REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

A PROJECT REPORT SUBMITTED BY

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BACHELOR OF TECHNOLOGY

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ST.JOSEPH COLLEGE OF ENGINEERING, SRIPERUMBUDUR

ANNA UNIVERSITY::CHENNAI602117

NOV2022

BONAFIDE CERTIFICATE

Certified that this project report **"REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM"** is the bonafide work of "MAHESHWARI.A(2919205023), MENAGA.S(212919205027),T.SARANYA(212919205041),VIJI.S(212919205060),who carried out the project work under my supervision.

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CONTENTS

1.Introduction:

Roads are the foremost source of linking between cities and villages. Due to the ease of traveling by road, vehicles have become the main way people travel. The chances of vehicular accidents (Vas) have increased with the growing number of vehicles on the roads. During a journey, one does not know what will happen on the next road, particularly during bad weather conditions (BWC). In such a situation,driving can be difficult due to bad visibility, which can lead to an accident. It was also noticed that in BWC, multiple vehicle collisions(MVCs) can occur owing to delay sin receiving information about an incident. According to one study by the Islamabad police, there were 9582 accidents from 2016 to 2017 all over Pakistan, involving 11, 317 vehicles, leading to 5047 facilities and12, 696 persons injured

Digital technologies like the Internet of Things (IoT) are reshaping road safety measures. Many technology initiatives are undertaken the world over to make smarter and safer roads, the ones that can interact with traffic and pedestrians. Assuming that by giving in vehicle technology information to the driver, accidents can be averted, several technology- based products have been developed. The latest technology researchers are working on is based on the Internet of Things (IoT). IoT is all about data. Data is becoming available resource for our world.

Many sectors and industries have adopted IoT to reduce errors and improve performance in manufacturing, energy, health care, and communication. The WHOdescribes different measures that can be implemented with minimal economic impactsin its “Save LIVES: Road Safety Technical Package”. A cornerstone of these steps isrealizing economic systems for “monitoring road safety by strengthening datasystems”. Meanwhile, a key theme in the package is motivating the adoption of a SafeSystemapproach,whichisaholisticapproachtoroadsafetythatpartsfromtraditionalmanagementsolutionsbyemphasizingsafetybydesign.

Mobile-phone-basedapplicationsusebuilt-insensordatatodetectthespeedlimitbasedonenvironmentalsituations.

The main contributions of this research are

1. A brief survey on the state of the art related to pre-accident as well as post-accident models,frameworks,and techniques;

2.Identification and reporting of limitations in previous studies related to accident detection;

3.The concept of a smart road with an event-sensing capability, plus implementation and testing through various experiments;

4. Demonstration of an ewand modern way to quickly detect accidents and communicate with nearby vehicles and EOCs.

The risks for loss of life, injuries, and other damage may increase if an incident is not reported to an EOC in a timely fashion. Lives can be saved by sending timely information about an accident through an automated mechanism. Moreover, quick automobile accident detection and an alert system are required to protect approaching vehicles against an MVC. Several methods have been implemented in advanced vehicles (Avs) for avoiding an accident. An accident threat is detected through sensors installed in vehicles or by using smartphone sensors. Previous researchers have used accelerometers, smoke detectors, infrared (IR) obstacle sensors, proximity sensors,and biosensors to detect an accident.

1.1.Project Overview:

The main aim of this project is to help people automate the roads by providing them with a Web App through which they can monitor the parameters of the road like temperature, speed limit, and visibility of the road.They also show guides for schools and provide services of displaying hospitals,and restaurant signs accordingly.

1.2Purpose:

A large amount of research is being carried out in the domain of accident avoidance and accident alarms by a large number of researchers and practitioners.To avoid accidents, many approaches are utilized to enhance safety. For ease of reference,theliteratureonaccidentdetectionandavoidanceisseparatedintothreeapproaches: stand-alone, cooperative, and hybrid. Stand-alone approaches use sensors, such as radar and light detection and ranging (LiDAR), for accident avoidance and detection,where as cooperative approaches rely on V2X technology and hybrid approaches.

2. LITERATURE SURVEY:<u>Abstract:</u>

In present Systems the road signs and the speed limits are Static. But the road signs can be changed in some cases.We can consider some cases when there are road diversions due to heavy traffic or due to accidents then we can change the road signs accordingly if they are digitalized . This project proposes a system that has digital signboard son which the signs can be changed dynamically. If there is rain fall then the roads will be slippery and the speed limit would be decreased. There is a web app through which you can enter the data on road diversions, accident- prone areas, and information sign boards can be entered through the web app. This data is retrieved and displayed on the sign boards accordingly

Introduction:

An automated deep learning (DL)-based system was developed for detecting accidents from video data. The system uses visual components in temporal order to represent traffic collisions. As a result, the model architecture is composed of a visual-features-extraction phase followed by transient pattern identification. Convolution and recurrent layers are used in the training phase to learn visual and temporal features. In public traffic accident datasets, an accuracy of 98% was attained in the detection of accidents,demonstratingastrongcapacityfordetectionindependentoftheroad structure. The solution is limited to automobile crashes, not motorbikes, bicycles, and pedestrians. Furthermore, the model makes mistakes when determining accident segments under poor illumination(e.g.,atnight),at lower solutions, and when there are occlusions.

An accident management system was proposed in that makes use of cellular technology in public transportation. This method enables communication across various components, including those in ambulances,RSUs,and servers.Furthermore,in this system, an optimal route-planning algorithm (ORPA) is proposed to optimize aggregate spatial utilization of road networks while lowering the travel cost to operate a vehicle. The ORPA was evaluated through simulations, and findings were compared with other current algorithms. In congested areas, the proposed method can also be used to offer fast routes for ambulances. All vehicles, including ambulances, are required to have are out indicator installed, as well as the ability to use remote correspondence. The ORPA outperformed in terms of average speed and travel duration, according to the evaluation data. The proposed system only works for predicted patterns and can fail due to the unpredicted behavior of traff

2.1 Existing problem:

TheSafeSystemApproach

The Safe System (SS) approach to transport networks originated with the “SafeRoad Transport System” model developed by the Swedish Transport Agency.

Initsessence,theapproachmigratesfromtheviewthataccidentsarelargelyand

automatically the driver's fault to a view that identifies and evaluates the true causes of accidents. Through the categorization of safety into the safety of three elements (vehicle, road, and road user), SS minimizes fatalities and injuries by controlling speeds and facilitating prompt emergency response. The model has been widely adopted since its introduction and is currently motivated by the WHO as a basis for road safety planning, policy-making, and enforcement

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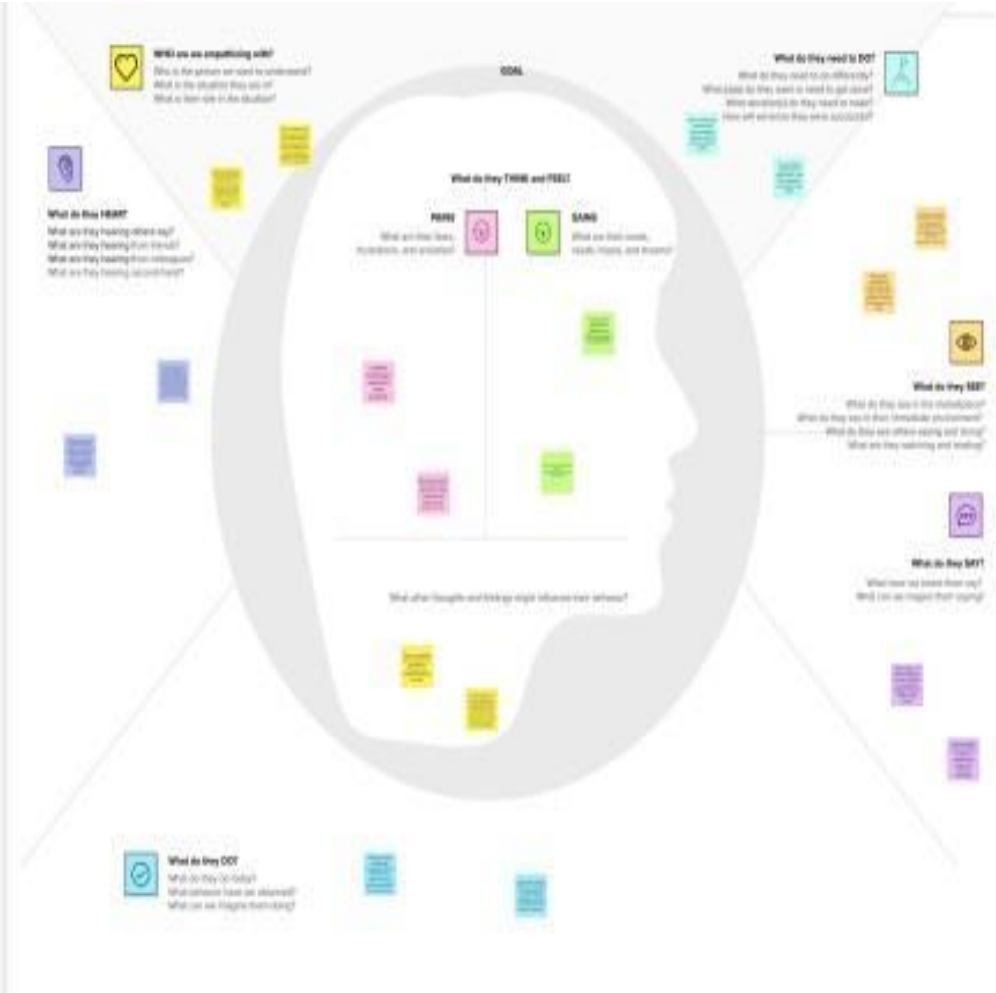
2.3 Problem Statement Definition

A problem statement is a concise description of an issue to be addressed or a condition to be improved upon. It identifies the gap between the current(problem) state and desired (goal) state of a process or product. Focusing on the facts, the problem statement should be designed to address the Five Ws. The first condition of solving a problem is understanding the problem, which can be done by way of a problem statement.

