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Safety and Security System to Automobiles

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ABSTRACT

The Rapid rise of technology and infrastructures have made our lives easier. The advent of technology has also increased traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of various reasons which were in detailed explained in this project and how to overcome accidents using the technologies of radars, retarders, Global Positioning System(GPS, communication through radar and Anti-lock braking system(ABS) and Electronic Brakeforce Distribution(EBD). These are utilized in such a manner that the vehicles(more than 3 wheels) do not collide each other at any circumstances and gives a clear traffic environment. The entire traffic is monitored in the control rooms and if any accident has happened due to the vehicles of 3 and bellow 3 wheeler, the information is passed in seconds and action is taken in few minutes. The whole mechanism is clearly explained in this project. Safety and security system is equipped with a radar transmission(77GHz), loaded maps for GPS additionally which gives a better environment to the world of transportation. It is necessary to reform the disturbed zones with the thought of reformers. So this paper reforms the automobile modules I.e., Vehicle will be manual when no danger can happen through or by it, if any is going to happen then it becomes partial automatic(under the control of safe modules) to avoid dangers.

Keywords— Radar, Retarders, speed, communication (V2V, V2C), ABS and EBD, HTML, JavaScript.

INTRODUCTION

The word accident is defined as “an unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damage or injury”, by the Oxford dictionary. But nowadays if we observe there are intentional accidents to a major extent. The problem of accidents are broadly classified into the following two types:

1) death rate 2) automobile waste.

Death rate:

The carelessness of the owner and manufacturer of an automobile leads to an increase of death due to accidents. The following figure gives a clear picture of the current scenario.

Automobile waste:

Automobiles are manufactured in the high infrastructure manufacturing plants includes human hard work and financial expense. These days the wastes are being increased with the increase of utilities. Due to the destruction of an automobile the part replacement or the abandonment of complete automobile is happening. This not only wastes the money but also the material and the core ingredients.

Cause:

The cause for the accidents can be classified as two types : 1)human error 2) machine error.

Human errors : 1)vision problem 2)understanding error 3)recklessness 4)confusion

Machine errors : 1)automobile parts error

Why not automation(i.e.., autonomous)?

There are so many incidents happened by the failure of the autonomous vehicles where suddenly the auto pilot facility fails or the glass objects or the light coloured objects are treated as the sky. So there is no need of complete autonomous but only needed at the time of error.

The below figures shows the possibility of accidents and the impact is indicated with the circle shaped structure on vehicles(blocks), which the accidents are caused by the improper vision or the reckless driving.

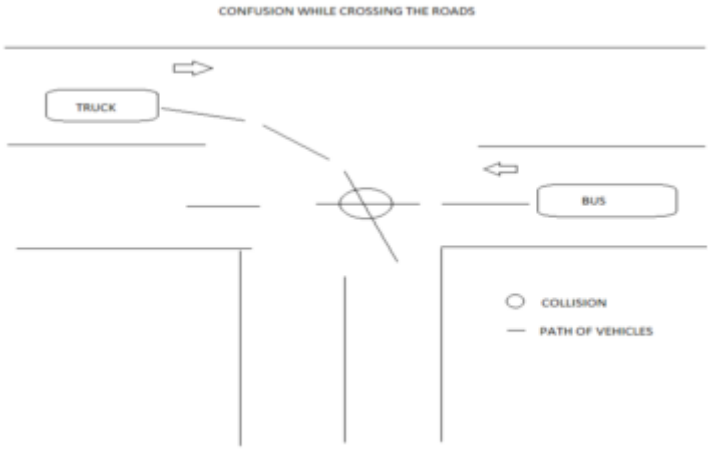


Figure 1. Explaining the possibility of an accident using a real situation of the vehicles while crossing 2-way road

