

# **IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION**

## **A PROJECT REPORT**

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## **ABSTRACT**

This paper is mainly streamered 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 connect switch and alarm 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 basedgadgets are briefly discussed in this chapter.

## **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.

## 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 help 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 location.
- c. By continuously checking the child's location notification will be generated if the child cross the geo fence. 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.
- d. child can also initiate emergency notification to the parents in case of unsafe situation.



**Fig 1.1 Child Safety using geo fence**

1. Enable tracking of the child's location and capturing of data remotely such as where the child located distance etc.
2. To show the child's actual data with reference values.
3. Enable sending of notification if the child is out of location or when the device realizes abnormal condition or situation.
4. 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 any place.

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 the chapter.

### **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 geo-fence around the 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. 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.

### **REFERENCES :**

#### **[1] SMART IOT DEVICE FOR CHILD SAFETY AND TRACKING :**

**Authors:** M Nandini Priyanka, S Muranga, 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 for a 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 LOCATION MONITORING ON GOOGLE MAPS USING GPS AND GSM :

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

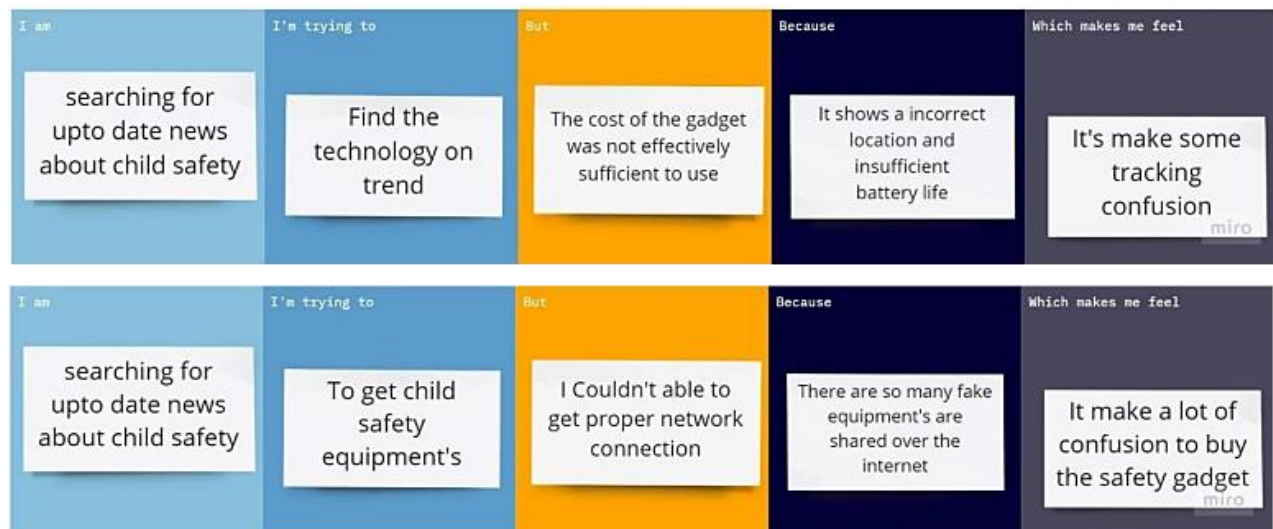
This paper provides an Android based solution for the parents to track their children in real time. Different devices are connected with a single device through channels of internet. The concerned device is connected to server via internet. The device can be used by parents to track their children in 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.

#### PROBLEM STATEMENT DEFINITION :

There are multiple news-sharing apps used by a single user and are often spammed with notifications. There is also a lot of fake news which gets shared. A news-sharing app wants to help users find relevant and important news easily every day and also understand explicitly that the news is not fake but from proper sources. While opening app for reading a news, I'm literally getting too much of advertisements in-between the content because of these ads I was unable to read the content properly and it makes me feel irritated. App wants to help users find relevant and important news easily every day and also understand explicitly without the ads.



**Fig 2.1 Problem Statement Definition**

<b>Problem Statement (PS)</b>	<b>I am (Customer)</b>	<b>I'm trying to</b>	<b>But</b>	<b>Because</b>	<b>Which makes me feel</b>
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 :

#### EMPATHY MAP :

An empathy map is a simple, easy to digital visual that captures knowledge about user's behaviors and attitudes. it is a usefull tool hep tems 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 help participants consider things from the user's sperspective along with his or her goals and challenge.

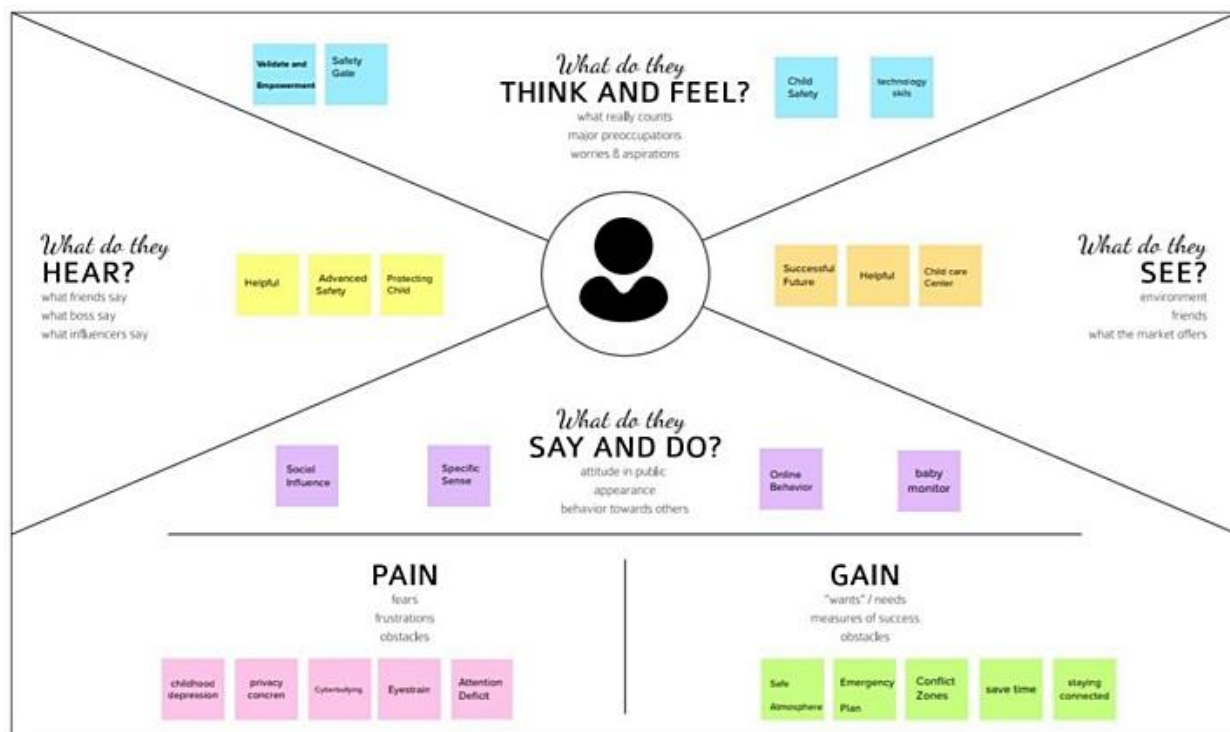


Fig 3.1 EmpathyMap Canvas

## 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.

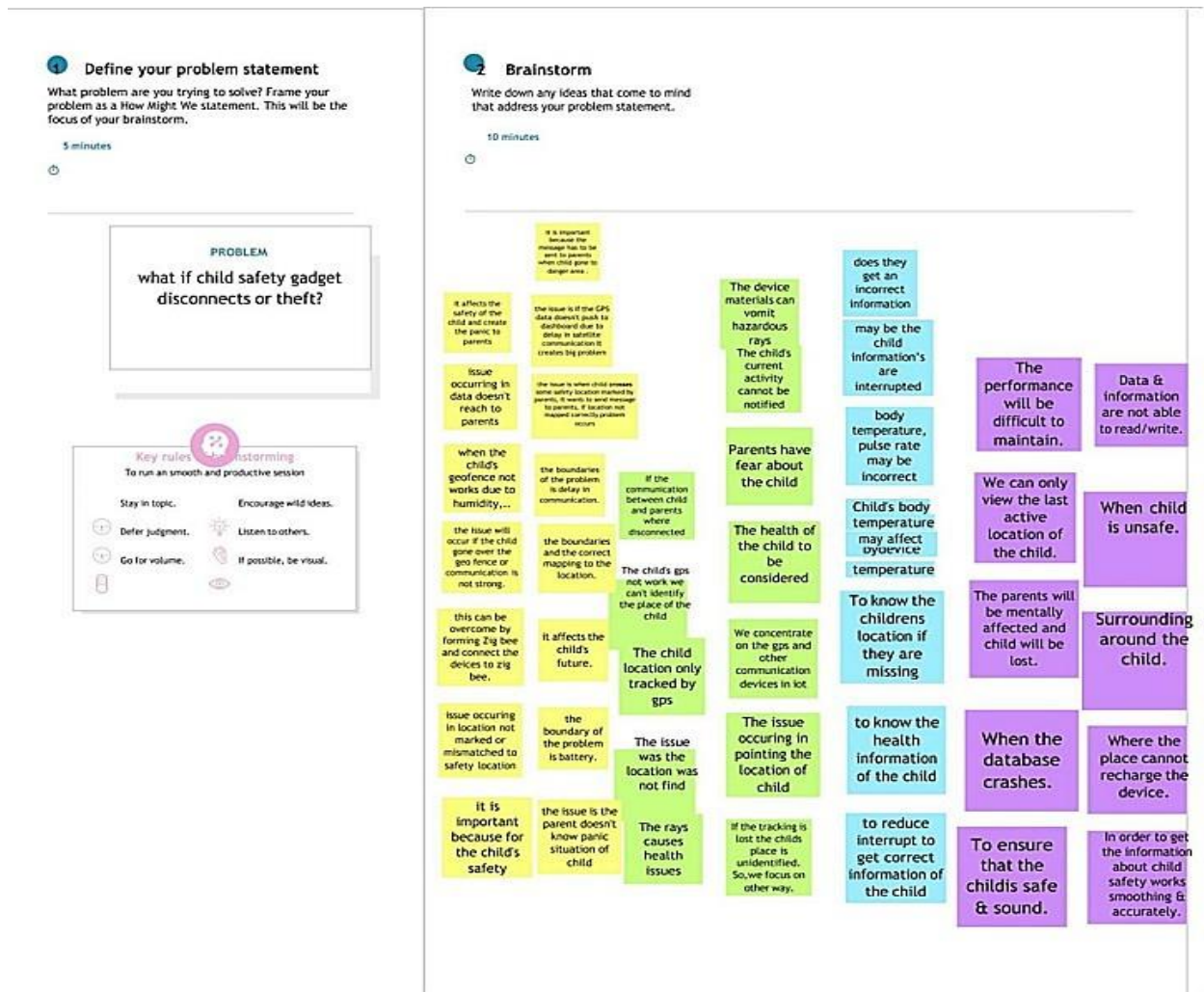


Fig 3.2 Brainstorming 1



3

### Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, 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

#### Based on location:

We can only view the last active location of the child.

issue occurring in location not marked or mismatched to safety location

To know the childrens location if they are missing

the issue is if the GPS data doesn't pushed to dashboard due to delay in satellite communication it creates big problem

#### Based on safety

the issue is when child crosses some safety location marked by parents ,it want to send message to parents ,if location not mapped correctly problem occurs

In order to get the information about child safety works smoothing & accurately.

it is important because the message has to be sent to parents when child gone to danger area .

