IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION

A PROJECT REPORT

Submitted by

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PULLOR, KARIYAPATTI

ABSTRACT

This paper is mainly streamed towards child safety solutions by developing 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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CHAPTER 1

INTRODUCTION

The introduction about the child safety monitoring and notifying using IoT based gadgets are briefly discussed in this chapter.

1.1 PROJECT OVERVIEW

The internet of things (IoT) refers to the set of devices and system that stay with real-world sensor and to the internet. During years' Child safety is under threat and it is very important to provide a technology- based solution which will help them under panic situations and monitor them using a smart gadget. The proposed system is equipped with GSM and GPS modules for sending and receiving call and SMS between safety gadget and parental phone, the proposed system also consists of Wi-Fi module used to implement IoT and send all the monitoring parameters to the cloud for android app monitoring on parental phone. Android application can be used to track the current location of safety gadget using its location coordinates on parental phone android app and also via SMS request from parent phone to safety gadget. Panic alert system is used during panic situations and automatic SMS alert and phone call is triggered from safety gadget to the parental phone seeking for help and also monitored for plug and unplug from hand, as soon the gadget is unplugged from hand a SMS is triggered to parental phone and the alert parameter is also updated to the cloud.

1.2 PURPOSE

a. As we all know, kids are the heartbeat of every parent, and when it comes to a child with special needs, parents have to be extra careful. They have to take extra care of their child.
b. 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 location.
c. 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.
d. Child can also initiate emergency notification to the parents in-case of unsafe situation.

Fig 1.1 Child Safety using geofence

a. Enable tracking of the child's location and capturing of data remotely such as where the child located distance etc.

b. To show the child's actual data with reference values.

c. Enable sending of notification if the child is out of location or when the device realizes abnormal conditions/ situations.

d. Develop a prototype of IOT wearable smart band connected to parent's Mobile apps so that they can monitor the actual condition of children at anytime and anyplace.

The remaining chapters of the project are organized as follows, Chapter 2 discusses the literature survey gone through for the project, Chapter 3 briefs about the ideation & proposed solution, Chapter 4 explains the requirement analysis, Chapter 5 explains about the project design, Chapter 6 depicts the project planning and scheduling of this project, Chapter 7 and 8 shows the coding and outcome of the project, Chapter 9 shows the advantages and disadvantages of the project, Chapter 10 concludes the project continued with the future scope explained in Chapter 11.

CHAPTER 2

LITERATURE SURVEY

The introduction about the literature survey gone through for the project are briefly discussed in this chapter.

2.1 EXISTING PROBLEM

As we all know, kids are the heartbeat of every parent, and when it comes to a child with special needs, parents have to be extra careful. They have to take extra care of their child. 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 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. Child can also initiate emergency notification to the parents in-case of unsafe situation.

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 parents 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.

2.2 REFERENCSES

[1] SMART IOT DEVICE FOR CHILD SAFETY AND TRACKING.

Authors: M Nandini Priyanka, S Murugan, K. N. H. Srinivas, T. D. S. Sarveswararao, E. Kusuma Kumari. **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 which ensures the complete solution for child safety problems.

[2] CHILD SAFETY WEARABLE DEVICE

Authors: Akash Moodbidri, Hamid Shahnasser **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 wearable 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 fora longer time.

[3] CHILD SAFETY&TRACKING MANAGEMENT SYSTEM BY USING GPS.

Authors: Aditi Gupta, Vibhor Harit.**Published in**: 2016 IEEE.

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.

[4] CHILDREN LOCATIONMONITORING ON GOOGLE MAPS USING GPS AND GSM

Authors: Dheeraj Sunehera, Pottabhatini Laxmi Priya.**Published in**: 2016 IEEE.

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.

2.3 PROBLEM STATEMENT DEFINITION

The increased number of recorded crimes against children nowadays raises serious concerns about kid safety and tracking. With this goal in mind, a smart Internet of Things (IoT) device for child safety and tracking was created to assist parents in finding and keeping an eye on their kids.

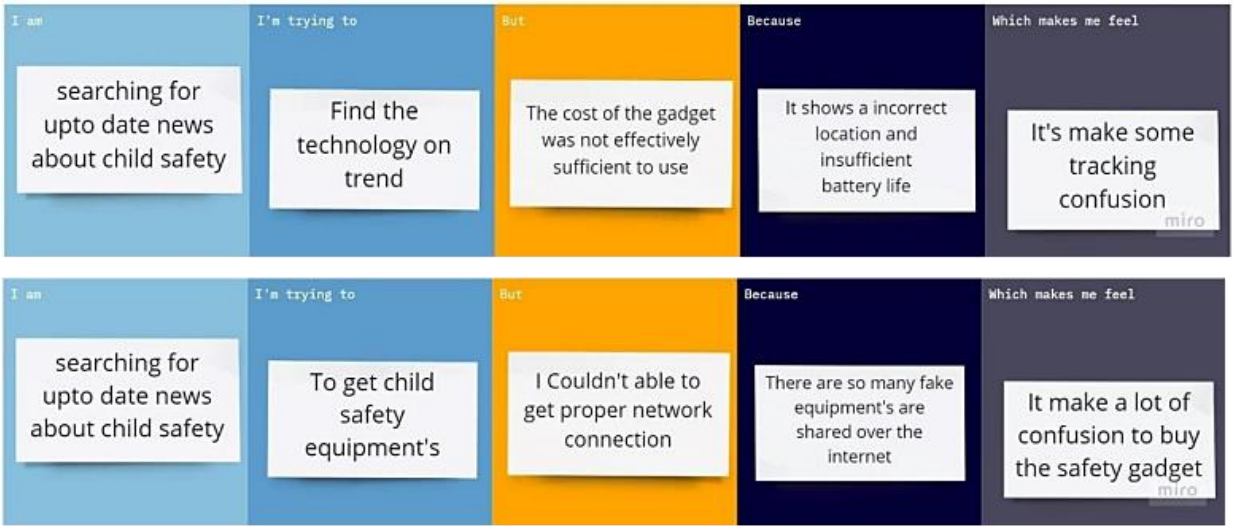


Fig 2.1 Problem Statement Definition

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Searching for up to day news about child safety	Find the technology on trend	The cost of the gadget was not effectively Sufficient to use	It shows a incorrect location and insufficient battery life	It's make some tracking confusion
PS-2	Searching for up to day news about child safety	To get the child safety Equipment's	I couldn't able to get proper network connection	There are so many fake equipment's are shared over the internet	It's make a lot of confusion to buy the Safety gadget

Table 2.1 Problem Statement Definition

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy –to-digest visual that captures knowledge about a user's behaviours and attitudes. It is a useful tool to helps teams better understand their users..

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenge.

Fig 3.1 Empathy Map Canvas

3.2 IDEATION & BRAINSTORMING

Brainstorming provides a free and open environment that encourages

everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate,helping each other develop a rich amount of creative solutions.

