IOT BASED SAFETY GADGET FOR023333

CHILD SAFETY MONITORING AND NOTIFICATION

IBM NALAIYA THIRAN

PROJECT REPORT

Submitted by

MANIMEKALAI G (620819106049)

SHARMILA V (620819106081)

DHIVYABHARATHI M (620819106020)

PRIYANKA S (620819106067)

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NAMAKKAL-637018

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BONAFIDE CERTIFICATE

Certified that this project report titled **"IOT BASED SAFETY GADGET FOR CHILD MONITORING AND NOTIFICATION"** is the bonafide work of **"MANIMEKALAI G (620819106049), SHARMILA V (620819106081), DHIVYABHARATHI M (620819106020), PRIYANKA S (620819106067)"** who carried out the project work under my supervision.

SIGNATURE

Dr.K.ANAND,B.E.,M.E.,Ph.D.,
FACULTY MENTOR
ASSISTANT PROFESSOR
Department of Electronics and Communication Engineering, ,
Gnanamani College of Technology,
Pachal,
Namakkal-637 018.

M.SATHYASUDHA,B.E.,M.E.,(Ph.D)
ASSISTANT PROFESSOR
Department of Computer Science and Engineering,
Gnanamani College of Technology,
Namakkal-637 018.

– – – – – – – – – – – –

SPOC

SIGNATURE

M.SATHYASUDHA,B.E.,M.E.,(Ph.D)
FACULTY EVALUATOR
ASSISTANT PROFESSOR
Department of Computer Science and Engineering,
Gnanamani College of Technology,
Pachal,
Namakkal-637 018.

Mr.R.PRABHU,B.E.,M.E.,(Ph.D)
HEAD OF THE DEPARTMENT
Department of Electronics and Communication Engineering,
Gnanamani College of Technology,
Namakkal-637 018.

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CHAPTER 1

INTRODUCTION

Internet of Things (IoT) is a set of systems and devices interconnected with real-world sensors and actuators to the Internet. It is able to make decisions via detecting the surrounding environment without human interaction . In this research, IoT is applied to propose a wearable smart band which helps parents to monitor and get known of their child's condition at anywhere and anytime even if they are not by their children side. Via the IoT smart band, children safety is guaranteed, and crime rate is reduced as immediate actions can be taken in case the child is in danger. Besides, unlike existing smart band, which is less focusing on child security aspect, the proposed system emphasizes in getting as much data as possible so that actual situation can be identified. The use of IoT in this device is motivated by the need of child security system in Malaysia due to child safety issues resulting from increasing cases on child related crime.

In fact, IoT has been applied in domains such as smart home, smart city, smart factory, supply chain, retail, agriculture, lifestyle, transportation, emergency, health care, environment, energy, culture and tourism . However, it is seldom used to monitor child's safety in Malaysia. Actually, there is a need to use IoT-based child security system since the safety of children has become a major concern .

Child tracker helps the parents in continuously monitoring the child's location. They can simply leave their children in school or parks and create a geofence around the particular location.

By continuously checking the child's location notifications will be generated if the child crosses the geofence.

Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.

1.1 Project Overview:

1. Enable tracking of the child's location and capturing of data remotely such as temperature, pulse, respiratory rate, quality of sleep and many more.

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 conditions/situations.

3. To trigger the alarm and enable automatic video recording whenever the emergency button is pressed. Then, emergency notification along with real-time video will be sent to and display in the parents' mobile apps.

4. Develop a prototype of IoT wearable smart band connected to parents' mobile apps so that they can monitor the actual condition of children at anytime and anyplace.

.

1.2 Project Purpose:

This IOT based child safety gadget for child safety monitoring and notification project makes parents to easily monitor their children in real time just like staying beside them as well as focusing on their own career without any manual intervention.

And also it refers to protecting children from or against any perceived or real danger/risk. It helps to reduce their vulnerability in harmful situations. It also means protecting children against social, psychological and emotional insecurity and distress. Basically, children cannot complain about abusements which they face in their daily life to their parents.

CHAPTER 2

LITERATURE SURVEY

2.1 Existing Problem:

1. RFID-based System for School Children Transportation Safety Enhancement This paper presents a system to monitor pick-up/drop-off of school children to enhance the safety of children during daily transportation from and to school. The system consists of two main units, a bus unit, and a school unit. The bus unit the system is used to detect when a child boards or leaves the bus. This information is communicated to the school unit that identifies which of the children did not board or leave the bus and issues an alert message accordingly. The system has a developed web-based database-driven application that facilities its management and provides useful information about the children to authorized personnel. A complete prototype of the proposed system was implemented and tested to validate the system functionality. The results show that the system is promising for daily transportation safety.

2. Parents need not have a smart mobile. Set of keywords are used to gain information from the kit. LOCATION keyword is used to obtain the location of the child. UV keyword is used to obtain the temperature of the surroundings. BUZZ keyword is used to turn on the buzzer which is fixed in that device.

3. A portable device which will have a pressure switch. As soon as an assailant is about to attack the person or when the person senses any insecurity from a stranger, he/she can then put pressure on the device by squeezing or compressing it. Instantly the pressure sensor senses this pressure and a conventional SMS, with the victim's location will be sent to their parents/guardian cell phone numbers stored in the device while purchasing it, followed by a call. If the call is unanswered for a prolonged time, a call will be redirected to the police and the same message will be sent. Additionally, if the person crosses some area which is usually not accessed by the person then a message with the real-time location is sent to the parent/guardian's phone via conventional SMS.

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

2.2 Problem Statement definition:

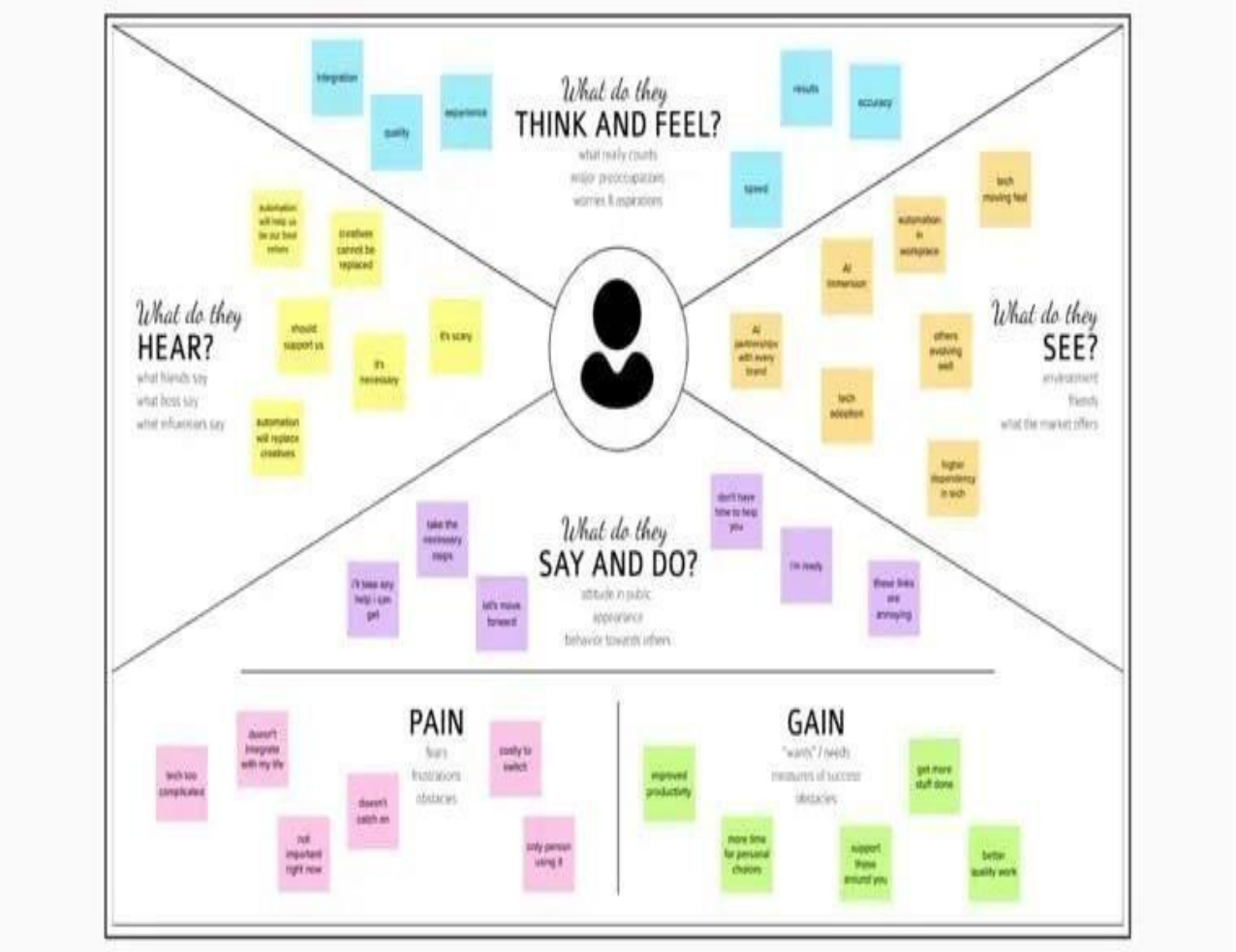
A tracker that helps parents tracks a childs location so that the child does not get into dangerous situations. Save the child as soon as possible is main moto of this statement.

CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 Empathy map canvas:

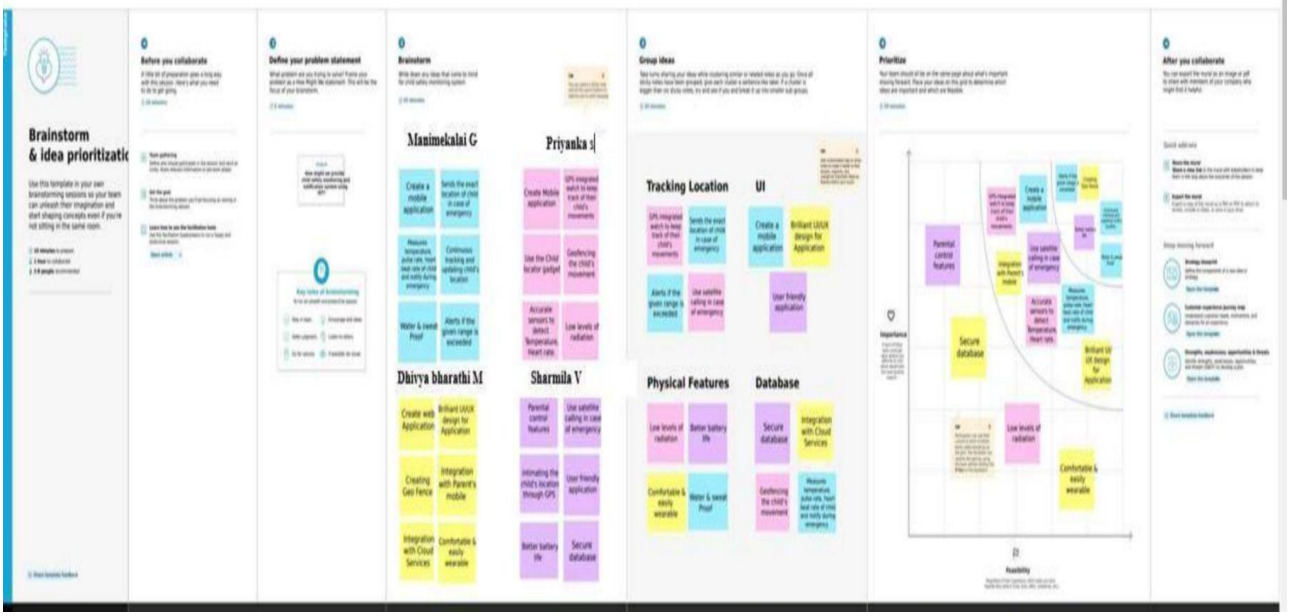
In empathy map canvas, we gathered views of different people and it help us to understand the user behaviour . It help us to gain a deeper insight into our customers. The four empathy map quadrants look at what the user says, thinks , feels, and does and it helps us to understand the user better.