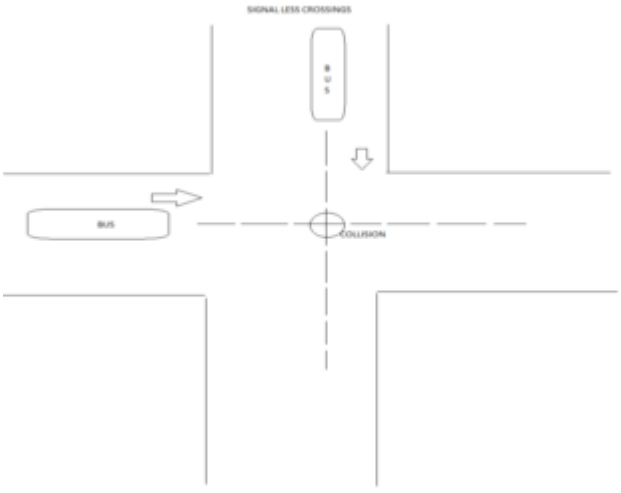


Figure 2. Explaining the possibility of an accident using a real situation of the vehicles while crossing 4-ways road

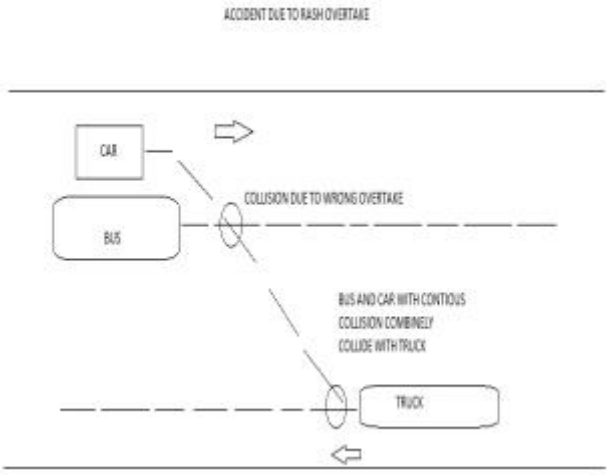


Figure 3. Explaining the possibility of an accident using a real situation of the vehicles while over-taking

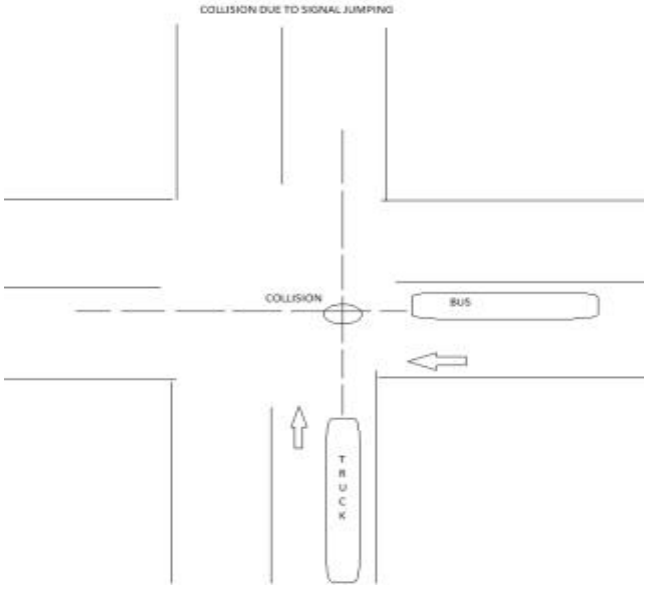


Figure 4. Explaining the possibility of an accident using a real situation of the vehicles while signal jumping happens

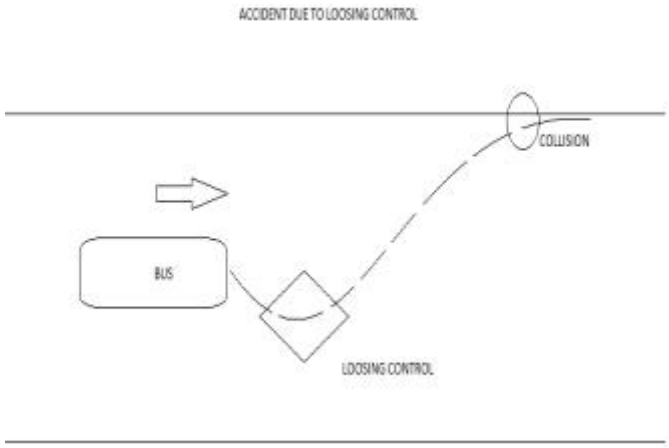


Figure 5. Explaining the possibility of an accident using a real situation of the vehicles when out of control