Fig 3.2 Brainstorming 1

Fig 3.3 Brainstorming 2

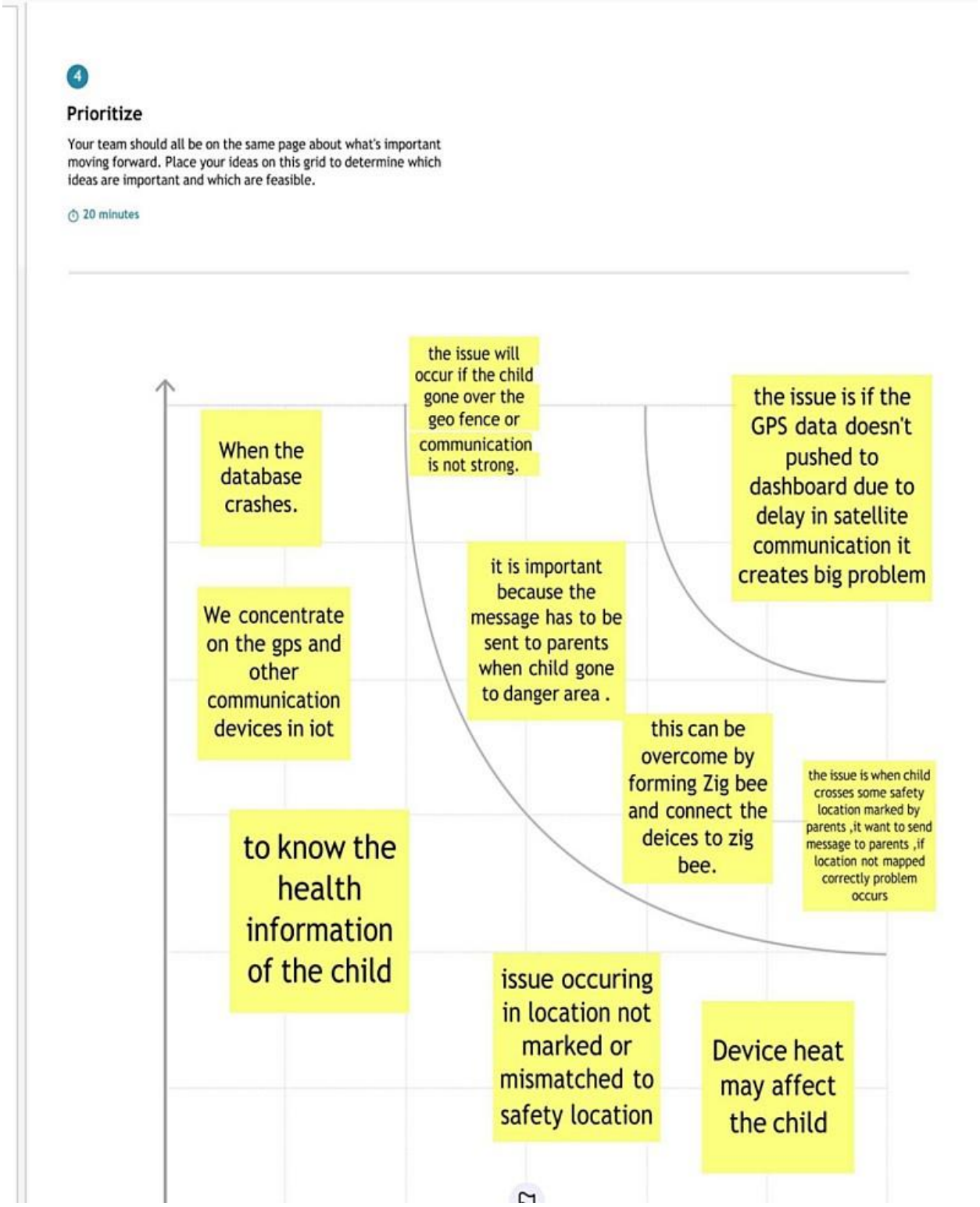


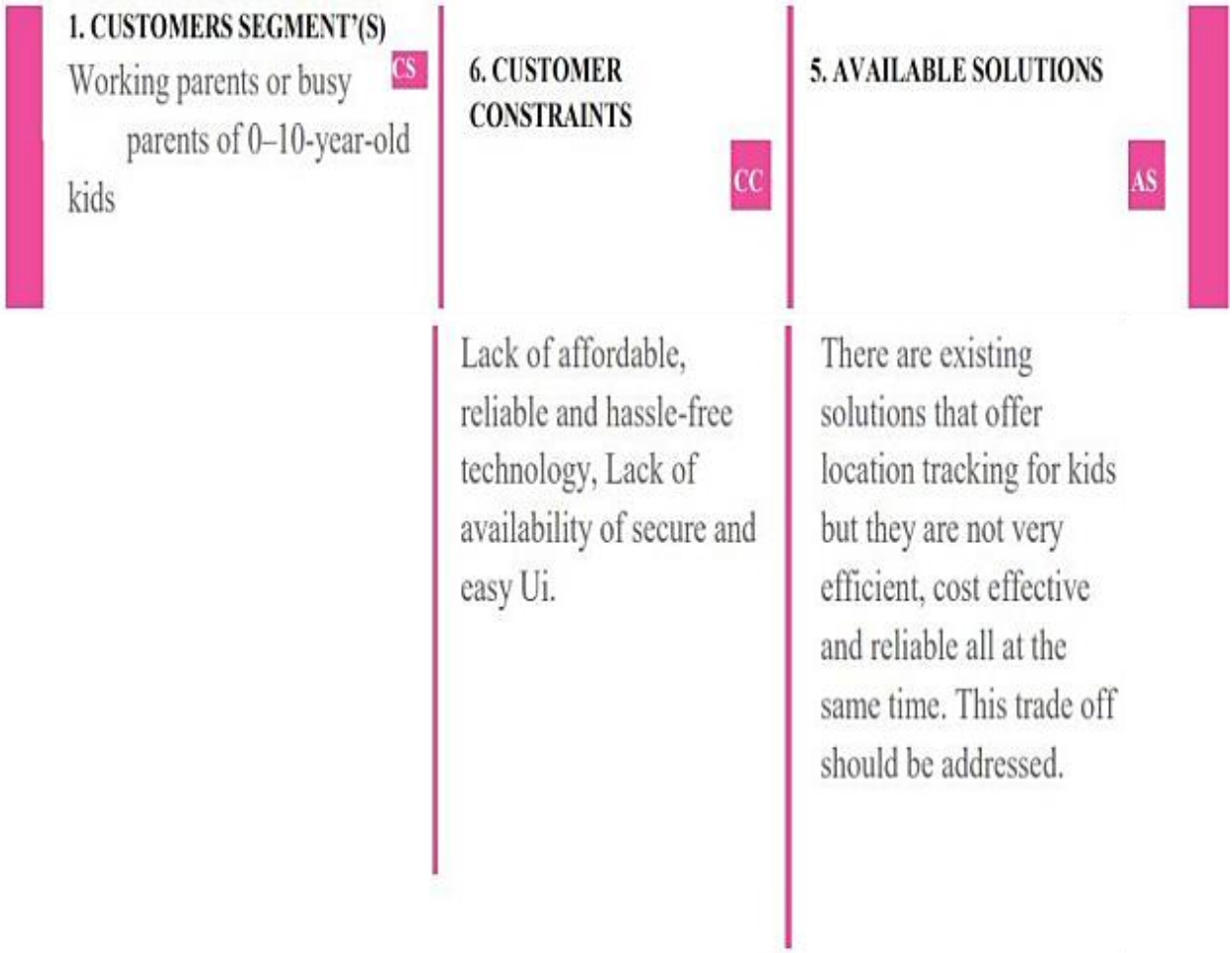
Fig 3.4 Brainstorming 3

3.3 PROPOSED SOLUTION

SI.NO	PARAMETER	DESCRIPTION
1.	Problem Statement (Problem to be solved)	With the increasing rate of child kidnapping and trafficking and lack of tracking technology for child, there is limited application for child monitoring. Hence an IoT based safety gadget for child safety is probably the need of the hour today.
2.	Idea / Solution description	A good solution to this issue would be to design a smart wearable Internet of Things sensor based device for monitoring the environment of a child along with a mechanism for tracking the child. The gadget will make use of GPS and a python script to publish the location details to th IBM IoT platform. The wearable also functions to send immediate alerts to the user through in case i the child crosses the geofence.
3.	Novelty / Uniqueness	All the existing systems make use of GPS and a mobile app to track and receive alerts regarding the child's location, while this system make use of the IBM Watson IOT Platform and IBM Cloud Services which is reliable and efficient to maintain the database of the child's location. The parent can set geofence and receive alerts through the web application which is user friendly and secure Created using the Node Red Service.

4.	Social Impact /Customer Satisfaction	The main concern of any parent would be the safety and security of their kids. The design of this model does not mandate a lot of technical knowledge from the user to operate and it is simple. The purpose of this device is to facilitate the guardian or parents in locating theirs child with ease and ensuring its well- being.
5.	Business Model(Revenue Model)	The target audience of this device is majorly th parents. Considering the Tracking ability of the device, Hardware quality, used technology and sensors, the starting range of price would go from Rs. 6000 and above. This type of wearable safety system is of utmost importance today and would be a must buy gadget in the market today.
6.	Scalability of the Solution	With the present needs for monitoring the child the system is designed. It has a location database to maintain the entire location history of the child and the parent can set the geofence to determine the safer boundary of the child. If there is a need for integrating additional sensors to improve accuracy, it can be done to make the system efficient in the long run.

3.4 PROBLEM SOLUTION FIT



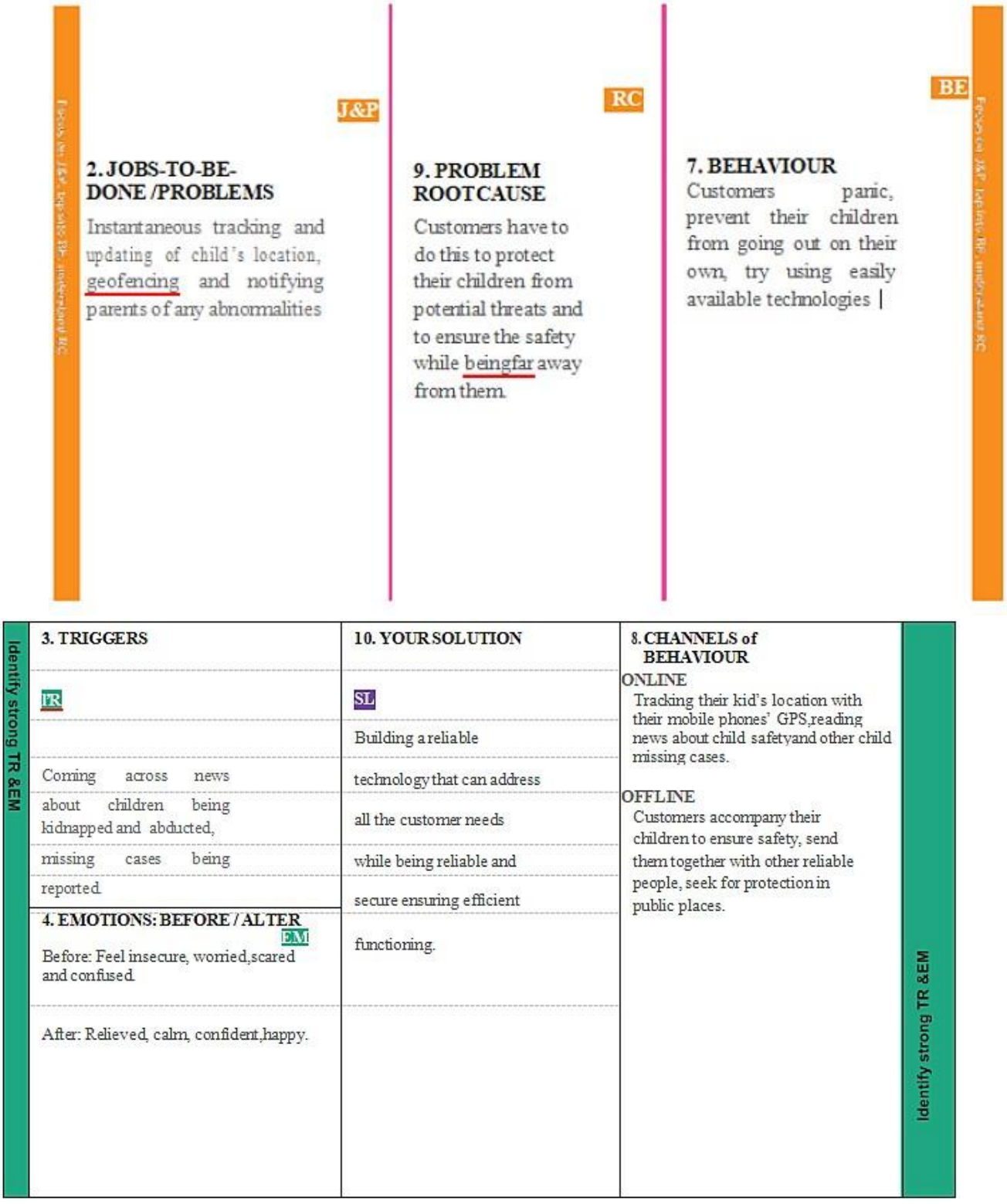


Fig 3.5 Problem Solution Fit

CHAPTER 4

REQUIREMENT ANALYSIS

In this chapter, the requirement analysis of the proposed system has been discussed along with the brief explanation about its advantages.

4.1 FUNTIONAL REQUIREMENT

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Gmail Registration through phone number
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	App installation	Installation through link Installation through play store
FR-4	Settings geofence	Setting by user to find child location
FR-5	Detecting child location	Detecting location via app Detecting location via SMS
FR-6	User Interface	User Login Form. Admin Login Form.

FR-7	Database	Stored in cloud for seamless connectivity. Parents and kids link with the distance and the location values obtained from the mobile devices are stored here. The values include parent id, kid id, distance, longitude, latitude etc.
FR-8	Server	It connects the database and the front end application. The back-end server has been implemented to run as a service and is deployed in an IBM cloud instance. The backend server has been implemented to run as a service and is deployed in an IBM cloud instance.
FR-9	GPS tracking	The system is implemented with a GPS module, which acquires the location information of the user and stores it to the database.
FR-10	API	The value collected is sent to the database using an API.
FR-11	React JS	We are using react is as front end for us project. Node JS for the back end we are using node is.
FR-12	GPS modules	It receives data directly from satellites.

FR-13	Battery Life	If the child or parent forgets to charge the device for a whole day then also the device will work. That's why we aim to make this device last the whole day with one charge. It should be long-lasting.
FR-14	Location History	The location history will help to track the child's activity so that the aren't will be updated. Location history will be there for 30 days. For example if the child gets missing with the help of location history the aren't can track down their child's activity and also can find their child.

4.2 NON-FUNCTIONAL REQUIREMENT

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

FR No.	Non-functional Requirements	Description
NFR-1	Usability	Device have GSM can help to inform the parents or relatives about the current situations of the child by deliver the message immediately to save the child.
NFR-2	Security	Make children parents more assure about their kid's security, we have a feature in our device called Geo-Fence. Whenever your child crosses that specific area, you will get an instant notification on your phone.
NFR-3	Reliability	Portable Easy to use Flexibility
NFR-4	Performance	Create a Child tracker which helps the parents with continuously monitoring the child's location. The notification will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.
NFR-5	Availability	Track your child even in a crowd Get travel details of kids at any time Know the current location

NFR-6	Scalability	Gadget ensures the safety and tracking of the children. Parents need not worry about their children.
NFR-7	Evaluability	The system should be able to deliver promptly to the financing authority. In the case of non-profit organizations, the solution should be 'advancing the mission'.
NFR-8	Dynamicity	IoT devices may have the capability to adapt dynamically and change based on their conditions.
NFR-9	Desirability	Navigation should be made easy. The user should be able to search and find the information he needs without much hassle.

This chapter dealt with the functional and non-functional requirement analysis of proposed system.