3.2 Ideation And Brainstroming

Ideation helps us to gether the idea of our individual teammates and grouping them based on the possibilities and similarities.It also helps us to prioritize our ideas based on importance and feasibility.

Brainstorm & Idea Prioritization:

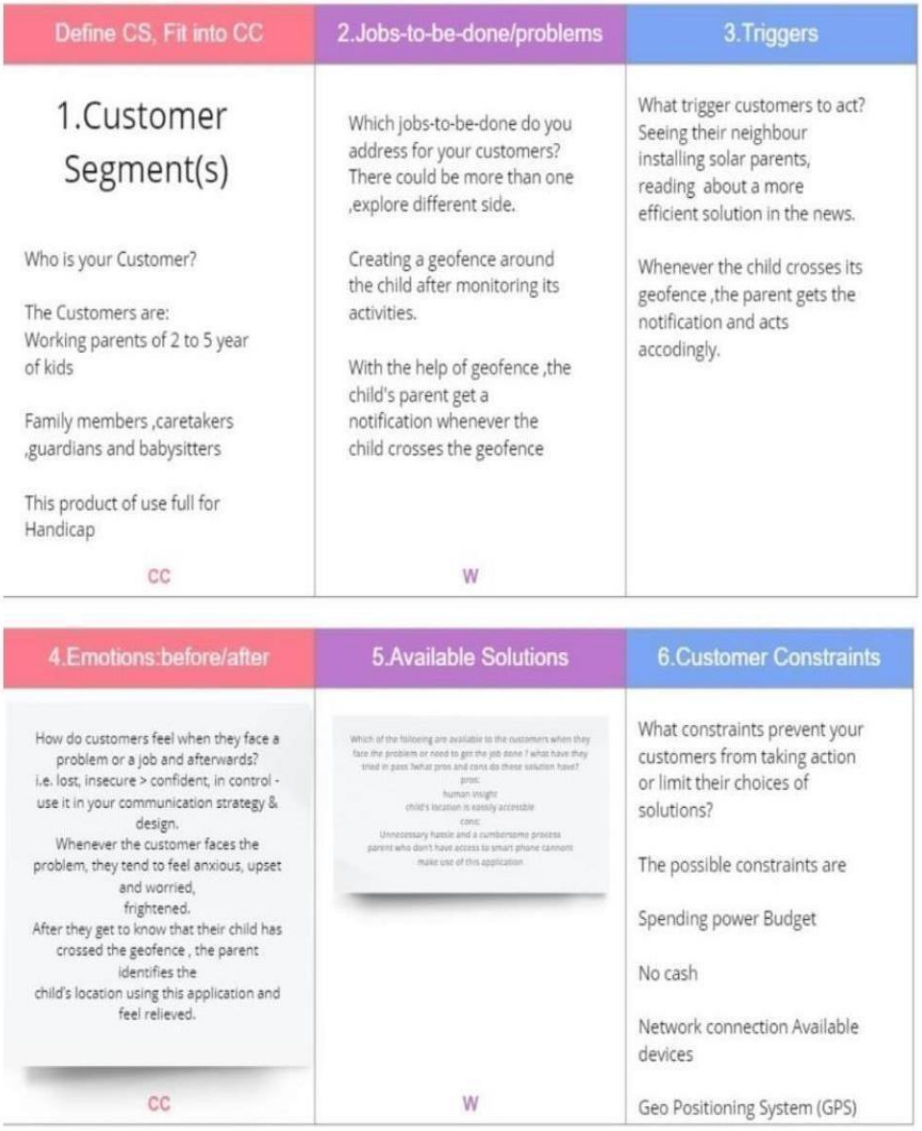


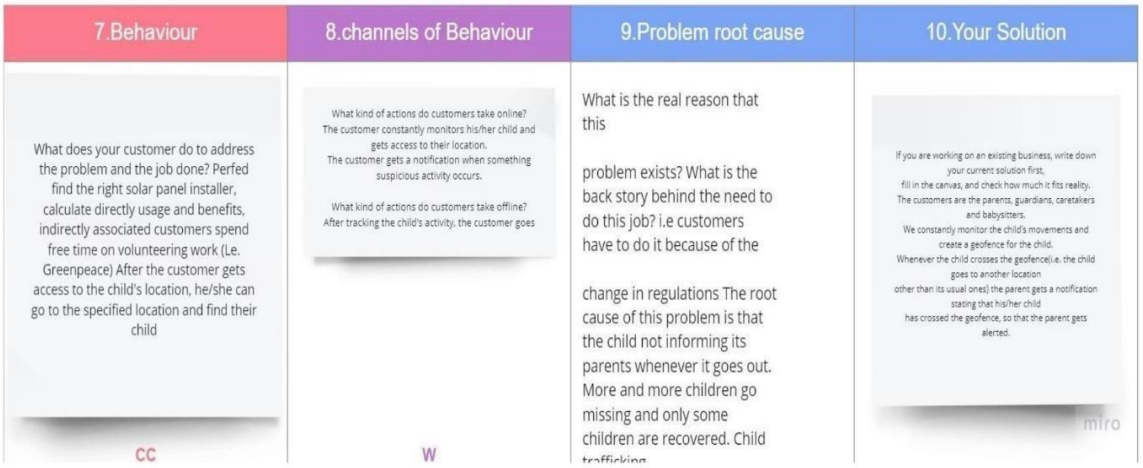
3.3 Proposed Solution:

Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	A tracker that helps parents track a child's location so that the child does not get into dangerous situations.
2.	Idea / Solution description	• Child tracker helps the parents in continuously monitoring the child's location. • They can simply leave their children in school or parks and create a geofence around the particular location. • By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.
3.	Novelty / Uniqueness	• A tracker used for child's safety and protection, such that it won't interfere with the day-to-day life of the child as well as be a very easy to use interface for parents has not been developed yet. • Hence, the proposed solution will ensure that there is a device that can be used in all areas, and uses different sorts of software's integrated together to maintain accuracy and ensure the safety of the child.
4.	Social Impact / Customer Satisfaction	• Reduce the anxiety, worry and nervousness of a parent when they are not around the child. Having a peace of mind on the child's whereabouts will increase customer satisfaction, as well as the inclusion of an easy to use and interactive user interface. • The reduction of child kidnappings, injuries, accidents, and missing children in the country
5.	Business Model (Revenue Model)	Business to Consumer Model Licensing Model Subscription Model Freemium Model
6.	Scalability of the Solution	By adopting multiple data storage technologies, controlling the IoT data pipeline, and using automated bootstrapping we ensure that the device is highly scalable.

3.4 Problem Solution Fit:




7.Behaviour
What does your customer do to address the problem and the job done? Perfed find the right solar panel installer, calculate directly usage and benefits, indirectly associated customers spend free time on volunteering work (I.e. Greenpeace) After the customer gets access to the child's location, he/she can go to the specified location and find their child
CC
8.channels of Behaviour
What kind of actions do customers take online?
The customer constantly monitors his/her child and gets access to their location.
The customer gets a notification when something suspicious activity occurs.
What kind of actions do customers take offline?
After tracking the child's activity, the customer goes
W
9.Problem root cause
What is the real reason that this
problem exists? What is the back story behind the need to do this job? i.e customers have to do it because of the
change in regulations The root cause of this problem is that the child not informing its parents whenever it goes out. More and more children go missing and only some children are recovered. Child
10.Your Solution
If you are working on an existing business, write down your current solution first,
fill in the canvas, and check how much it fits reality.
The customers are the parents, guardians, caretakers and babysitters.
We constantly monitor the child's movements and create a geofence for the child.
Whenever the child crosses the geofence(i.e. the child goes to another location
other than its usual ones) the parent gets a notification stating that his/her child
has crossed the geofence, so that the parent gets alerted.
miro

CHAPTER 4

REQUIREMENT ANALYSIS:

In order to describe the requirements of our project we have listed our functional and non-functional requirements along with its sub requirement

4.1 FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

Functional Requirements:

Following are the functional requirements of the proposed solution

FR.NO	Functional requirements	Sub Requirements(Story/Sub-Task)
FR-1	User registration/login	Registration through Gmail
FR-2	Create site details	Module records only user and password of the user
FR-3	View GPS Location	The android application users google GPS location map services to locate their child's location
FR-4	Manage site	Parents are manage the sites details
FR-5	Notification	Receive SMS and Email from child in emergency time
FR-6	Sos button-for emergency	Alert them if the child is in danger to the parents

Non-functional requirements

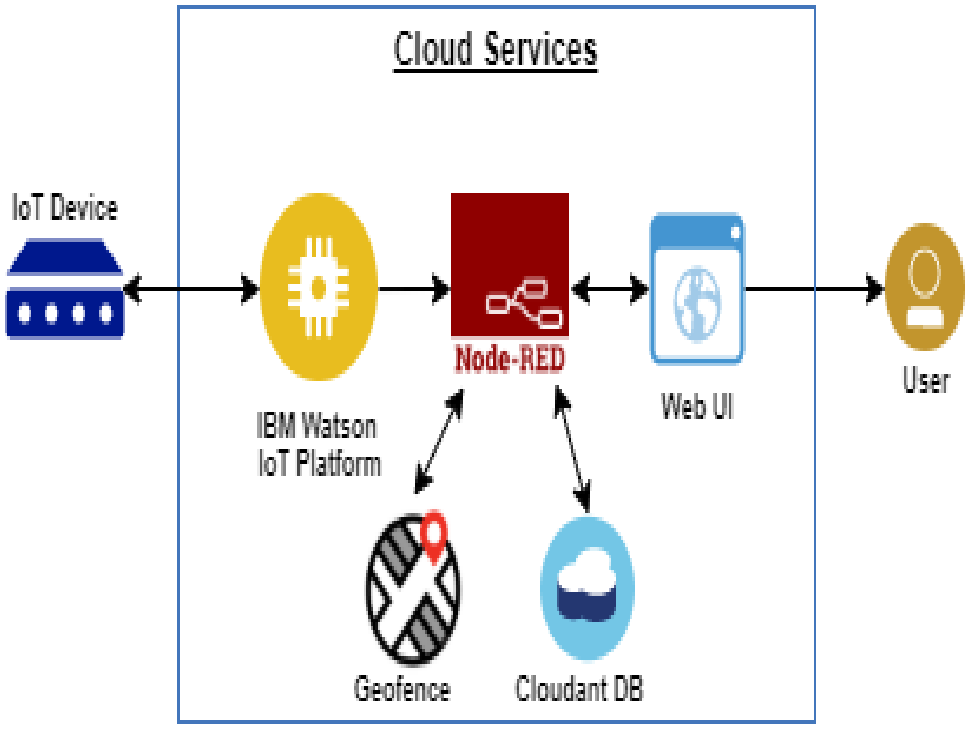
Following are the non-functional requirements of the proposed solution

FR.NO	Non-Functional requirements	Description
NFR-1	Usability	Ease of use and user friendly interface
NFR-2	Security	App operation and use of safety requirements related to access control,private data processing And external attack risk reduction
NFR-3	Reliability	App behavior in case of alarm status
NFR-4	Scalability	It ways to expand the system and avoid adversely affected performance
NFR-5	Performance	How many simultaneous users or transaction the system is to service and it's response
NFR-6	Availability	Requirements for app continuous running

Service used:

- IBM cloud
- IBM Watson IoT Platform
- Node-RED Service
- Cloudant DB

BLOCK DIAGRAM:



Hardware / Software designing:

To complete this project , you should have the following software and packages.