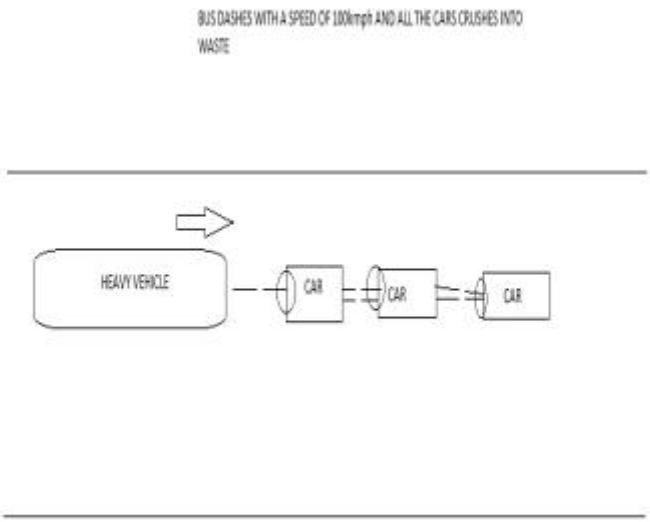


Figure 6. Explaining the possibility of an accident using a real situation of the vehicles when the vehicle is about to crash the other vehicles

METHODS AND WORKING

The vehicle is fitted with the radar system, retarder control and communication system(v2v,v2control room like ola and uber apps etc), GPS, ABS(Ant-lock Braking System, EBD(Electronic Brake Distribution) and vibration module(used when accidents happened, if any). The detection and the ranging is done by the radar system, as soon as a vehicle approaches the range of the other vehicle a technical communication starts between the vehicle like the distance between them, speed, and the GPS location of both the vehicles, details of collision possibilities and these details are shared with the control room nearby, by both the vehicles.

By this, the movement of the vehicles is monitored in the control room and the traffic is maintained clean throughout the way.

Test case "1"

whenever the vehicle is near the other vehicle i.e., 10 meters apart, the collision initial notification is raised in both the vehicles and the drivers have to respond. If the response is given the vehicle runs normally. If not, the vehicle without response is subjected to error and the distance ranging permit is minimized to 5 meters and the retarder starts working which allows the driver to maintain the speed less than the speed of the front vehicle. The notification is not attended by the front vehicle only then the change of lane notification is passed to the other vehicles.

Test case "3"

If the distance between the vehicles ranges from 2.5 to 3.5meters, the retarder functions at its full capacity and when ranges less than 2.5 ABS and EBD is activated (when the vehicle is speeding more than 40kmph). The vehicles behind this vehicle and the control room get a notification of change of lane. For all the test cases, in case of an accident detected by the vibration module the traffic is restricted to other lanes remaining and a emergency and details of the vehicles including the chassis number are sent to the control room and an immediate action will be taken. The location of the accident is automatically sent to the emergency numbers like 100, 108, 911 etc through the control room.

Test case "8"

If an obstacle is detected, then the action is done according to the ranging of the obstacle detection by the radar system. The ranging will be,

Less than or equal to 40kmph and distance.

Unusual change of lane leads to error notification to the vehicle and control room as well. Neglecting the notification switches the ABS on. (type, 3 in the notification area).

Signal jumping leads to a manual break down i.e., treats the signal as an obstacle and featured with the switch on of ABS until the signal turns green and big jerk may arise. This is done with the help of vehicle to infrastructure mode of communication. (note: This is not featured for the emergency vehicles).

In case of an emergency or the official siren consisting vehicles, they must give the origin and destination to the control room and get an approval of route in which the notification of emergency is passed to the vehicles in the route and a late is left blank for the emergency vehicles.

In the case of signal dead places, the entire set up works on offline Google maps and GIS technology, where the origin, destination and route must be preloaded and gets approved by the control room at

20 km before the start of the signal dead area.