#### based on health

The device materials can vomit hazardous rays

Child's body temperature may affect by device temperature

Device heat may affect the child

to know the health information of the child

it affects the safety of the child and create the panic to parents

the issue is the parent doesn't know panic situation of child

If the communication between child and parents where disconnected

#### Based on communication

Data & information are not able to read/write.

#### based on data

to reduce interrupt to get correct information of the child

When the database crashes.

We concentrate on the gps and other communication devices in iot

the issue will occur if the child gone over the geo fence or communication is not strong.

the boundaries of the problem is delay in communication.

the issue is if the GPS data doesn't pushed to dashboard due to delay in satellite communication it creates big problem

Fig 3.3 Brainstorming 2



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

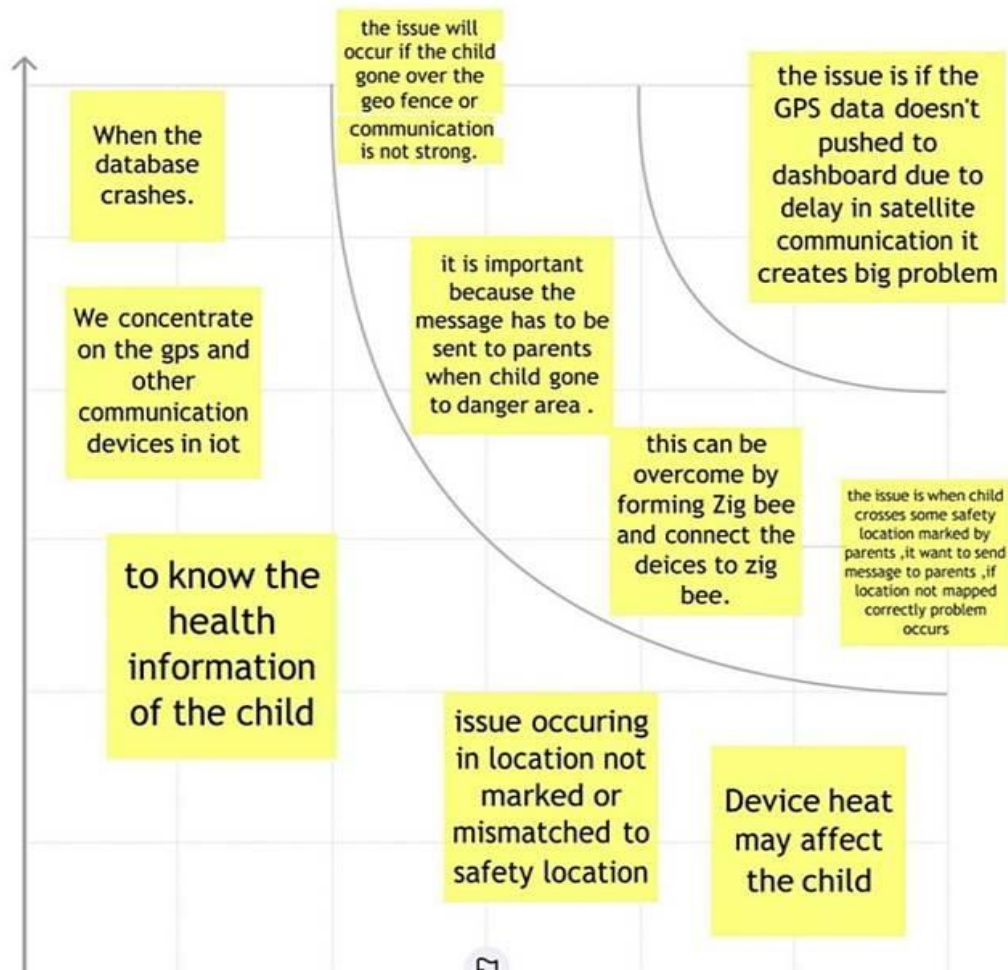


Fig 3.4 Brainstorming 3

### PROPOSED SOLUTION :

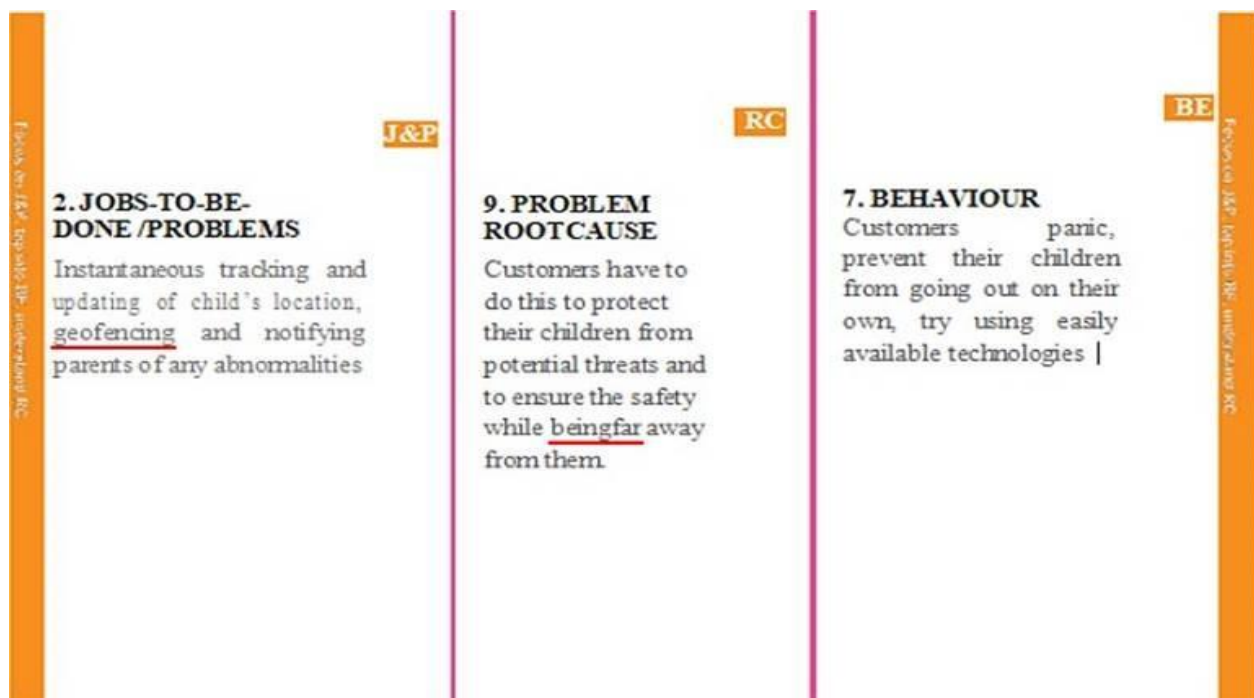
Sl.NO	PARAMETER	DESCRIPTION
1.	Problem Statement (Problem to be solved)	With the increasing rate of child kidnapping and trafficking and lack of tracking technology for child, there is limited application for child monitoring. Hence an IoT based safety gadget for child safety is probably the need of the hour today.
2.	Idea / Solution description	A good solution to this issue would be to design a smartwearable 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 the IBM IoT platform. The wearable also functions to send immediate alerts to the user through in case if the child crosses the geofence.

3.	Novelty / Uniqueness	<p>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 NodeRed Service. .</p>
4.	Social Impact / Customer Satisfaction	<p>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 their child with ease and ensuring its well-being.</p>
5.	Business Model (Revenue Model)	<p>The target audience of this device is majorly the 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.</p> <p>This type of wearable safety system is of utmost importance today and would be a must buy gadget in the market today.</p>

6.	Scalability of the Solution	<p>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.</p>
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#### PROBLEM SOLUTION FIT :

<b>1. CUSTOMERS SEGMENT'(S)</b> Working parents or busy parents of 0–10-year-old kids	<b>6. CUSTOMER CONSTRAINTS</b>  Lack of affordable, reliable and hassle-free technology, Lack of availability of secure and easy Ui.	<b>5. AVAILABLE SOLUTIONS</b>  There are existing solutions that offer location tracking for kids but they are not very efficient, cost effective and reliable all at the same time. This trade off should be addressed.
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Identify strong TR & EM	<b>3. TRIGGERS</b>	<b>10. YOUR SOLUTION</b>	<b>8. CHANNELS of BEHAVIOUR</b>	Identify strong TR & EM
	<b>TR</b>	<b>SL</b>	<b>ONLINE</b>	
	Coming across news about children being kidnapped and abducted, missing cases being reported.	Building a reliable technology that can address all the customer needs while being reliable and secure ensuring efficient functioning.	Tracking their kid's location with their mobile phones' GPS, reading news about child safety and other child missing cases.	
	<b>4. EMOTIONS: BEFORE / AFTER</b> <b>EM</b> Before: Feel insecure, worried, scared and confused. After: Relieved, calm, confident, happy.		<b>OFFLINE</b> Customers accompany their children to ensure safety, send them together with other reliable people, seek for protection in public places.	

Fig 3.5 Problem SolutionFit

## 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.

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

FR-12	GPS modules	It receives data directly from satellites.
FR-13	Battery Life	<p>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.</p> <p>It should be long-lasting.</p>
FR-14	Location History	<p>The location history will help to track the child's activity so that they will be updated. Location history will be there for 30 days.</p> <p>For example if the child gets missing with the help of location history they can track down their child's activity and also can find their child.</p>

## 4.2 NON-FUNCTIONAL REQUIREMENT :

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

FR. No.	Non-functional Requirements	Description
NFR-1	Usability	<p>Device have GSM can help to inform the parents or relatives about the current situations of the child by deliver the message immediately to</p>



		save the child.
NFR-2	Security	<p>Make children parents more assure about their kid's security, we have a feature in our device called Geo-Fence.</p> <p>Whenever your child crosses that specific area, you will get an instant notification on your phone.</p>
NFR-3	Reliability	<p>Portable</p> <p>Easy to use</p> <p>Flexibility</p>
NFR-4	Performance	<p>Create a Child tracker which helps the parents with continuously monitoring the child's location.</p> <p>The notification will be sent according to the child's location to their parents or caretakers.</p> <p>The entire location data will be stored in the database.</p>

NFR-5	Availability	<p>Track your child even in a crowd Get travel details of kids at any time</p> <p>Know the current location</p>
NFR-6	Scalability	<p>Gadget ensures the safety and tracking of the children.</p> <p>Parents need not worry about their children.</p>
NFR-7	Evaluability	<p>The system should be able to deliver promptly to the financing authority.</p> <p>In the case of non-profit organizations, the solution should be 'advancing the mission'.</p>
NFR-8	Dynamicity	<p>IoT devices may have the capability to adapt dynamically and change based on their conditions.</p>
NFR-9	Desirability	<p>Navigation should be made easy.</p> <p>The user should be able to search and find the information he needs without much hassle.</p>