Softwares:

- Python IDE 3.7
- Node red

Packages:

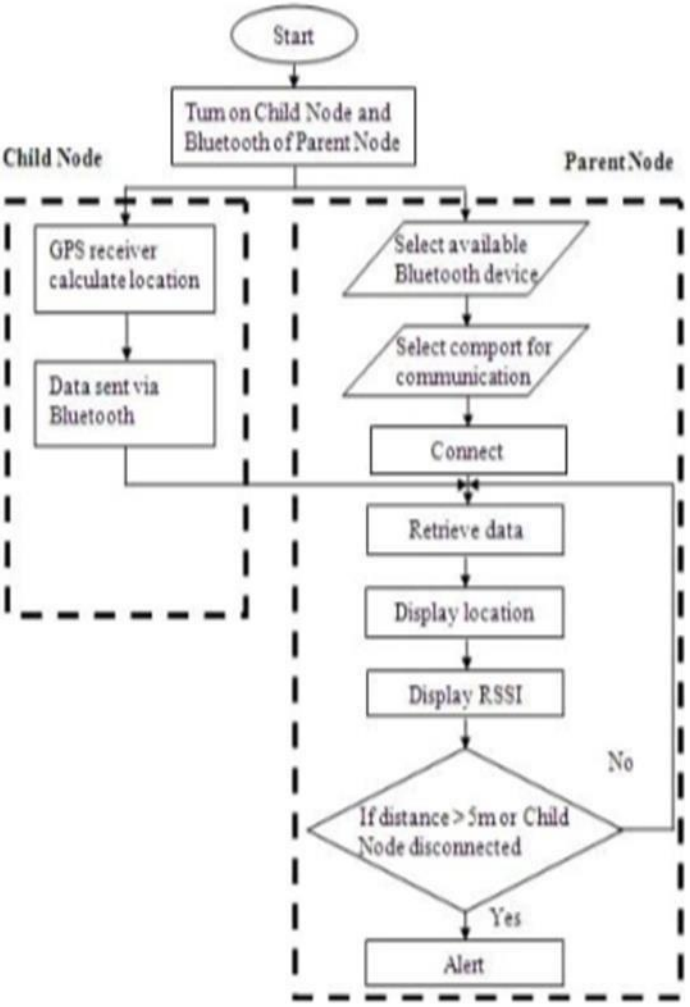
- wiotp-sdk

CHAPTER 5

PROJECT DESIGN

5.1 Data Flow Diagram:

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



5.2 Solution & Technical Architecture

The below diagram shows the technical architecture.

The tables below describe the technologies used for each process and application characteristics.

Technical Architecture:

Table-1 :

Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The communication protocol being used in the proposed solution might act as an interface the way like WiFi, Bluetooth and ZigBee	MIT app
2.	Application Logic	The data to be collected and sent to the authenticator s(parent) via GSM providing the GPS coordinates to easily locate access and monitor the child	IBM Watson STT service, python etc
3.	Database	Data to be segregated and secured in the form of relational DBMS	MySQL
4.	Cloud Database	IBM	IBM Cloudant
5.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
6.	ExternalAPI-1	To access the children location	GPS location monitoring etc
7.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration	Cloud Foundry

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	The proposed solution being framed in the form an android application providing the end user an easy surveillance of their children (preferably users are parents)	UI/UX design developement
2.	Security Implementations	The developed application should be accessible in the way it can only respond to the comments of the relevant users	Encryptions, IAM Controls.
3.	Scalable Architecture	The app format comes the way easier to handle and operate.	Not yet determined
4.	Availability	The developed solution tends to be available in the market at any time	Not yet determined
5.	Performance	Highly proper and betterment functionalities are to be ensured in the designed solution	Not yet determined

5.3 User stories

User stories helps to capture a description of a software feature from an end-user perspective. Here, it helps us to categorize the requirements based on user's preference.

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Simulation creation	USN-1	Connect Sensors and Arduino with python code	2	High	Manimekalai G Priyanka s Dhivya Bharathi M Sharmila V
Sprint-2	Software	USN-2	Creating device in the IBM Watson IoT platform, workflow for IoT scenarios using Node-Red	2	High	Manimekalai G Priyanka s Dhivya Bharathi M Sharmila V
Sprint-3	MIT App Inventor	USN-3	Develop an application for the Smart farmer project using MIT App Inventor	2	High	Manimekalai G Priyanka s Dhivya Bharathi M Sharmila V
Sprint-3	Dashboard	USN-3	Design the Modules and test the connect to data base.	2	High	Manimekalai G Priyanka s Dhivya Bharathi M Sharmila V
Sprint-4	Web UI	USN-4	To make the user to interact with software and find the Location	2	High	Manimekalai G Priyanka s Dhivya Bharathi M Sharmila V

CHAPTER 6

PROJECT PLANNING AND SCHEDULING

6.1 Sprint planning and Estimation:

Sprint 1 is about **REGISTRATION** of the IoT device in Parent's Web Application for getting information about Child's Status.

Sprint 1:Coding,Output-Screenshot

```
<html><head>
<form action="action page php" method="post">
 <form>
<div class="container">
<h1>Register Here</h1>
<p>Please fill in the details to create an account with us.</p><hr>
<div>
<label for="id"><b>device id</b></label>
<input type="text" placeholder="device id" name="id"></div>
<div>
<label for="email"><b>Enter Email</b></label>
<input type="text" placeholder="Enter Email" name="email"></div>
<div>
<label for="pwd"><b>Password</b></label>
```

```
<input type="password" placeholder="Enter Password" name="pwd"></div>
<div>
<label for="confirm"><b>Confirm Password</b></label>
<input type="password" placeholder="Confirm Password" name="confirm"></div><hr>
<p>By creating an account you agree to our <a href="#">Terms & Privacy</a>.</p>
<button type="submit" class="registerbtn"><strong>Register</strong></button>
</div>
<div class="container signin">
<p>Already have an account? <a href="#">Sign in</a>.</p>
</div>
</form><style></head> body { background-
color: #9FE2BF;
}
</style>
<style> div { background-color:#9FE2BF; padding-top: 30px; padding-right:
30px; padding-bottom: 50px; padding-left: 80px; position:center; align-content:
center;
}
</style></html>
```

Sprint -2

LOGINandNOTIFIACATIONoftheIoTdeviceinParent'sWebApplicationforgettinginformationaboutChild'sStatus.

LOGIN:-

Coding,Output,Screenshot

```
<!DOCTYPEhtml>
<html><head>
<metaname="viewport"content="width=device-width,initial-scale=1">
<title>LoginPage</title>
<style>Body{fontfamily:Calibri,Helvetica,
        sansserif;background-color:#9FE2BF;
}
button{  backgroundcolor:#9FE2BF;
width:100%;              color:black;
```

```
padding:15px;       margin:10px0px;
border:none; cursor:pointer;
        }form{ border:
3pxsolid#f1f1f1;
   }
input[type=text],input[type=password]
{ width:100%; margin:
8px0;padding:12px20px; display:inline-block; border:
2pxwhite;box-sizing:border-box;
   }
button:hover
{opacity:0.7;
   }
 .cancelbtn{ width:
auto;padding:10px
18px;margin:10px
5px;
   }
 .container{ padding:
25px;backgroundcolor:#CCCCFF;
   }
</style></head>
```

```
<body>
  <center><h1>LoginForm</h1></center>
  <form>
    <divclass="container">
    <label>DeviceID/Number:</label>
      <inputtype="password"placeholder="EnterPassword"name="password"required>
      <label>E-Mail:</label>
      <inputtype="text"placeholder="EnterUsername"name="username"required>
      <label>Password:</label>
      <inputtype="password"placeholder="EnterPassword"name="password"required>
      <buttontype="submit">Login</button>
      <buttonclass="loginBtnloginBtn--facebook">LoginwithFacebook.</button>
      <buttonclass="loginBtnloginBtn--google">LoginwithGoogle.</button>
      <inputtype="checkbox"checked="checked">Rememberme
      <buttontype="button"class="cancelbtn">Cancel</butt on>Forgot<ahref="#">password?</a>
    </div>
  </form>
</body>
</html> OUTPUT:
```

```
TOKEN"OKZ+q@JfPWDOd6wBTj"//Tok
enStringdata3;floatdist;
//------------customizetheabovevalue charserver[]=ORG
".messaging.internetofthings.ibmcloud.com";//servernamecharpublishtopic[]="ultrasonic/e
vt/Data/fmt/json";/*topicnameandtypeofeventperformandformatinwhichdatatobe
send*/charsubscribetopic[]="ultrasonic/cmd/test/fmt/String";/*cmd REPRESENTCommandtupeand
COMMANDISTESTOFFORMATSTRING*/ charauthMethod[]="use-token-auth";//authentication methodchartoken[]=TOKEN;char
clientid[]="d:"ORG":"DEVICE_TYPE":"DEVICE_ID;//CLIENTID
//.....
WiFiClientwifiClient;//creatinganinstanceforwificlient
PubSubClientclient(server,1883,callback,wifiClient);/*callingthepredefinedclientidby
passingparameterlikeserverid,portandwificredential*/intLED=4;inttrig=5;intecho=18;void
setup(){Serial.begin(115200);pinMode(trig,OUTPUT);pinMode(echo,INPUT);pinMode(LED,OUTPUT);
delay(10);Serial.println();wificonnect();mqttconnect();
}
voidloop()
{digitalWrite(trig,LOW);digital Write(trig,HIGH);delayMicrose
conds(10);digitalWrite(trig,LO W);floatdur=pulseIn(echo,HIG
H);floatdist=(dur*
0.0343)/2;Serial.print("distanc
```

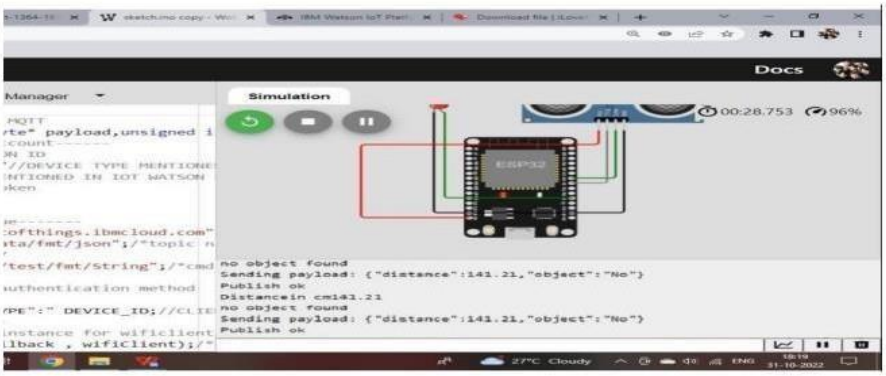
```
eincm");
 Serial.println(dist);Publis
hData(dist);delay(1000);if
(!client.loop()){mqttconne ct();
 }
}
/*.....retrivingtocloud.....*/voidPublishData(floatdist){mqttconnect();//functi
oncallforconnectingtoibm

String object;if(dis
t<100)
{
  digitalWrite(LED,HIGH);
Serial.println("noobjectisnear");object="Nea
r";                    }          else
{digitalWrite(LED,LOW);Serial.println("noobj ectfound");object="No";
 }
 String payload="{\"distance\":";payload
+=dist;payload
+=",""\"object\":\"";payload+=object; payload+="\"}";
```

```
Serial.print("Sendingpayload:"); Serial.println(payload);
if(client.publish(publishtopic,(char*)payload.c_str())){
  Serial.println("Publishok");

  }else{

   Serial.println("Publishfailed");
 }}voidmqttconnect(){i f(!client.connected()){
   Serial.print("Reconnectingclientto");
Serial.println(server);while(!!!client.connect(clientid,authMet hod,token)){Serial.print(".");
          delay(500);
   } initManagedDevice();
   Serial.println(); }}voidwificonnect()//functiondefenitionforwificonnect{

Serial.println();
Serial.print("Connectingto");
 WiFi.begin("vivo1816","taetae95",6);//PASSINGTHEWIFICREDIDENTIALSTOESTABLISH
CONNECTIONwhile(WiFi.status()!=WL_CONNECTED){ delay(500);
   Serial.print(".");
 }
 Serial.println("");Serial.println("
 WiFiconnected");Serial.println(
```