Algorithm of the project based on working

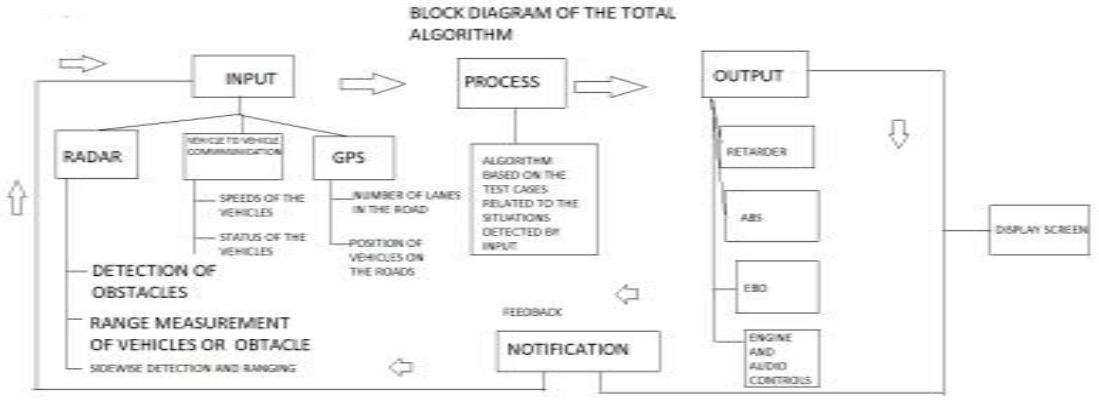


Figure 7. Flow-chart of the algorithm

ALGORITHM FOR RADAR SYSTEM

Step-1 : start

Step-2 : declare variable ar,ar1,ar2,ar3,ar4,radar

Step-3 : if (radar=front)

ar= ---

Else

ar1= --- ; ar2= --- ; ar3= --- ; ar4= ---

Step-4 : send ar,ar1,ar2,ar3,ar4 values to GENERAL BODY ALGORITHM(A1)

Step-5 : stop

ALGORITHM FOR V2V(vehicle to vehicle) RESULTS

Step-1 : start

Step-2 : declare variables sp1,sp2

Step-3 : sp1= ---,sp2= ---

Step-4 : send sp1,sp2 values to GENERAL BODY ALGORITHM(A1)

Step-5 : stop

ALGORITHM FOR V2C(vehicle to control room) RESULTS

Step-1 : start

Step-2 : communicate values location to control room

Step-3 : stop

ALGORITHM FOR NUMBER OF LANES

Step-1 : start

Step-2 : declare variable nl

Step-3 : nl= -

Step-4 : send the value of nl to GENERAL BODY ALGORITHM(A1)

Step-5 : stop

ALGORITHM FOR VIBRATION SENSOR MODULE(Nvb)

Step-1 : start

Step-2 : declare variable vb

Step-3 : vb= on limit or limit crossed

Step-4 : send vb value to GENERAL BODY ALGORITHM(A1)

Step-5 : stop

ALGORITHM FOR NOTIFICATION(N)

Step-1 : start

Step-2 : declare variables N, Nresponse

Step-3 : read the values of N,Nresponse

Step-4 : send the N,Nresponse values to secondary notification algorithm

Step-5 : for (N=1)

display danger

Step-6 : for (N=2)

display danger2

Step-7 : for (N=3)

display NO MANUAL CONTROL

Step-8 : stop

SECONDARY NOTIFICATION ALGORITHM(AN)

Step-1 : start

Step-2 : read the values of N,Nresponse

Step-3 : declare AN

Step-4 : for (Nresponse=positive)

return AN=1,N=0

stop

Step-5 : for (Nresponse=negitive1,N=1)

return N=2

Step-6 : for (Nresponse=negitive2,N=2)

return N=3

Step-7 : for (N=3)

Step-8 : return AN=0

Step-9 : stop

ALGORITHM FOR NOTIFICATION OF LANES(Nnl)

Step-1 : start

Step-2 : read AN,nl values

Step-3 : for (AN=0,nl=1)

send as lane stop(Nalpha) to vehicles and control room

Step-4 : for (AN=0,nl>1)

send change lane to all the back vehicles and control room

Step-5 : stop

GENERAL BODY ALGORITHM(A1)

Step-1 : start

Step-2 : receive the values of variables ar,sp1,sp2,vb

Step-3 : read the values of variables ar,sp1,sp2,vb

Step-4 : switch the cases A2, A3, A4, A5

Step-5 : stop

ALGORITHM FOR TEST CASE-1(A2)

