IoT application	IBM Watson IoT Platform
4.	Application -3	It assists the IoT Platform	IBM Watson Assistant
5.	Database	Data Configuration & Types	IBM Bluemix & HTTP
6.	Cloud Database	Database Service on Cloud	IBM Cloudant
7.	File Storage	File storage requirements	IBM Block Data Storage
8.	External API-1	Connect the device to the IoT platform	IBM Device API
9.	External API-2	Connect the node-RED services	Location API
10.	Machine Learning Model	It uses past behaviour to identify patterns and builds models that help predict future behaviour and events	Using program conditionloop
11.	Infrastructure (Server /Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Wireless local Server Cloud Server Configuration : IBMCloud Server	Cloud Foundry

Table-2:**Application Characteristics:**

S · N O	CHARACTERISTICS	DESCRIPTION	TECHNOLOGY
1	Open-Source Frameworks	Sensors, software applications & Cloud application	Open connectivity foundation
2	Security Implementations	The technology segment focused on safeguarding connected devices and networks in the IoT	Encryptions, monitor traffic congestion, using admin, device authentication
3	Scalable Architecture	If the communication stack from the end devices to the cloud is made asynchronous, so that load times are cut down	Agile methodology, IBM architecture
4	Availability	use of distributed servers, the system must be available 24/7	client server, server service, GPS System
5	Performance	number of requests per sec, stimulate devices from different locations and real time system	network technologies like wifi, 4G, etc. it works with popular chipsets

USER STORIES

Customer Journey						
SCENARIO Monitoring child location	ENTICE How does someone initially aware of this?	ENTER What do people experience as they begin the process?	ENGAGE In the core moments in the process, what happens?	EXIT What do people typically experience as the process ends?	EXTEND What happens after the experience is over?	
STEPS	<div>create an application that helps parents or guardians to monitor their child</div> <div>Parents can create an geofence to set boundaries for their child</div>	Checks whether the child is inside the geofence	It updates the location and activities of the child	Alert will pop when the child removes the device for confirmation	A review will be sent to parents about their child everyday post usage of device	
INTERACTIONS	<div>Interacting with their child when they are away from parents</div> <div>Child's location will be updated regularly</div>	Create a geofence to set boundaries	The safety of the child is met through the device	Alerts and notifications will be sent to parents	We can't receive updates in absence of data or gps	
GOALS AND MOTIVATIONS	<div>Preventing the child from getting lost</div> <div>Getting live updates about the child</div>	Parents or guardians have to click on the start button	Ensures the child safety and security	Alert message will be sent when the child crosses the geofence	Sends the location of the child	
POSITIVE MOMENTS	<div>Child is being monitored without any caretaker</div> <div>Parents will feel better since they are monitoring even when they are away</div>	Tracking the children in a easiest way	Regular updates and easy interaction	Parents can do their work since their child is being monitored	Less expensive	
NEGATIVE MOMENTS	<div>App won't work if any technical issue arises</div>	When alerts are not received properly	Continuous internet is required to get live updates	It is a drag to follow the process	Many issues need to be modified	
AREAS OF OPPORTUNITY	<div>When parents and caretaker is not available</div> <div>Immediately alerts when child crosses the border</div>	Sending messages or calls is an alternative method	When caretaker or parents not near the child	Parents can reach their children when their work over	Timeline of the child location is stored	

Team id:IBM-Project-21146-1659774304

PROJECT PLANNING & SCHEDULING

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	Y.Badrinath
Sprint-1		USN-2	As a Parent/ Guardian, I can register for the application through Gmail	1	Medium	Chandhini.J B
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	Harini Sree.S