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

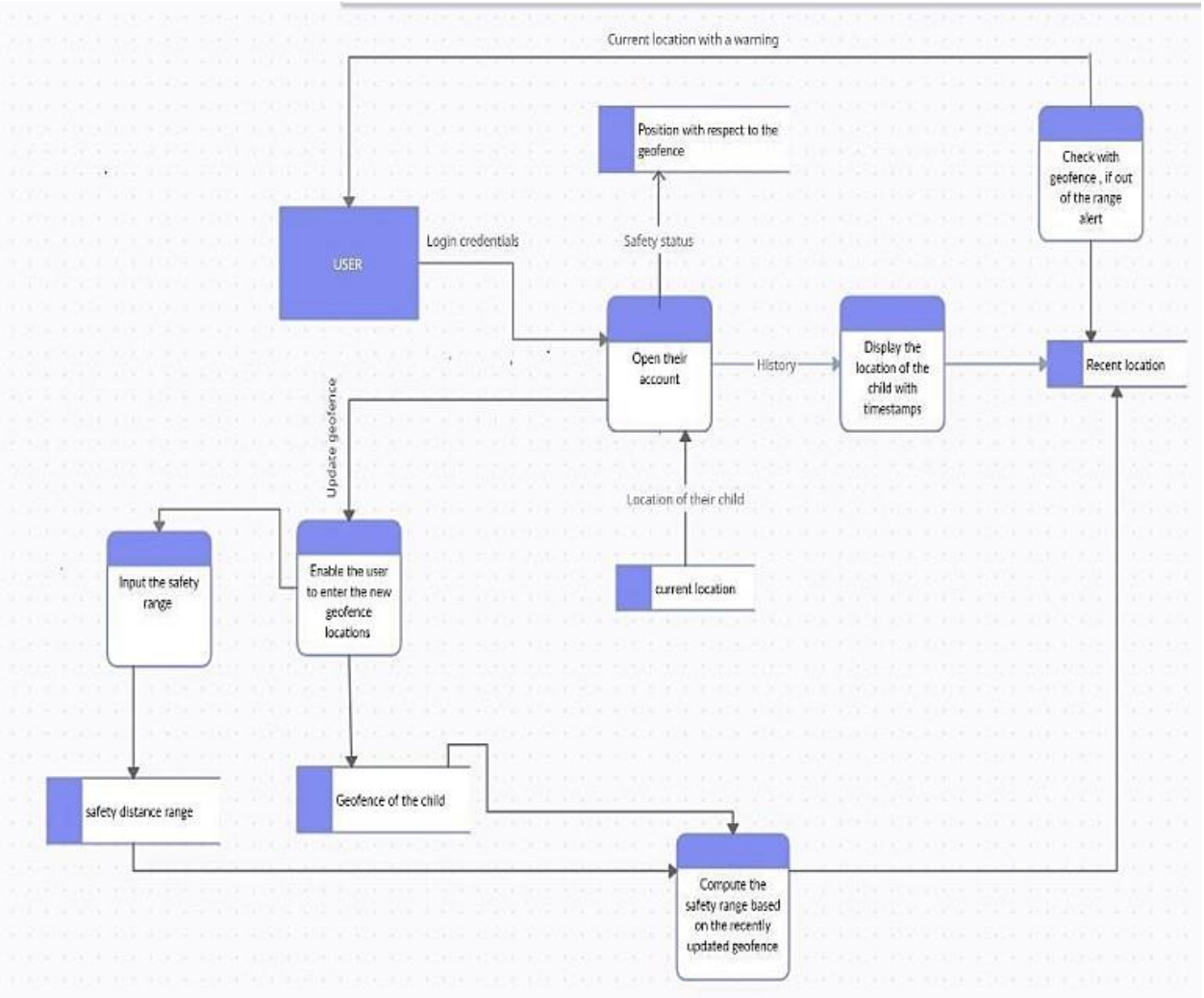


Fig 5.1 Dataflow Diagram

5.2 SOLUTION & TECHNICAL ARCHITECTURE

5.2.1 SOLUTION ARCHITECTURE

Track current location of the child using GPS and continuous monitoring of the same is done. When the gadget detects the activity to be outside the given geofence (as mentioned by the parent or guardian), alert messages or notifications are sent to the registered device, appropriately. Additional features such as recording of messages could be done if any kind of danger is sensed.

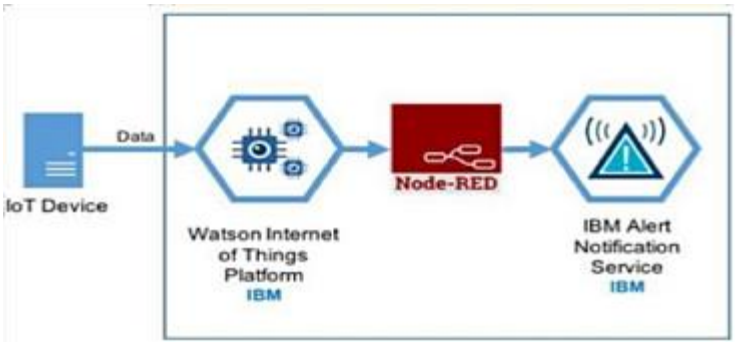


Fig 5.2 Solution Architecture Diagram

5.2.2 TECHNICAL ARCHITECTURE

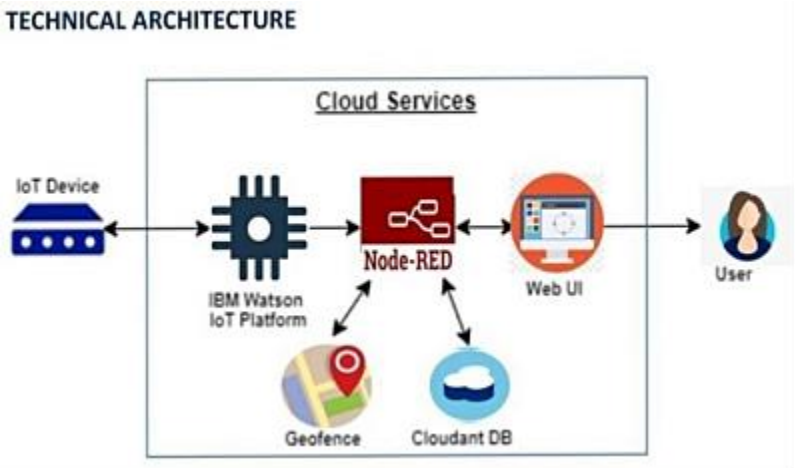


Fig 5.3 Technical Architecture Diagram

5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user) and (Web user)	Registration	USN-1	As a user, I can register my account by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered myself	I can receive confirmationemail & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through apple account	I can register & access the dashboard with apple account Login	High	Sprint-2

	Login	USN-4	As a user, I can log into the application by entering user id & password		High	Sprint1
Customer Care Executive	Login		As I enter I can view the working of the application and scan for any glitches and monitor the operation and check if all the users are authorized.	I can login only with my provided credentials	Medium	Sprint - 3

Table 5.1 User Stories

CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

MILESTONE NAME	ACTIVITIES	MILESTONE NUMBER	DESCRIPTION	COMPLETION DATE
PREREQUISITES			Create the IBM account and download the necessary software for your chosen category of the project	28/08/2022
IDEATION PHASE	Literature Survey	1	Literature survey on the selected project by gathering and referring research paper and publications	04/09/2022
	Empathy Map	1	Create an empathy map that list the user's pains and gains	10/09/2022
	Problem Statement	1	Summarize the problem that customer needs to be solved	11/09/2022

	Brainstorming	1	Gather many different ideas from the team mates and prioritize the idea based on feasibility and innovative	18/9/2022
PROJECT DESIGN PHASE -1	Proposed Solution	2	Prepare the proposed solution document that you proposed to solve the problem statement which should include feasibility ,business model … etc.	27/09/2022
	Solution Architecture	2	Prepare Solution architecture diagram for the proposed solution	04/10/2022
	Problem Solution Fit	2	Prepare Solution Fit Document for the proposed solution	04/10/2022
PROJECT DESIGN PHASE -2	Customer Journey Map	3	Prepare a customer journey map to understand how the user interact and experience your product	10/10/2022
	Data Flow Diagram	3	Draw the data flow diagram for you proposed solution	13/10/2022

	Solution Requirements	3	Create a solution requirement document for the proposed solution	14/10/2022
	Technology Stack	3	Prepare the technology stack diagram for the proposed solution	14/10/2022
PROJECT PLANNING	Milestone And Activity List	4	Create a document to show your milestones as well as activity in your development cycle	08/11/2022
	Sprint Delivery Plan	4	Create a sprint plan for the project	08/11/2022
PROJECT DEVELOPMENT PHASE	Sprint-1	5	Delivery of the sprint-1	09/11/2022
	Sprint-2	6	Delivery of the sprint-2	10/11/2022
	Sprint-3	7	Delivery of the sprint-3	13/11/2022
	Sprint-4	8	Delivery of the sprint-4	17/11/2022

Table 6.1 Sprint Planning and Estimation

6.2 SPRINT DELIVERY SCHEDULE

SPRINT	FUNCTIONAL REQUIREMENT (EPIC)	USER STORY NUMBER	USER STORY / TASK	STORY POINTS	PRIORITY	TEAM MEMBERS
Sprint-1	Login	USN-1	As a customer, I might ensure login credential through gmail ease manner for the purpose of sending alert message to the parents or guardians (or) informing through normal message.	2	High	Thamarai Selvi.M Sujitha.P

Sprint-1	Registration	USN-2	As a user, I have to registered my details and tools details in a simple and easy manner by considering the safety of child, this registered system sends notification to the parents.	2	High	Shri Nandha Parvatha.K Vinitha.M Sujitha.P
Sprint-2	Dashboard	USN-3	As a user, In case of any emergency situation parents(I) must get the alert notification and location of the child.	3	Medium	Thamarai Selvi.M Shri Nandha Parvatha.K Vinitha.M Sujitha.P

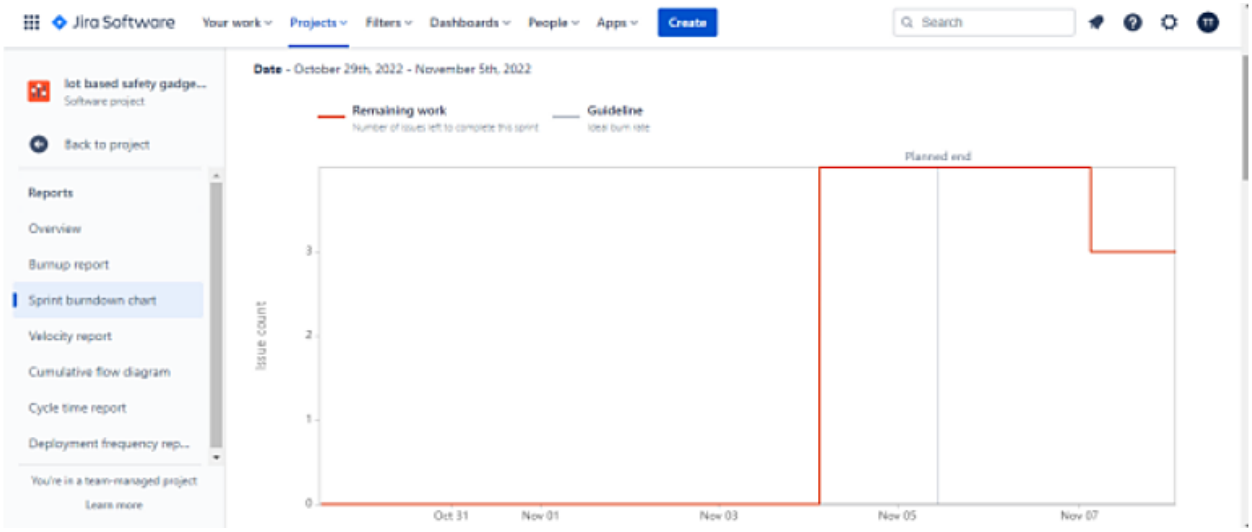
Sprint-3	Dashboard	USN-4	As a user, I(parent) need to safeguard child and tracking the child's location and it is important to notify near police station incase of more emergency .	2	High	Sujitha.P Shri nandha parvatha.K
Sprint-3	Dashboard	USN-5	As a user, Its good to have a IOT based system to safeguard monitoring without presence of parent.	2	High	Thamarai selvi.M Vinitha.M Sujitha.P

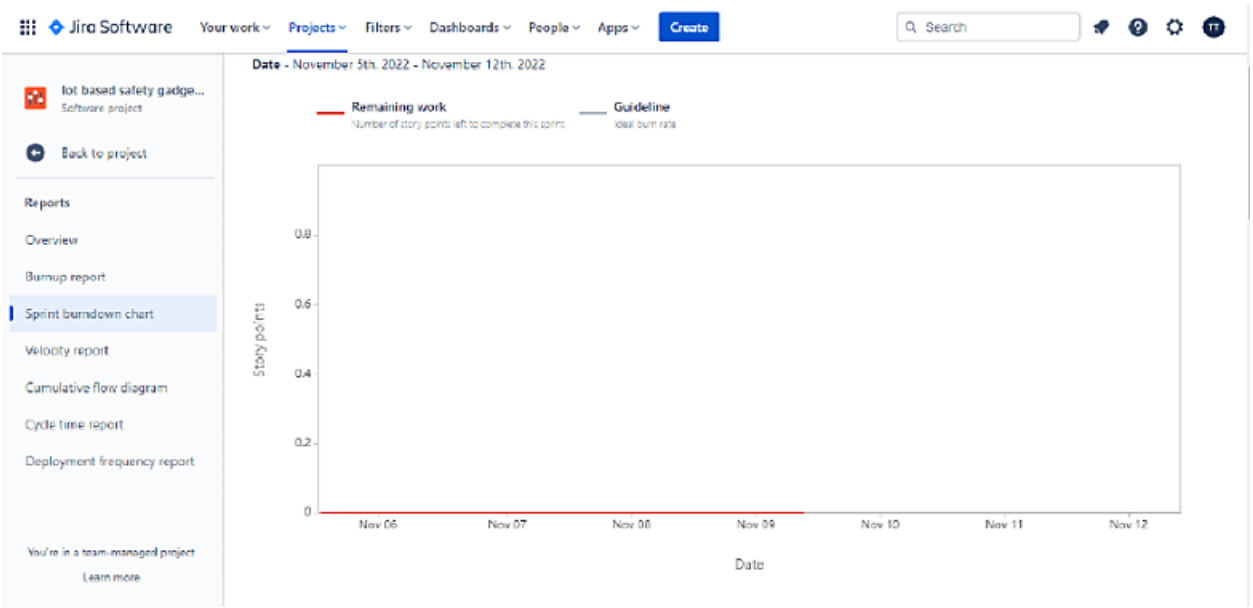
Sprint 4	Monitoring the environment	USN 1	User can monitor the situation of the environment from a dashboard that displays sensor information about the environment and child health.	2	High	Shri nandha parvatha.K Thamarai selvi.M
Sprint- 4	Event Notification	USN 6	Sending an alert SMS to the parents and guardians in case of panic situation.	2	High	Sujitha.P Vinitha.M