Step-1 : start

Step-2 : read ar,sp1,sp2,vb

Step-3 : if (ar=10,vb= on limit)

if(sp1>sp2,sp1>40,sp2>40)

N=1

read N value

switch AN

if AN=1

stop

else

switch retarder(sp2=sp1),CN

return to A1

else

display safe

Step-4 : if (ar=5,vb= on limit)

if (sp1>sp2,sp1>40,sp2>40)

N=1

read N value

switch AN

if AN=1

stop

else

switch retarder(sp2=sp1),EBD,Nnl,CN

return to A1

else

display safe

Step-5 : stop

ALGORITHM FOR TEST CASE-3(A3)

Step-1 : start

Step-2 : read ar,sp1,sp2,vb

Step-3 : if (2.5<=ar<=3.5,vb= on limit)

if (sp1>sp2,sp1>40,sp2>40)

N=1

read N value

switch AN

if AN=1

stop

else

switch retarderfull(sp2>sp1),EBD,Nnl,CN

return to A1

else

display safe

stop

Step-4 : if (ar<2.5,vb= on limit) and (sp1>sp2,sp1>20,sp2>20)

N=1

read N value

switch AN

if AN=1

stop

else

switch ABS,EBD,Nnl,CN

return to A1

else

display safe

Step-5 : stop

ALGORITHM FOR TESTCASE-8(A4)

Step-1 : start

Step-2 : read ar,sp1,sp2,vb,radar

Step-3 : if (radar=front,ar=10,sp2=0,sp1<40)

switch retarder full,CN,Nnl

Step-5 : for (radar=front,ar<10,sp2=0)

switch ABS,EBD,CN,Nnl

Step-6 : if (radar=side,arr=0.3)

display safe

Step-7 : if (radar=side,arr<0.3)

switch EBD,CN,Nnl

Step-8 : stop

ALGORITHM FOR SIDE RADAR(A5)

Step-1 : start

Step-2 : read radar,ar1,ar2,ar3,ar4

Step-3 : if (radar= -1,(ar1<0.3 or a2<0.3 or ar3<0.3 or ar4<0.3)

N=1

read N value

switch AN

if AN=1

stop

else

declare variable N11

switch ABS,CN,Nnl

N=N11

if N=N11

return N=3

else

switch ~ABS

else

display safe

Step-4 : stop

ALGORITHM FOR Vibration sensor result (A7)

Step-1 : start

Step-2 : read vb value

Step-3 : if (vb= limit crossed)

switch CN,Nnl and display accident

else

display safe

Step-4 : stop

Result of using the algorithm:

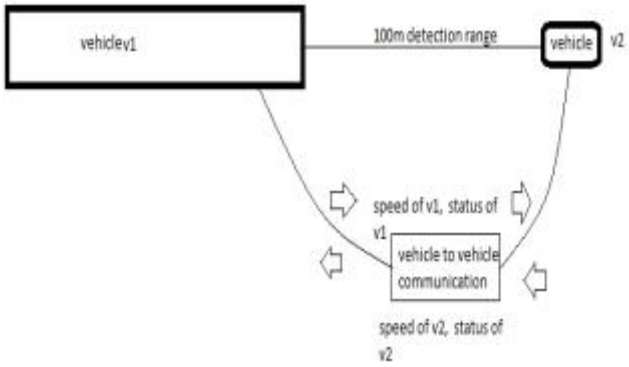


Figure 8. Explaining the result at range of distance and speed that the system recognized, using a real situation

In figure 8, the detection and ranging is done by using the radar algorithm and vehicle to vehicle communication. Since the detection range and speeds and status of the vehicles in normal, the whole algorithm returns the value that indicates the approval to the next detection and the algorithm of remaining will be considered as dead. So no working of remaining systems.

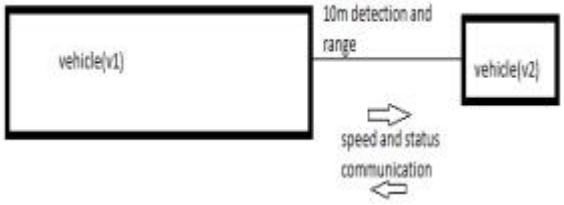


Figure 9. Explaining the result at range of distance and speed that the system recognized, using a real situation

In figure 9,the vehicles came to a range of 10m where the notification algorithm gets activated and on ignore of the notification and the respective test case and algorithm of ABS, EBD, engine are activated.