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

## CHAPTER 5

### PROJECT DESIGN :

It is design of the project

### DATA FLOW DIAGRAMS :

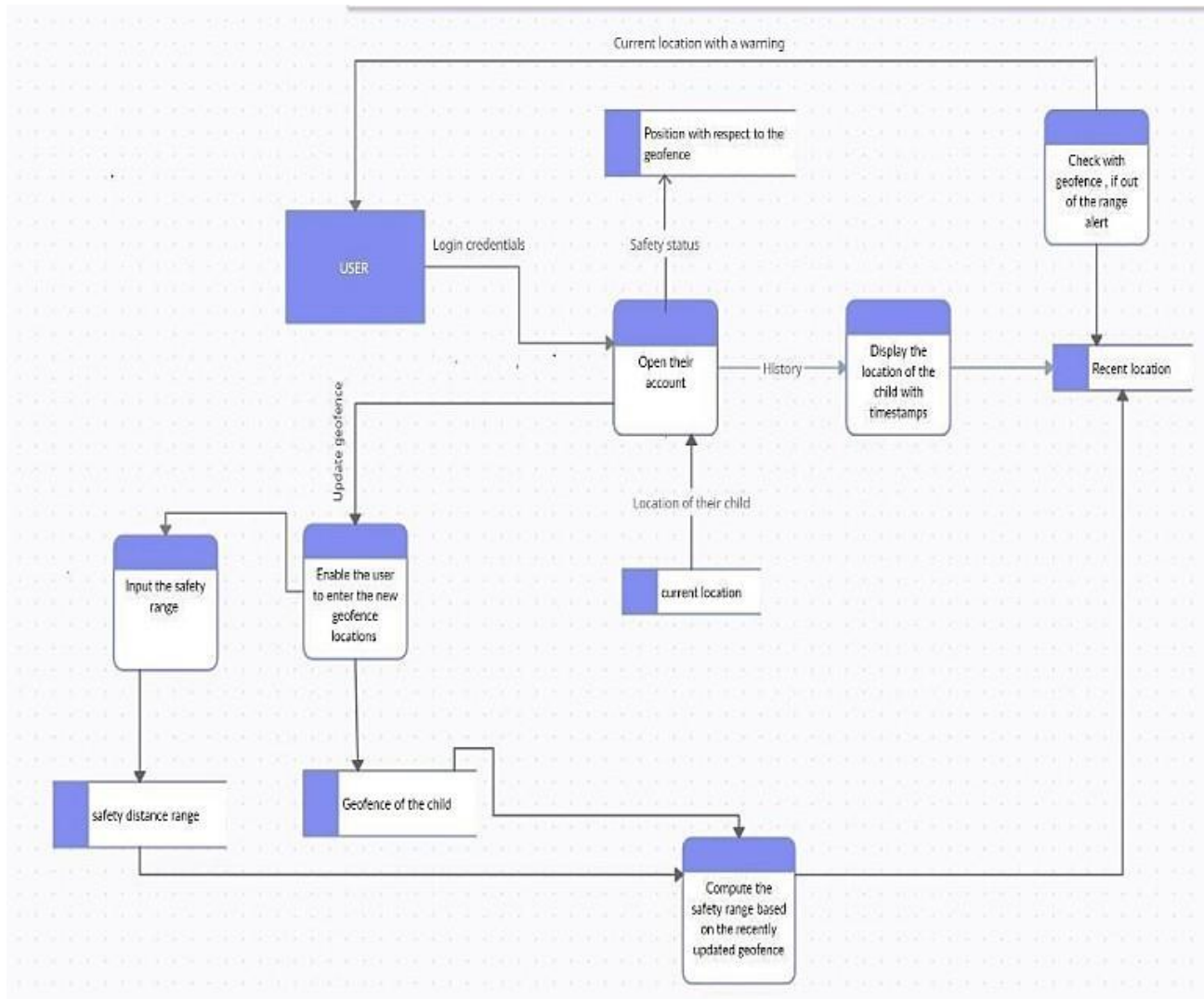


Fig 5.1 DataflowDiagram

## SOLUTION & TECHNICAL ARCHITECTURE :

### 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.

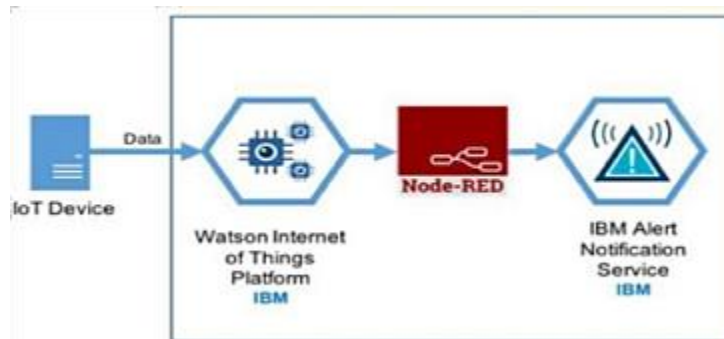
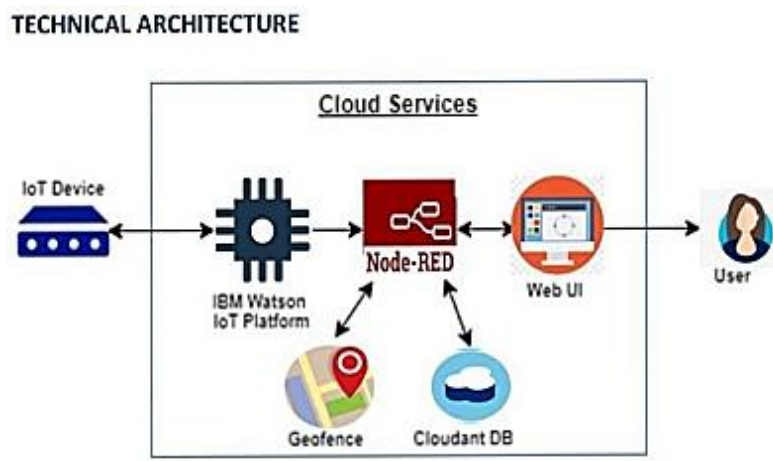


Fig 5.2 Solution Architecture Diagram

### TECHNICAL ARCHITECTURE :



**Fig 5.3 Technical Architecture Diagram**

**USER STORIES :**

<b>User Type</b>	<b>Functional Requirement (Epic)</b>	<b>User Story Number</b>	<b>User Story / Task</b>	<b>Acceptance criteria</b>	<b>Priority</b>	<b>Release</b>
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 confirmation email & 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	Sprint-1
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

#### 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	27/08/2022
IDEATION PHASE	Literature Survey	1	Literature survey on the selected project by gathering and referring research paper and publications	02/09/2022
	Empathy Map	1	Create an empathy map that list the user's pains and gains	08/09/2022

	Problem Statement	1	Summarize the problem that customer needsto be solved	09/09/2022
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	Brainstorming	1	Gather many different ideas fromthe team mates and prioritize the idea based on feasibilityand innovative	16/9/2022
<b>PROJECT DESIGNPHASE -1</b>	Proposed Solution	2	Prepare the proposed solutiondocument that youproposed to solve the problem statement which should include feasibility ,business model ...etc.	24/9/2022
	Solution Architecture	2	Prepare Solution architecture diagram for the proposed solution	01/10/2022
	Problem Solution Fit	2	Prepare Solution Fit Document forthe proposed solution	01/10/2022



<b>PROJECT DESIGN PHASE -2</b>	Customer Journey Map	3	Prepare a customer journey map to understand how the user interact and experience your product	08/10/2022
	Data Flow Diagram	3	Draw the dataflow diagram for you proposed solution	12/10/2022

	Brainstormi ng	1	Gather many different ideas from the team mates and prioritize the idea based on feasibility and innovative	16/9/2022
<b>PROJECT DESIGN PHASE -1</b>	Propos ed Solution	2	Prepare the proposed solution document that you proposed to solve the problem statement which should include feasibility , business model ...etc.	24/9/2022

	Solution Architecture	2	Prepare Solution architecture diagram for the proposed solution	01/10/2022
	Problem Solution Fit	2	Prepare Solution Fit Document for the proposed solution	01/10/2022
<b>PROJECT DESIGN PHASE -2</b>	Customer Journey Map	3	Prepare a customer journey map to understand how the user interact and experience your product	08/10/2022
	Data Flow Diagram	3	Draw the dataflow diagram for your proposed solution	12/10/2022

**Table 6.1 Sprint Planning and Estimation**

## 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 email ease manner for the purpose of sending alert message to the parents or guardians (or) informing through normal message.	2	High	yaakobu stephin.D prasath.j

			As a user,			
Sprint-1	Registration	USN-2	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 onto the parents.	2	High	suriya s sunil kumar.s
			As a user,			
Sprint-2	Dashboard	USN-3	In case of any emergency situation parents(I) must get the alert notification and location of the child.	3	Medium	yaakobustep hin.D sunilkumar.S

			As a user,			
--	--	--	------------	--	--	--

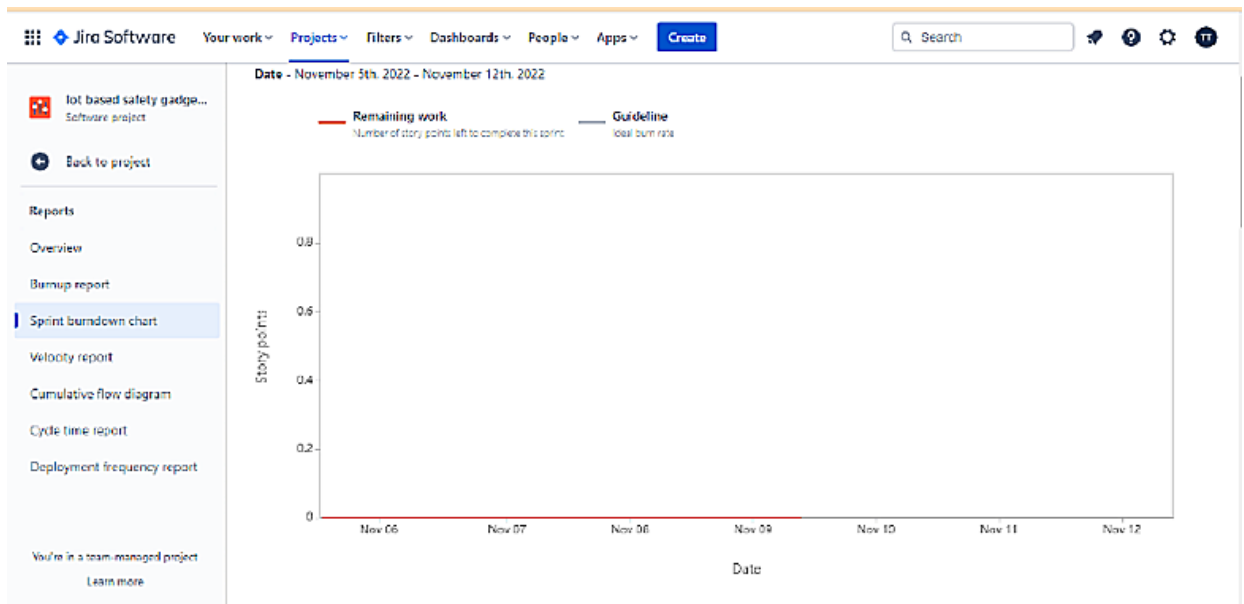
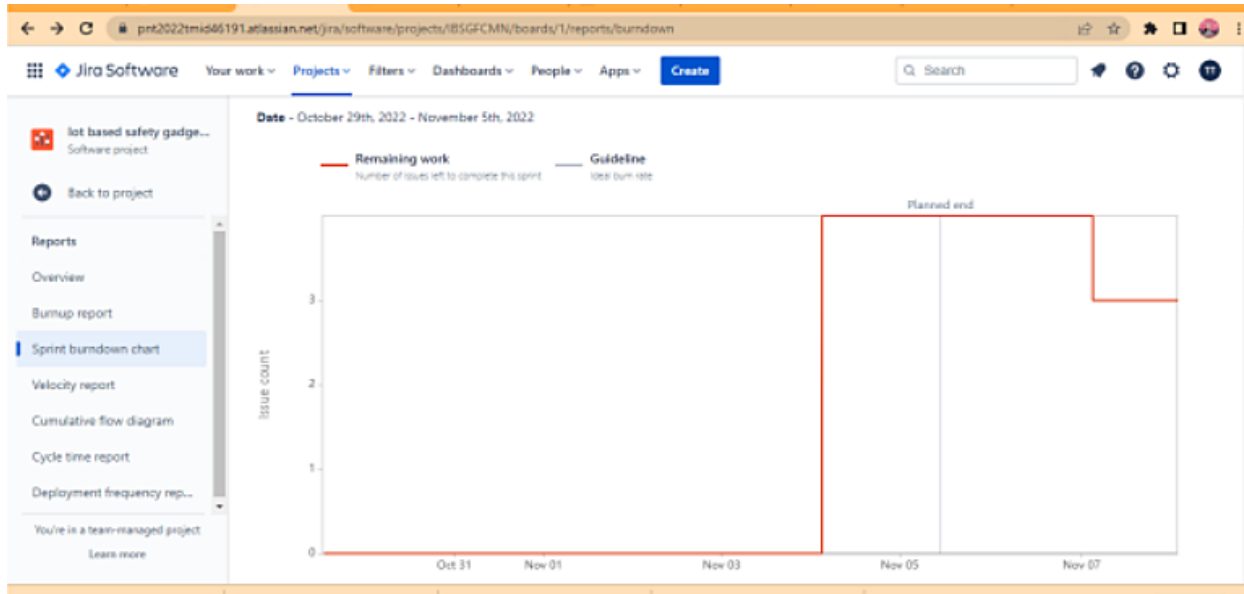
			I(parent) need to safeguard child and			
Sprint- 3	Dashboard	USN- 4	tracking the child's location and it is	2	High	yaakobu stephin.D
			important to notify near police stationinca se of more emergency .			
			As a user,			
Sprint- 3	Dashboard	USN- 5	Its good to have a IOT based systemto safeguard monitoring without presence of parent.	2	High	sunilkum ar.s prasath.J