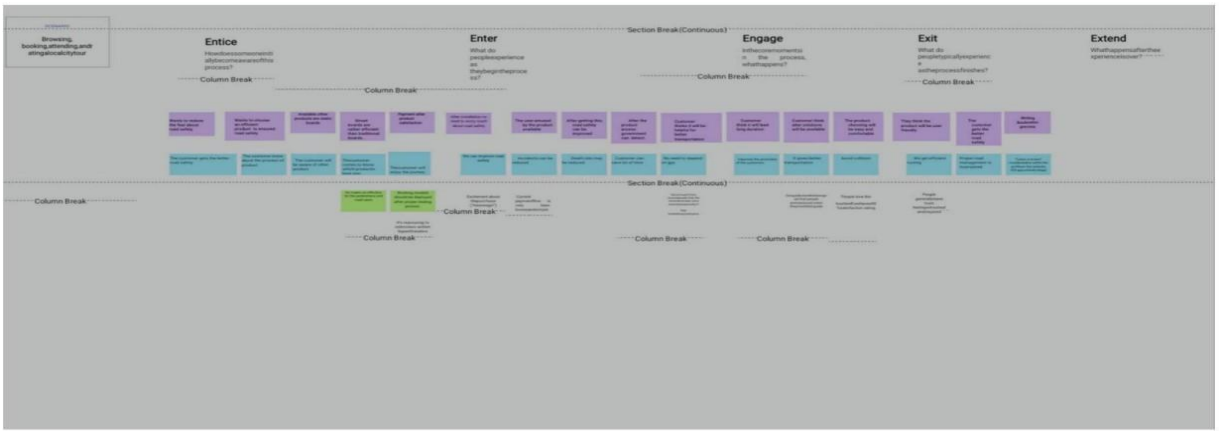
In present Systems the road signs and the speed limits are Static. But the road signs can be changed in some cases. We can consider some cases when there are road diversions due to heavy traffic or due to accidents then we can change the road signs accordingly if they are digitalized. This project proposes a system that has digital signboard son which the signs can be changed dynamically. If there is rain fall then the roads will be slipper yand the speed limit would be decreased. There is a web app through which you can enter the data on road diversions, accident-prone areas, and information sign boards can been through the webapp.This data is retrieved and displayed on the signboards accordingly.

3. IDEATION & PROPOSED SOLUTION:

3.1 Empathy Map Canvas:



3.2 Ideation & Brainstorming:



3.3 Proposed Solution:

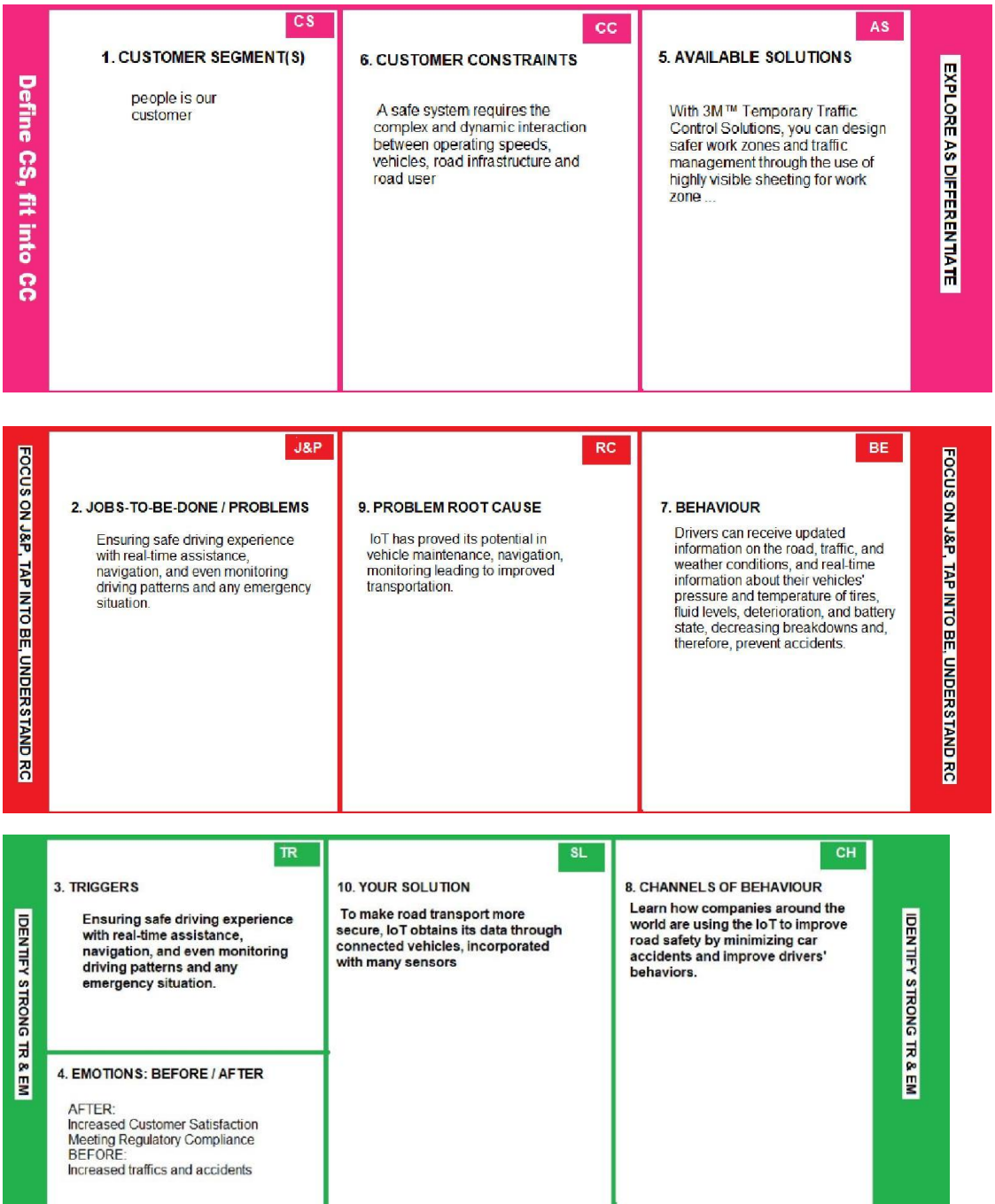
The project teams hall fill in the following information in the proposed solution template.

S.No.	Parameter	Description
•	Problem Statement(Problem to be solved)	The Safe System (SS) approach to road safety emphasizes safety by design by ensuring safe vehicles, road networks, android
•	Idea/Solution description	Ensuring safe driving experience with real- time assistance, navigation, and even monitoring driving patterns and any emergency.
•	Novelty / Uniqueness	IoT is already working to ensure road safety in areas such as vehicle maintenance, improved circulation, navigation, and monitoring environmental conditions

•	Social Impact/Customer Satisfaction	While the literature presented in this systematic review shows that IoT can positively impact the perceived or explicit happiness of people,

•	Business Model (Revenue Model)	IoT will not only enable driving new decision making but may well increase your revenue too.
•	Scalability of the Solution	IoT road sensors can provide real-time data from roads to help divert the flow of traffic away from area so hazard.

3.4 Problem Solution fit:



4. REQUIREMENT ANALYSIS

4.1 Functional requirement:

FRNo.	Functional Requirement(Epic)	Sub Requirement (Story/Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Verifying Email	Verification Email is sent to respective Email ID for verification.
FR-4	Authentication	Using Biometrics or PINAuthentication to perform some sensitive actions on the app.
FR-5	Exporting Reports	Allowing users to export their yearly, monthly, and weekly stats.
FR-6	Sharing of data to third-party applications	Allowing users to share some data via WhatsApp and other mediums.