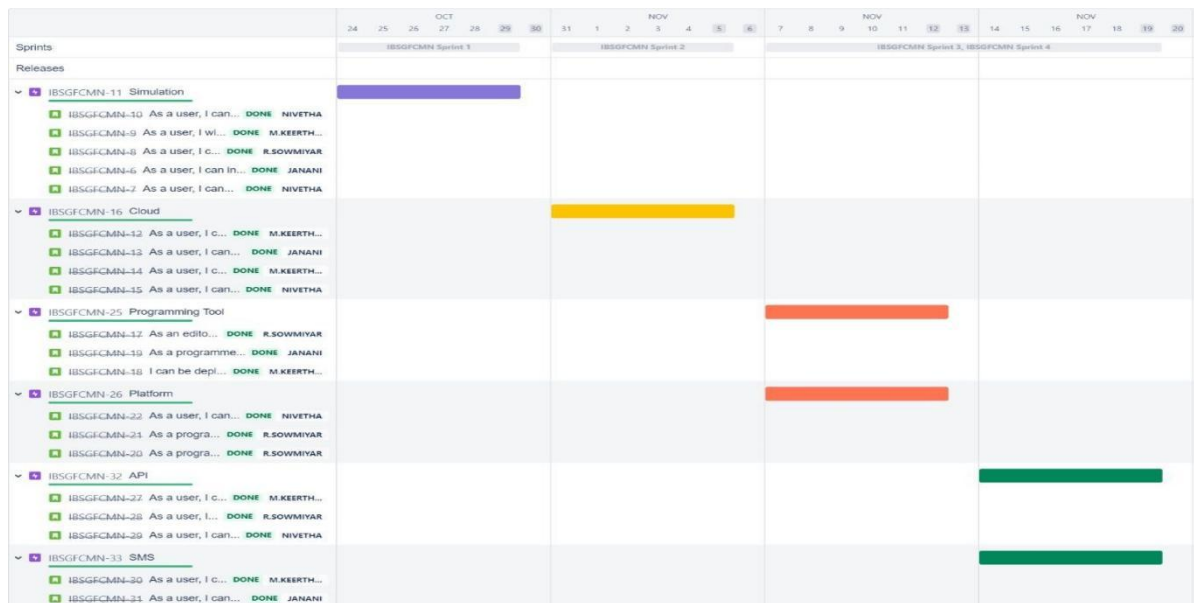
SPRINT DELIVERY SCHEDULE

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)
Sprint1	20	4 Days	24 Oct 2022	27 Oct 2022	20	29 Oct 2022
Sprint2	20	5 Days	28 Oct 2022	01 Nov 2022	20	04 Nov 2022
Sprint3	20	8 Days	02 Nov 2022	09 Nov 2022	20	11 Nov 2022
Sprint4	20	9 Days	10 Nov 2022	18 Nov 2022	20	19 Nov 2022

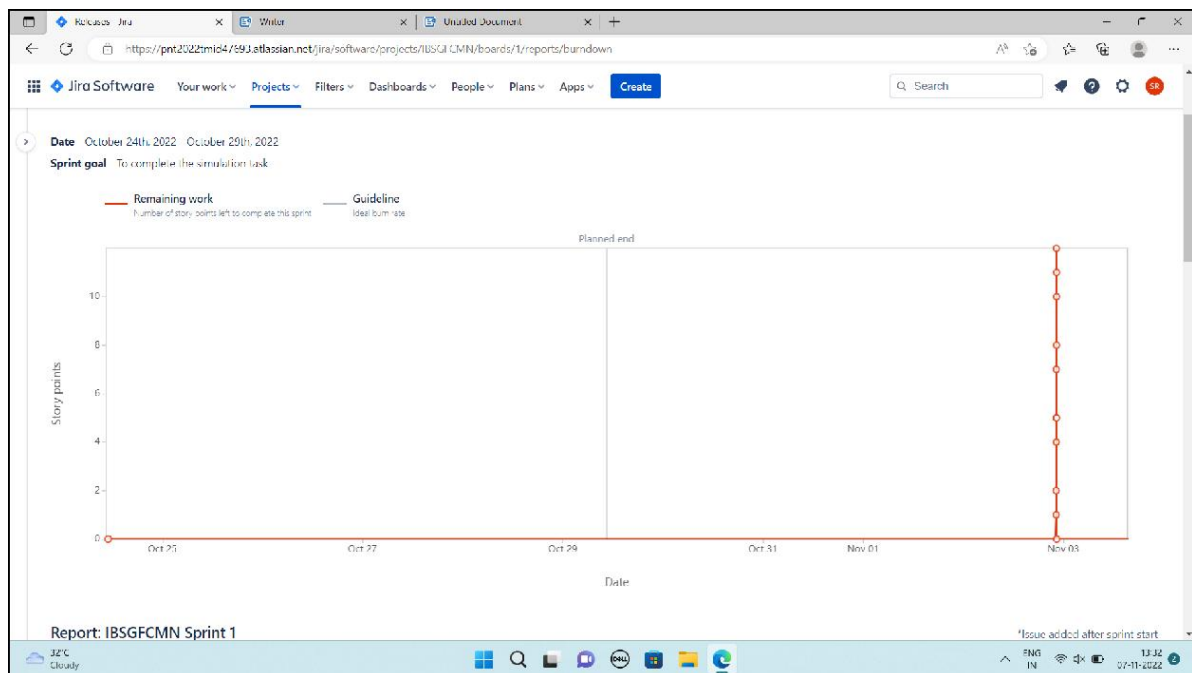
REPORTS FROM JIRA

JIRA RoadMap:

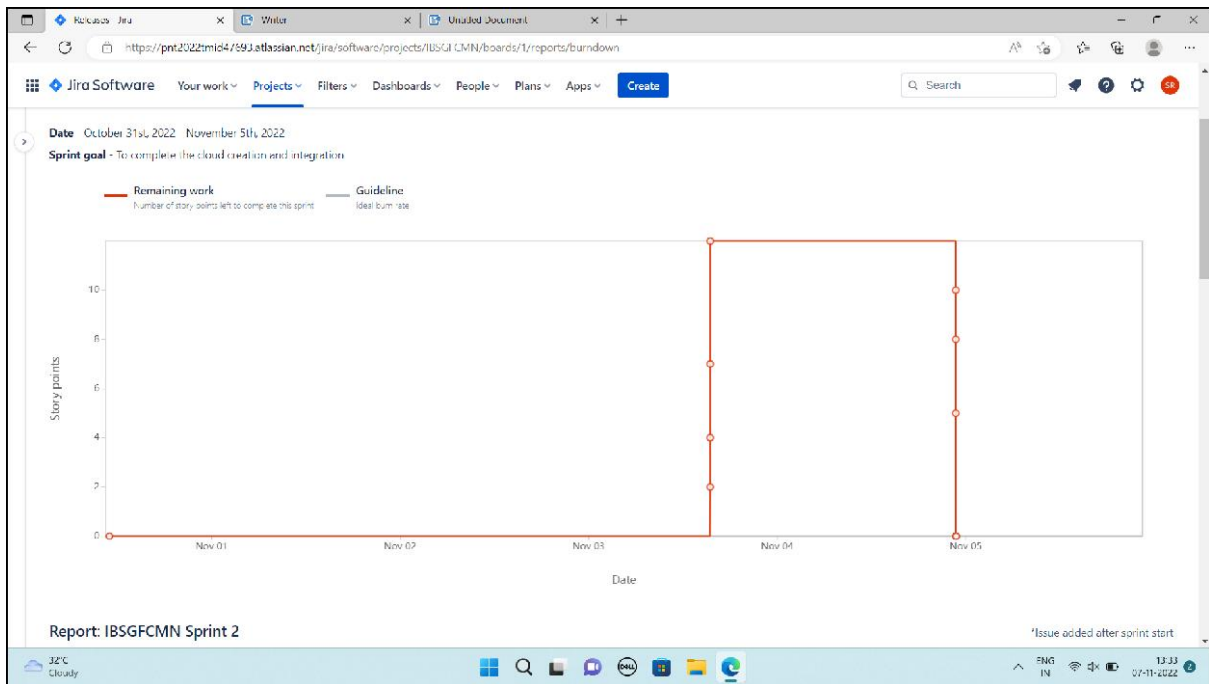


Burndown Chart:

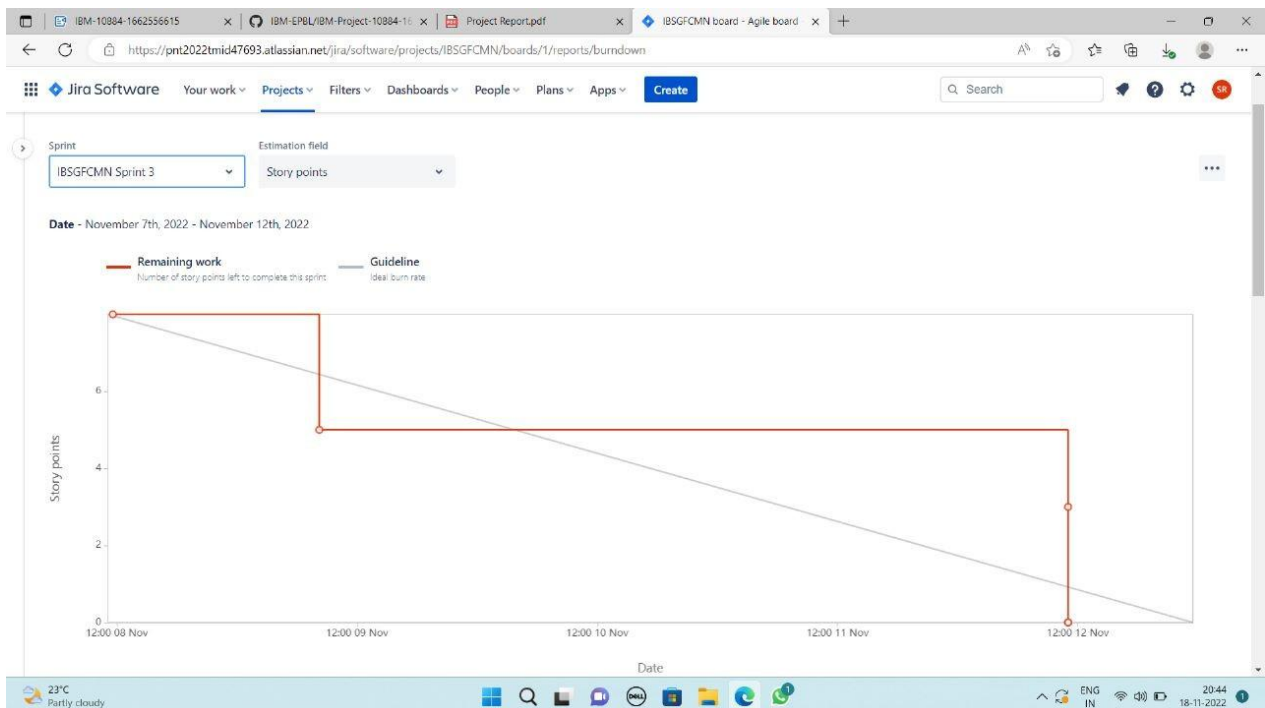
Sprint-1



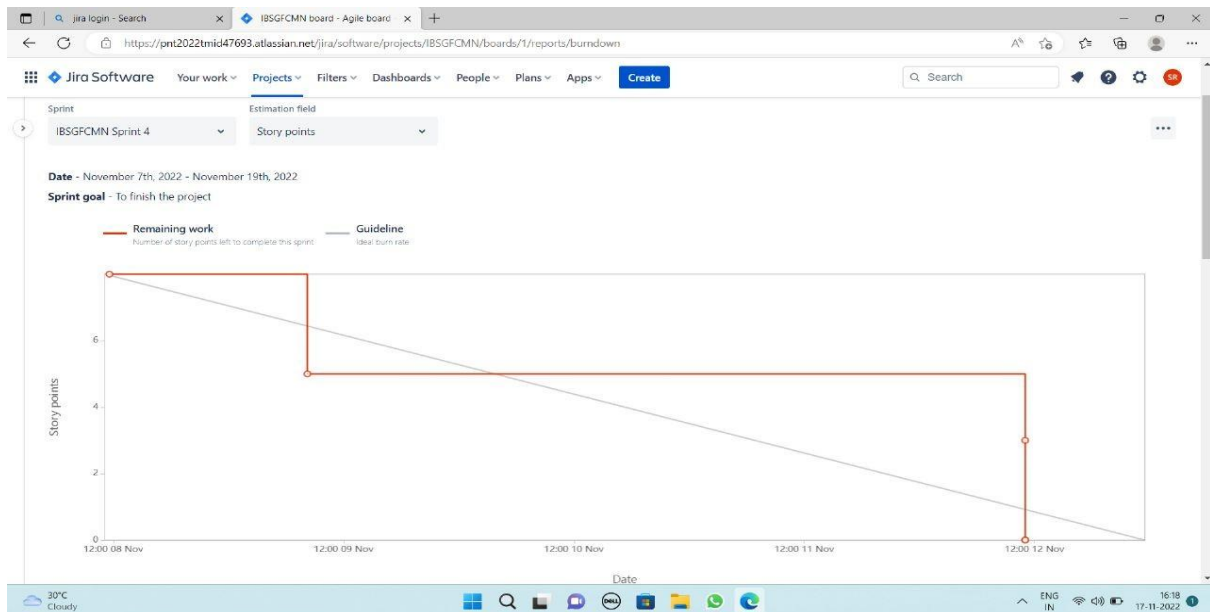
Sprint-2



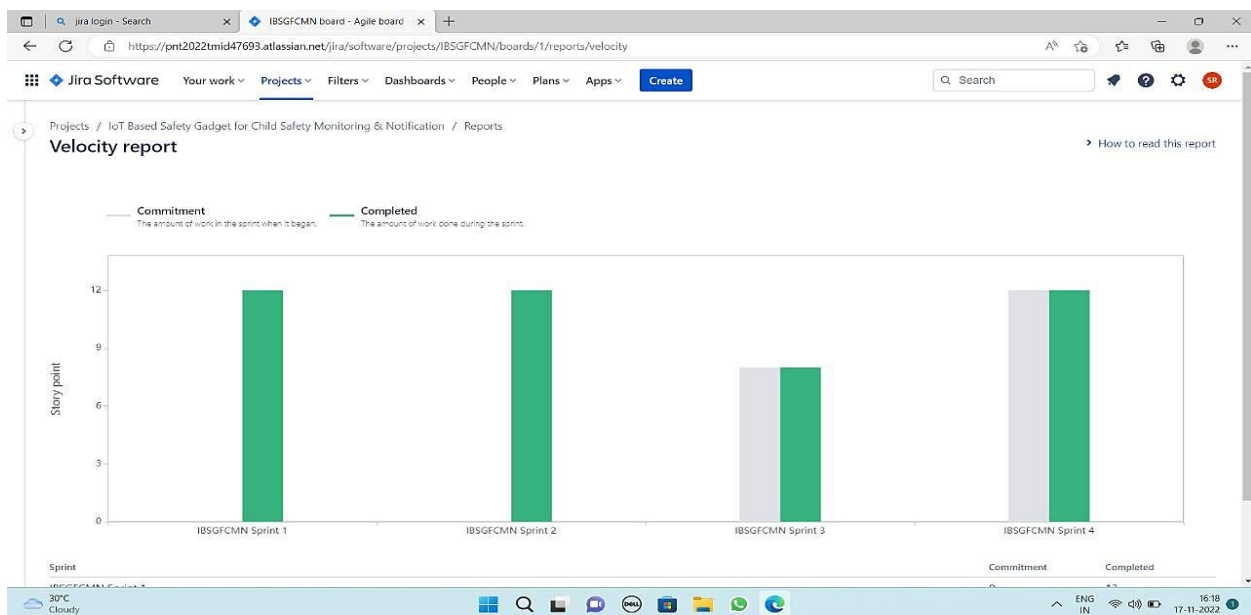
Sprint-3

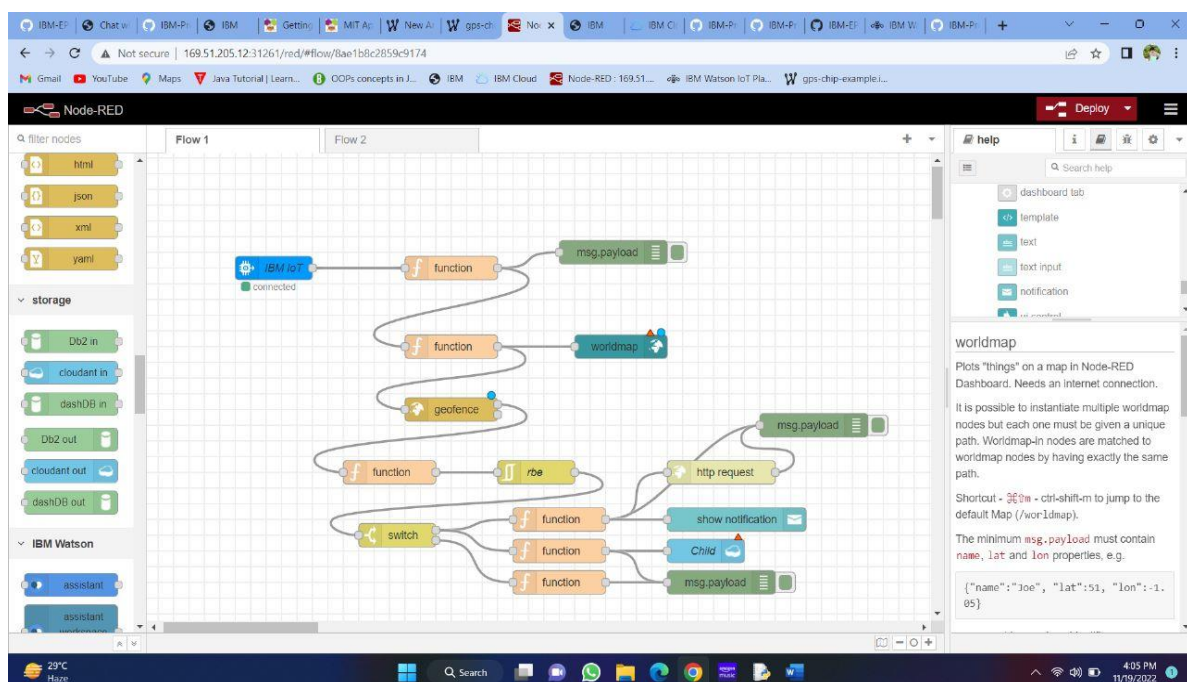


Sprint-4

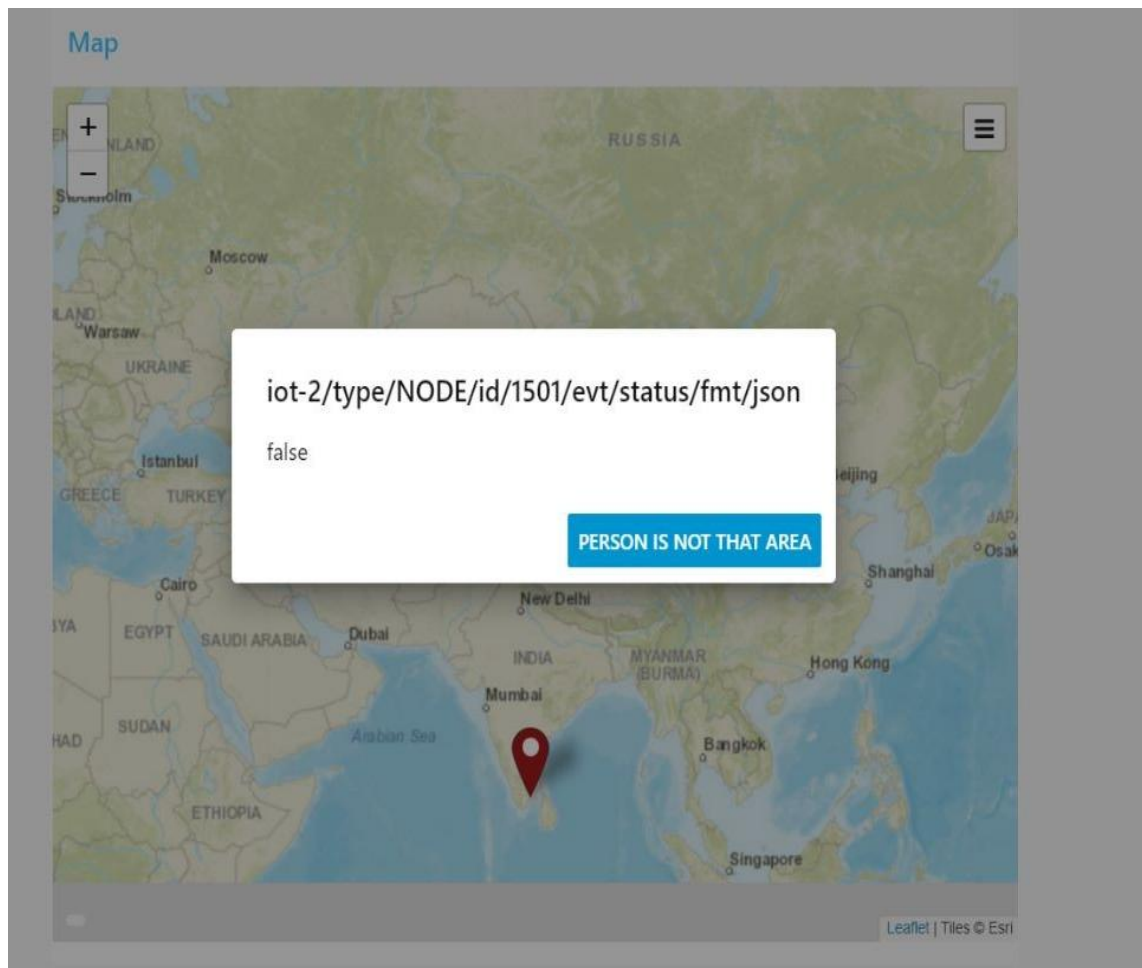


VELOCITY REPORT





1. Once we get the location details in the IBM