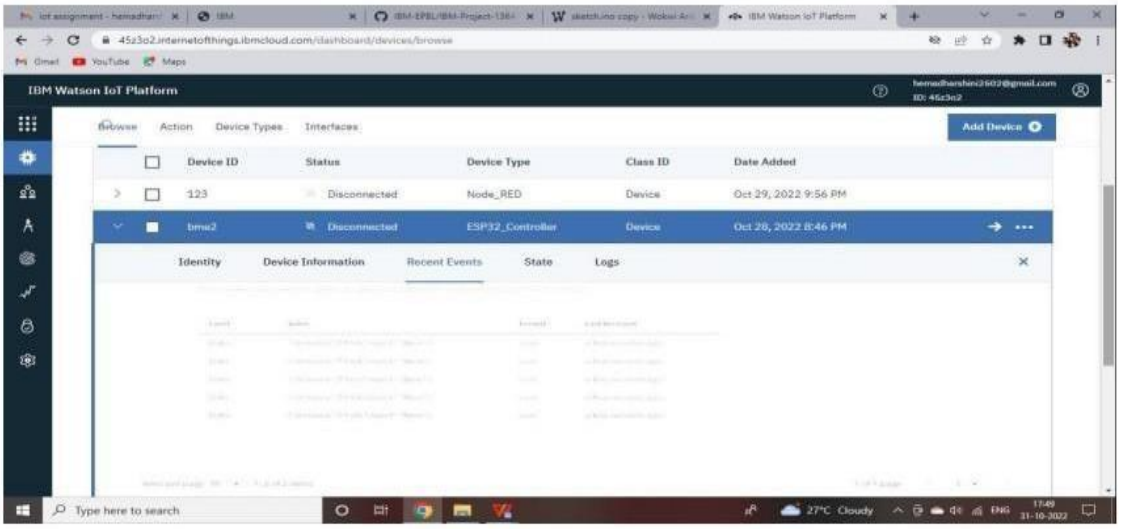
```
 "IP
 address");Serial.println(WiFi.lo
callP()); }void
initManagedDevice(){if(client.subsc ribe(subscribetopic)){Serial.println(
(subscribetopic));
   Serial.println("subscribetocmdOK");
 }else{
   Serial.println("subscribetocmdfailed");
 }
}voidcallback(char*subscribetopic,byte*payload,unsignedintpayloadLength)
{
 Serial.print("callbackinvokedfortopic:");
Serial.println(subscribetopic);for(inti=0; i<payloadLength;i++){
//Serial.print((char)payload[i]);data3+=(char)paylo ad[i];
 //Serial.println(data3);
//digitalWrite(LED,LOW);//}data3="";
}
```

OUTPUT:

Whenchildisnotdetectedwithinthesafezonewiththehelpofl oTdevice



Childsstatusarenotifiedtoparentsdeviceusingcloudservice

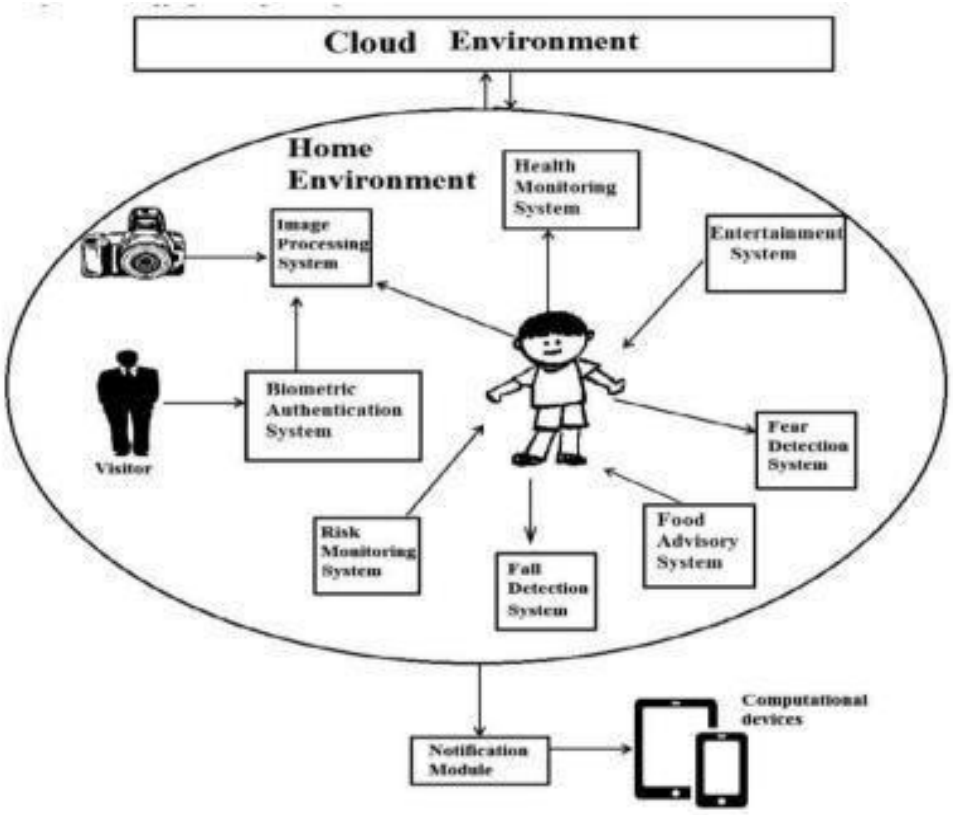


Sprint-3

- The Smart Mom architecture thus eases their work and helps them in taking care of the child It is also assumed that this system is useful for children between ages five to fifteen years.
- Since, children below five years are years delicate to be taken care of by an autonomous system and children above fifteen years are grown up enough to be taken care of by their mothers pervasively.
- Smart Mom architecture is divided into two domains namely−the cloud environment and the home environment. Each domain is subdivided into a number of modules depending upon the application system.

Notification module

- The notification is responsible for sending notifications to the computing devices either at home or outside. The computing device can be wired or wireless and may belong to either the child, the governess,doctor or the mother of the child depending upon the needed application.



Python Serial Loopback Test

```
import serial

#####Global Variables#########################################
#be sure to declare the variable as 'global var' in the fxnser = 0

#####FUNCTIONS###############################################

#initialize serial

connectiondef init_serial():

COMNUM = 9 #set you COM port # here

global ser #must be declared in each fxn

usedser = serial.Serial()

ser.baudrate = 9600

ser.port = COMNUM - 1 #starts at 0, so subtract
```

1#ser.port = '/dev/ttyUSB0' #uncomment for linux
#you must specify a timeout (in seconds) so that the# serial port doesn't hang

ser.timeout = 1

ser.open() #open the serial

port # print port open or

closedif ser.isOpen():

print 'Open: ' + ser.portstr

#####SETUP###

#this is a good spot to run your initializationsinit_serial()

#####MAIN LOOP###

while 1:

#prints what is sent in on the serial port

temp = raw_input('Type what you want to send, hit enter:\n\r')

ser.write(temp) #write to the serial port

bytes = ser.readline() #reads in bytes followed by a newline print

'You sent: ' + bytes #print to the console

break #jump out of loop

#hit ctr-c to close python window

```
#adjust these values based on your location and m
TRX = -105.1621     #top right longitude
TRY = 40.0868       #top right latitude
BLX = -105.2898     #bottom left longitude
BLY = 40.0010       #bottom left latitude
```

Run the program by typing:

- High-level language software design has long stayed in use for surrounded-systems growth.
- Though, assemblage programming still overwhelms, mostly for digital-signal processor (DSP) based systems.
- DSPs are frequency systems automatic in assembly language by computer operator who know the processor building inside out. The key incentive for this practice is

performance, even with the disadvantages of assembly software design when linked to high level programming.

Sprint-4

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>
<head>
<title>Child Safety Tips - Kidnapping Escape</title>
<link href="https://www.crime-safety-security.com/crime.xml" rel="alternate" title="RSS"
type="application/rss+xml"/>
<style type="text/css">
#addSiteTo {
width:90%;
font-size:85%;
text-align:center;
padding:8px 0;
border:1px solid #000;
margin:12px auto;
background-color: #FFFFFF;
}

#addSiteTo p {
padding:2px 2px 4px;
margin:0;

}
```

```
}

#addSiteTo img {
border:0;
padding:1px 0;



  #addSiteTo .questionMark {
   padding:0;
   margin:1px auto;
   text-align:center;
   width:75%;
   }

   #addSiteTo .questionMark img {
   margin:0 4px 4px 0;
   padding:0;
   }
  </style>
  <meta content="text/html; charset=utf-8" http-equiv="Content-Type"/>
  <meta content="Child Safety Tips for stranger danger and personal safety devices to prevent child
  kidnapping." name="Description"/>
  <meta content="Child Safety, Stranger Danger, child kidnapping, Personal Safety Devices"
  name="Keywords"/>
  <link href="http://web.archive.org/web/20120213042846cs_/http://www.crime-safety-
  security.com/support-files/classic_footer.css" rel="stylesheet" type="text/css"/>
  <meta content="SKYPE_TOOLBAR_PARSER_COMPATIBLE" name="SKYPE_TOOLBAR"/>
  <link href="https://www.crime-safety-security.com/child-safety-kidnap.html" rel="canonical"/>
  <script language="JavaScript" type="text/javascript">
  <!--

  function MM_swapImgRestore()
  {
     var i,x,a=document.MM_sr; for(i=0;a&&i<a.length&&(x=a[i])&&x.oSrc;i++) x.src=x.oSrc;

  }
```

```
function MM_preloadImages()
{
  var d=document;
  if(d.images)
  {
        if(!d.MM_p) d.MM_p=new Array();
        var i,j=d.MM_p.length,a=MM_preloadImages.arguments;
        for(i=0; i<a.length; i++)
          if (a[i].indexOf("#")!=0)
          {
                d.MM_p[j]=new Image; d.MM_p[j++].src=a[i];
          }
  }
}

function MM_swapImage()
{
  var i,j=0,x,a=MM_swapImage.arguments;
  document.MM_sr=new Array;
  for(i=0;i<(a.length-2);i+=3)
        if ((x=MM_findObj(a[i]))!=null){document.MM_sr[j++]=x; if(!x.oSrc) x.oSrc=x.src;
x.src=a[i+2];}
}

function MM_openBrWindow(theURL,winName,features)
{
  window.open(theURL,winName,features);
}
```