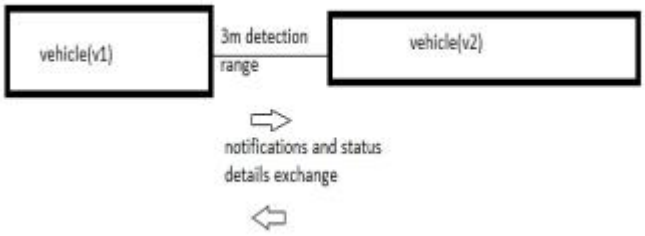


Figure 10. Explaining the result at the peak range of distance that the system has, using a real situation

Here the vehicles reached the peak stage of the algorithm where the activation of ABS, EBD and engine and audio will done without the linkage of notification response.

Converting Algorithm into code

HTML Code

```
<!DOCTYPE html>

<html>

<title>
```

```
<p>SSSA</p>
</title>
<head>
<h1 id="heading"> SAFETY AND SECURITY SYSTEM TO AUTOMOBILES 2.0</h1>
<a href="https://drive.google.com/file/d/1-9_oPAzX6-
elKoNEpOVKALxhjUIqZMWD/view?usp=sharing"><h3 id="heading"> USER MANUAL</a>
</head>
<body>
<div class="Loc">
<h3>Enter the Vehicle's location</h3>
<input type="text" id="location">
<p>
<input type="button" id="location" value="upload location coordinates" onclick= "location1()">
</p>
</div>
<div class="R">
<p1>
<h1>RADAR SYSTEM</h1>
<p>
<p>If Radar is front give inpuut "1" else give the input "-1" </p>
<input type="text" id="radar">
</p>
<p>
<p>Feed of front Radar</p>
<input type="text" id="ar">
</p>
<p>
<input type="text" id="ar1"> Feed of Radar1
</p>
<p>
<input type="text" id="ar2"> Feed of Radar2
</p>
```

```
<p>
<input type="text" id="ar3"> Feed of Radar3
</p>
<p>
<input type="text" id="ar4"> Feed of Radar4
</p>
<input type="button" value=" upload values " onclick="RadarSystem()">
<p>
<canvas id="radarDisp" ><h1></h1></canvas>
</p>
</p1>
</div>
<p2>
<div class="V2VV">
<h1>VEHICLE TO VEHICLE COMMUNICATION</h1>
<p> Feed of Vehicle's speed</p>
<input type="text" id="sp1">
</p>
<p>
<p>Feed of near by vehicle's speed</p>
<input type="text" id="sp2">
</p>
<p>
<input type="text" id="L"> Feed of number of lanes
</p>
<p>
<input type="text" id="VIB"> Feed of vibration sensor
</p>
<input type="button" value=" upload values " onclick="V2V()">
<p>
<canvas id="V2V" ><h1></h1></canvas>
</p>
```

```
</div>
</p2>
<p3>
<div class="N">
<h1>NOTIFICATION BOX</h1>
<p>
<input type="text" id="N"> Notification
<input type="button" value=" upload values " onclick="Notification()">
</p>
<p>
<canvas id="NR"> </canvas>
</p>
</div>
</p3>
<p4>
<div class="SN">
<h1>SECONDARY NOTIFICATION BOX</h1>
<p>
<input type="button" value=" upload values " onclick="SNotification()"> <h5> this is for the b
etter understanding of secondary notification else can be taken directly</h5>
</p>
</p4>
<p5>
<canvas id="SN"> </canvas>
<h1>CONTROL ROOM</h1>
<canvas id="CR"> </canvas>
<p>
<input type="text" id= "feedd">
</p>
<p>
<input type= "button" value="send feed" onclick="feed()">
</p5>
```

```
</div>
<p6>
<div class="EM">
<h1>EMERGENCY VEHICLE FILLUP</h1>
<p>
<canvas id="EMM"> </canvas>
</p>
<p>
<input type="text" id="feeddd">
</p>
<p>
<input type= "button" value="send feed" onclick="feed()">
</p>
</p6>
<p>
<div class="TS">
<h1>TEST CASE CHECK BOX</h1>
<input id="input" type="text">
<button onclick="TestCase()"> Apply test cases</button> mention the test case number
</p>
<canvas id="display"> </canvas>
</div>
</p6>
<p7>
<input type="button" class= "reset" value=" Reset screens " onclick="refresh()">
</p7>
</body>
</html>
```