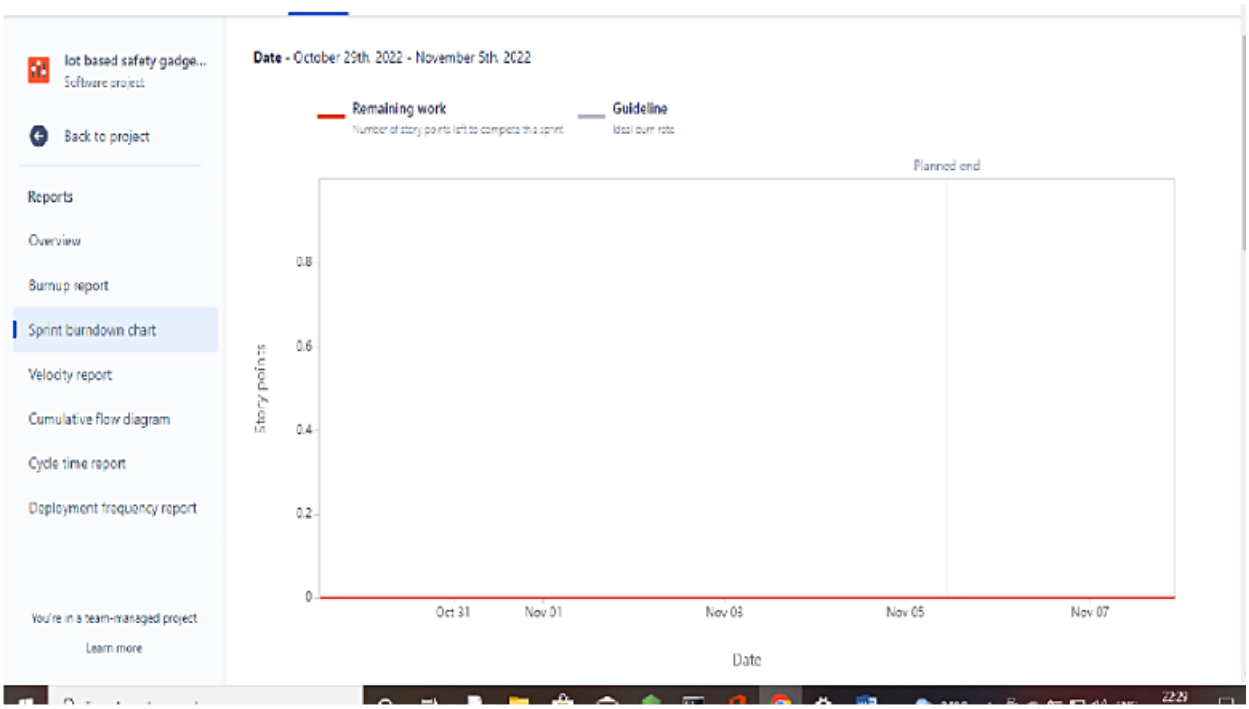
Table 6.2 Sprint Delivery Schedule

6.3 REPORTS FROM JIRA

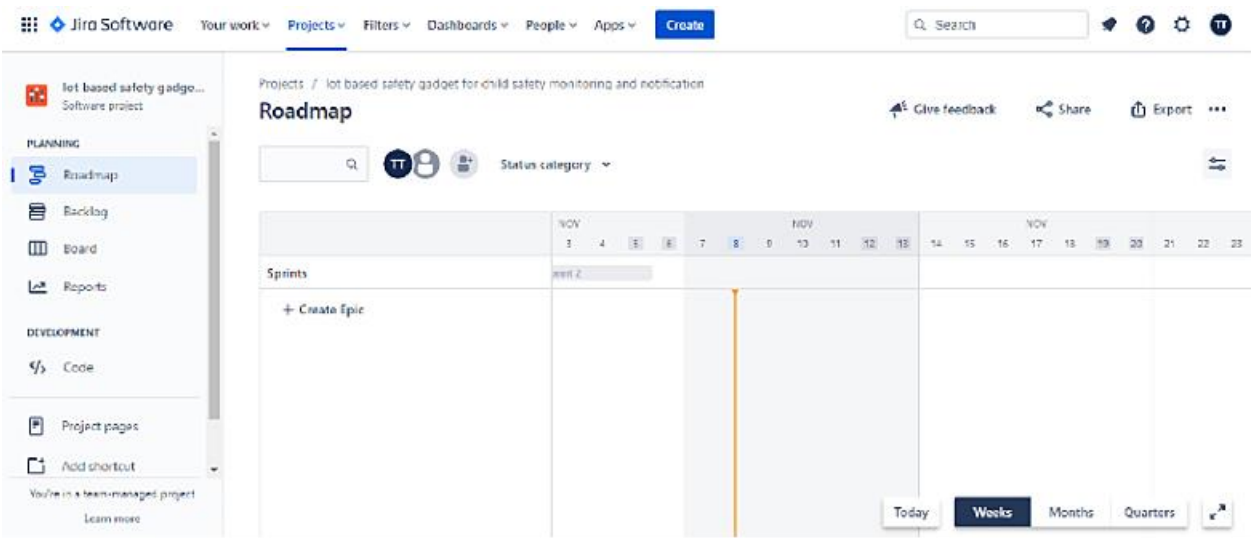
BURNDOWN CHART

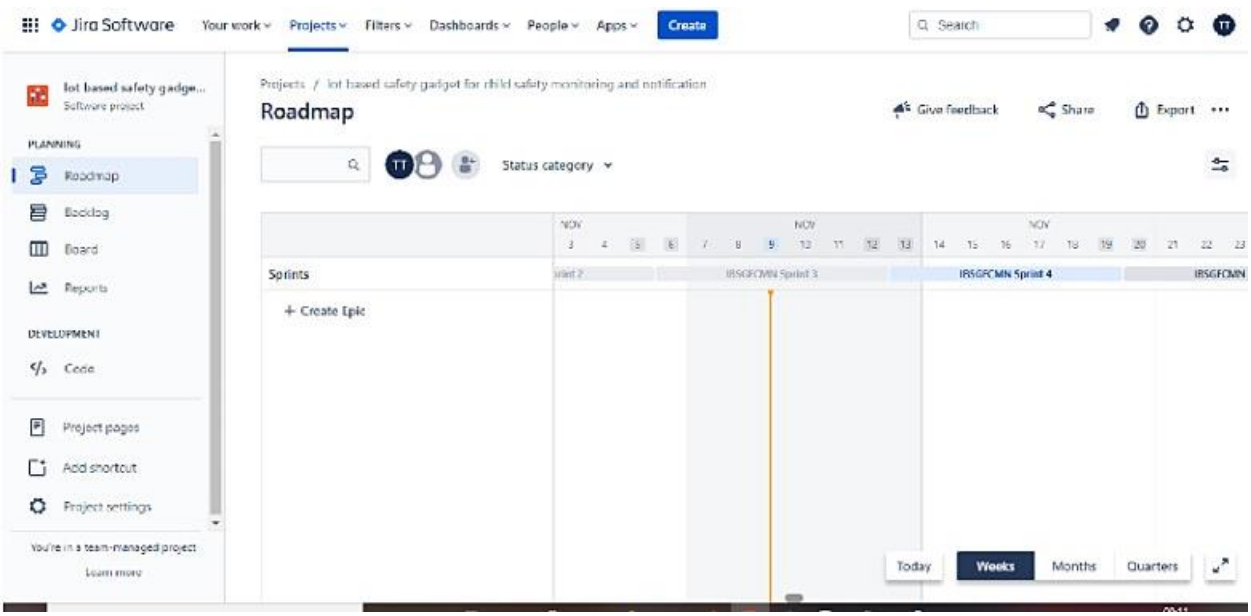





Iot based safety gadge...
Software project
Back to project
Reports
Overview
Burnup report
Sprint burndown chart
Velocity report
Cumulative flow diagram
Cycle time report
Deployment frequency report
You're in a team-managed project
Learn more
Date - October 29th 2022 - November 5th 2022
Remaining work
Guideline
Planned end
Story points
0.8
0.6
0.4
0.2
0
Oct 31
Nov 01
Nov 03
Nov 05
Nov 07
Date

ROADMAP


Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Iot based safety gadge...
Software project
PLANNING
Roadmap
Backlog
Board
Reports
DEVELOPMENT
Code
Project pages
Add shortcut
You're in a team-managed project
Learn more
Projects / Iot based safety gadget for child safety monitoring and notification
Roadmap
Give feedback
Share
Export
Status category
NOV
Sprints
+ Create Epic
Today
Weeks
Months
Quarters

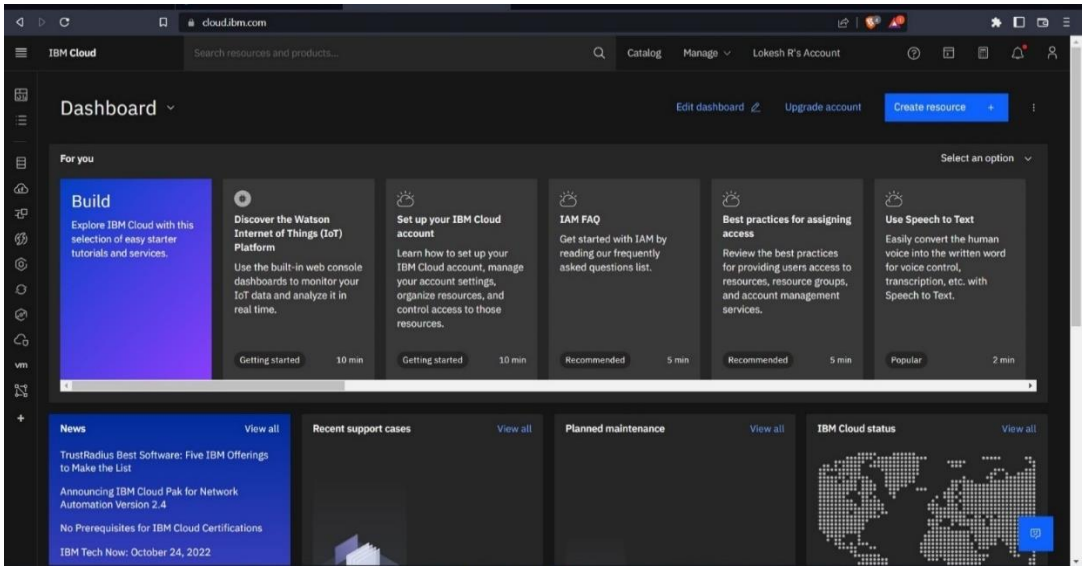

Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Iot based safety gadge...
Software project
PLANNING
Roadmap
Backlog
Board
Reports
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Projects / Iot based safety gadget for child safety monitoring and notification
Roadmap
Give feedback
Share
Export
Status category
NOV
NOV
NOV
Sprints
IRSGFCMN Sprint 4
IRSGFCMN
+ Create Epic
Today
Weeks
Months
Quarters