```
function MM_findObj(n, d)
{
  var p,i,x;
  if(!d) d=document; if((p=n.indexOf("?"))>0&&parent.frames.length)
  {
        d=parent.frames[n.substring(p+1)].document; n=n.substring(0,p);
  }
  if(!(x=d[n])&&d.all)
        x=d.all[n];
  for (i=0;!x&&i<d.forms.length;i++) x=d.forms[i][n];
  for(i=0;!x&&d.layers&&i<d.layers.length;i++)
        x=MM_findObj(n,d.layers[i].document);
  if(!x && d.getElementById)
        x=d.getElementById(n);
  return x;

}
//-->
</script>
<script language="JavaScript" type="text/JavaScript">
<!--
function MM_displayStatusMsg(msgStr) { //v1.0
  status=msgStr;
  document.MM_returnValue = true;
}
//-->
</script>
```

```
<style media="all" type="text/css">

body, td

{

        font:13px Verdana, Geneva, Arial, Helvetica, sans-serif;

        color:#000;

        margin: 0px;

        }

</style>

</head>

<body alink="Red" background="http://www.crime-safety-security.com/imgs/backimage.gif"
bgcolor="#FFFFFF" link="Blue" onload="MM_preloadImages('http://www.crime-safety-
security.com/imgs/index-over.gif', 'http://www.crime-safety-security.com/imgs/crime-blog-over.gif',
'http://www.crime-safety-security.com/imgs/site-directory-over.gif', 'http://www.crime-safety-
security.com/imgs/index-sitemap-over.gif', 'http://www.crime-safety-security.com/imgs/Stranger-
Danger-over.gif', 'http://www.crime-safety-security.com/imgs/Internet-Safety-for-Kids-over.gif',
'http://www.crime-safety-security.com/imgs/Cyber-Bullying-over.gif', 'http://www.crime-safety-
security.com/imgs/Stop-Bullying-over.gif', 'http://www.crime-safety-security.com/imgs/School-
Violence-over.gif', 'http://www.crime-safety-security.com/imgs/Teen-Abuse-over.gif',
'http://www.crime-safety-security.com/imgs/Cyber-Stalking-over.gif', 'http://www.crime-safety-
security.com/imgs/College-Security-over.gif', 'http://www.crime-safety-security.com/imgs/Running-
Safety-over.gif', 'http://www.crime-safety-security.com/imgs/Street-Crime-over.gif',
'http://www.crime-safety-security.com/imgs/Purse-Snatching-over.gif', 'http://www.crime-safety-
security.com/imgs/Parking-Lot-Safety-over.gif', 'http://www.crime-safety-
security.com/imgs/Driving-Safety-Tips-over.gif', 'http://www.crime-safety-
security.com/imgs/Apartment-Security-over.gif', 'http://www.crime-safety-
security.com/imgs/Burglary-Prevention-over.gif', 'http://www.crime-safety-
security.com/imgs/Camping-Safety-over.gif', 'http://www.crime-safety-security.com/imgs/Myth-
Busters-over.gif', 'http://www.crime-safety-security.com/imgs/Urban-Myths-over.gif',
'http://www.crime-safety-security.com/imgs/Free-Range-Kids-over.gif', 'http://www.crime-safety-
security.com/imgs/Myths-and-Urban-Legends-over.gif', 'http://www.crime-safety-
security.com/imgs/True-Crimes-over.gif', 'http://www.crime-safety-security.com/imgs/True-Crime-
Stories-over.gif', 'http://www.crime-safety-security.com/imgs/True-Crime-Library-over.gif',
'http://www.crime-safety-security.com/imgs/Crimes-of-Passion-over.gif', 'http://www.crime-safety-
security.com/imgs/home-security-overview-over.gif', 'http://www.crime-safety-
security.com/imgs/outdoor-safety-overview-over.gif', 'http://www.crime-safety-
security.com/imgs/car-security-overview-over.gif', 'http://www.crime-safety-
security.com/imgs/travel-security-overview-over.gif', 'http://www.crime-safety-
security.com/imgs/child-safety-overview-over.gif', 'http://www.crime-safety-
```

security.com/imgs/women-safety-overview-over.gif', 'http://www.crime-safety-security.com/imgs/workplace-safety-overview-over.gif', 'http://www.crime-safety-security.com/imgs/criminal-minds-intuition-over.gif', 'http://www.crime-safety-security.com/imgs/criminal-minds-overview-over.gif', 'http://www.crime-safety-security.com/imgs/victims-options-overview-over.gif', 'http://www.crime-safety-security.com/imgs/survival-options-overview-over.gif', 'http://www.crime-safety-security.com/imgs/stress-control-overview-over.gif', 'http://www.crime-safety-security.com/imgs/fighting-options-overview-over.gif', 'http://www.crime-safety-security.com/imgs/Verbal-Self-Defense-over.gif', 'http://www.crime-safety-security.com/imgs/Self-Defense-over.gif', 'http://www.crime-safety-security.com/imgs/rape-escape-options-overview-over.gif', 'http://www.crime-safety-security.com/imgs/security-products-overview-over.gif', 'http://www.crime-safety-security.com/imgs/security-products-alarms-over.gif', 'http://www.crime-safety-security.com/imgs/DIY-Home-Security-Systems-over.gif', 'http://www.crime-safety-security.com/imgs/security-products-simple-electronic-over.gif', 'http://www.crime-safety-security.com/imgs/Door-Security-Systems-over.gif', 'http://www.crime-safety-security.com/imgs/Peepholes-over.gif', 'http://www.crime-safety-security.com/imgs/Home-Intercom-System-over.gif', 'http://www.crime-safety-security.com/imgs/Lock-Bumping-over.gif', 'http://www.crime-safety-security.com/imgs/Sliding-Door-Security-over.gif', 'http://www.crime-safety-security.com/imgs/Outdoor-Security-Lighting-over.gif', 'http://www.crime-safety-security.com/imgs/Pepper-Spray-over.gif', 'http://www.crime-safety-security.com/imgs/Personal-Security-Alarm-over.gif', 'http://www.crime-safety-security.com/imgs/GPS-Child-Locator-over.gif', 'http://www.crime-safety-security.com/imgs/Senior-Safety-Products-over.gif', 'http://www.crime-safety-security.com/imgs/crime-survivors-overview-over.gif', 'http://www.crime-safety-security.com/imgs/newsletter-archive-t-2-over.gif', 'http://www.crime-safety-security.com/imgs/Identity-Theft-over.gif', 'http://www.crime-safety-security.com/imgs/article-bank-t-2-over.gif', 'http://www.crime-safety-security.com/imgs/about-michael-over.gif', 'http://www.crime-safety-security.com/imgs/contact-us-over.gif', 'http://www.crime-safety-security.com/imgs/share-this-site-over.gif', 'http://www.crime-safety-security.com/imgs/privacy-policy-over.gif', 'http://www.crime-safety-security.com/imgs/terms-of-service-over.gif')" vlink="Purple">

<table align="center" border="0" cellpadding="0" cellspacing="0" width="725">

<tbody>

<tr align="left">

<td colspan="2" valign="top"></td>

</tr>

<tr>

<td bgcolor="#CCCCCC" valign="top" width="130">

```
<div id="Layer1" style="position:absolute; width:150px;  z-index:1; visibility: visible; top: 130px;">
<style type="text/css">
.navheader {
display: block;
width: 150px;
font-family: Arial;
font-size: 14px;
font-weight: bold;

color: #FFFFFF;
text-align: center;



border-top-width: 0px;
border-right-width: 0px;
border-bottom-width: 0px;
border-left-width: 0px;
background-color: #6699FF
}
</style>
<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('index','','http://www.crime-safety-security.com/imgs/index-
over.gif',1)"><img alt="Home" border="0" name="index"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/index.gif"/></a>
<br/>
<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image0','','http://www.crime-safety-security.com/imgs/crime-
blog-over.gif',1)"><img alt="RSS/Blog It" border="0" name="Image0"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/crime-blog.gif"/></a>
```


<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image1','','http://www.crime-safety-security.com/imgs/site-directory-over.gif',1)"><img alt="Site Directory" border="0" name="Image1"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-security.com/imgs/site-directory.gif"/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image2','','http://www.crime-safety-security.com/imgs/index-sitemap-over.gif',1)"><img alt="Index/Sitemap" border="0" name="Image2"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-security.com/imgs/index-sitemap.gif"/>

FAQs

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image4','','http://www.crime-safety-security.com/imgs/Stranger-Danger-over.gif',1)"><img alt="Stranger Danger" border="0" name="Image4"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-security.com/imgs/Stranger-Danger.gif"/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image5','','http://www.crime-safety-security.com/imgs/Internet-Safety-for-Kids-over.gif',1)"><img alt="Kid-Safe Internet" border="0" name="Image5"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-security.com/imgs/Internet-Safety-for-Kids.gif"/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image6','','http://www.crime-safety-security.com/imgs/Cyber-Bullying-over.gif',1)"><img alt="Cyber Bullying" border="0" name="Image6"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-security.com/imgs/Cyber-Bullying.gif"/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image7','','http://www.crime-safety-security.com/imgs/Stop-Bullying-over.gif',1)"><img alt="Stop Bullying" border="0" name="Image7"

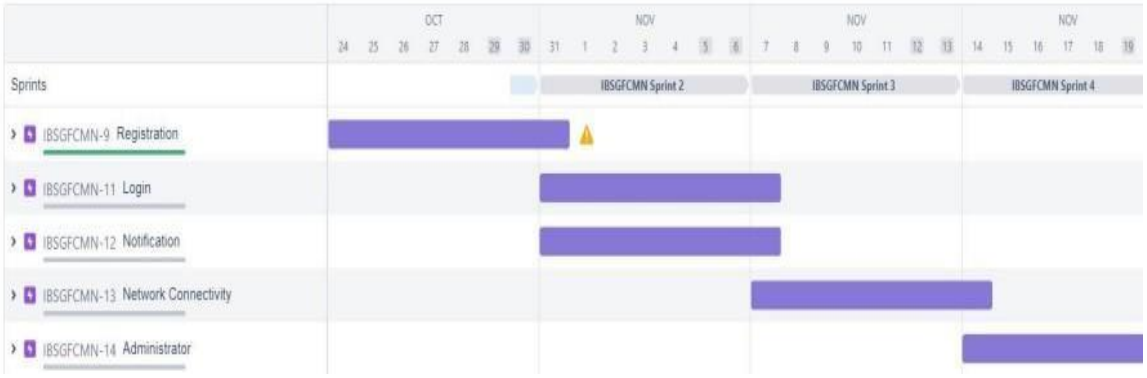
```
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/Street-Crime.gif"/></a>

<br/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image14','','http://www.crime-safety-security.com/imgs/Purse-
Snatching-over.gif',1)"><img alt="Purse Snatching" border="0" name="Image14"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/Purse-Snatching.gif"/></a>

<br/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image15','','http://www.crime-safety-security.com/imgs/Parking-
Lot-Safety-over.gif',1)"><img alt="Parking Lot Safety" border="0" name="Image15"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/Parking-Lot-Safety.gif"/></a>

<br/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image16','','http://www.crime-safety-security.com/imgs/Driving-
Safety-Tips-over.gif',1)"><img alt="Driving Safety Tips" border="0" name="Image16"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/Driving-Safety-Tips.gif"/></a>

<br/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image17','','http://www.crime-safety-
security.com/imgs/Apartment-Security-over.gif',1)"><img alt="Apartment Security" border="0"
name="Image17" src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/Apartment-Security.gif"/></a>

<br/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image18','','http://www.crime-safety-security.com/imgs/Burglary-
Prevention-over.gif',1)"><img alt="Home Defense" border="0" name="Image18"
src="http://web.archive.org/web/20120213042846im_/http://www.crime-safety-
security.com/imgs/Burglary-Prevention.gif"/></a>