Sprint -4	Monitoring the environment	USN 1	User can monitor the situation ofthe environme nt from a dashboard that displays	2	High	yaakobu stephin.D prasath.J
			sensor informati onabout the environme nt and child health.			
Sprin t-4	Event Notification	USN 6	Sending an alert SMS to the parents and guardians in case of panic situation.	2	High	suriya .s prasayh.J

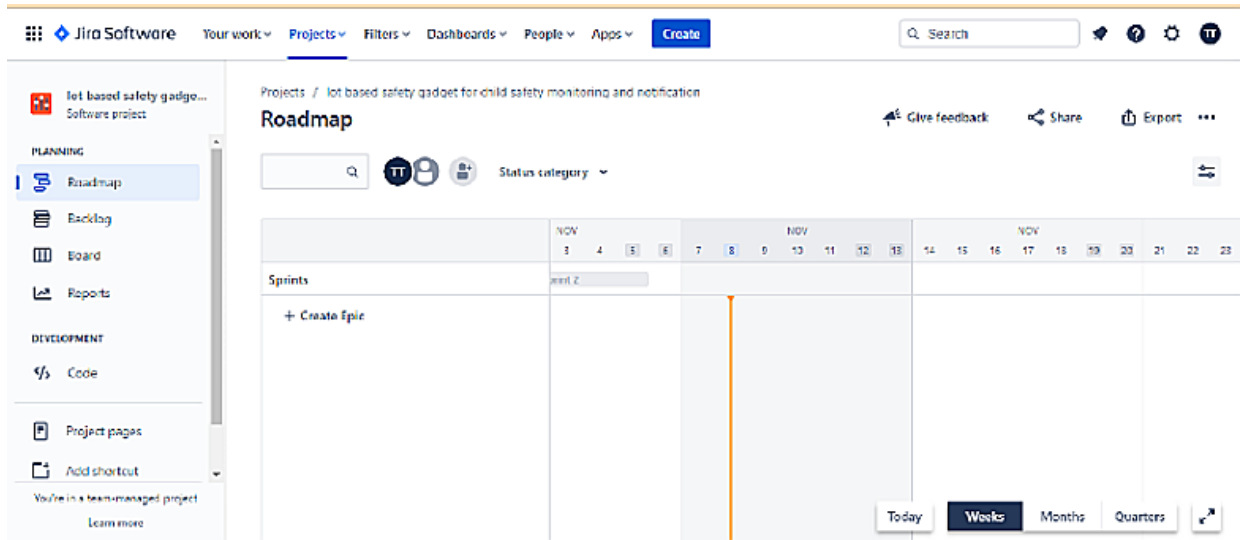
**Table 6.2 Sprint DeliverySchedule**

## REPORTS FROM JIRA :

### BURNDOWN CHART :



## ROADMAP :



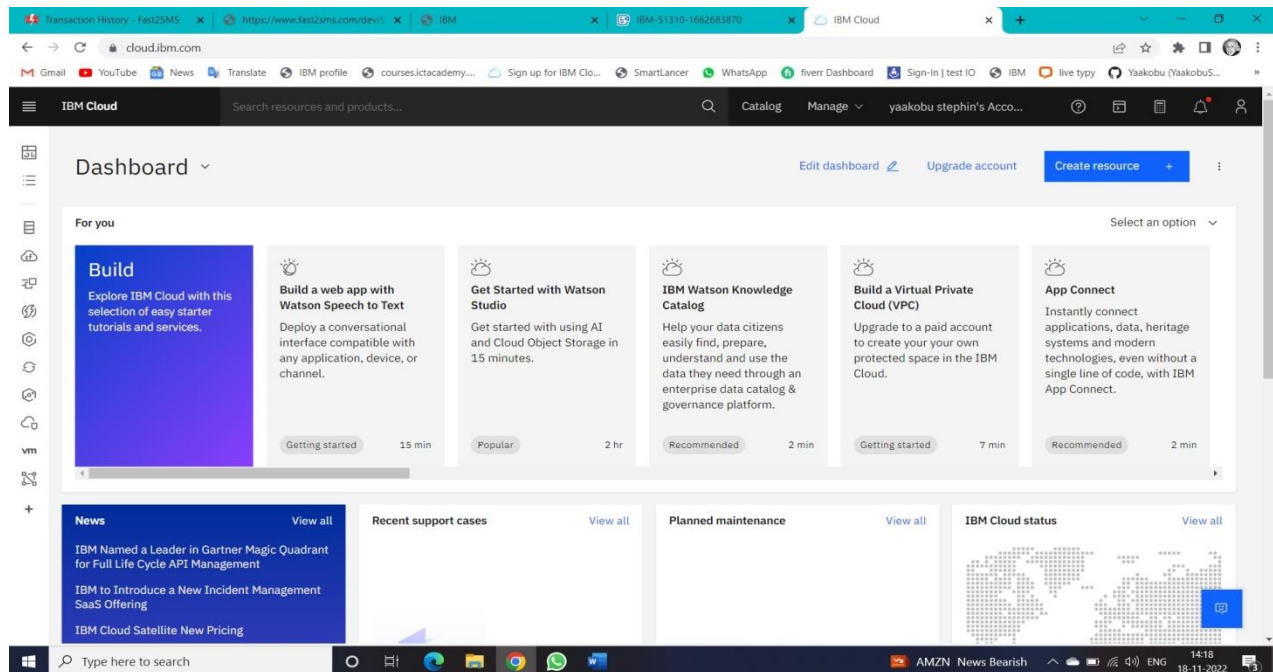


# CHAPTER 7

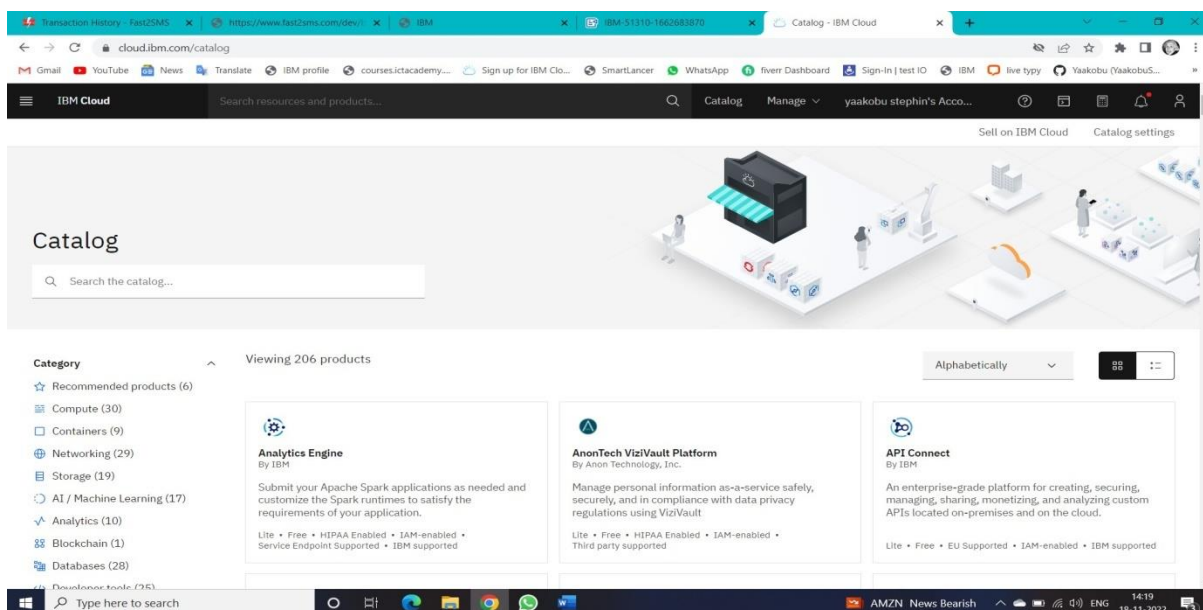
## CODING AND SOLUTIONING

### CREATE AND CONFIGURE IBM CLOUD SERVICES :

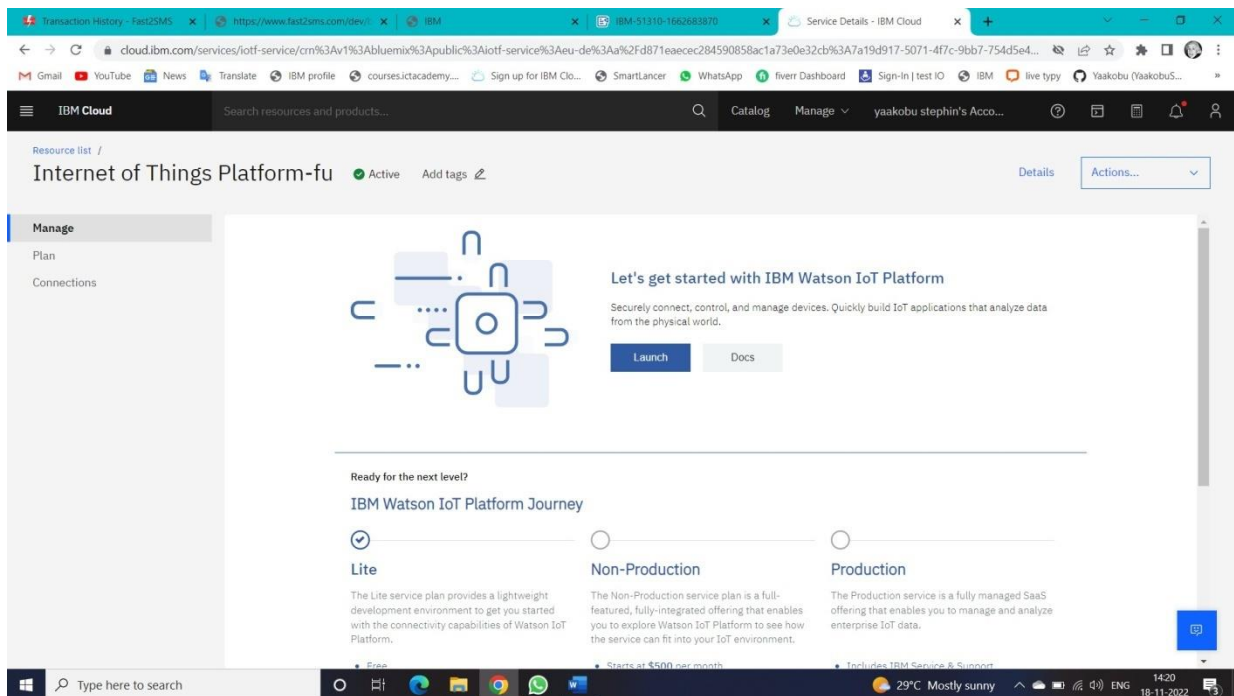
USN 1: As a user I need to enroll the cloud registration :