4.2 Non-Functional Requirements:

FRNo.	Non-FunctionalRequirement	Description
NFR-1	**Usability**	Dashboard must be simple, clean, and customizable.
NFR-2	**Security**	Using two-factor authentication and maintaining session period for some actions.
NFR-3	**Reliability**	Ensure the code is well and good before making it to production.
NFR-4	**Performance**	Writing an efficient code to give better performance to the low-end devices too.
NFR-5	**Availability**	Deploying the application in two or moreAvailability Zones to ensure the availability SLA of 99.999%
NFR-6	**Scalability**	Using Auto-scalableservicesinthecloudfor database,compute,etc….

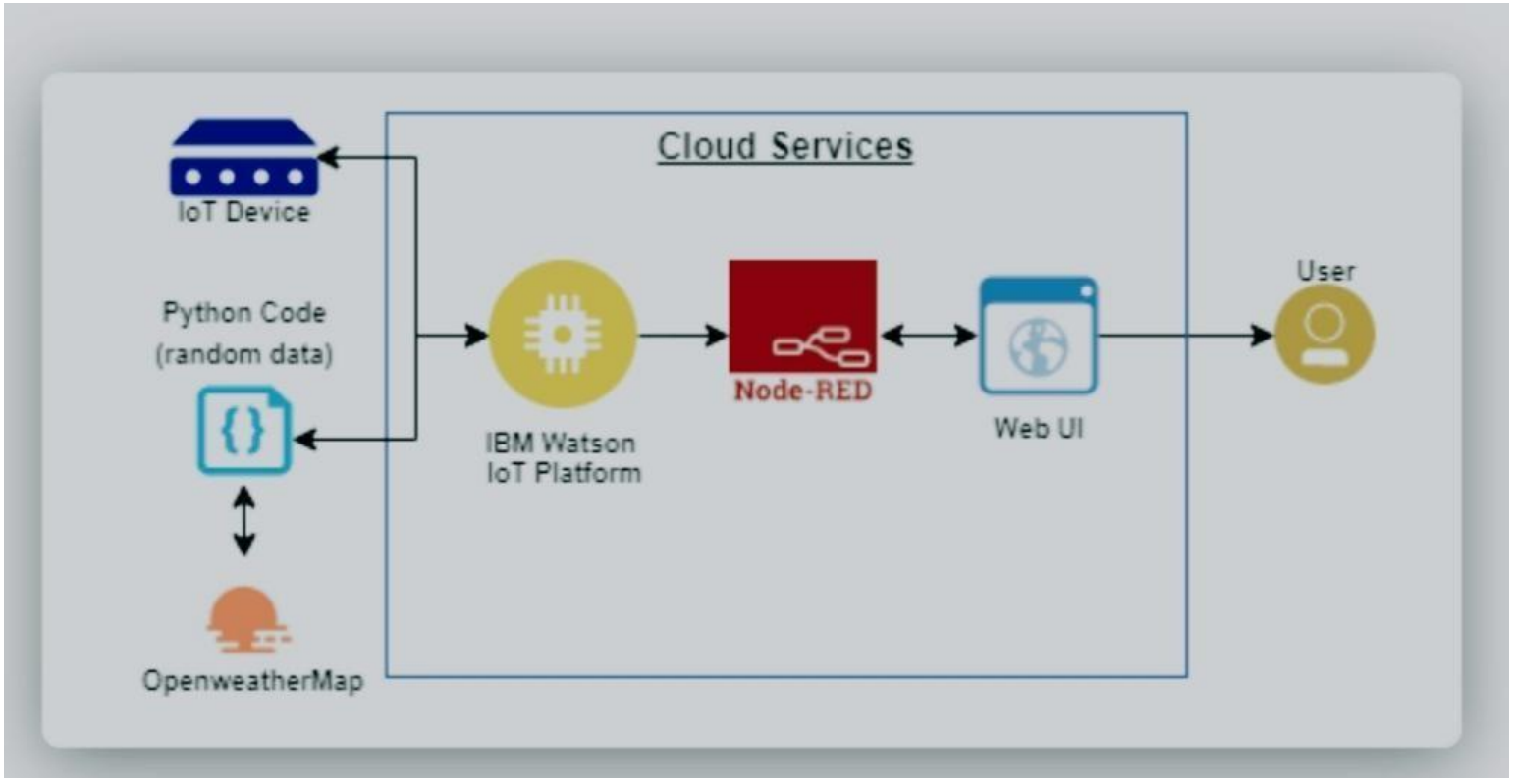
5. PROJECT DESIGN:

Project design is an early phase of the project lifecycle where ideas, processes,resources, and deliverables are planned out. A project design comes before aprojectplanasit'sabroadoverviewwhereasaprojectplanincludesmoredetailedinformation.

5.1 DataFlowDiagrams:

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

5.2 Solution&TechnicalArchitecture:



5.3 Userstories:

Usethebelowtemplatetolistalltheuserstoriesfortheproduct.

UserType	FunctionalRequirement(Epic)	User Story Number	UserStory/Task	Acceptance Criteria	Priority	Release
Customer (Mobileuser)	Registration	USN-1	As a user, I can register for the application by entering my email,and password, and confirming my password.	I can accessmyaccount/dashboard	High	Sprint-1
		USN-2	As a user, I will receive a confirmation email once I haverTown-freeor the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application throughFacebook	I can register access the dashboard with FacebookLogin	Low	Sprint-2
		USN-4	As a user, I can register for the application throughGmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard					
Customer(Webuser)	Registration	USN-1	Asauser,Icanregister for the application by	I can accessmyaccount/	High	Sprint-1

			entering my email,password, and confirming my password	dashboard		
Customer CareExecutive	Toll free number	USN-1	As an executive I can solve people queries and complaints	I can access account information of users	Medium	Sprint-1
Administrator	Login	USN-1	As a administration, I can log into application and webby entering my email,password and confirming my password	I can access all data in the application, Ican change Or Alter	High	Sprint-1
	Update	USN-2	As an administrator Ican update the information given by the user.	I can change the data based on user given	High	Sprint-1
	Monitor	USN-3	As an administrator Ihave to monitor the details given and make use of that.	I will make the monitoring needs to check the information.	Medium	Sprint-1
	Testing	USN-3	Asanadministrator,testing is needed to check how reliable the application is.	I will ensure the testing process correctly and make it for user usage.	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

Thedefinitionofasprintisadedicatedperiodinwhichasetamountofworkwillbe completedona project.It's part of theagile methodology,and anAgile project

will be broken down into number of sprints,eachsprinttakingtheprojectclosertocompletion**.**

6.1 SprintPlanning&Estimation:

Usethebelowtemplatetocreateproductbacklogandsprintschedule

Sprint	**FunctionalRequirement(Epic)**	**User StoryNumber**	**UserStory/Task**	**Story Points**	**Priority**	**TeamMembers**
Sprint-1	Registration	USN-1	Asauser,Icanregisterfor the application by entering my email,password, and confirming my password.	2	High	MALLIKA
Sprint-1		USN-2	As a user, I will receive confirmation email onceI have registered for the application	1	High	AKSHANA
Sprint-2		USN-3	Asauser,Icanregisterfor the applicationthroughFacebook	2	Low	SNEKA
Sprint-1		USN-4	Asauser,Icanregisterfor the application throughGmail	2	Medium	LOGESWARI
Sprint-1	Login	USN-5	Asauser,Icanlogintothe application by entering email &password	1	High	MALLIKA
	Dashboard					

6.2 Sprint Delivery Schedule:

Project Tracker, Velocity & Burndown Chart:

Sprint	Total Story Points	Duration	Sprint StartDate	Sprint End Date (Planned)	Story Points Completed(as son Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	10Days	31Oct2022	10Nov2022	1	27Oct2022
Sprint-2	20	8Days	10Nov2022	17Nov2022	2	05Nov2022
Sprint-3	20	7Days	12Nov2022	19Nov2022	1	12Nov2022
Sprint-4	20	15Days	12Nov2022	26Nov2022	2	20Nov2022

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of theteamie 20(pointspersprint).Let's Calculate The Team's Average Velocity(AV)periterationunit(story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