<br/>

<a onmouseout="MM_swapImgRestore()"
onmouseover="MM_swapImage('Image19','','http://www.crime-safety-security.com/imgs/Camping-
Safety-over.gif',1)"><img alt="Camping Safety" border="0" name="Image19"
```

6.2 Sprint Delivery Schedule:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

6.3 REPORTS FROM JIRA

JIRA Roadmap Progress:



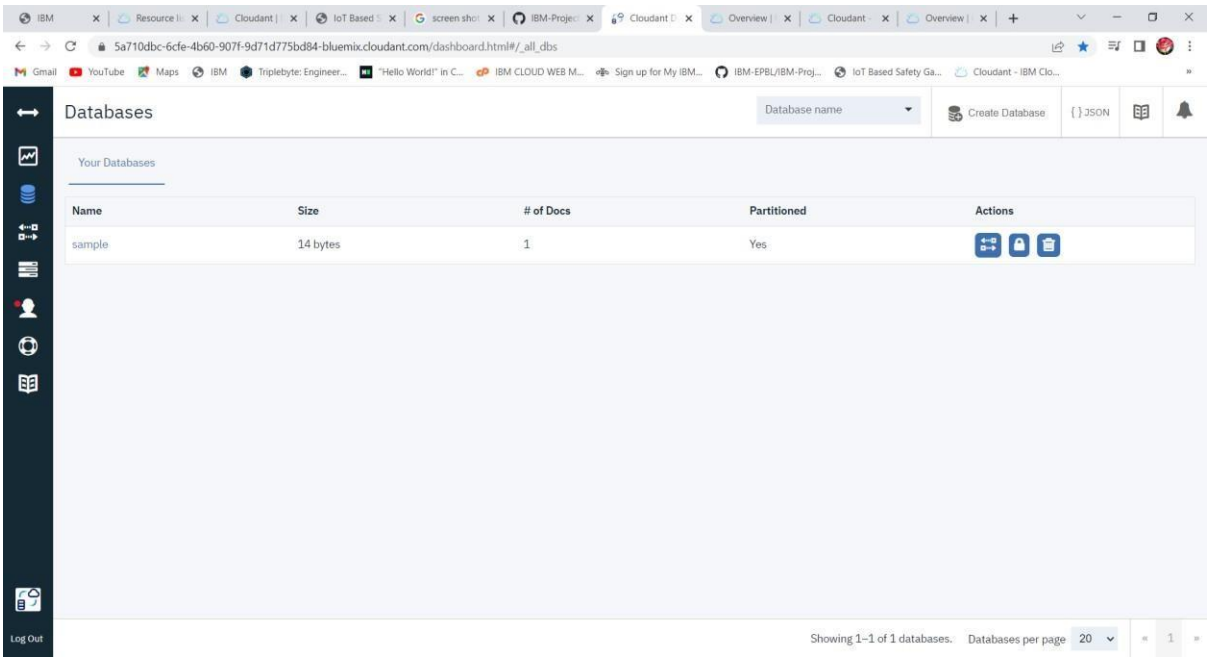
CHAPTER 7
CODING AND SOLUTION

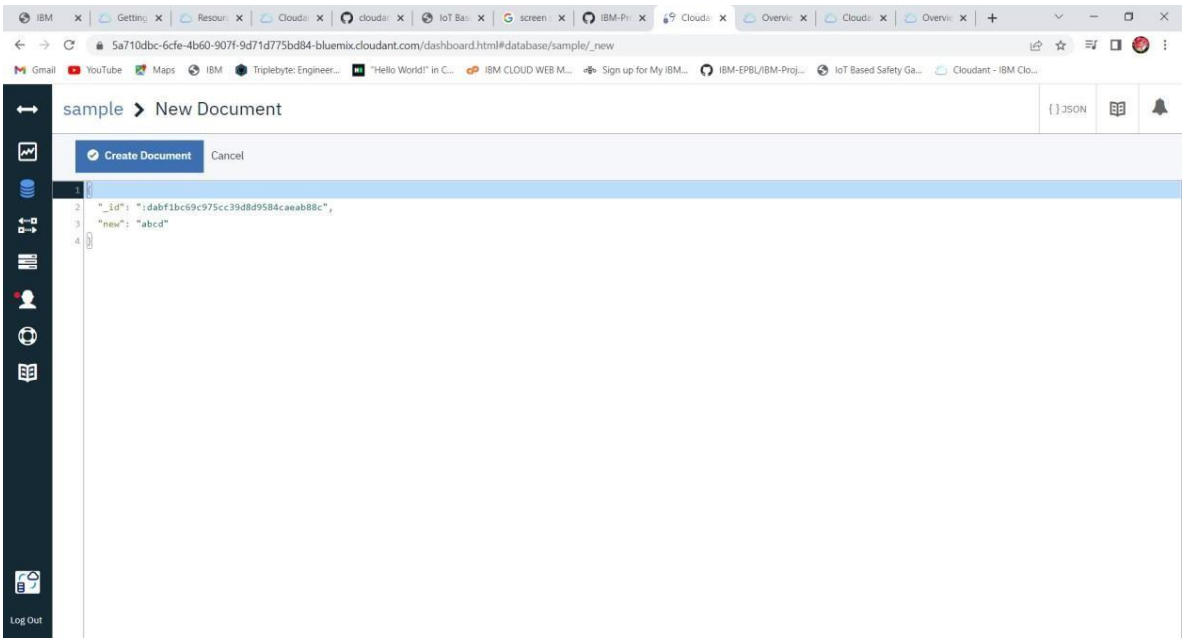
noderedfinal.py - C:\Users\PRIYA\AppData\Local\Programs\Python\Python37\noderedfinal.py (3.7.0)

File Edit Format Run Options Window Help

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random

organization="4fvzwi"
deviceType="raspberrypi"
deviceId="93455"
authMethod="token"
authToken="9345567410"

try:
    deviceOptions={"org": organization,"type": deviceType,"id": deviceId,"auth-method": authMethod,"auth-token": authToken}
    deviceCli=ibmiotf.device.Client(deviceOptions)
except Exception as e:
    print("caught exception connecting device:%s" % str(e))
    sys.exit()

deviceCli.connect()
while True:
        #in data
        name="priyanka"
        #lattitude=11.229592;
        #longtitude=  78.171158;
        #out data
        lattitude=12.7345;
        longtitude=13.2020;

        data={'lat':lattitude,'lon':longtitude,'name':name}
        def myOnPublishCallback():
          print("published lattitude=%d" %lattitude,"longtitude=%d" %longtitude,"to ibm watson")


        success=deviceCli.publishEvent("IotSensor","json",data,qos=0,on_publish=myOnPublishCallback)
        if not success:
            print("Not connected to IoTF")
        time.sleep(3)
deviceCli.disconnect()
```

7.3 DATABASE SCHEMA





CHAPTER 8
TESTING

```
*Python 3.7.0 Shell*
File  Edit  Shell  Debug  Options  Window  Help
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:59:51) [MSC v.1914 64 bit (AMD6
4)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\PRIYA\AppData\Local\Programs\Python\Python37\noderedfinal.py
2022-11-18 18:08:38,164   ibmiotf.device.Client      INFO    Connected successfu
lly: d:4fvzwi:raspberrypi:93455
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
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published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
published lattitude=12 longtitude=13 to ibm watson
```
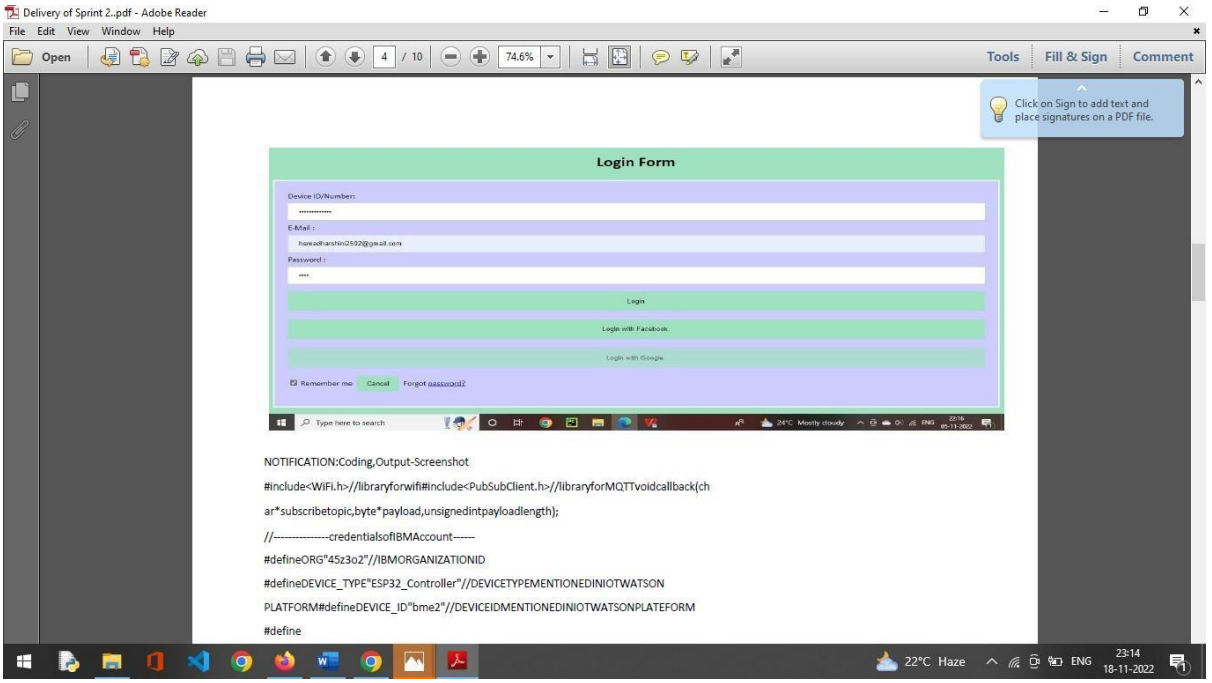
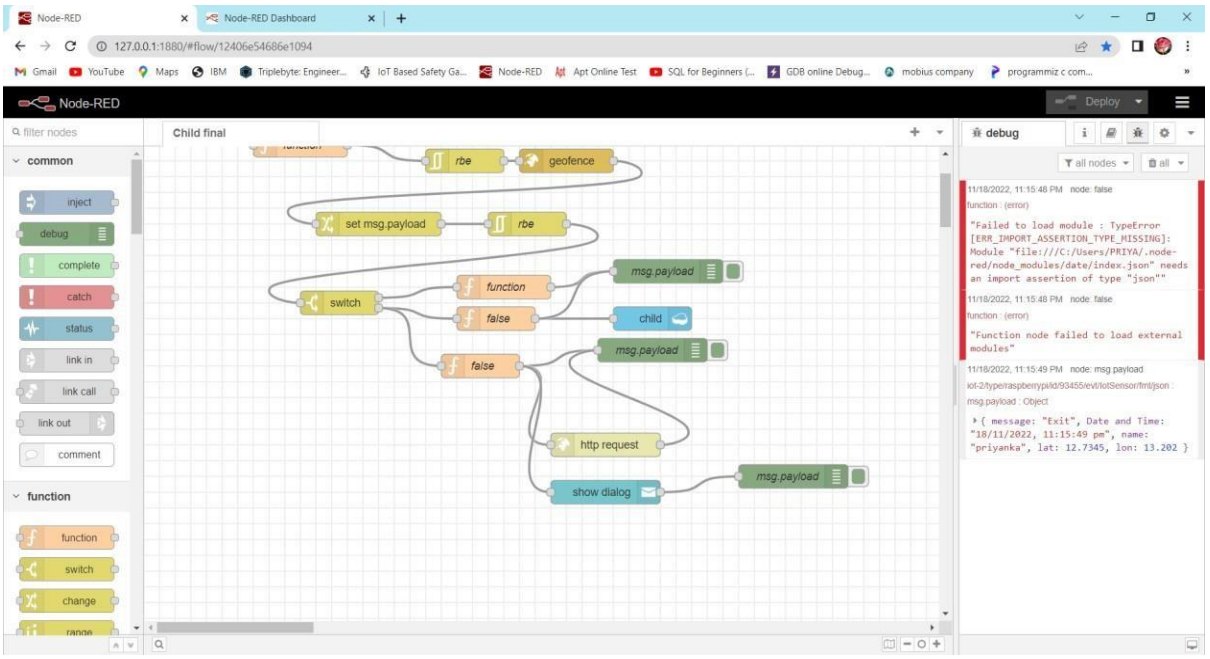
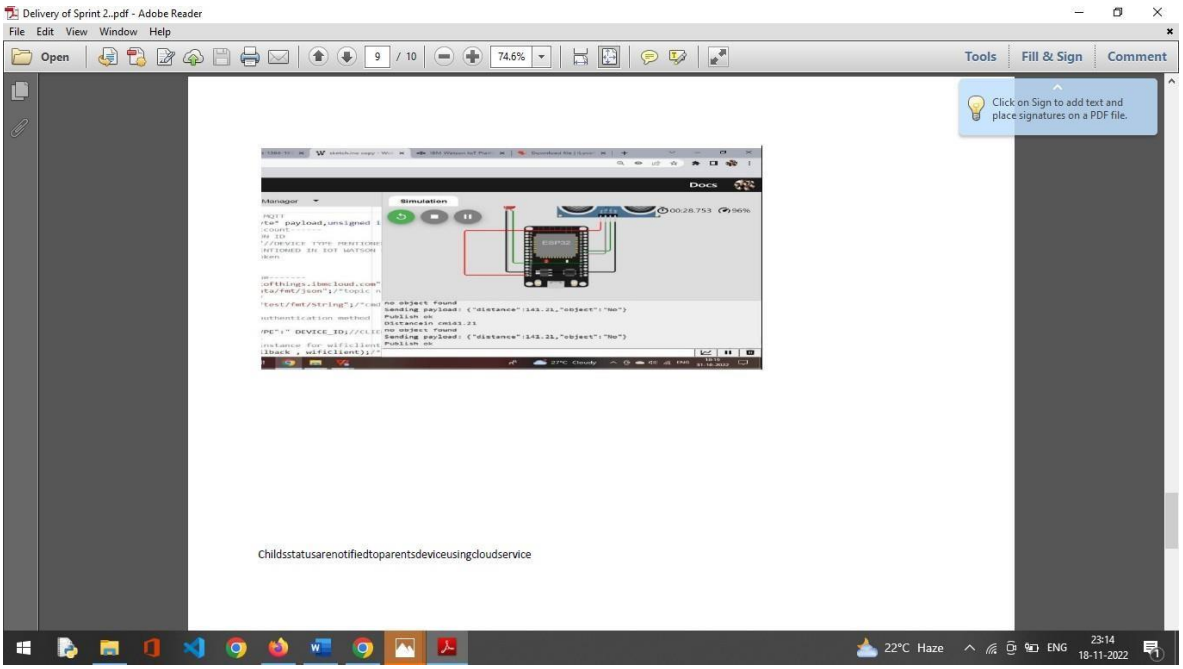