Watson IoT Platform , We are extracting that data into the NODE-RED Service.
2. We are going to pass the data to geofence node it is going to check whether that particular person in that area or not.
3. Along with the entire data, we are store the location details in Cloudant database.
4. If the child crosses the location, we are showing web UI pop-up alert.



Feature 3 - Fast2sms

Whenever that person is not in that area , we are going to send fast SMS to that particular child's guardian.

Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

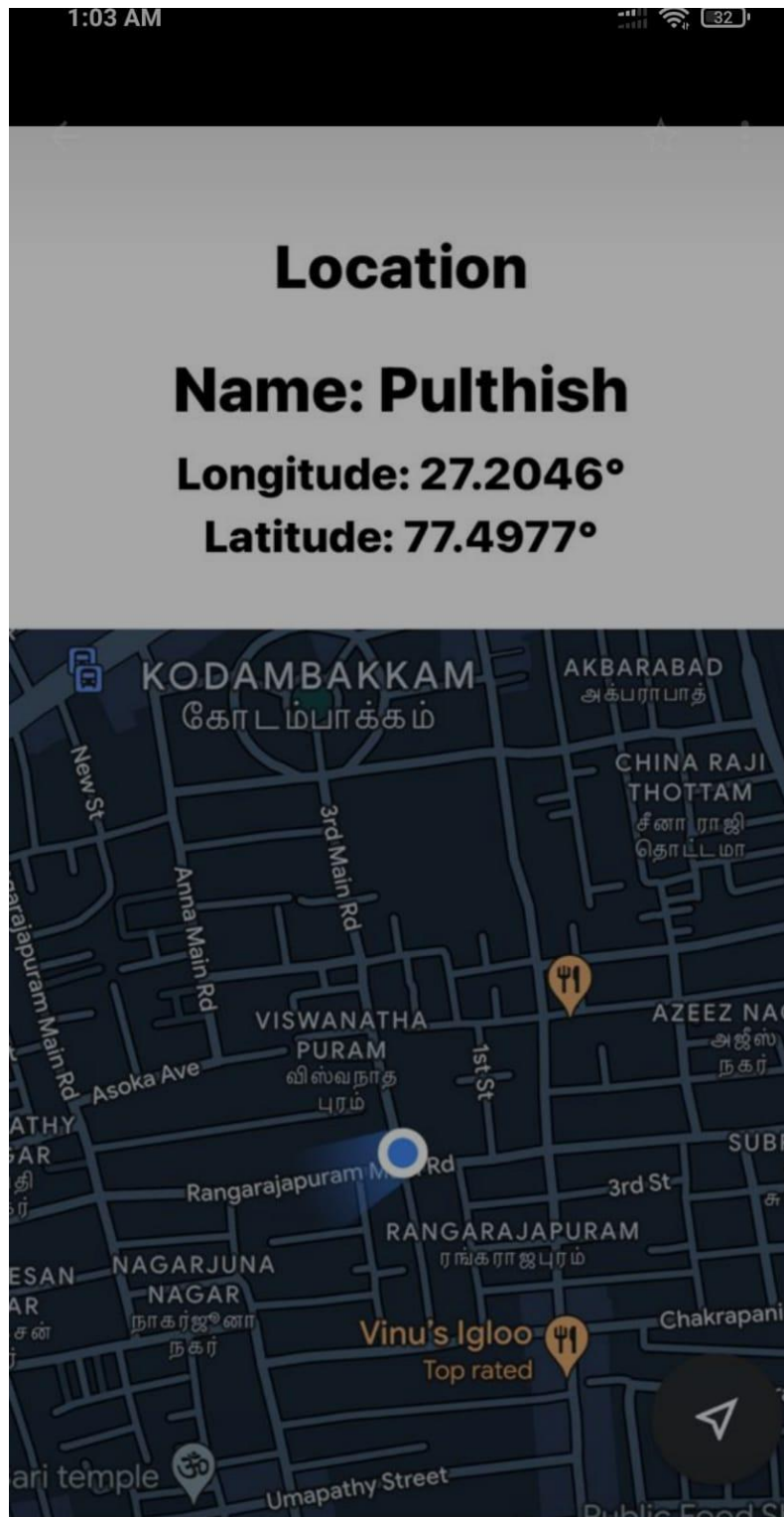
Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