CSS Code

```
body {
  background-image : url("https://images.pexels.com/photos/210182/pexels-photo
210182.jpeg?auto=compress&cs=tinysrgb&dpr=2&h=650&w=940");
```

```
}
#heading {
  text-align: center;
  color : red;
}
.Loc {
  color : black;
  position : relative;
  width : 178px;
  height : 159px;
  background-color : #255B;
  border : 5px solid #255B;
  left: 250px;
  top : 100px
}
div.R {
  color : #f89a03;
background-color: #255B;
  width: 600px;
 border: 3px solid #100D;
position : relative;
 left : 50px;
top : 140px;
}
div.V2VV {
  color : #f89a03;
background-color: #255B;
  width: 600px;
 border: 3px solid #100D;
position : relative;
 left : 50px;
top : 400px;
```

```
}
div.N {
  color : #f89a03;
  background-color: #255B;
  width: 600px;
 border: 3px solid #100D;
position : relative;
 left : 710px;
top : -260px;
}
div.SN {
  color : #f89a03;
  background-color: #255B;
  width: 600px;
 border: 3px solid #100D;
position : relative;
 left : 50px;
top : 500px;
}
div.EM {
  color : #f89a03;
  background-color: #255B;
  width: 355px;
  height: 450px;
 border: 3px solid #100D;
position : relative;
 left : 900px;
top : -2445px;
}
div.TS {
  color : #f89a03;
background-color: #255B;
```

```
position : relative;
left : -200px;
top : 2000px;
border: 3px solid #100D;
width: 600px;
}
canvas{
  width: 350px;
  height:200px;
  border:2px solid #c3c3c3;
}
.reset{
  left : -740px;
  position : relative;
  top :  -5400px;
  border : 10px solid #255B;
}
```