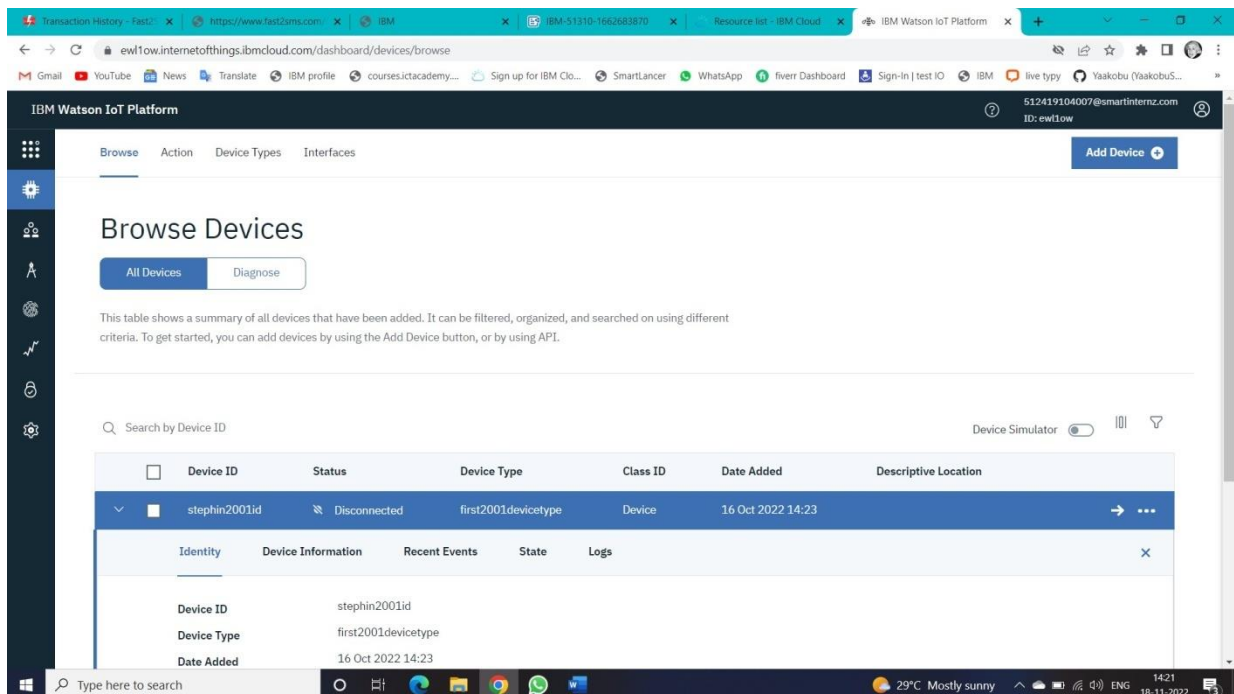
USN 2: As a user, I will create IBM cloud account :



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 deviceType and ID :

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Browse' tab is selected, displaying a table of devices. The device 'stephin2001id' is highlighted, and its details are shown in a modal window.

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
stephin2001id	Disconnected	first2001devicetype	Device	16 Oct 2022 14:23	

**Device Details for stephin2001id:**

- Device ID:** stephin2001id
- Device Type:** first2001devicetype
- Date Added:** 16 Oct 2022 14:23
- Added By:** 512419104007@smartinternz.com
- Connection Status:** Disconnected  
Last Connected: 17 Nov 2022 21:01  
Client Address: 157.51.17.179 SecureToken  
Duration: a few seconds  
Data Transferred: 669 B

## USN 6: Simulate the node created :

The screenshot shows the IBM Watson IoT Platform dashboard with a simulation running. The 'Browse' tab is selected, and the device 'NodeRed\_1' is highlighted. The 'Recent Events' tab is active, showing a live stream of data.

Device ID	Status	Device Type	Class ID	Date Added
123456	Disconnected	NodeRed	Device	Oct 29, 2022 3:29 PM
NodeRed_1	Connected	NodeRed	Device	Oct 29, 2022 3:32 PM

**Recent Events for NodeRed\_1:**

Event	Value	Format	Last Received
event_1	{"longitude":63}	json	a few seconds ago
event_1	{"longitude":50}	json	a few seconds ago
event_1	{"longitude":63}	json	a few seconds ago
event_1	{"longitude":56}		
event_1	{"longitude":51}		

1 Simulation running

## CREATE AND ACCESS NODE-RED :

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

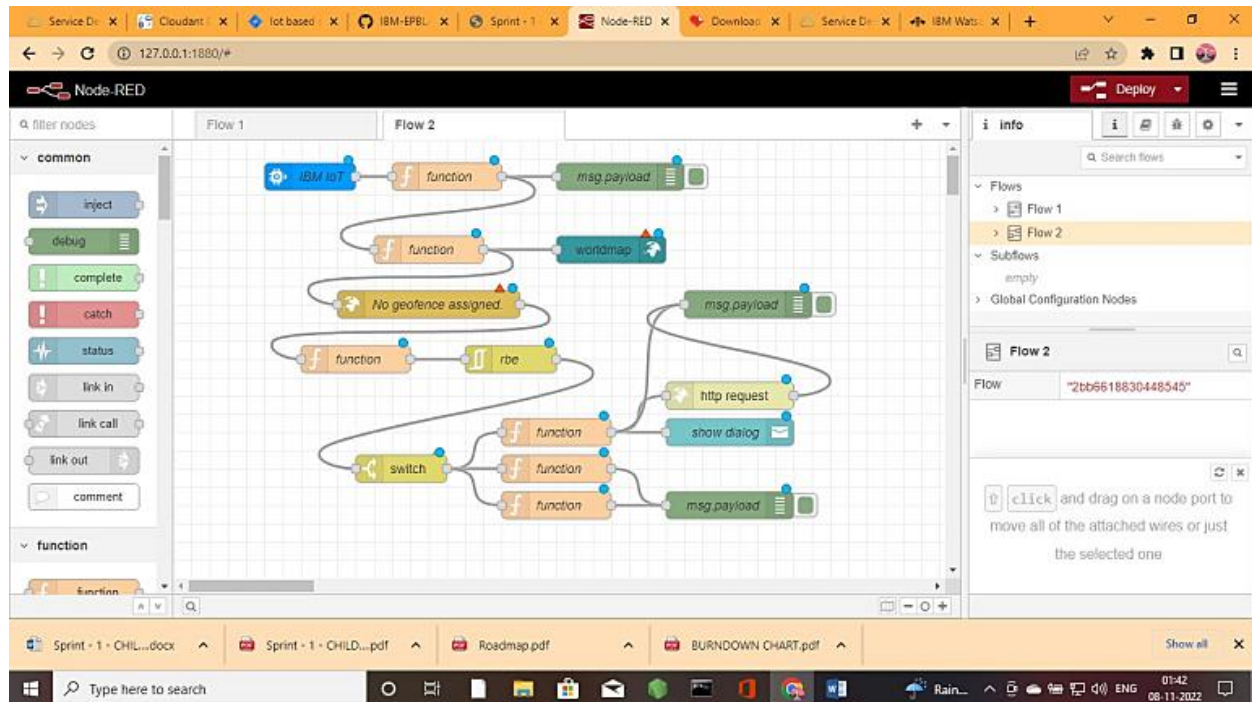
The screenshot displays the IBM Cloud console interface for a Node RED application. The top navigation bar includes the IBM Cloud logo, a search bar, and links to Catalog, Manage, and the user's account (yaakubu stephin's Acco...). The main content area shows the 'Node RED NJCYM 2022-10-16' application, which is in a 'Running' state. A notification banner at the top indicates that 'IBM Cloud Foundry Public is being deprecated'. The 'Overview' tab is selected, showing a 'Health' status of 100% with 1/1 instance(s) running. A slider for 'MB memory per instance' is set to 256. The 'Runtime' section shows a 'Node.js' runtime with a '256' MB allocation and '1.75 GB still available'. The 'Runtime cost' is displayed as '\$0.00'. The 'Connections (1)' section shows a single connection to 'node-red-njcy-2022--cloudant-1665914034943-24965'. The bottom of the screen shows a Windows taskbar with various application icons and system information.