CHAPTER 7

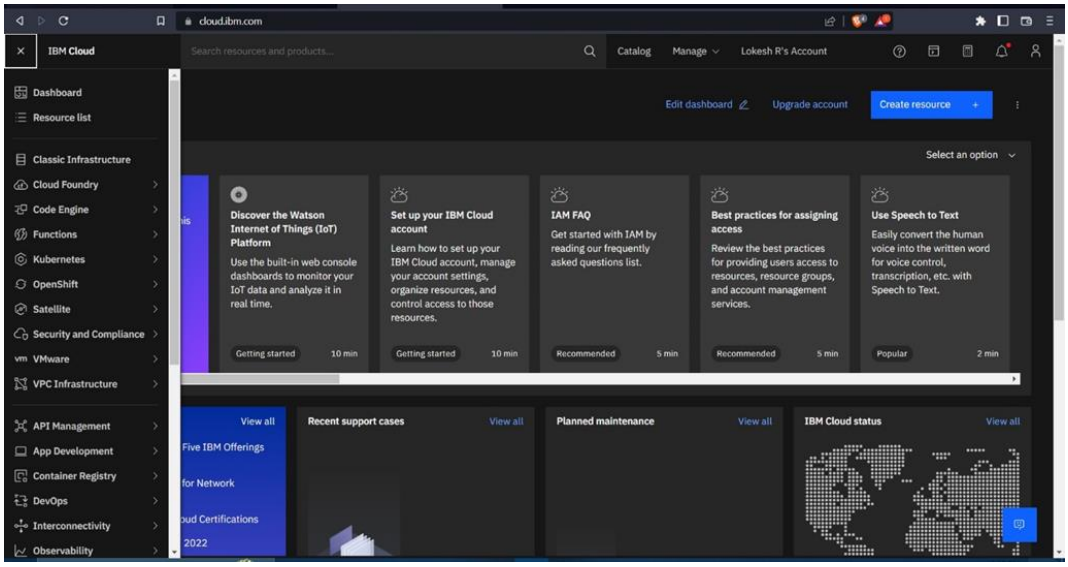
CODING AND SOLUTIONING

7.1 CREATE AND CONFIGURE IBM CLOUD SERVICES

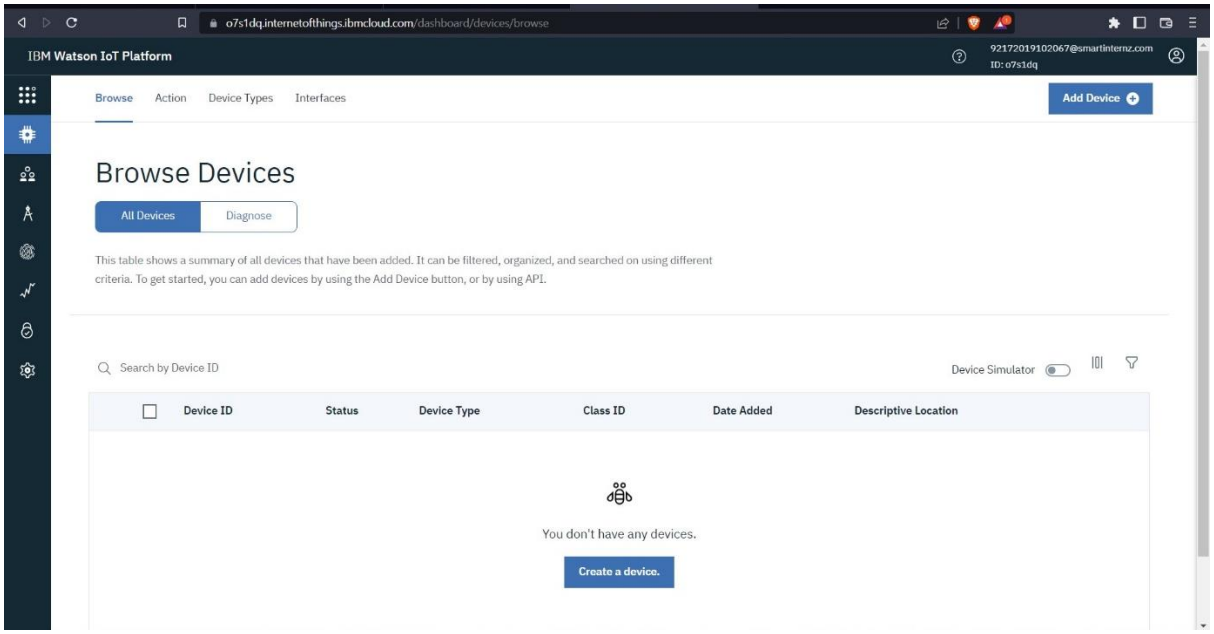
USN 1: As a user I need to enroll the cloud registration



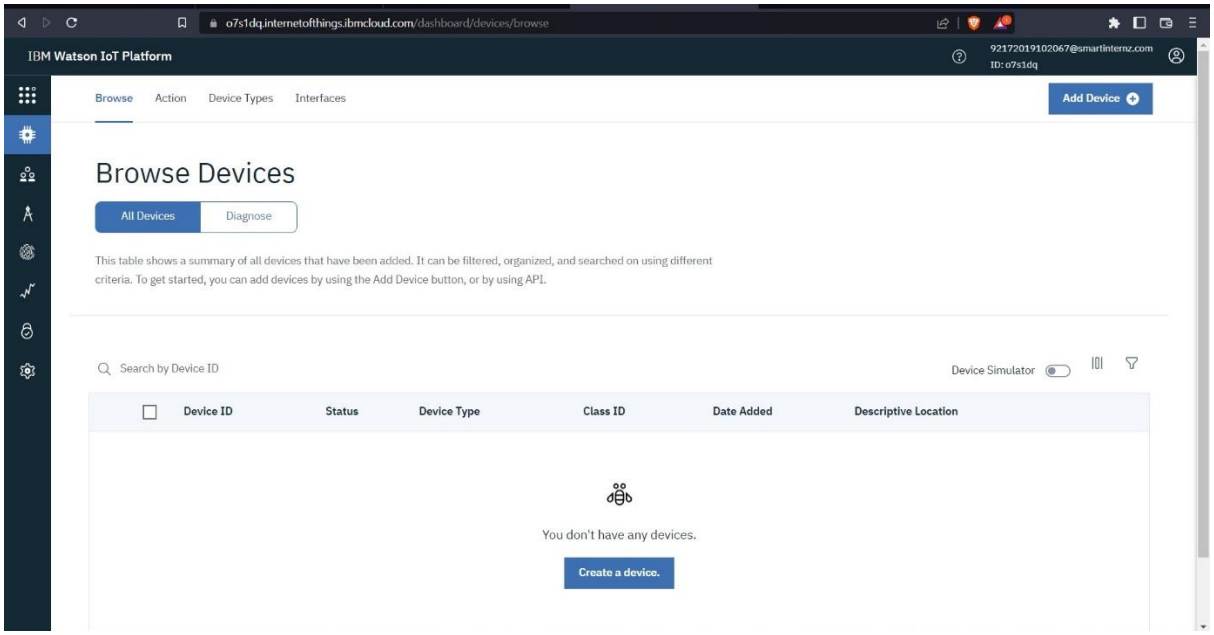
USN 2: As a user, I will create IBM cloud account.



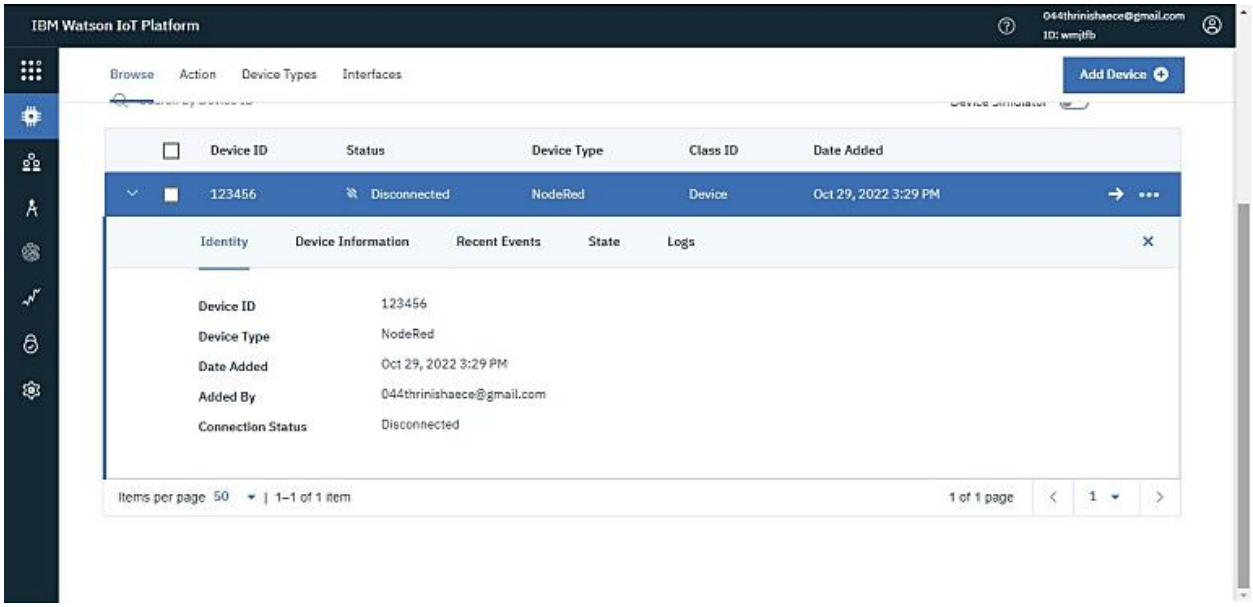
USN 3: After creating cloud account launch IBM Watson IOT platform by accessing cloud account .



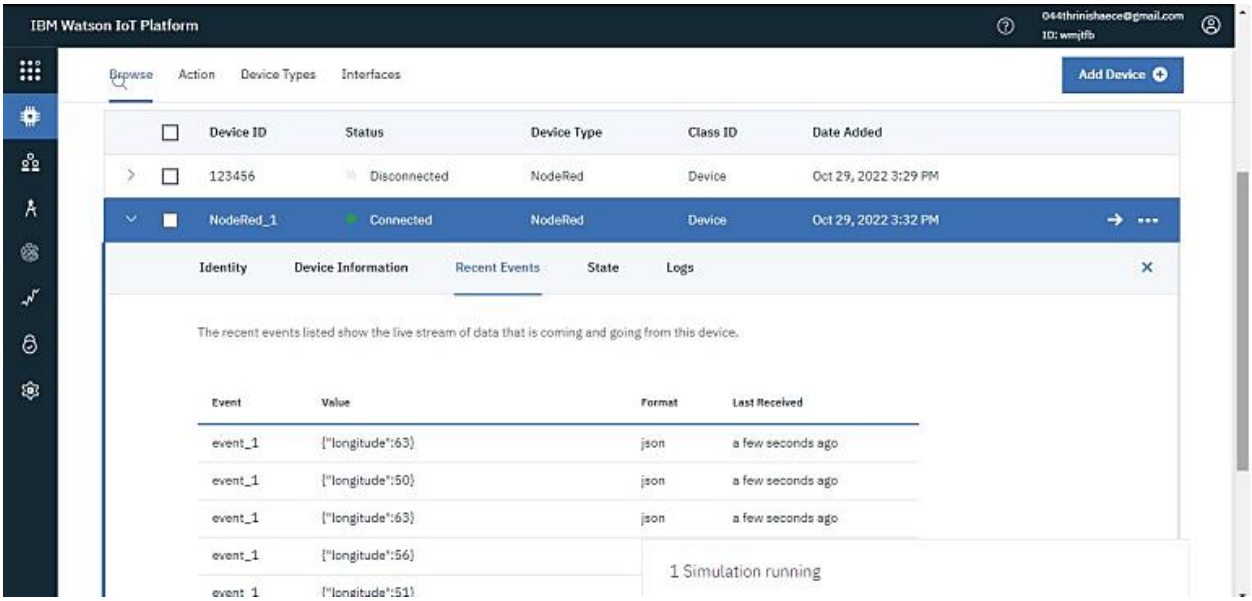
USN 4: Create the node in IBM Watson platform