Alert: Your kid has crossed the geofence!

Feature 4 - Mobile App






In addition we are using mobile app to view the location details along with child name.



TESTING

1. Verify python code is run without error.
2. Verify the login the Cloud Services.
3. Verify create a device in the IBM Watson IoT platform and get the device credentials.
4. Verify the events is shown in the card.
5. Verify the events is stored in the database.
6. Verify to create a node -red services.
7. To create a web UI to interact with user.
8. To send SMS to the particular child's guardian.
9. Verify user is able to log into app with Valid credentials.
10. Verify it show the location in app.

Test cases

Sprint	Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	TC for Automation(Y/N)	BUG ID	Executed By
Sprint-1	PythonCode_TC_OO1	Code	Python3.7.4	Verify python code is run without error	Software	1.Download the python version3.7.4 2.Type the program and save it 3.Verify it is run continuously		2022-11-16 15:17:30.513 Using:ibm-device-client DeviceClient INFO Connected successfully: 6.4399e-NODE:1501 Data published to IBM IoT platform: { "name": "Sowmiya", "lat": 9.38, "lon": 78.5488783 }	Working as expected	Pass	YES	NIL	Janani
Sprint-2	IBMCloud_TC_OO2	Functional	IBM Cloud Services	Verify the login the Cloud Services	IBM Cloud Services	1.Login in cloud.ibm.com 2.Obtain promocode in IOT		Successfully created the IBM account	Working as expected	Pass	YES	NIL	Keerthana
Sprint-2	IBM Watson IoT Platform_TC_OO3	Functional	IBM Cloud Services	Verify create a device in the IBM Watson IoT platform and get the device credentials.	IBM Cloud Services	1.In IBM Cloud Service go to catalog 2.To create an Internet of things platform 3.Launch the IBM Watson IoT Platform 4.Login the Platform by clicking organization ID 5.Create a device & configure it		{ "name": "Sowmiya", "lat": 9.38, "lon": 78.5488783 }	Working as expected	Pass	YES	NIL	Nivertha
Sprint-2	Board_TC_OO4	Non-Functional	IBM Cloud Services	Verify the events is shown in the card	IBM Cloud Services	1.Go to IBM Watson IoT Platform 2.Create the board 3.Create name board 4.Create latitude board	BOARD: LOCATION	Test: Sowmiya Gauge: Latitude Gauge: Longitude	Working as expected	Pass	YES	NIL	Sowmiya
Sprint-2	CloudantDB_TC_OO4	Dataset	IBM Cloud Services	Verify the events is stored in the database	IBM Cloud Services	1.Go to IBM Cloud Services 2.In resources list, click on cloudant 3.In database, create a document to	Document: tracker	Successfully created the Database	Working as expected	Pass	NO	NIL	Nivertha
Sprint-3	NodeRedService_TC_OO5	Functional	IBM Cloud Services	Verify to create a node -red services	IBM Cloud Services	1.In IBM Cloud Service go to catalog 2.To create a NODE-RED app 3. Deploy the app 4. Visit the app URL 5.In node-red, we need to connect	Using grafana node, we create in form of circle to check whether the child in that area or not		Working as expected	Pass	NO	NIL	Keerthana
Sprint-3	WebUI_TC_OO6	Functional	Node-Red Service	To create a web UI to interact with user	Node-Red Service	1.Go to dashboard 2.Open a link UI dashboard 3.Display the location 4.pop up SMS if person not in area	Show the pop up SMS in UI		Working as expected	Pass	NO	NIL	Janani
Sprint-4	FastSMS Service_TC_OO7	Functional	FastSMS Service	To send SMS to the particular child's guardian	Software	1.Login FastSMS Service 2.GO to Dev API 3.Sending SMS using HTTP Package	Show the pop up SMS	Alert: Sowmiya is not in that area	Working as expected	Pass	NO	NIL	Sowmiya
Sprint-4	MobileApp_TC_OO8	Functional	MIT APP Inventor	Verify user is able to log into app with Valid credentials	Software	1.Login MIT APP Inventor 2.Design Frontend & Backend	Username:sowmiya Password:****	User should navigate to next screen	Working as expected	Pass	YES	NIL	Nivertha
Sprint-4	MobileApp_TC_OO9	Functional	MIT APP Inventor	Verify it show the location in app	Software	1.Login MIT APP Inventor 2.Design Frontend & Backend 3.Connect to node -red	Name: Sowmiya Latitude: ***** Longitude: *****	The App shows the location value	Working as expected	Pass	NO	NIL	Sowmiya