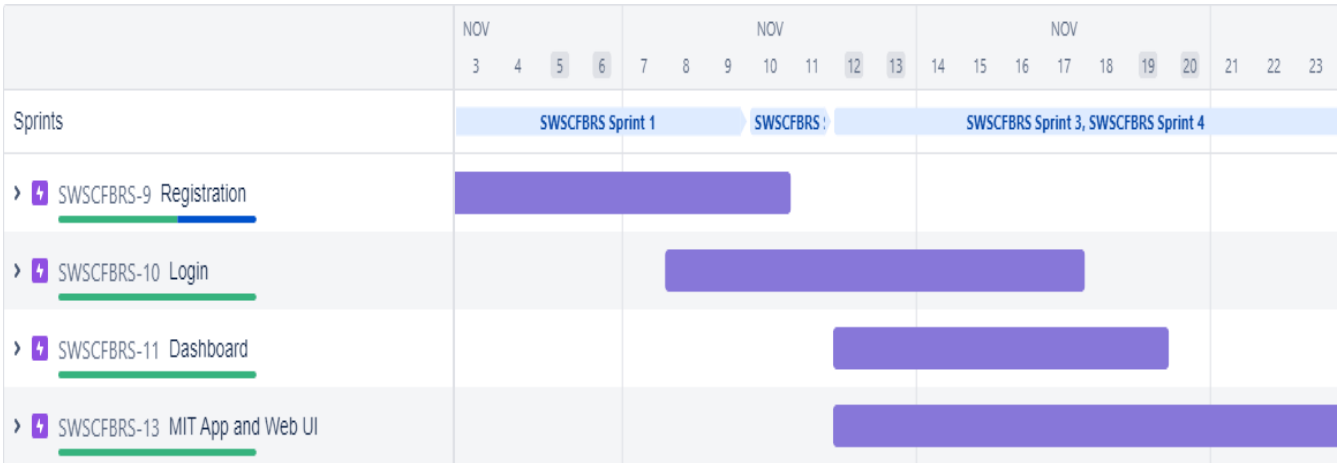
BurndownChart:

A burn-down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as scrum. However, burn-downchartscanbeappliedtoanyprojectcontainingmeasurableprogressovertime.

https://www.visual-paradigm.com/scrum/scrum-burndown-chart/https://www.atlassian.com/agile/tutorials/burndown-charts

Reference:https://pnt2022tmid34520.atlassian.net/jira/software/projects/SWSCFBR S/boards/1/roadmap?shared=&atlOrigin=eyJpIjoiMjk5YmJiNzhiNDllNDkwNWI5ODEyZjMxMDQxNjIxODYiLCJwIjoiaiJ9

ReportsfromJIRA:



7. CODING & SOLUTIONING:

(Explain The Features Added In The Project Along With Code):

7.1 Feature1(coding and result):

```
import ootp.sdk.device
import time
import random
import ibmiotf.application
import ibmiotf.device
import requests,json

myConfig =
   {#Configuratio
   n"identity":{
      "orgId":"xfx k9",
      "typeId":
      "NodeMCU","deviceId":"638547635
```

8"

```
    },
    #APIKey
    "auth":{
       "token":"9384731286"
    }
}

#ReceivingcallbacksfromIBMIOTplatformdef
myCommandCallback(cmd):
    print("MessagereceivedfromIBMIoTPlatform:%s"%cmd.data['command'])m=cmd.data['com
    mand']

client = wiotp.sdk.device.DeviceClient(config=myConfig,
logHandlers=None)client.connect()

#OpenWeatherMapCredentials
BASE_URL =
"https://api.openweathermap.org/data/2.5/weather?"CITY="Nagercoi
l"
URL=BASE_URL+"q="+CITY+"&units=metric"+"&appid="+"01df65417ab3968e3fc2a38c4
aee27bb"

whileTrue:
    response=requests.get(URL)ifr
    esponse.status_code==200:
       data=response.json()main
       =
       data['main']temperature=m
       ain['temp']
       humidity=main['humidity']pr
       essure =
       main['pressure']report=data['
       visibility']

       #message
       partmsg=random.randint(
       0,5)ifmsg==1:
          message="SLOWDOWN,SCHOOLISNEAR"
       elif msg==2:
          message="NEEDHELP,POLICESTATIONAHED"
       elif msg==3:
          message="EMERGENCY,HOSPITAL NEARBY"
       elif msg==4:
          message="DINE IN,RESTAURENTAVAILABLE"
       else:
          message=""#Sp
```

eedLimitpart

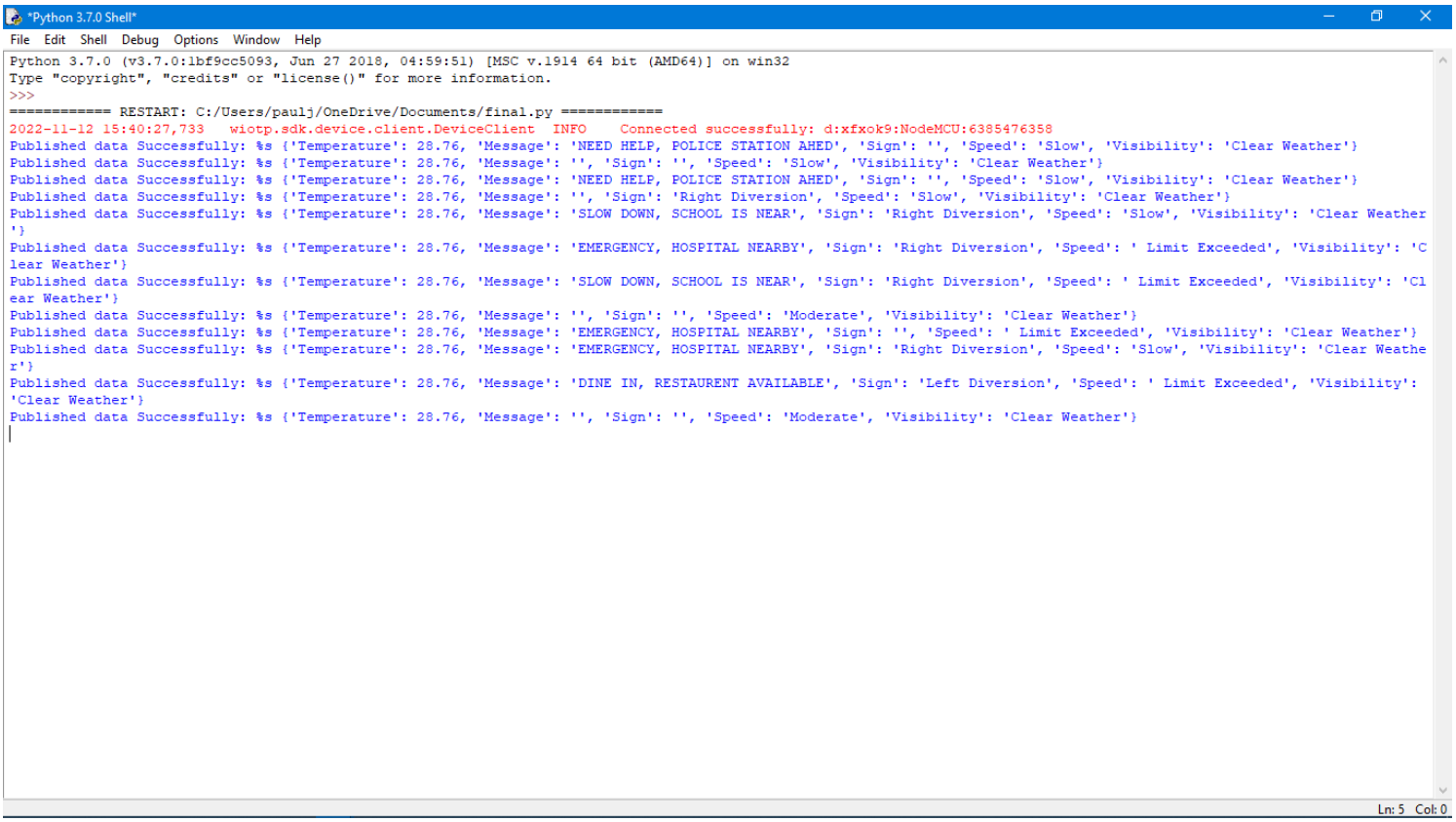
```
        speed=random.randint(0,150)
        ifspeed>=100:
            speedMsg=" Limit
        Exceeded"elif speed>=60
        speed<100:
            speedMsg="Moderate"else
        :
             speedMsg="Slow"

         #Diversion
        partsign=random.randint(
        0,5)ifsign==1:
            signMsg="Right
        Diversion"elfsign==3:
            signMsg="Left
        Diversion"elfsign==5:
            signmsg="UTurn"
        else:
             signMsg=""

         #Visibility
        if temperature<24:
            visibility="Fog Ahead, Drive
        Slow"elif temperature<20:
            visibility="Bad
        Weather"else:
            visibility="ClearWeather"

    else:
        print("Error the HTTP request")
    myData={'Temperature':temperature, 'Message':message, 'Sign':signMsg,
'Speed':speedMsg,'Visibility':visibility}
    client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onPublish=None)#PUB
LISHINGTOIOTWATSON
    print("Published data Successfully: %s",
    myData)client.commandCallback =
    myCommandCallbacktime.sleep(5)
client.disconnect()
```