USN 5: After Creating node get device Type and id

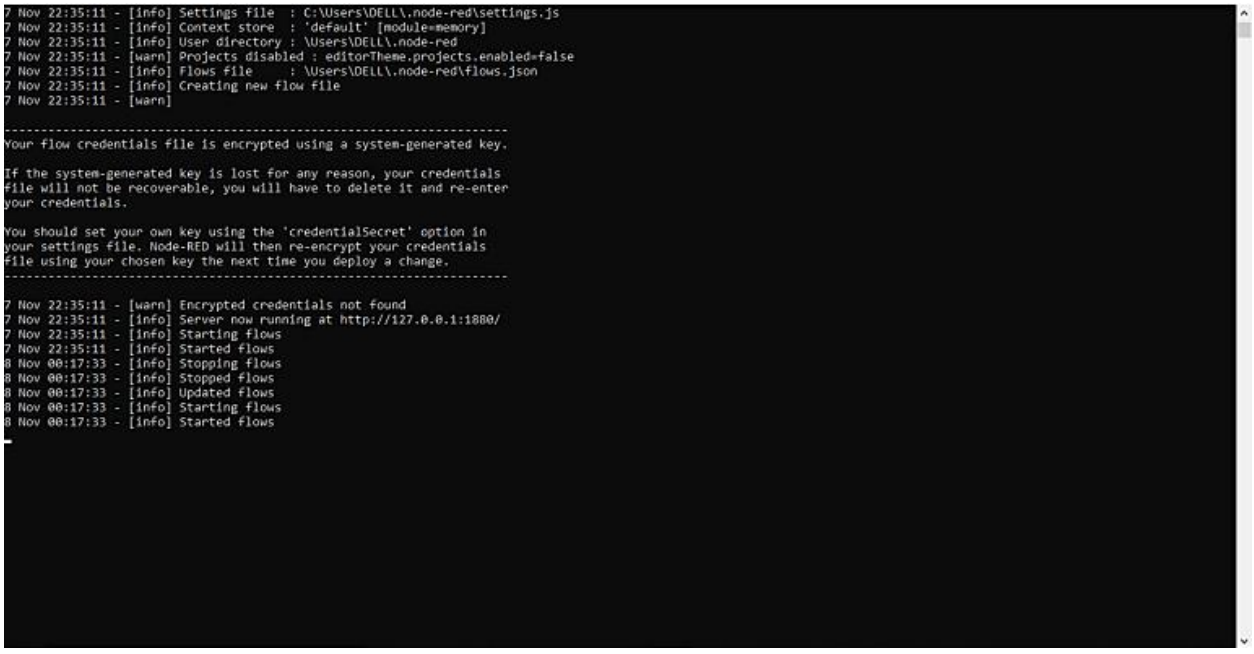


USN 6: Simulate the node created

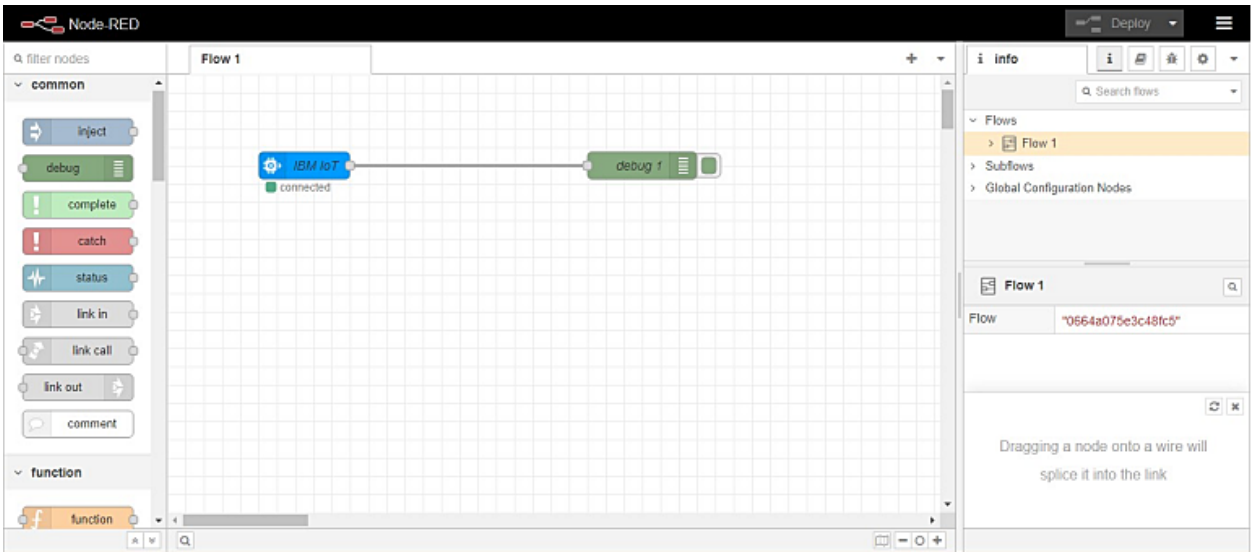


7.2 CREATE AND ACCESS NODE-RED

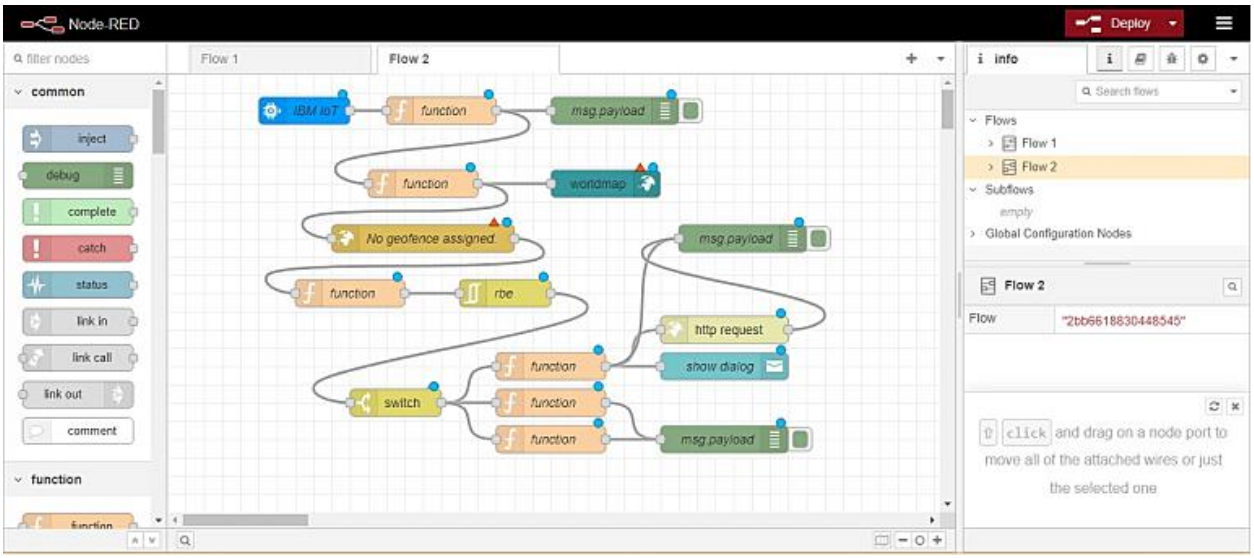
USN 7: As a user, I can create Node-red by app deployment



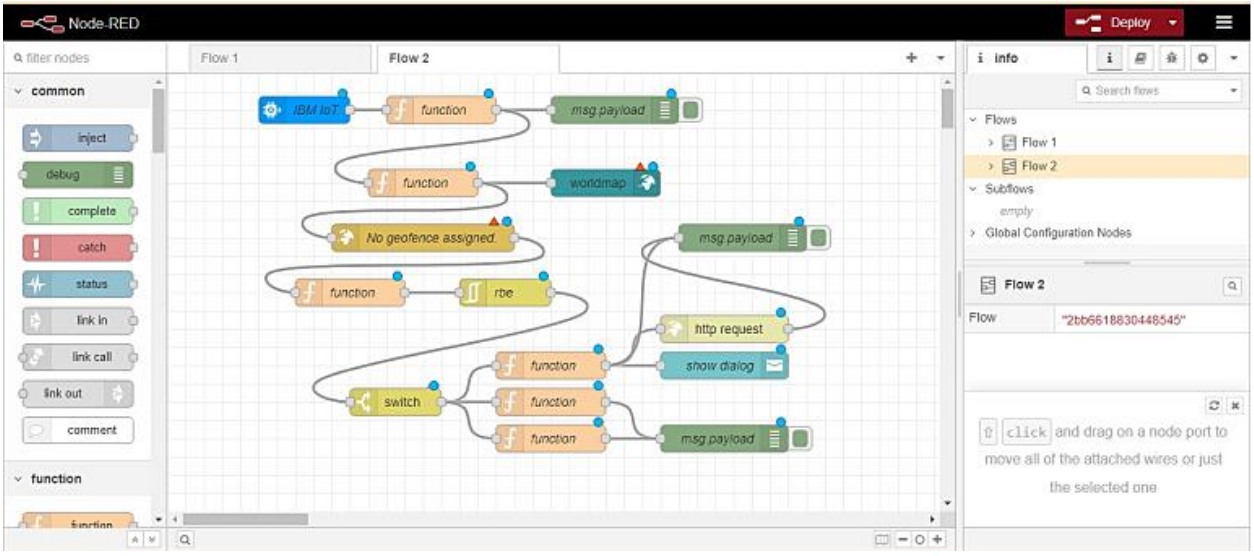
USN 8: Connect IBM Watson with node red through API key



USN 9 : Design the project flow using Node-Red

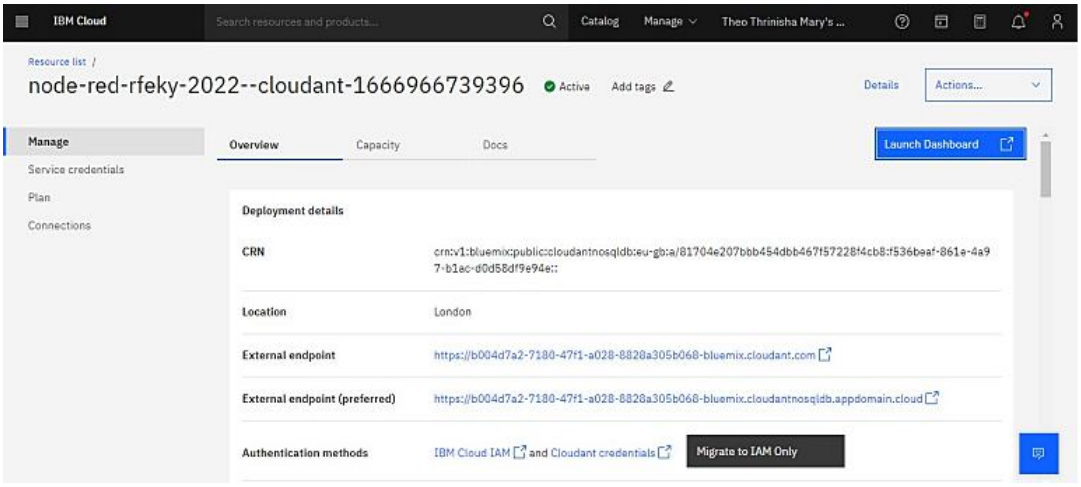


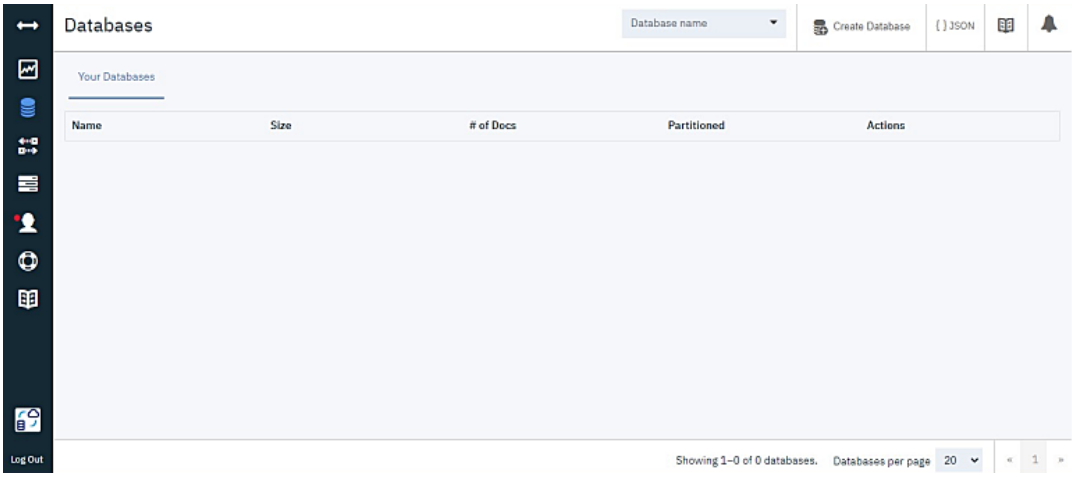
USN 10: Check for the proper connections and the output in the node red application