8.1 TEST CASES

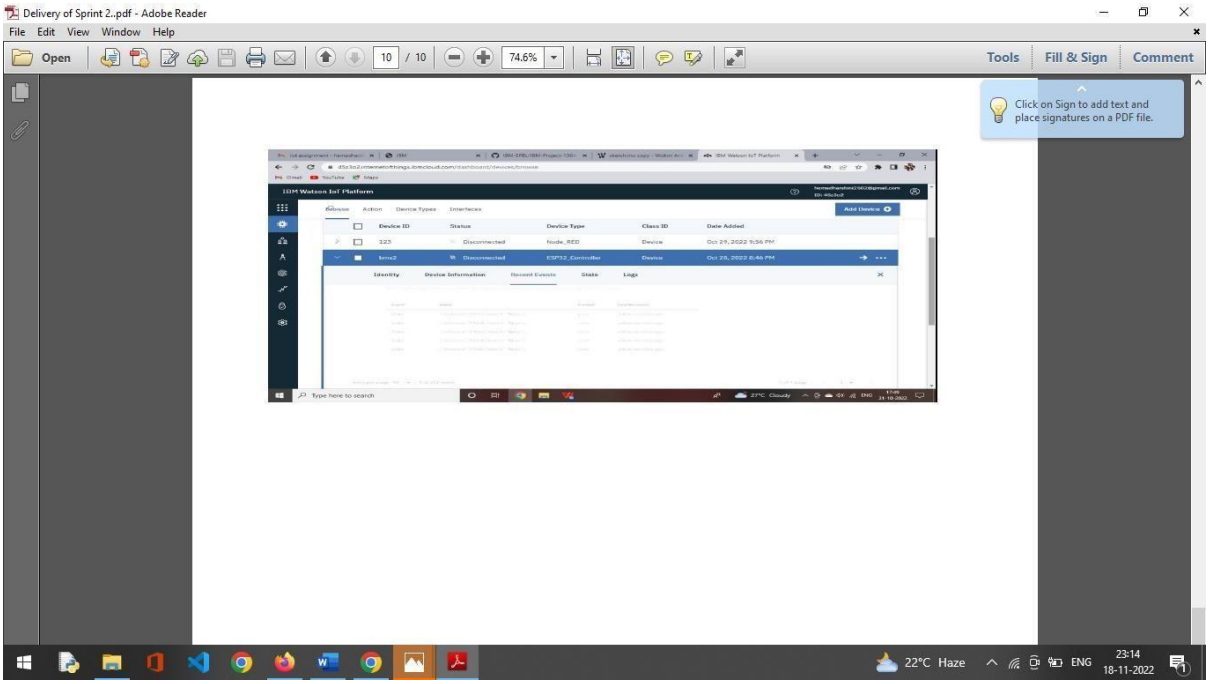
CHAPTER 9

9.1 PERFORMANCE TESTING




Node-RED
Node-RED Dashboard
127.0.0.1:1880/#flow/12406e54686e1094
Node-RED
Deploy
Child final
common
inject
debug
complete
catch
status
link in
link call
link out
comment
function
function
switch
change
range
rbe
geofence
set msg.payload
rbe
function
msg.payload
switch
false
child
false
msg.payload
http request
show dialog
msg.payload
debug
all nodes
all
11/18/2022, 11:15:48 PM node: false
function : (error)
"Failed to load module : TypeError [ERR_IMPORT_ASSERTION_TYPE_MISSING]: Module "file:///C:/Users/PRIYA/.node-red/node_modules/date/index.json" needs an import assertion of type "json""
11/18/2022, 11:15:48 PM node: false
function : (error)
"Function node failed to load external modules"
11/18/2022, 11:15:49 PM node: msg.payload
iot-2/type/raspberrypi/id/93455/evt/IotSensor/fmt/json : msg.payload : Object
{ message: "Exit", Date and Time: "18/11/2022, 11:15:49 pm", name: "priyanka", lat: 12.7345, lon: 13.202 }


Delivery of Sprint 2..pdf - Adobe Reader
File Edit View Window Help
Open
9 / 10
74.6%
Tools
Fill & Sign
Comment
Click on Sign to add text and place signatures on a PDF file.
Childsstatusarenotifiedtoparentsdeviceusingcloudservice
22°C Haze
ENG
23:14
18-11-2022



CHAPTER 10

ADVANTAGES

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.

DISADVANTAGES

The device can not be used in rural areas .Shows the block diagram of the proposed child safety device.It consists of inbuilt WI-FI,GSM,GPS and Blutooth modules.

CHAPTER 11

CONCLUSION

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.

CHAPTER 12

FUTURE SCOPE

Child maltreatment prevention efforts have grown and changed substantially over the last half century. They have moved beyond a public awareness approach to one that emphasizes the vital role of community, early intervention services, and caregiver education to help keep children safe from abuse and neglect. There is growing recognition that child maltreatment is a substantial public health concern as well as a serious social problem. Recent research suggests investments in prevention go beyond protecting children from maltreatment to also preventing maltreatment's devastating consequences, such as debilitating and lifelong physical and mental health problems, considerable treatment and health-care costs, and lost opportunities in education and work (Institute of Medicine & National Research Council, 2014). This issue brief presents prevention as the most important means of keeping children safe from abuse and neglect and highlights current best practices and emerging trends in the child protection field.

CHAPTER 13

APPENDIX

13.1 SOURCE CODE

GitHub link: https://github.com/IBM-EPBL/IBM-Project-45453-1660730126

Video demo link:

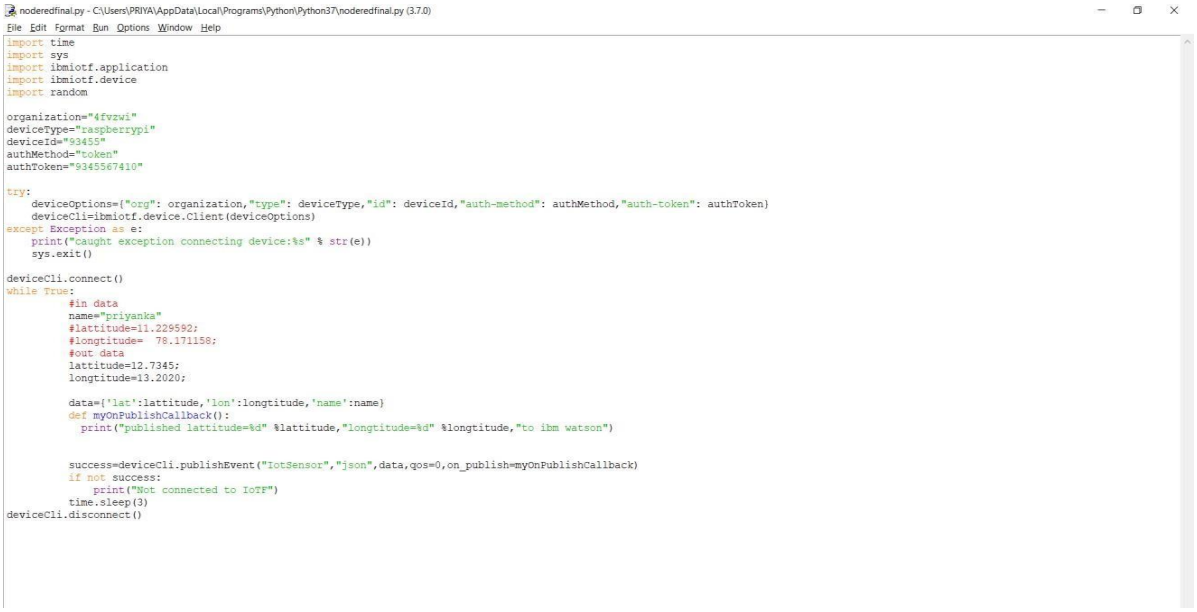
https://drive.google.com/file/d/1_eoe_I1ulBLsu9ApHU7hHk78OOZ67tIN/view?usp=share_link