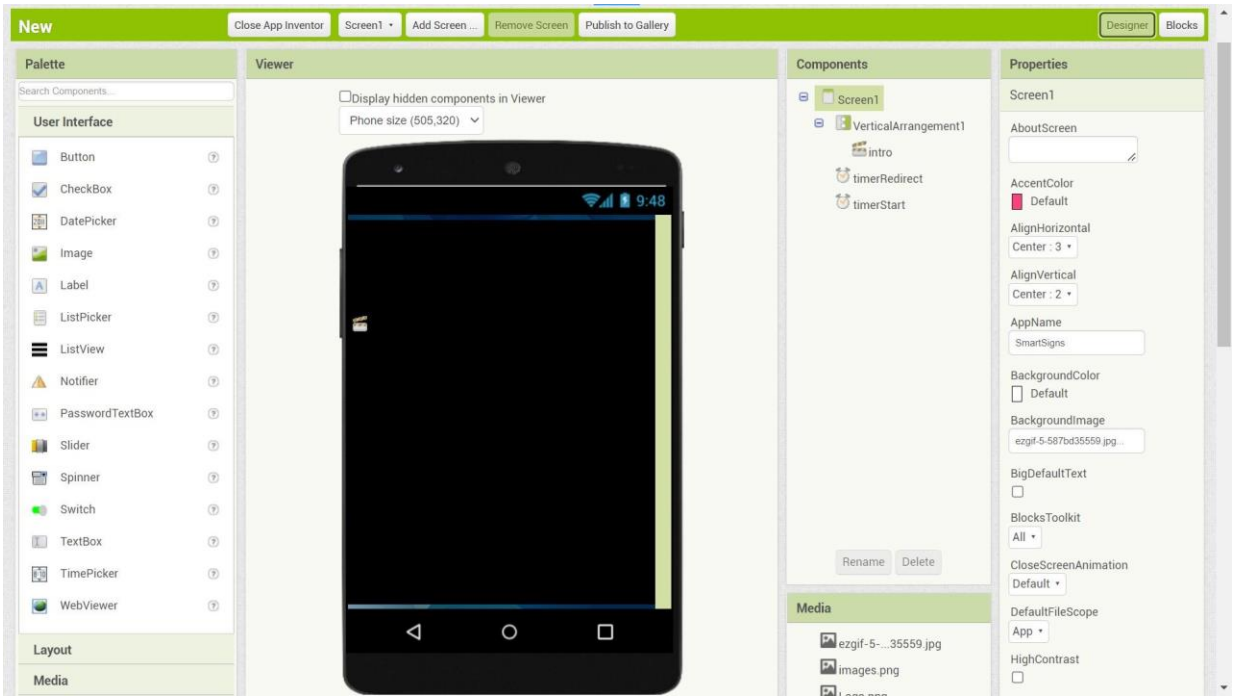
Output:



7.2 Feature2:(MIT APP INVENTOR)

MITAPPINVENTOR:ICON PAGE:

ForScreen1:


New
Close App Inventor
Screen1
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Palette
Search Components...
User Interface
Button
CheckBox
DatePicker
Image
Label
ListPicker
ListView
Notifier
PasswordTextBox
Slider
Spinner
Switch
TextBox
TimePicker
WebViewer
Layout
Media
Viewer
Display hidden components in Viewer
Phone size (505,320)
9:48
Components
Screen1
VerticalArrangement1
intro
timerRedirect
timerStart
Rename
Delete
Media
ezgif-5-...35559.jpg
images.png
Properties
Screen1
AboutScreen
AccentColor
Default
AlignHorizontal
Center : 3
AlignVertical
Center : 2
AppName
SmartSigns
BackgroundColor
Default
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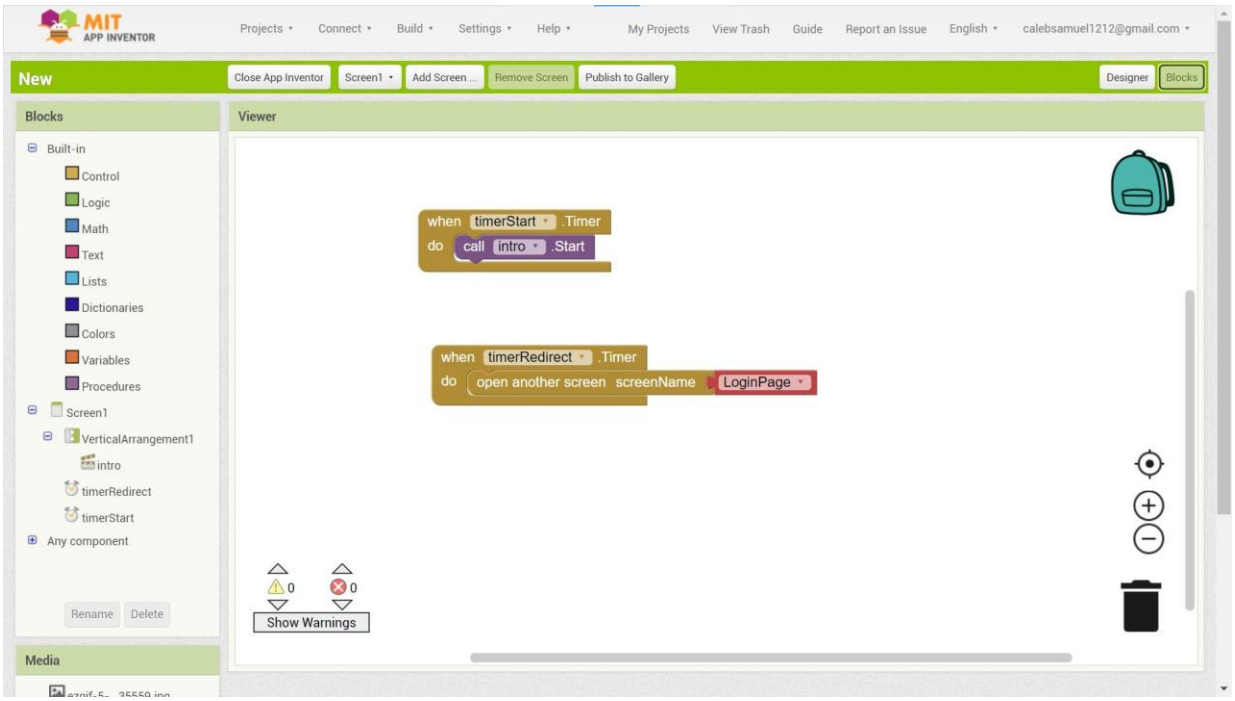
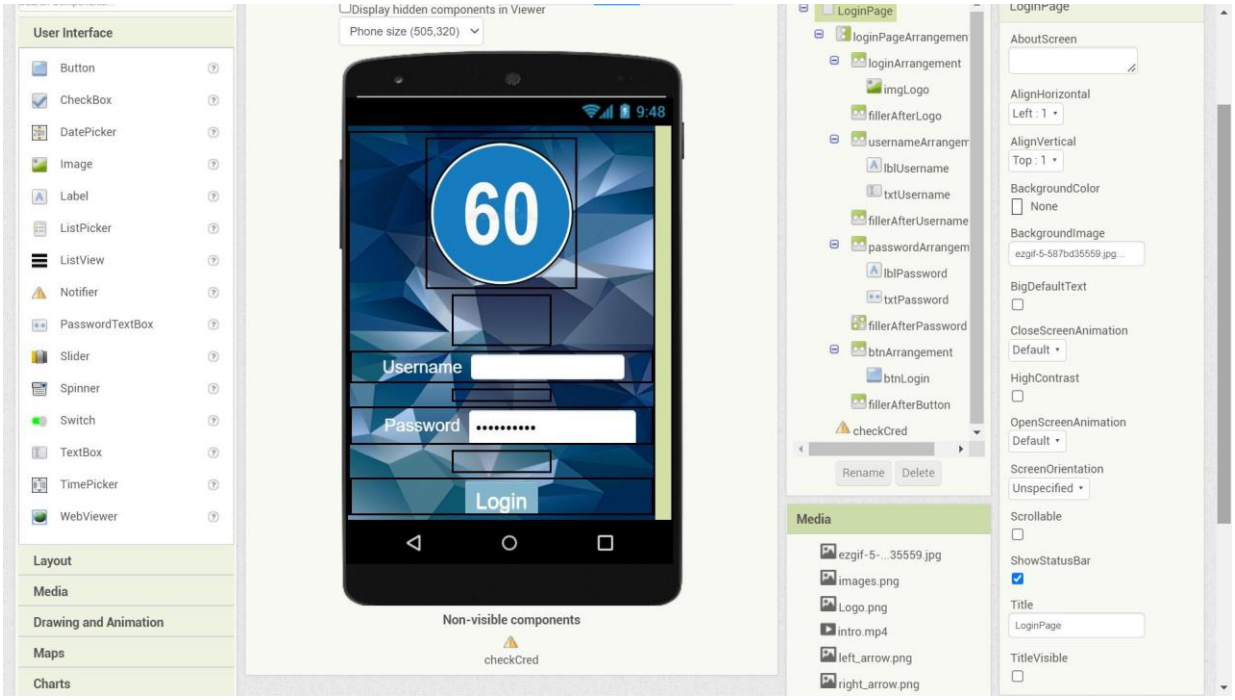
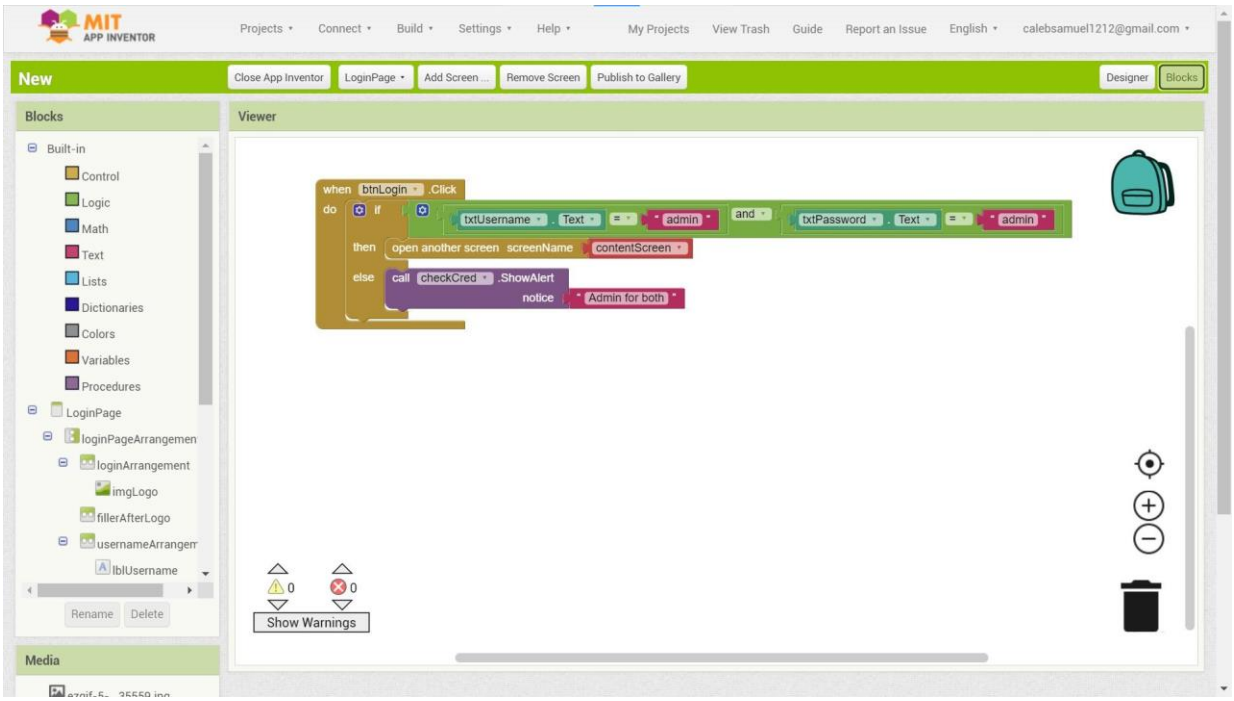
BlocksToolkit
All
CloseScreenAnimation
Default
DefaultFileScope
App
HighContrast