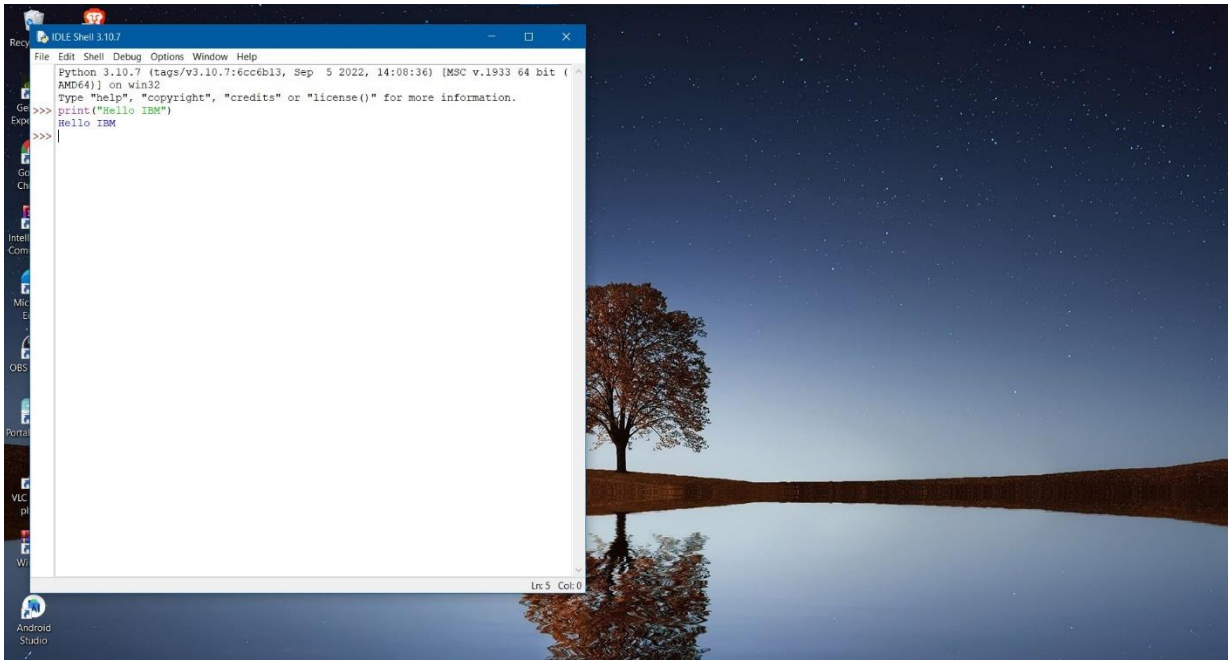
7.3 CREATE A DATABASE IN CLOUDANT DB AND DEVELOP THE PYTHON SCRIPT

USN 11: Launch the Cloudant DB and Create database to store the location data





USN 12: Install the python software



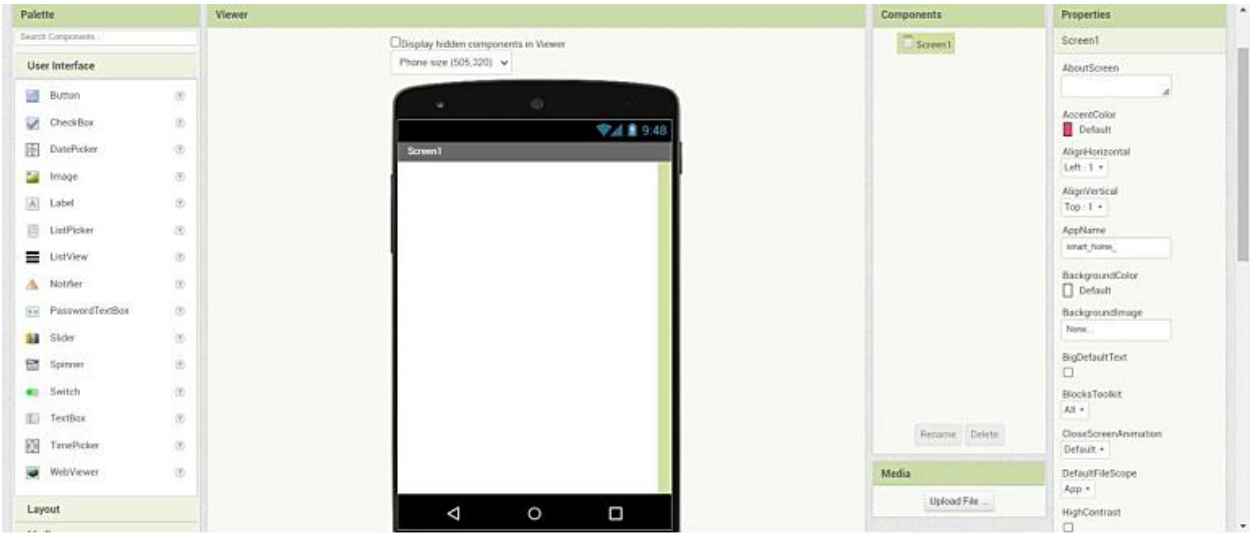
USN 13: Develop the python scripts to publish details to IBM IoT Platform

USN 14: Integrate the device id, authentication token in python script

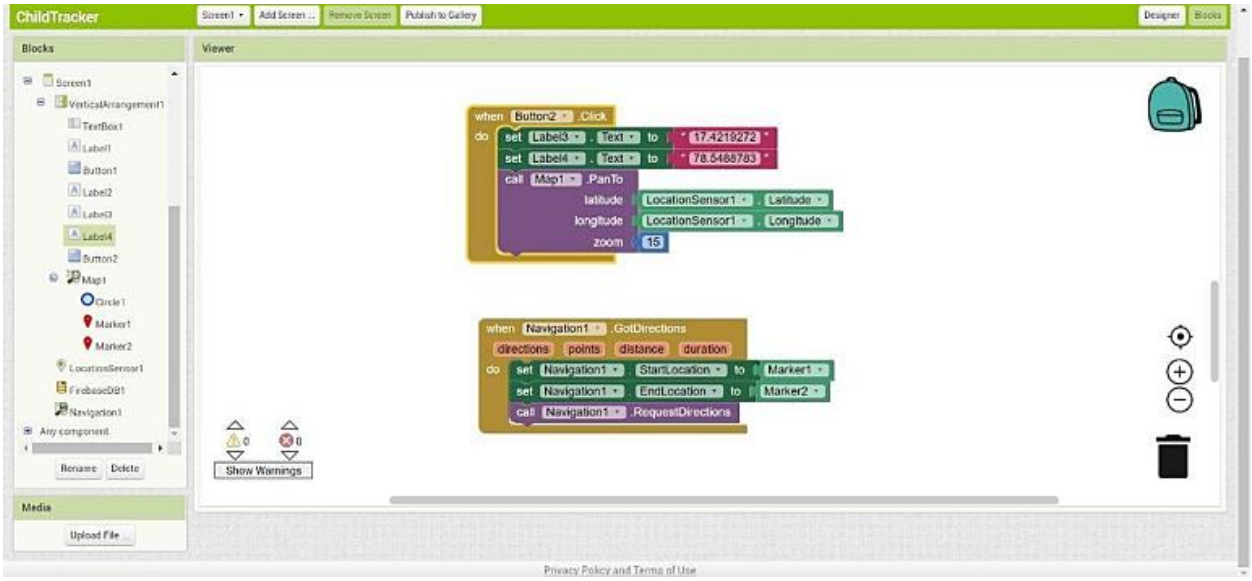
USN 15: Develop the python code for publishing the location (latitude & longitude) to IBM IoT Platform

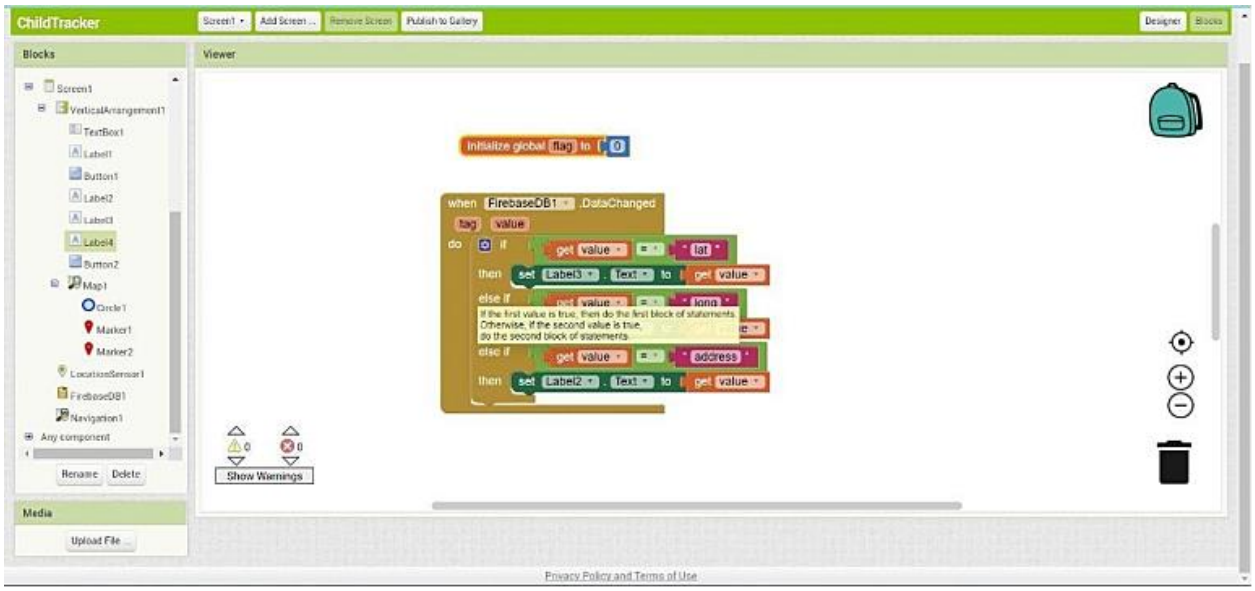
7.4 CREATE THE MOBILE APPLICATION USING MIT APP INVENTOR