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

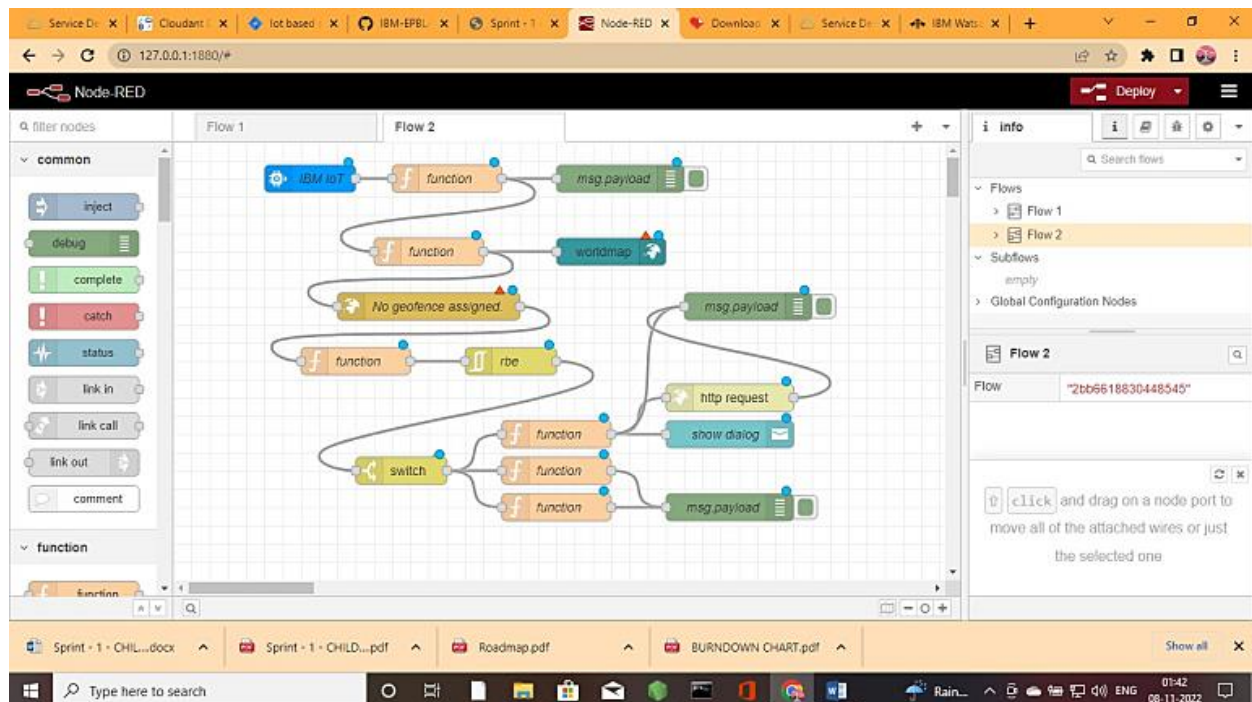
The screenshot shows the Node-RED web interface in a browser. The address bar displays the URL '127.0.0.1:1880/#flow/0664a075e3c48fc5'. The interface includes a left sidebar with a 'filter nodes' search bar and a list of nodes categorized under 'common' and 'function'. The main workspace, titled 'Flow 1', contains a single flow with an 'IBM Watson' node connected to a 'debug 1' node. The 'IBM Watson' node is marked as 'connected'. The right sidebar shows the 'info' panel for the selected flow, displaying the flow ID '0664a075e3c48fc5' and a message: 'Dragging a node onto a wire will splice it into the link'. The bottom of the screen shows a Windows taskbar with various application icons and system information.



USN 9 : Design the project flow using Node-Red :



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



## 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 :

The image shows two screenshots from a Windows desktop environment. The top screenshot displays the IBM Cloud console for a resource named 'node-red-rfkey-2022--cloudant-1666966739396'. The 'Overview' tab is selected, showing deployment details such as CRN, Location (London), and External endpoints. A 'Launch Dashboard' button is visible in the top right. The bottom screenshot shows the Cloudant dashboard at the URL 'b004d7a2-7180-47f1-a028-8828a305b068-bluemix.cloudant.com/dashboard.html'. The 'Databases' section is active, showing a table with columns: Name, Size, # of Docs, Partitioned, and Actions. The table is currently empty, and a message at the bottom indicates 'Showing 1-0 of 0 databases.' The Windows taskbar at the bottom of both screenshots shows various open applications and the system clock set to 08:49 on 09-11-2022.

IBM Cloud console resource details for 'node-red-rfkey-2022--cloudant-1666966739396':

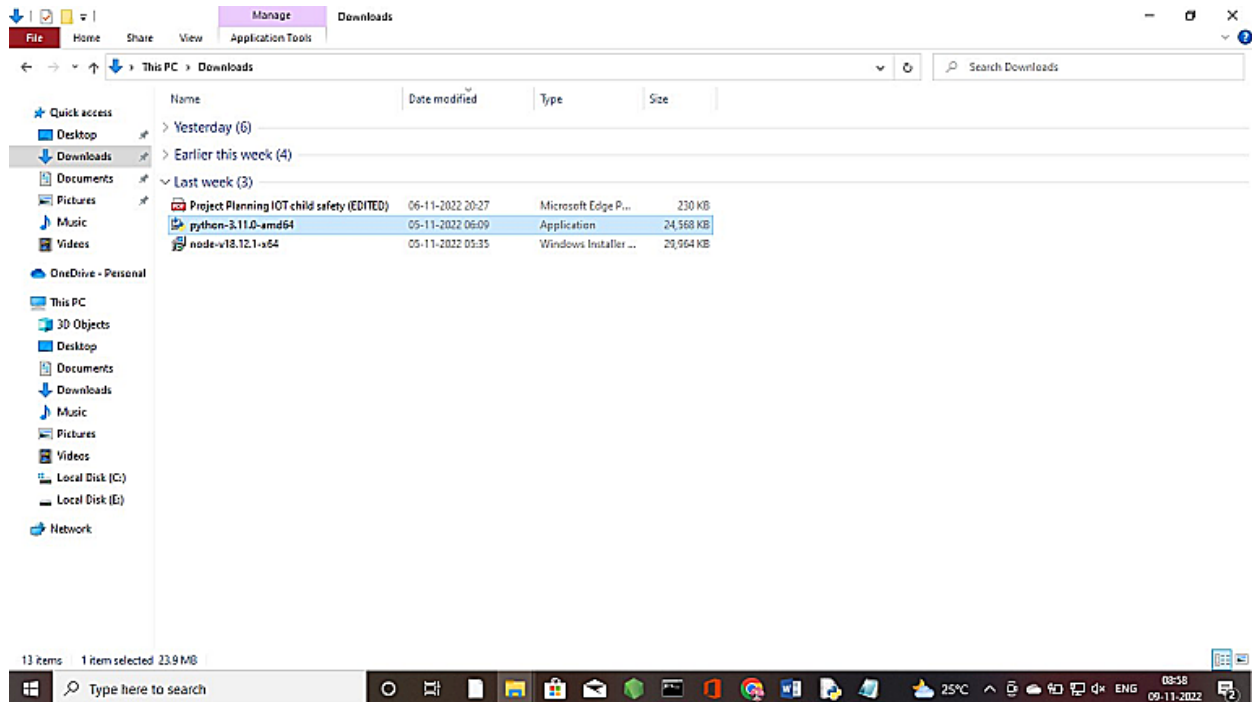
- CRN: crncv1:bluemix:public:cloudantnosqldb:eu-gb:a/81704e207bbb454dbb467f57228f4cb8f536beaf-861e-4a97-b1ac-d0d58df9e94e::
- Location: London
- External endpoint: <https://b004d7a2-7180-47f1-a028-8828a305b068-bluemix.cloudant.com>
- External endpoint (preferred): <https://b004d7a2-7180-47f1-a028-8828a305b068-bluemix.cloudantnosqldb.appdomain.cloud>
- Authentication methods: IBM Cloud IAM and Cloudant credentials

Cloudant dashboard 'Databases' section:

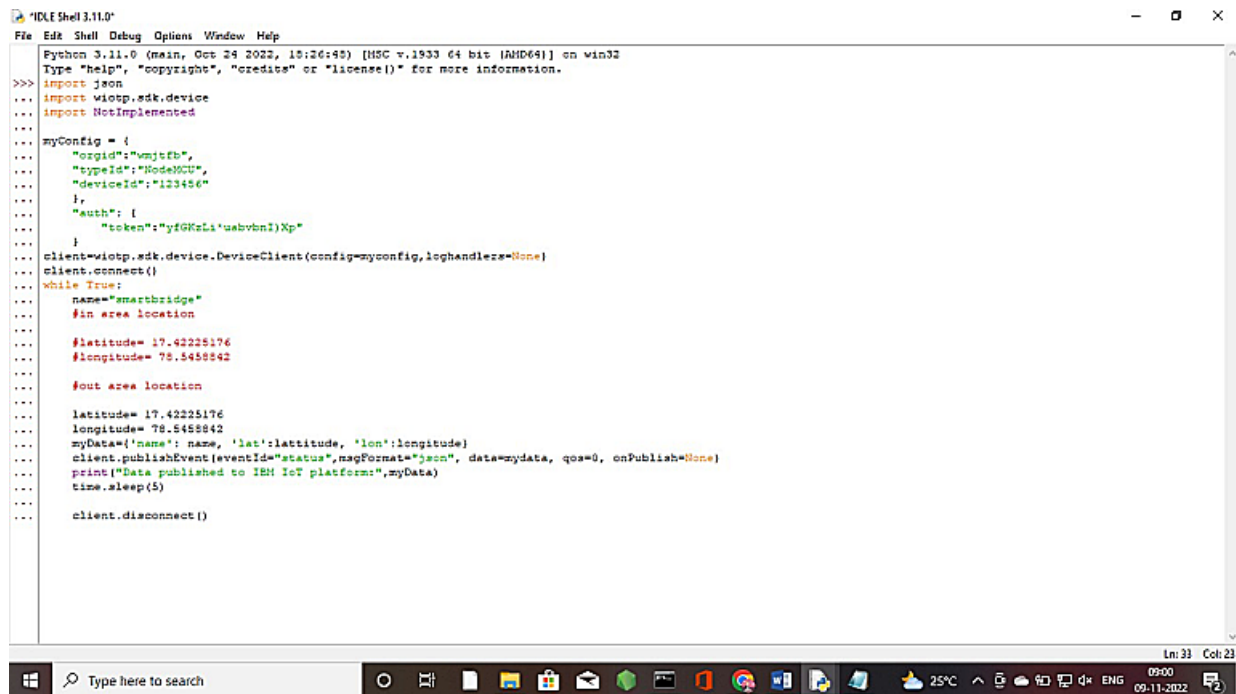
Name	Size	# of Docs	Partitioned	Actions
------	------	-----------	-------------	---------

Showing 1-0 of 0 databases. Databases per page: 20

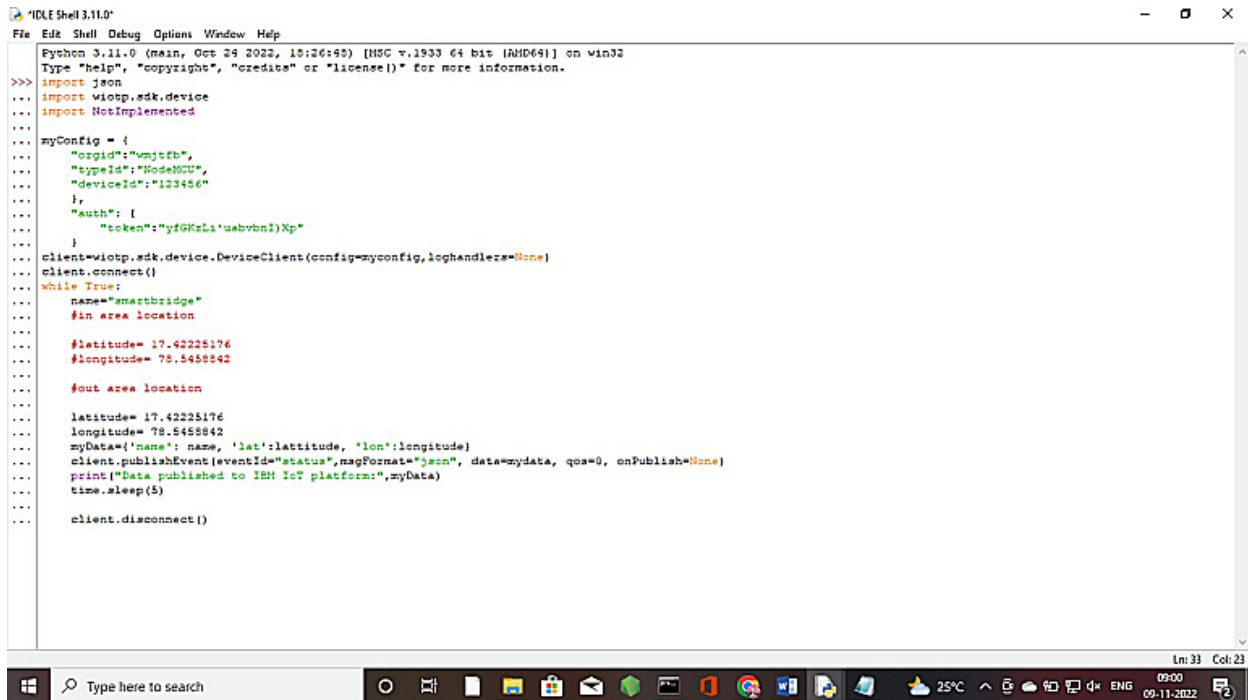
## USN 12: Install the python software :