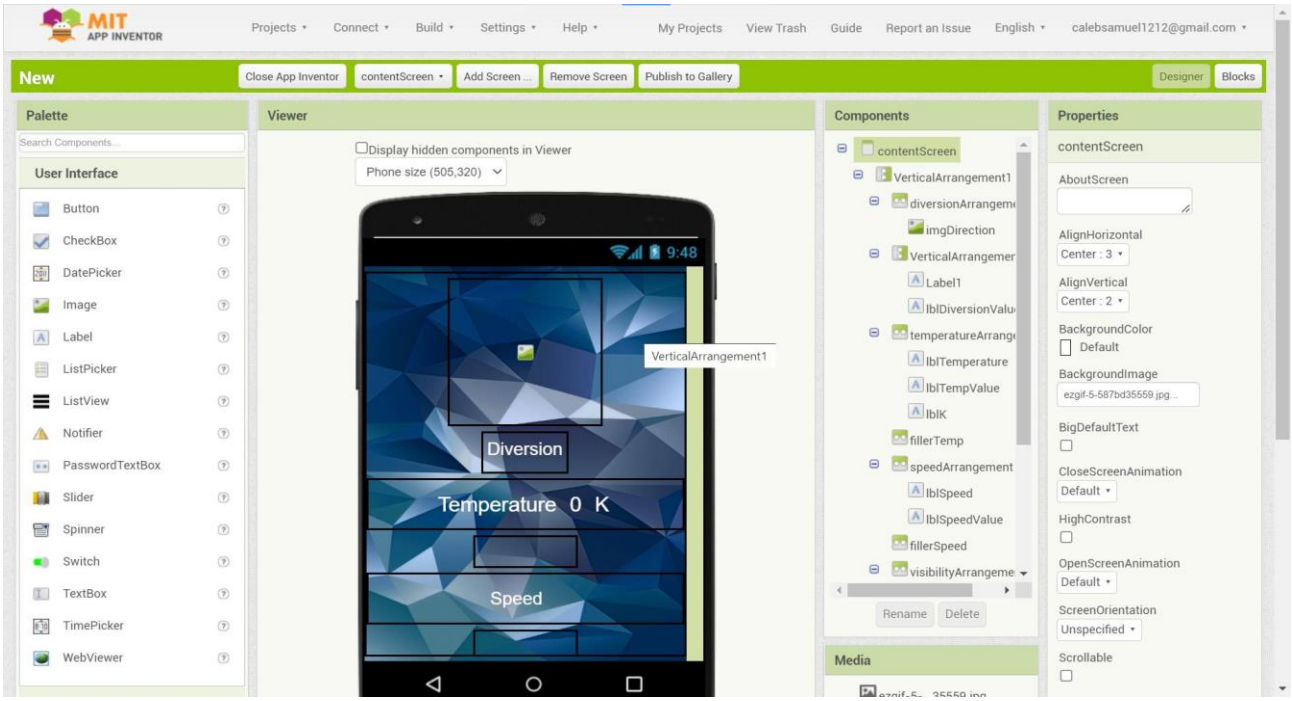

MIT APP INVENTOR
Projects
Connect
Build
Settings
Help
My Projects
View Trash
Guide
Report an Issue
English
calebsamuel1212@gmail.com
New
Close App Inventor
Screen1
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Blocks
Built-in
Control
Logic
Math
Text
Lists
Dictionaries
Colors
Variables
Procedures
Screen1
VerticalArrangement1
intro
timerRedirect
timerStart
Any component
Rename
Delete
Media
Viewer
when timerStart .Timer
do call intro .Start
when timerRedirect .Timer
do open another screen screenName LoginPage
0
0
Show Warnings

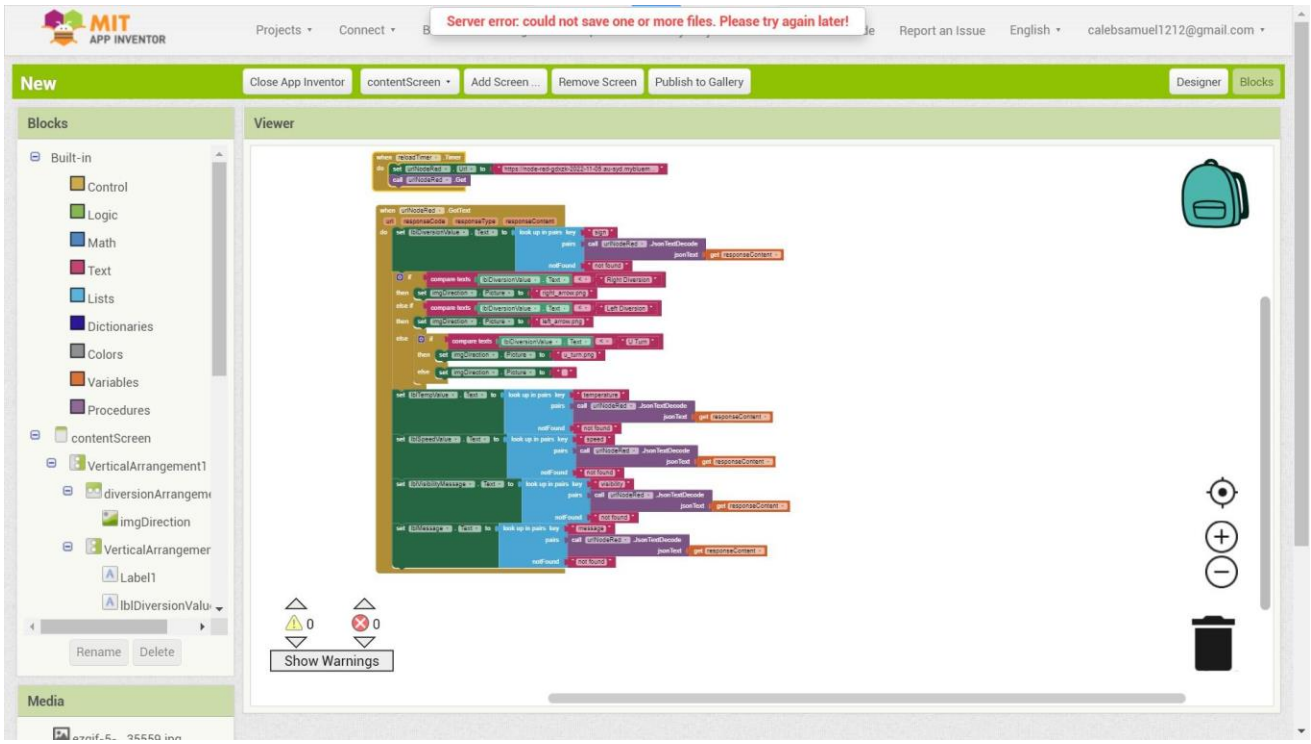
ForScreen2:


User Interface
Button
CheckBox
DatePicker
Image
Label
ListPicker
ListView
Notifier
PasswordTextBox
Slider
Spinner
Switch
TextBox
TimePicker
WebViewer
Layout
Media
Drawing and Animation
Maps
Charts
Display hidden components in Viewer
Phone size (505,320)
9:48
60
Username
Password
Login
Non-visible components
checkCred
LoginPage
loginPageArrangemen
loginArrangement
imgLogo
fillerAfterLogo
usernameArrangem
lblUsername
txtUsername
fillerAfterUsername
passwordArrangem
lblPassword
txtPassword
fillerAfterPassword
btnArrangement
btnLogin
fillerAfterButton
checkCred
Rename
Delete
Media
ezgif-5-...35559.jpg
images.png
Logo.png
intro.mp4
left_arrow.png
right_arrow.png
LoginPage
AboutScreen
AlignHorizontal
Left : 1
AlignVertical
Top : 1
BackgroundColor
None
BackgroundImage
ezgif-5-587bd35559.jpg...
BigDefaultText
CloseScreenAnimation
Default
HighContrast
OpenScreenAnimation
Default
ScreenOrientation
Unspecified
Scrollable
ShowStatusBar
Title
LoginPage
TitleVisible


MIT APP INVENTOR
Projects
Connect
Build
Settings
Help
My Projects
View Trash
Guide
Report an Issue
English
calebsamuel1212@gmail.com
New
Close App Inventor
LoginPage
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Blocks
Viewer
Built-in
Control
Logic
Math
Text
Lists
Dictionaries
Colors
Variables
Procedures
LoginPage
loginPageArrangemen
loginArrangement
imgLogo
fillerAfterLogo
usernameArrangem
lblUsername
Rename
Delete
Media
when btnLogin .Click
do if
txtUsername . Text = admin
and
txtPassword . Text = admin
then open another screen screenName contentScreen
else call checkCred .ShowAlert
notice Admin for both
0
0
Show Warnings

ForScreen3:

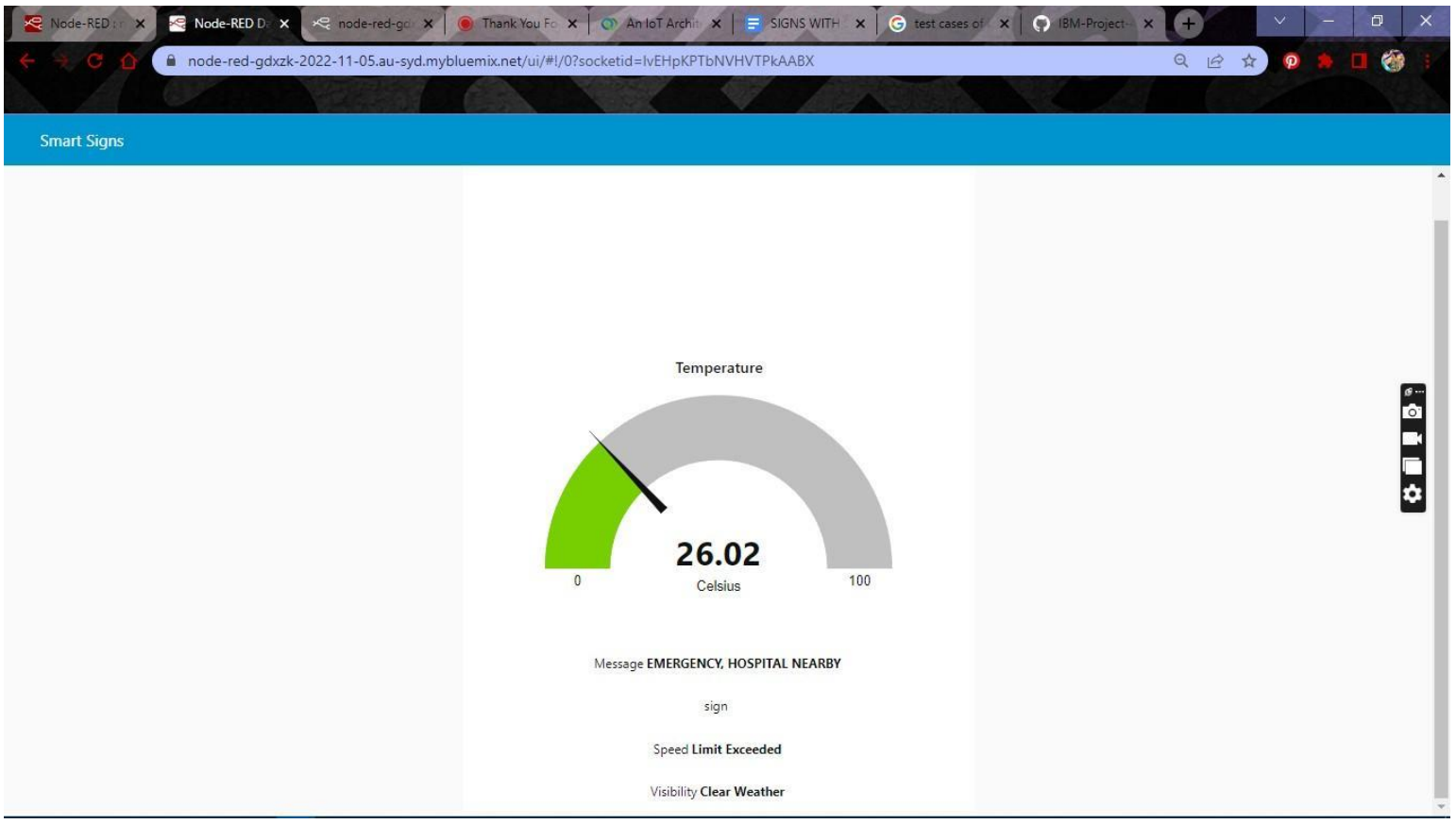

MIT APP INVENTOR
Projects
Connect
Build
Settings
Help
My Projects
View Trash
Guide
Report an Issue
English
calebsamuel1212@gmail.com
New
Close App Inventor
contentScreen
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Palette
User Interface
Button
CheckBox
DatePicker
Image
Label
ListPicker
ListView
Notifier
PasswordTextBox
Slider
Spinner
Switch
TextBox
TimePicker
WebViewer
Viewer
Display hidden components in Viewer
Phone size (505,320)
9:48
VerticalArrangement1
Diversion
Temperature 0 K
Speed
Components
contentScreen
VerticalArrangement1
imgDirection
Label1
temperatureArrange
lblTemperature
lblTempValue
lblK
fillerTemp
speedArrangement
lblSpeed
lblSpeedValue
fillerSpeed
Rename
Delete
Media
Properties
contentScreen
AboutScreen
AlignHorizontal
Center : 3
AlignVertical
Center : 2
BackgroundColor
Default
BackgroundImage
BigDefaultText
CloseScreenAnimation
Default
HighContrast
OpenScreenAnimation
Default
ScreenOrientation
Unspecified
Scrollable


MIT APP INVENTOR
Server error: could not save one or more files. Please try again later!
Projects
Connect
Report an Issue
English
calebsamuel1212@gmail.com
New
Close App Inventor
contentScreen
Add Screen ...
Remove Screen
Publish to Gallery
Designer
Blocks
Blocks
Built-in
Control
Logic
Math
Text
Lists
Dictionaries
Colors
Variables
Procedures
contentScreen
VerticalArrangement1
diversionArrangeme
imgDirection
VerticalArrangemer
Label1
lblDiversionValu
Rename
Delete
Media
Viewer
0
0
Show Warnings