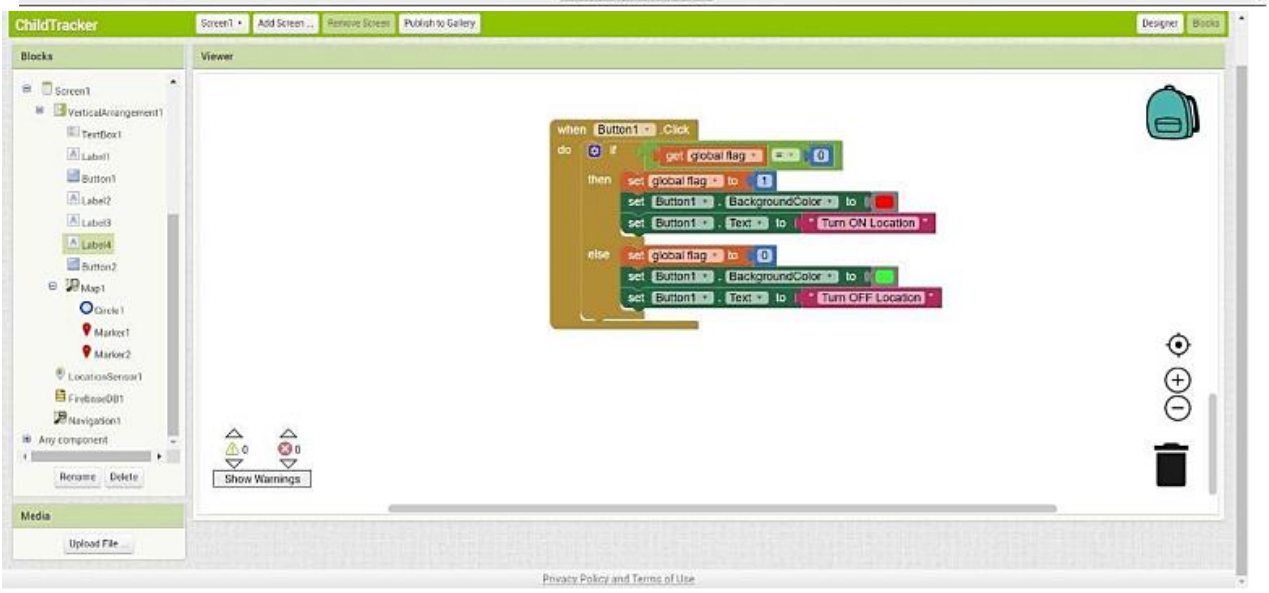
CREATE APP IN MIT APP INVENTOR

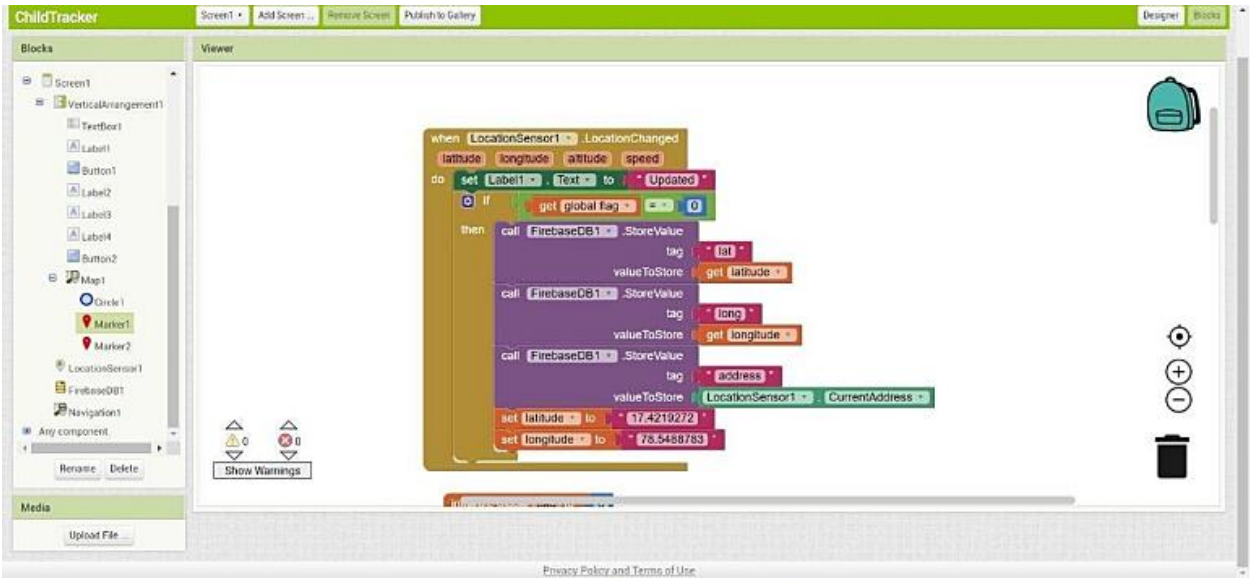


BLOCK CONFIGURATION




ChildTracker
Blocks
Viewer
Initialize global flag to 0
when FirebaseDB1 .DataChanged
tag value
do if get value = lat
then set Label3 . Text to get value
else if get value = long
else if get value = address
then set Label2 . Text to get value
Show Warnings
Media
Upload File ...
Privacy Policy and Terms of Use

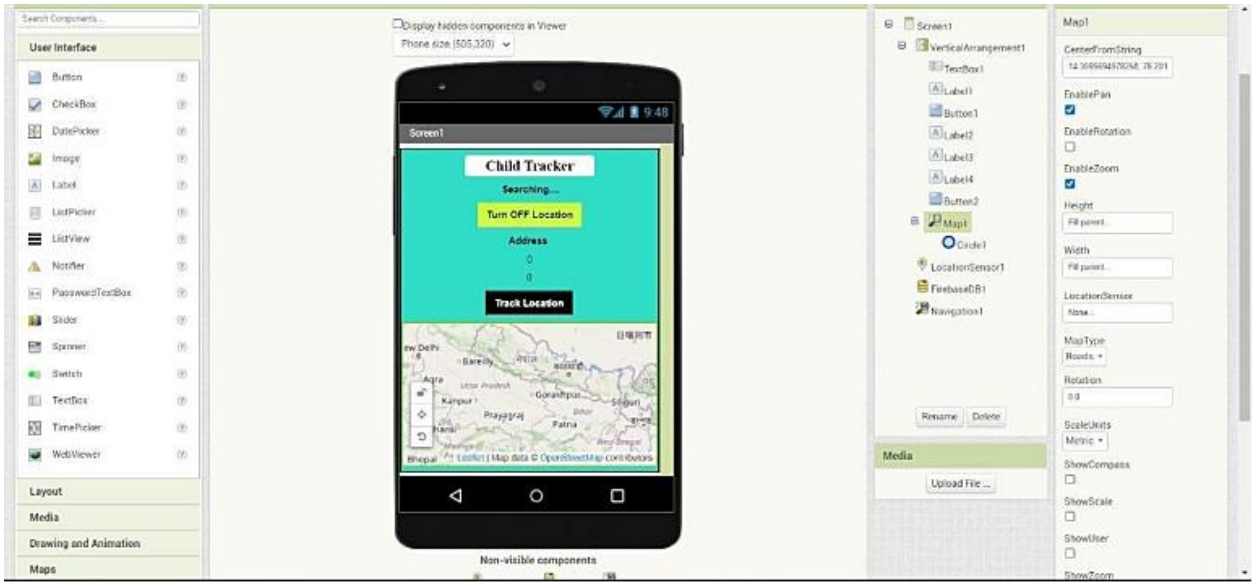

ChildTracker
Blocks
Viewer
when Button1 .Click
do if get global flag = 0
then set global flag to 1
set Button1 . BackgroundColor to
set Button1 . Text to Turn ON Location
else set global flag to 0
set Button1 . BackgroundColor to
set Button1 . Text to Turn OFF Location
Show Warnings
Media
Upload File ...
Privacy Policy and Terms of Use

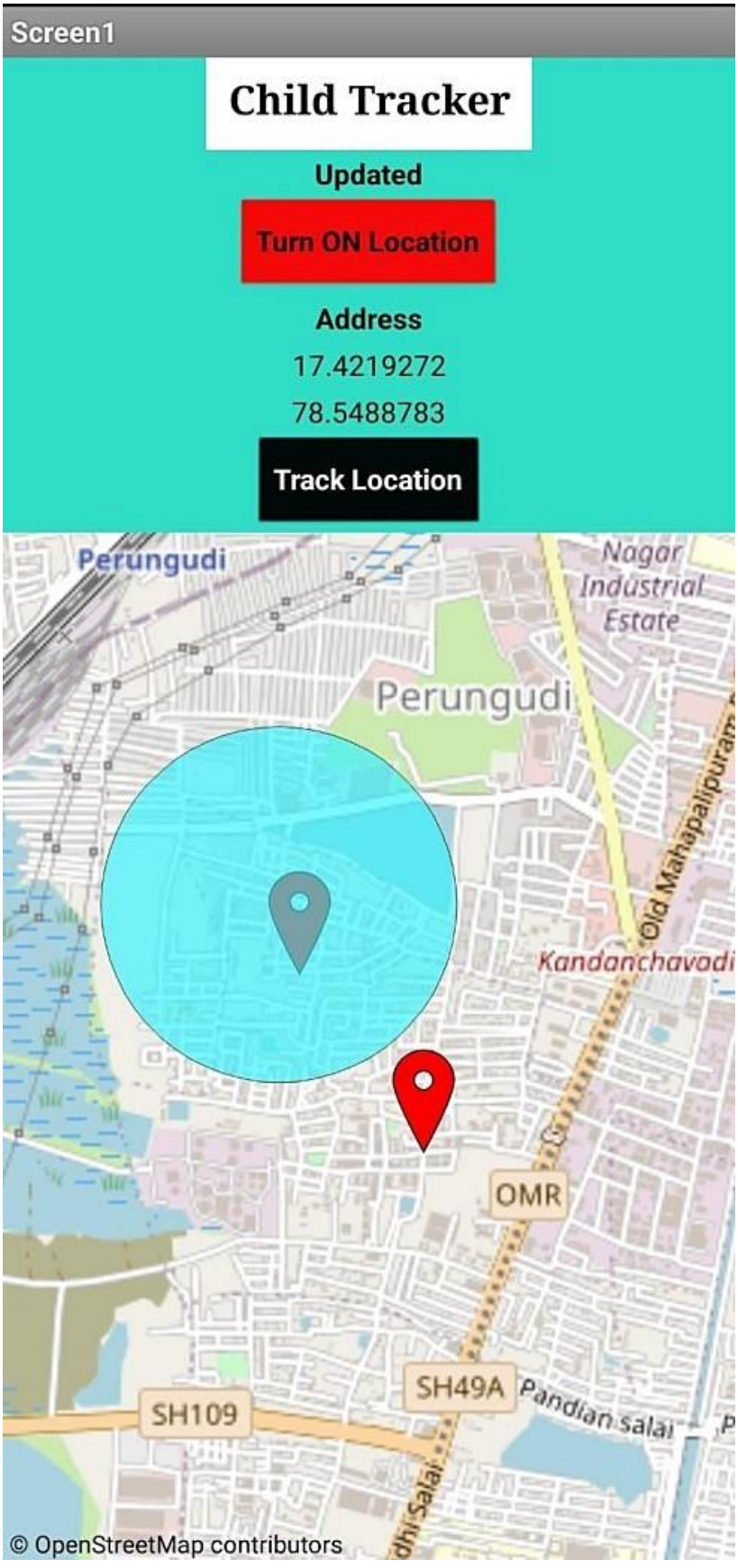

ChildTracker
Blocks
Viewer
when LocationSensor1 .LocationChanged
latitude longitude altitude speed
do set Label1 . Text to Updated
if get global flag = 0
then call FirebaseDB1 .StoreValue
tag lat
valueToStore get latitude
call FirebaseDB1 .StoreValue
tag long
valueToStore get longitude
call FirebaseDB1 .StoreValue
tag address
valueToStore LocationSensor1 . CurrentAddress
set latitude to 17.4219272
set longitude to 78.5488783
Show Warnings
Media
Upload File ...
Privacy Policy and Terms of Use

Thus, this chapter dealt with the coding and development process of proposed system.

CHAPTER 8

RESULT




Screen1
Child Tracker
Updated
Turn ON Location
Address
17.4219272
78.5488783
Track Location
Perungudi
Nagar
Industrial
Estate
Perungudi
Old Mahapalipuram
Kandanchavadi
OMR
SH49A
Pandian salai
SH109
© OpenStreetMap contributors

CHAPTER 9

ADVANTAGES AND DISADVANTAGES

9.1 ADVANTAGES

- A Child's GPS Tracker reports any potential dangers and protects them in the process.
- It acts as a communication tool for parents and can be helpful even when traveling.
- Usually, children tend to wander a lot. With the help of GPS Tracking devices, you can easily and quickly know where your children are.
- 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.
- Prevent abduction and let your children play and walk around safely. Our Personal GPS trackers for kids are great options for parents for monitoring their children 24/7.

9.2 DISADVANTAGES

- Young children may refuse to cooperate unless allowed to play with their 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 bad eating habits.

CHAPTER 10

CONCLUSION

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 parents 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.

This wearable device has a superior mode for viewing and locating the children\'s whereabouts with correct latitude and longitude, which is especially useful when using Google maps. This could assist to reduce the number of attacks on children while also making them feel protected and secure. The major goal of this project is to create a device that protects youngsters from risky circumstances while also assisting them in combating them.

CHAPTER 11

FUTURE SCOPE

A camera module for surveillance of the child's surrounds can be added to improve the system's performance. It's also possible to do it with a Raspberry Pi and Lily pad. It is possible to develop a more energy-efficient type that can keep the battery for a longer period of time.

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. The system can be modified by installation of small solar panels for charging the battery of smart gadget to gain maximum battery backup.

For surveillance of the child's surroundings, to get a clearer picture of the location, this wearable can also contain a camera module incorporated in it. The camera will be collecting information in the same manner as the GPS module. It will be on stand by conserving power waiting for the particular keyword "SNAPSHOT" to be sent from the user's smart phone to the GSM shield will activate the camera to start clicking a snapshot of the surrounding and save the file temporarily on the external micro SD card. After which Arduino UNO will access the saved image from the micro SD storage and transfer it to the GSM module which send it to the user via SMS/MMS text.

Git Link : git@github.com:IBM-EPBL/IBM-Project-35724-1660288042.git

Demo Link: https://drive.google.com/file/d/1A0ErGSlDIoyfVicUJ8HCYKyQI04N-9N-/view?usp=drivesdk