## USN 13: Develop the python scriptsto publish detailsto IBM IoT Platform :

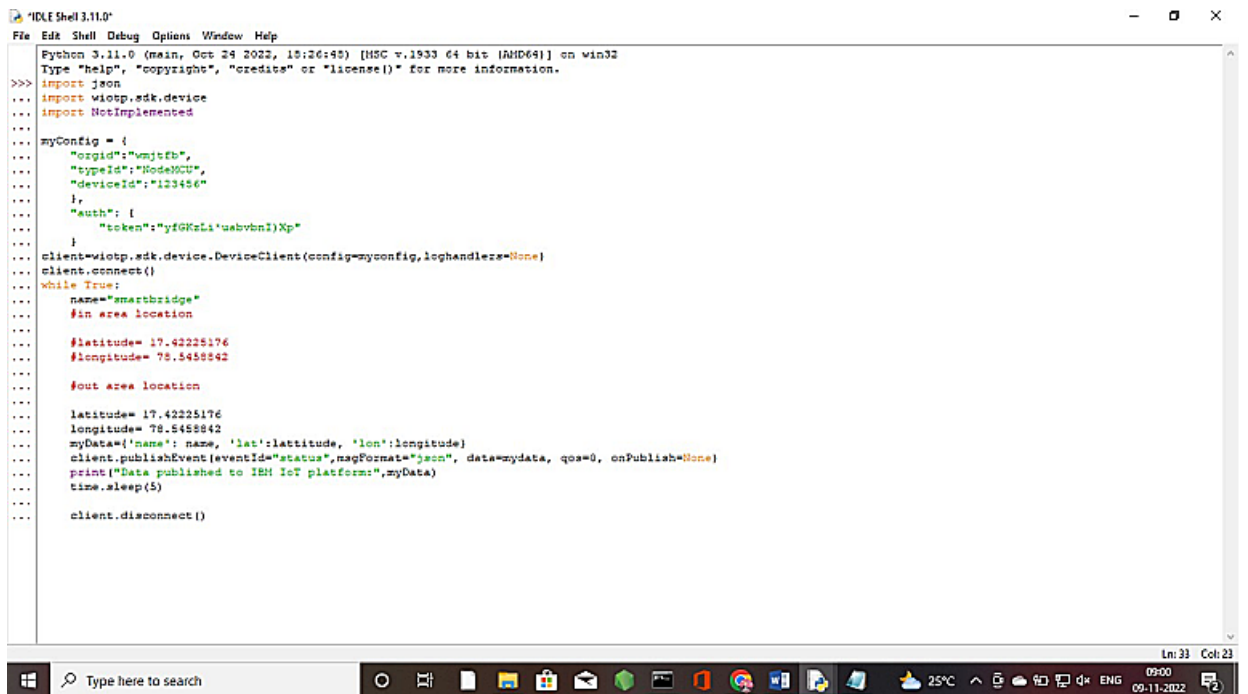


USN 14: Integrate the device id, authentication token in python script :



```
Python 3.11.0 (main, Oct 24 2022, 18:26:45) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> import json
... import wiotp.sdk.device
... import NotImplemented
...
... myConfig = {
...     "orgid": "vmjtfb",
...     "typeId": "NodeMCU",
...     "deviceId": "123456",
...     },
...     "auth": {
...         "token": "yfGKzLi'usbvbnI)Xp"
...     }
... }
... client=wiotp.sdk.device.DeviceClient(config=myconfig, loghandler=None)
... client.connect()
... while True:
...     name="smartbridge"
...     #in area location
...
...     #latitude= 17.42225176
...     #longitude= 78.5458842
...
...     #out area location
...
...     latitude= 17.42225176
...     longitude= 78.5458842
...     myData={'name': name, 'lat':latitude, 'lon':longitude}
...     client.publishEvent(eventId="status",msgFormat="json", data=mydata, qos=0, onPublish=None)
...     print("Data published to IBM IoT platform:",myData)
...     time.sleep(5)
...
...     client.disconnect()
```

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

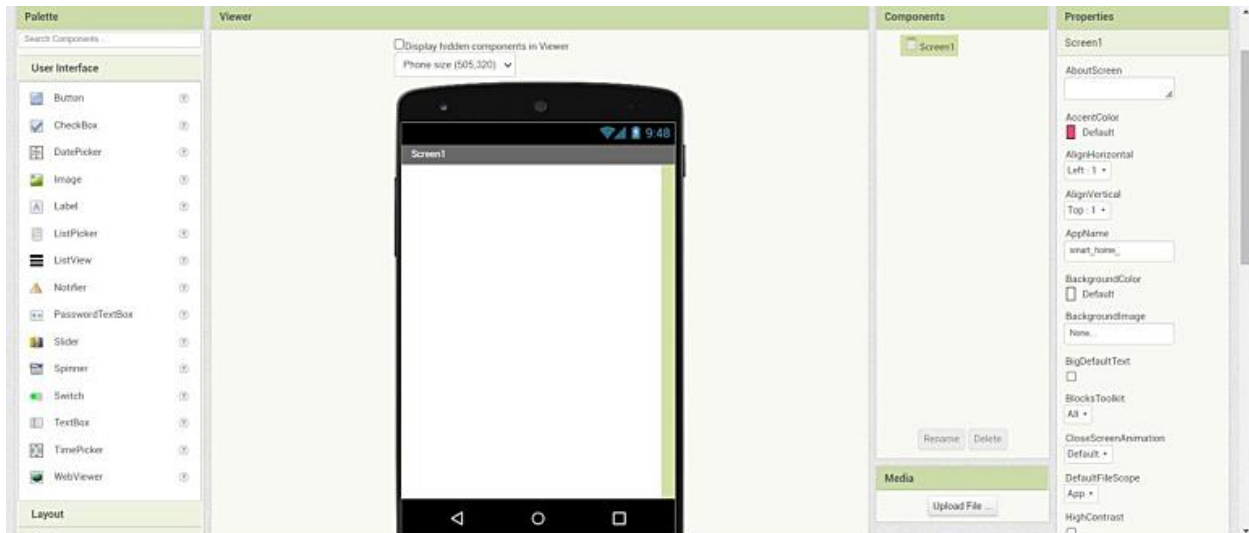


```
Python 3.11.0 (main, Oct 24 2022, 18:26:45) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> import json
... import wiotp.sdk.device
... import NotImplemented
...
... myConfig = {
...     "orgid": "vmjtfb",
...     "typeId": "NodeMCU",
...     "deviceId": "123456",
...     },
...     "auth": {
...         "token": "yfGKzLi'usbvbnI)Xp"
...     }
... }
... client=wiotp.sdk.device.DeviceClient(config=myconfig, loghandler=None)
... client.connect()
... while True:
...     name="smartbridge"
...     #in area location
...
...     #latitude= 17.42225176
...     #longitude= 78.5458842
...
...     #out area location
...
...     latitude= 17.42225176
...     longitude= 78.5458842
...     myData={'name': name, 'lat':latitude, 'lon':longitude}
...     client.publishEvent(eventId="status",msgFormat="json", data=mydata, qos=0, onPublish=None)
...     print("Data published to IBM IoT platform:",myData)
...     time.sleep(5)
...
...     client.disconnect()
```

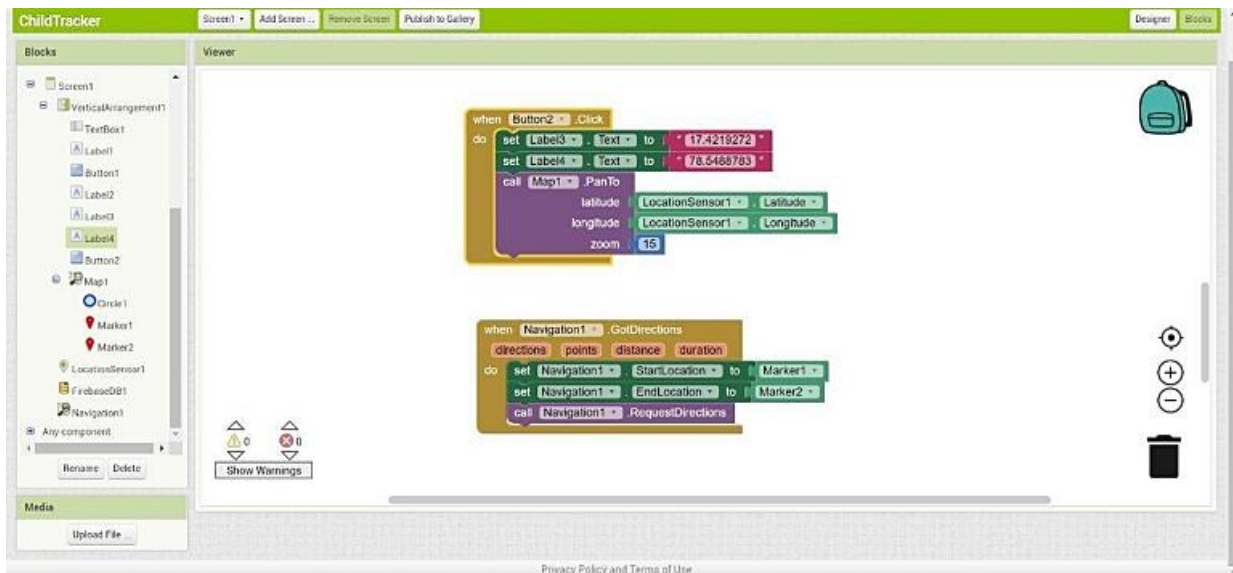


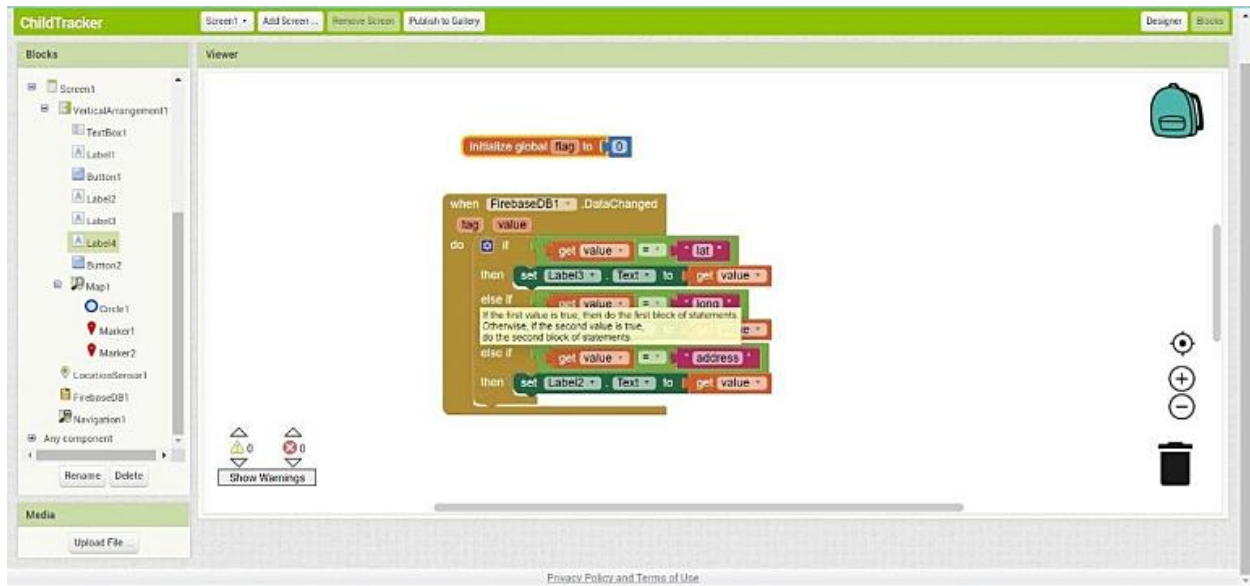
## CREATE THE MOBILE APPLICATION USING MIT APP INVENTOR :