8. TESTING:

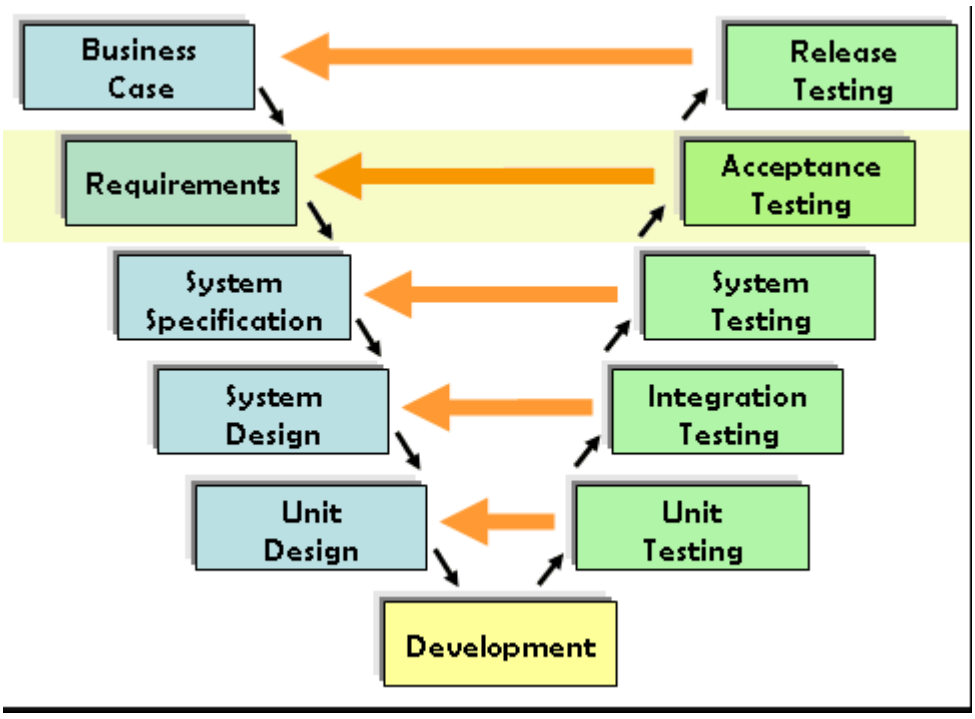
Testcaseshelpguidethetesterthroughasequenceofstepstovalidatewhetherasoftwareapplicationisfreeofbugs,andworkingasrequiredbytheend-user.
Learning how to write test cases for software requires basic writing skills,attention to detail,and a good understanding of the application undertest(AUT).

8.1 TestCases:



8.2 UserAcceptanceTesting:

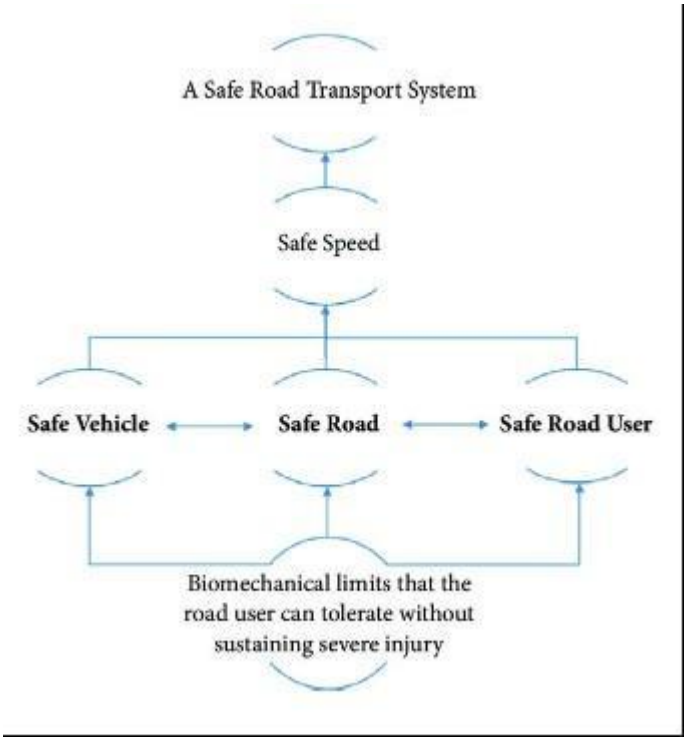
UAT consists, in practice, of people from the target audience using the application.The Defects Theyfindarethenreportedandfixed.Thisscenarioiswhatmostcloselyresembles“the real world.”Theprocessallowsusersto
“get their hands dirty”with the application.They can see if thingsworkasintended.



ThemainpurposeofUATistovalidateend-to-endbusinessflow.Itdoesnotfocusoncosmeticerrors,spelling mistakes, or system testing. User Acceptance Testing is carried out in a separate testing environment with a production-like data setup. It is a kind of black box testing where two or more end-users will be involved.

9. RESULTS:

9.1 PerformanceMetrics:



10. ADVANTAGES & DISADVANTAGES

Advantages:

Connected vehicles have various benefits such as

- Multimodalsensorsandedgecomputinghelpspeeduptheflowoftrafficwithreal-timeprocessing,reducingcongestionandemissions.
- Smartroadtechnologycanassistinoptimizingtrafficflow
- Itwillmanageroadconditions,creatingamoresustainableenvironmentwithincities.

- Improved controlandsafetycanbeachievedthroughIoT-enabled cars.Incase Over-speeding,the notification gets displayed.
- Ensuring a safe driving experience with real-time assistance, navigation, and even monitoring driving patterns and any emergency. Additionally, along with the state of the traffic, IoT drivers can receive updated information on the state of the roads, i.e.,potholes,ice,grade changes,blackspots,etc.

DISADVANTAGES:

- Securityandprivacy.KeepingthedatagatheredandtransmittedbyIoTdevicessafeischallenging,astheyevolveandexpandinuse....
- Technical Complexity....
- Connectivity And Power Dependence....
- Integration....
- Higher Costs(time and money)

11. CONCLUSION:

The world doesn’t change on its own but we humans can change the world to be safe, better, and harmless. Since the road isn’t said to be safe let’s make it safer with the technologies present and available tous. The Internet of Things is one of the technologies that can lead us to travel on enhanced safe roads. So let's come together to create a better world with no accidents and a smart road for the future generation.

12. FUTURESCOPE:

IoT obtains the majority of its data with the help of connected cars. These incorporate a large number of sensors that hat establish communication whitecloud,other vehicles,and devices. Thanks to this it provides data and information of great utility for the improvement of road safety. The safe system approach to road safety emphasizes safety by design ensuring safe vehicles, road networks, and road users. Evolving Towards the future, the road needs to boil with advanced sensors and antenna systems to have peace with then ewera.

13. APPENDIX:

SourceCode:

```
import ootp.sdk.device
import time
import random
import ibmiotf.application
import ibmiotf.device
import requests,json

myConfig =
   {#Configuratio
   n"identity":{
      "orgId":"xfx k9",
      "typeId":
      "NodeMCU","deviceId":"6385476358"
   },
   #APIKey
   "auth":{
      "token":"9384731286"
   }
}

#ReceivingcallbacksfromIBMIOTplatformdefm
yCommandCallback(cmd):
```

```
    print("MessagereceivedfromIBMIoTPlatform:%s"%cmd.data['command'])m=cmd.data['comm
    and']

client = wiotp.sdk.device.DeviceClient(config=myConfig,
logHandlers=None)client.connect()

#OpenWeatherMapCredentials
BASE_URL =
"https://api.openweathermap.org/data/2.5/weather?"CITY="Nagercoil"
URL=BASE_URL+"q="+CITY+"&units=metric"+"&appid="+"01df65417ab3968e3fc2a38c4ae
e27bb"

whileTrue:
    response=requests.get(URL)ifr
    esponse.status_code==200:
        data=response.json()main
        =
        data['main']temperature=m
        ain['temp']
        humidity=main['humidity']press
        ure =
        main['pressure']report=data['vis
        ibility']

        #message
        partmsg=random.randint(
        0,5)ifmsg==1:
            message="SLOWDOWN,SCHOOLISNEAR"
        elif msg==2:
            message="NEEDHELP,POLICESTATIONAHED"
        elif msg==3:
            message="EMERGENCY,HOSPITAL NEARBY"
        elif msg==4:
            message="DINE IN,RESTAURENTAVAILABLE"
        else:
            message=""

         #Speed Limit
        partspeed=random.randint(0,
        150)ifspeed>=100:
            speedMsg=" Limit
        Exceeded"elif speed>=60
        speed<100:
```

```
    speedMsg="Moderate"els
e:
     speedMsg="Slow"
```

```
        #Diversion
       partsign=random.randint(
       0,5)ifsign==1:
          signMsg="Right
       Diversion"elfsign==3:
          signMsg="Left
       Diversion"elfsign==5:
          signmsg="UTurn"
       else:
           signMsg=""

        #Visibility
       if temperature<24:
          visibility="Fog Ahead, Drive
       Slow"elif temperature<20:
          visibility="Bad
       Weather"else:
          visibility="ClearWeather"

    else:
       print("Error the HTTP request")
    myData={'Temperature':temperature, 'Message':message, 'Sign':signMsg,
'Speed':speedMsg,'Visibility':visibility}
    client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onPublish=None)#PUBLI
SHINGTOIOTWATSON
    print("Published data Successfully: %s",
    myData)client.commandCallback =
    myCommandCallbacktime.sleep(5)
client.disconnect()
```

GitHub Link:

https://github.com/IBM-EPBL/IBM-Project-24715-1659947756