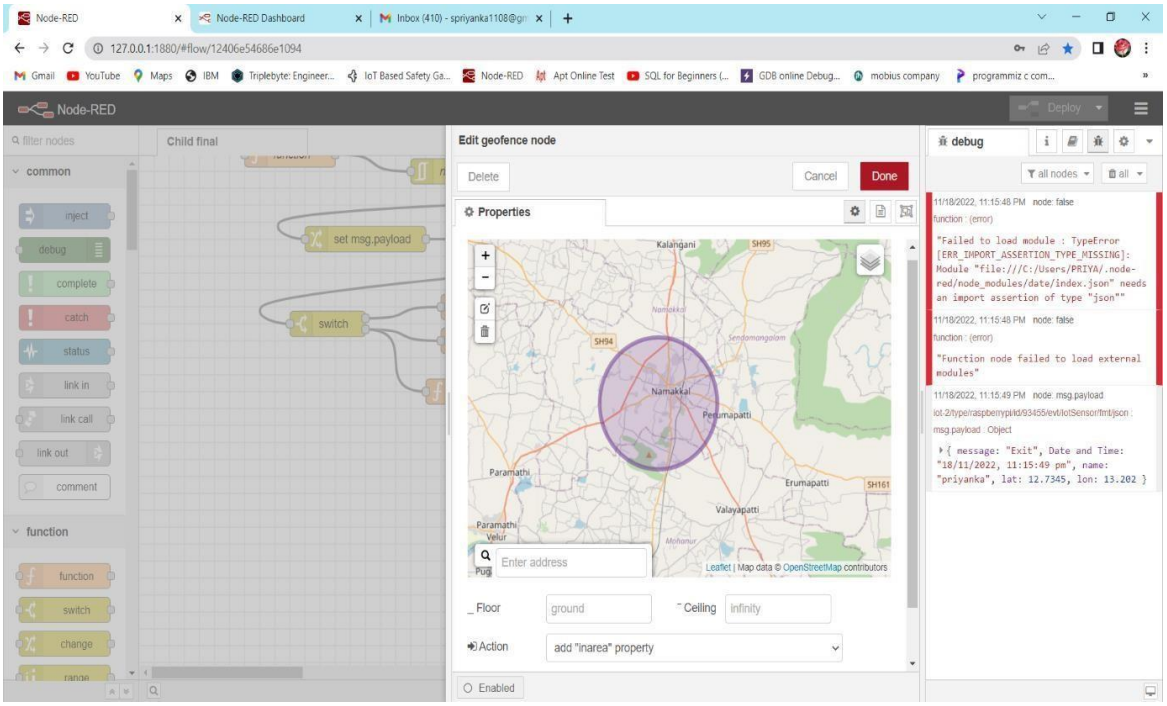
```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random

organization="4fvzwi"
deviceType="raspberrypi"
deviceId="93455"
authMethod="token"
authToken="9345567410"

try:
    deviceOptions={"org": organization,"type": deviceType,"id":
deviceId,"auth-method": authMethod,"auth-token": authToken}
    deviceCli=ibmiotf.device.Client(deviceOptions)
except Exception as e:
    print("caught exception connecting device:%s" % str(e))
    sys.exit()

deviceCli.connect()
while True:
          #in data
          name="priyanka"
          #lattitude=11.229592;
          #longtitude= 78.171158;
          #out data
          lattitude=12.7345;
          longtitude=13.2020;

          data={'lat':lattitude,'lon':longtitude,'name':name}
          def myOnPublishCallback():
            print("published lattitude=%d" %lattitude,"longtitude=%d"
%longtitude,"to ibm watson")



success=deviceCli.publishEvent("IotSensor","json",data,qos=0,on_publish
=myOnPublishCallback)
```

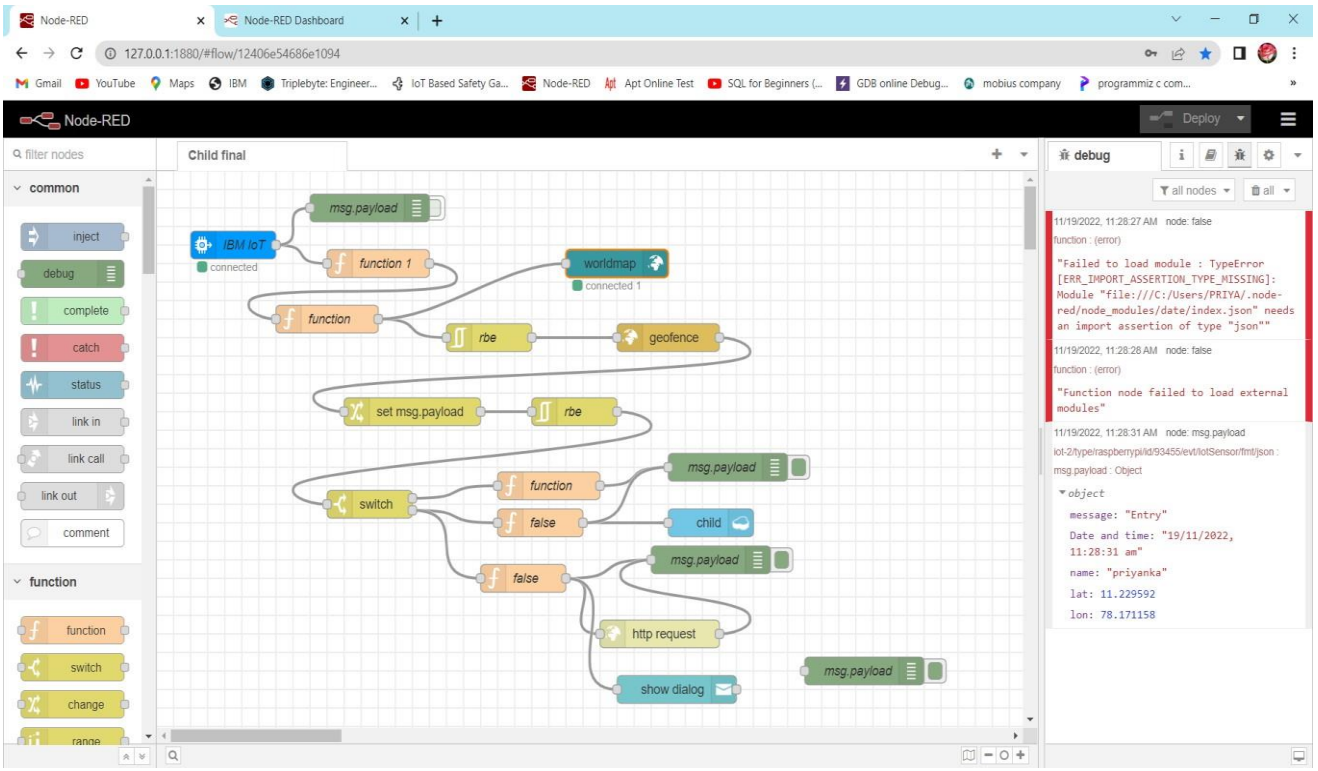
```
if not success:
    print("Not connected to IoTF")
time.sleep(3)
```

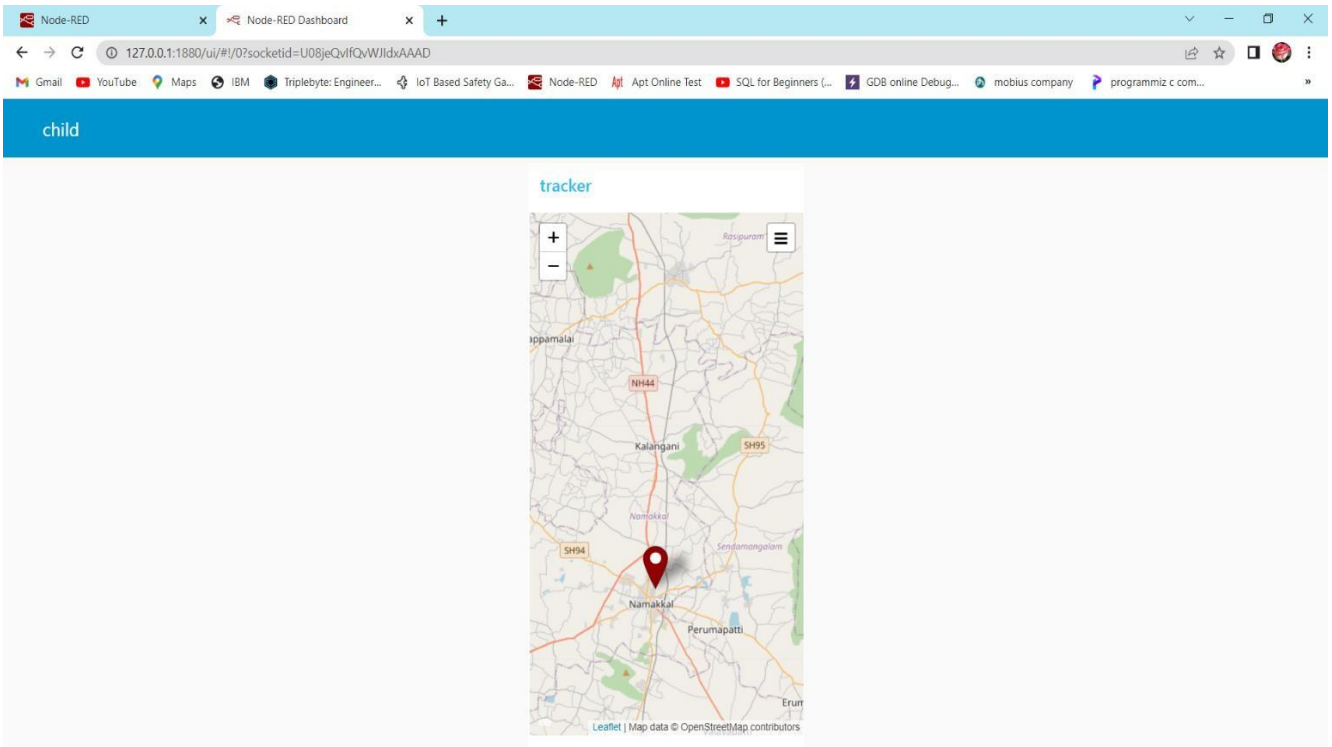
```
deviceCli.disconnect()
```

13.2 SCREEN SHOTS






Node-RED
Node-RED Dashboard
127.0.0.1:1880/#flow/12406e54686e1094
Deploy
Child final
common
inject
debug
complete
catch
status
link in
link call
link out
comment
function
function
switch
change
range
msg.payload
IBM IoT
connected
function 1
worldmap
connected 1
function
rbe
geofence
set msg.payload
rbe
msg.payload
function
switch
false
child
msg.payload
false
http request
msg.payload
show dialog
debug
all nodes
all
11/19/2022, 11:28:27 AM node: false
function : (error)
"Failed to load module : TypeError [ERR_IMPORT_ASSERTION_TYPE_MISSING]: Module "file:///C:/Users/PRIYA/.node-red/node_modules/date/index.json" needs an import assertion of type "json""
11/19/2022, 11:28:28 AM node: false
function : (error)
"Function node failed to load external modules"
11/19/2022, 11:28:31 AM node: msg.payload
iot-2/type/raspberrypi/id/93455/evt/IotSensor/fmt/json : msg.payload : Object
object
message: "Entry"
Date and time: "19/11/2022, 11:28:31 am"
name: "priyanka"
lat: 11.229592
lon: 78.171158


Node-RED
Node-RED Dashboard
127.0.0.1:1880/ui/#!/0?socketid=U08jeQvlfQvWJIdxAAAD
child
tracker
Kalangani
NH44
SH95
SH94
Namakkal
Perumapatti
Leaflet | Map data © OpenStreetMap contributors

CHAPTER 14

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