User Acceptance Testing

1.Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [IoT Based Safety Gadget For Child Safety Monitoring & Notification] project at the time of the release to User Acceptance Testing (UAT).

1.Defect Analysis

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	Subtotal
By Design	5	3	2	0	10
Duplicate	0	0	0	1	1
External	2	0	0	1	3
Fixed	6	2	0	0	8
Not Reproduced	0	1	1	0	2
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals	13	6	3	2	24

2.Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pas s
Print Engine	1	0	0	1
Client Application	2	0	0	2
Security	1	0	0	1
Outsource Shipping	1	0	0	1
Exception Reporting	1	0	0	1
Final Report Output	2	0	0	2
Version Control	2	0	0	2

RESULTS

Performance Metrics

NFT - Risk Assessment						
S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Risk Score
1	IoT Based Safety Gadget for Child Safety Monitoring & Notification	Existing	No Changes	No Changes	No Changes	GREEN
Justification						
As we have completed the project successfully						

NFT - Detailed Test Plan		
S.No	Project Overview	NFT Test approach
1	Track the location & send an alert to the particular's person	Load Test

End Of Test Report				
S.No	Project Overview	NFT Test approach	Test Outcome	Approvals/SignOff
1.	We need to Track the location of particular child suppose, If the child crosses the geofence. It is send SMS to that parents/guardian then we need to track the location.	Load Test	Response time meets the actual Result.	Project's Mentors

1

NFT Test approach	
Load Test	
Scenario Name	Load Test - Location Tracker SAMPLE PROJECT
Scenario Type	Load Test - Duration 30 minutes
Scenario Objectives	To Stimulate Python Code(Location Details) and to monitor the performance of Location Tracker SAMPLE PROJECT
Steps	1. We have integrate IBM Watson IoT Platform in order to get this Location details from python program. 2. We also integrate fast SMS service in order to send an alert to guardian or parent
Entry Criteria	Test data is set-up. All the Components(software & hardware) is set-up. It is completed successfully.
Exit Criteria	Response time meets the actual Result. Test completion report is agreed upon by mentors.

ADVANTAGES & DISADVANTAGES

Advantages:

1.Peace of mind for parents

Parents no longer need to ring their child continuously, thus causing them to feel embarrassed, or interrupting their play and exploration.

Location tracking can also ease unnecessary worry if a child doesn't answer the phone straight away - through GPS tracking, a parent can receive a quick update and put their mind to rest.

2.Gives kids more freedom

It gives children more freedom because when parents know where the children are, means they're more relaxed about letting the kids go further afield.

3.Reassurance for children

Location tracking can also be reassuring for the child, particularly if they get lost - this is especially useful if a child wanders off in a crowded place.

4.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.

5.Get geofence details of kids at any time

Send alert Notification to the parents if their children cross the geofence.

Disadvantage

1.Kids may become more secretive

Young people may respond to being tracked by becoming increasingly secretive and flouting the surveillance by, for example, leaving their phone at a friend's house so their parents think they're there.

1.They don't become streetwise

Young people run the risk of not learning to be independent and safe on their own.

2. Internet and social media access

Children need a smartphone for their parents to install a tracking app, but this can expose them to the potential dangers associated with social media and the internet such as cyber bullying, inappropriate contact with strangers and unsupervised access to inappropriate information.

3.Trust issues

If they're being tracked, young people may feel their parents think they can't be trusted. By contrast, if they feel they are trusted, such responsibility can help them behave in a trustworthy manner.

CONCLUSION

This Project demonstrates smart IoT devices for child safety tracking and monitoring, to help the parents to locate and monitor their children.

We have integrate IBM Watson Iot Platform in order to get this location details (i.e. latitude & longitude) from python program and we also integrate Fast SMS service in order to send an alert to guardian/ parent.

The system also consists of mobile app and send all the monitored parametersto cloud on parental phone.

FUTURE SCOPE

This system can be further enhanced by installation of mini-camera inside smart gadget for better security so that live footage can be seen on parental phone during panic situations. GPS device come with a panic button that let your child alert you when something wrong or they need help. The system can be modified by installation of small solar panels for charging the battery of smart gadget to gain maximum battery backup.

APPENDIX

SOURCE CODE

Github link: <https://github.com/IBM-EPBL/IBM-Project-21146-1659774304>

Demo link: <https://youtu.be/3p1cNeIIYJE>