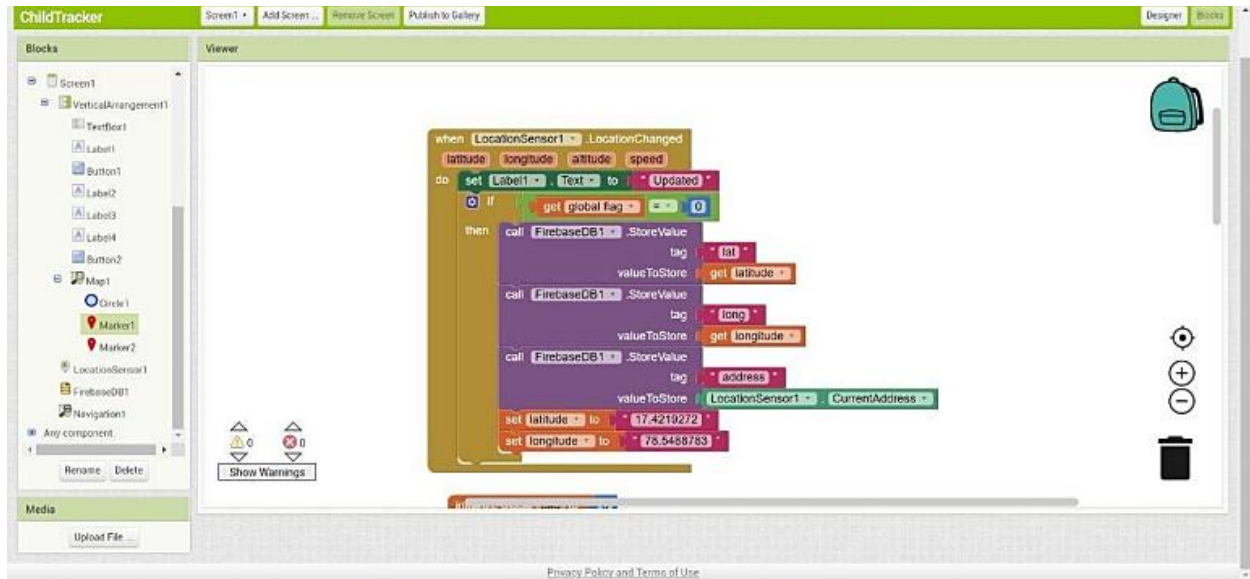
### CREATE APP IN MIT APP INVENTOR :



### BLOCK CONFIGURATION :



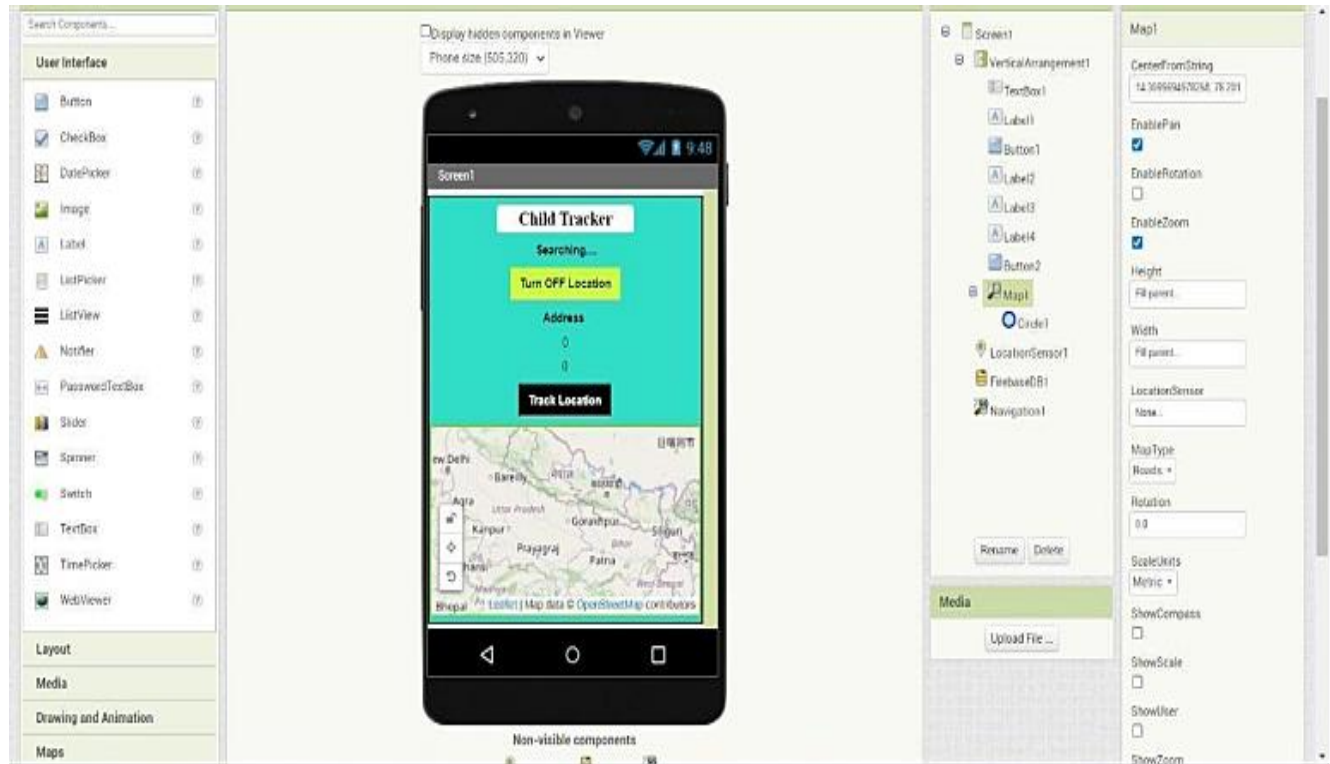




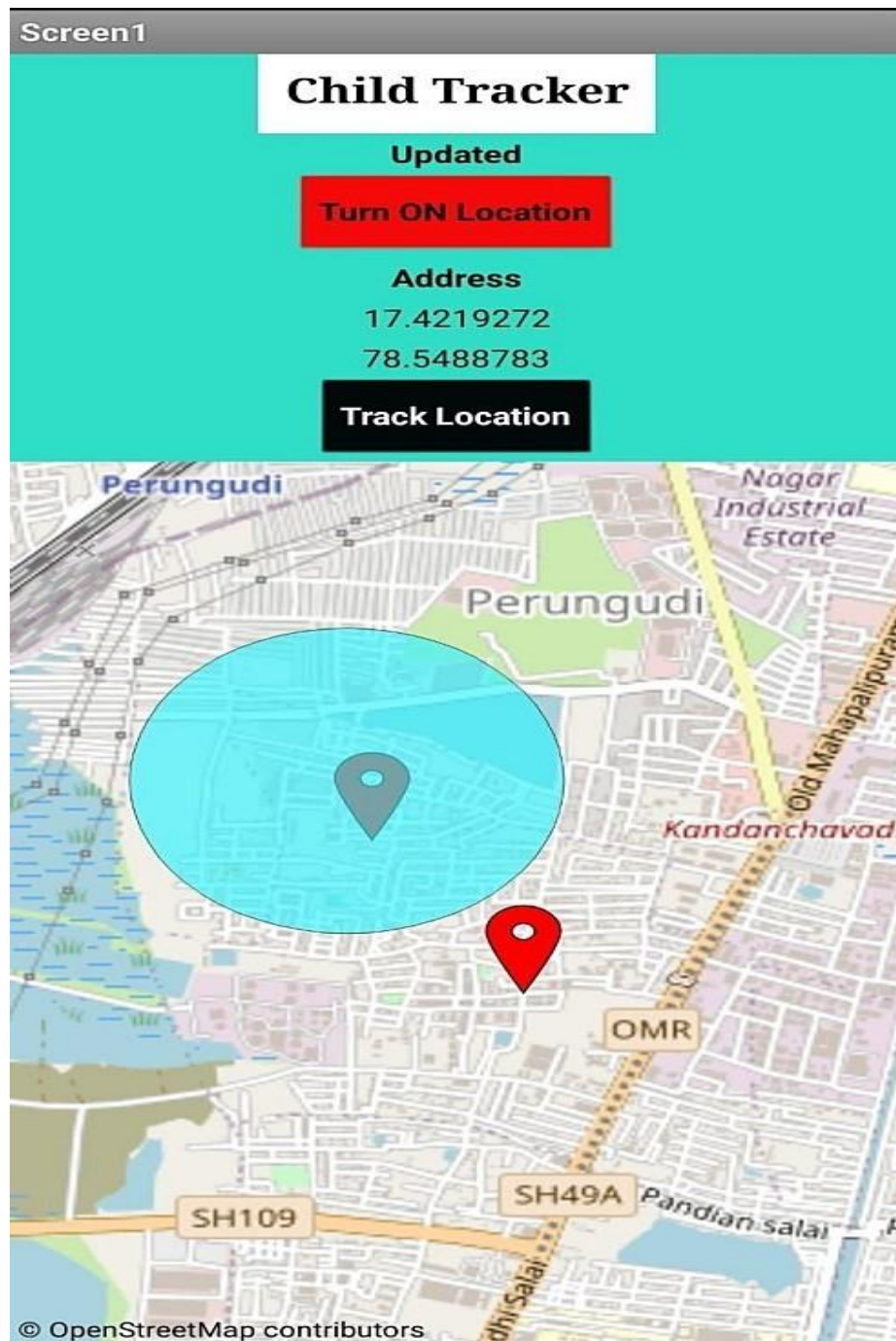
Thus, this chapter dealt with the coding and development process of proposed system.

## CHAPTER 8

### RESULT OF APK :



## OUTPUT IN MOBLIE SCREEN :



## CHAPTER 9

### ADVANTAGES AND DISADVANTAGES

#### ADVANTAGES :

1. A Child's GPS Tracker reports any potential dangers and protects them in the process.
2. It acts as a communication tool for parents and can be helpful even when traveling.
3. Usually, children tend to wander a lot. With the help of GPS Tracking devices, you can easily and quickly know where your children are.
4. 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.
5. 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.

#### DISADVANTAGES :

1. Young children may refuse to cooperate unless allowed to play with their gadgets.
2. Excess use of electronic gadgets can lead to children spending less time outdoors and limiting their social interaction.
3. It may lead to poor concentration in studies and lack of interest in day-to-day activities.
4. 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 surroundings 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.