JavaScript Code

```
var ar=null; var ar1=null; var ar2=null; var ar3=null; var ar4=null; var radar=null; var sp1=null; var sp2=null;var nl=null;var vb=null;var N=null; var Nresponse=null;var AN=null;var L=null;

//LOCATION INPUT BOX
function location1() {
var location1=document.getElementById("location");
L= location1.value;
  return L;
}
//EMERGENCY VEHICLES CANVAS FEED
var dispE=document.getElementById("EMM");
  dispE.style.backgroundColor="white"
 var dispE1=dispE.getContext("2d");
  dispE1.font="14px TimesNewRoman";
  dispE1.fillStyle="red";
//EMERGENCY VEHICLES CANVAS FEED
```

```
//RADAR SYSTEM CANVAS START
dispR=document.getElementById("radarDisp");
  dispR.style.backgroundColor="white"
 var dispR1=dispR.getContext("2d");
  dispR1.font="14px TimesNewRoman";
  dispR1.fillStyle="black";
//RADAR SYSTEM CANVAS END
//TEST CASES CANVAS START
var dispTS=document.getElementById("display");
  dispTS.style.backgroundColor="white"
 var dispTS1=dispTS.getContext("2d");
  dispTS1.font="14px TimesNewRoman";
  dispTS1.fillStyle="black";
//TEST CASES CANVAS END
//CONTROL ROOM CANVAS START
var dispCR=document.getElementById("CR");
  dispCR.style.backgroundColor="white"
 var dispCR1=dispCR.getContext("2d");
  dispCR1.font="14px TimesNewRoman";
  dispCR1.fillStyle="black";
//CONTROL ROOM CANVAS END
//VEHICLE DISPLAY BOARD CANVAS START
var dispS=document.getElementById("V2V");
  dispS.style.backgroundColor="white"
 var dispS1=dispS.getContext("2d");
  dispS1.font="14px TimesNewRoman";
  dispS1.fillStyle="black";
//VEHICLE DISPLAY BOARD CANVAS END
//SECONDARY NOTIFICATION CANVAS START
  var dispSN=document.getElementById("SN");
  dispSN.style.backgroundColor="white"
 var dispSN1=dispSN.getContext("2d");
```

```
  dispSN1.font="14px TimesNewRoman";
  dispSN1.fillStyle="black";
//SECONDARY NOTIFICATION CANVAS END
//NOTIFICATION CANVAS START
 var dispN=document.getElementById("NR");
  dispN.style.backgroundColor="white"
 var dispN1=dispN.getContext("2d");
  dispN1.font="14px TimesNewRoman";
  dispN1.fillStyle="black";
 //NOTIFICATION CANVAS END
//RADAR SYSTEM
function RadarSystem() {
  var radarx=document.getElementById("radar")
  var radar0=document.getElementById("ar");
  var radar1=document.getElementById("ar1");
  var radar2=document.getElementById("ar2");
  var radar3=document.getElementById("ar3");
  var radar4=document.getElementById("ar4");
  radar=radarx.value;
  ar=radar0.value;
  ar1=radar1.value;
  ar2=radar2.value;
  ar3=radar3.value;
  ar4=radar4.value;
 var dispR=document.getElementById("radarDisp");
  dispR.style.backgroundColor="white"
 var dispR1=dispR.getContext("2d");
  dispR1.font="14px TimesNewRoman";
  dispR1.fillStyle="black";
  if (radar>0){
    dispR1.clearRect(0,0,dispR.width,dispR.height);
    dispR1.fillText(ar,10,25);
```

```
   return ar;
  }
  else
  {
    dispR1.clearRect(0,0,dispR.width,dispR.height);
    dispR1.fillText(ar1,10,30);
    dispR1.fillText(ar2,10,60);
    dispR1.fillText(ar3,10,90);
    dispR1.fillText(ar4,10,120);
   return ar1,ar2,ar3,ar4;
  }
}
//VEHICLE TO VEHICLE COMMUNICATION, NUMBER OF LANES AND VIBRATION
SENSOR
function V2V() {
  var speed1=document.getElementById("sp1");
  var speed2=document.getElementById("sp2");
var lanes=document.getElementById("L");
var vib=document.getElementById("VIB");
  sp1=speed1.value;
  sp2=speed2.value;
  nl=lanes.value;
  vb=vib.value;
  var dispS=document.getElementById("V2V");
  dispS.style.backgroundColor="white"
 var dispS1=dispS.getContext("2d");
  dispS1.font="14px TimesNewRoman";
  dispS1.fillStyle="black";
  if (sp1==0){
    dispS1.clearRect(0,0,dispS.width,dispS.height);
    dispS1.fillText("The vehicle is not moving",10,30);
    dispS1.fillText("number of lanes= " +nl,10,60); // NUMBER OF LANES
    dispS1.fillText("vibration sensor value= " +vb,10,90);//VIBRATION SENSOR
```

```
  }
  else if (sp1>0){
      dispS1.clearRect(0,0,dispS.width,dispS.height);
    dispS1.fillText(sp1,10,30);
    dispS1.fillText(sp2,10,60);
    dispS1.fillText("number of lanes= " +nl,10,90); //NUMBER OF LANES
    dispS1.fillText("vibration sensor value= " +vb,10,120);//VIBRATION SENSOR
    return sp1,sp2,nl,vb;
    }
    if(vb=="limit crossed") {
  dispTS1.fillStyle="red";
  dispTS1.fillText("accident",10,100);
  dispCR1.fillStyle="red";
  dispCR1.fillText("accident at " +L ,10,100);
  dispS1.fillStyle="red";
  dispS1.fillText("accident",10,100);
}
}
//NOTIFICATION ALGORITHM
function Notification() {
var N1=document.getElementById("N");
//var N2=document.getElementById("N2");
  N=N1.value;
 //Nresponse=N2.value;
  var dispN=document.getElementById("NR");
  dispN.style.backgroundColor="white"
 var dispN1=dispN.getContext("2d");
  dispN1.font="14px TimesNewRoman";
  dispN1.fillStyle="black";
  if (N==1) {
  if (confirm( "Danger caution 1")==true) {
      Nresponse="positive";
```

```
 dispN1.clearRect(0,0,dispN.width,dispN.height);
  dispN1.fillText("N value is " +N,10,60);
  dispN1.fillText("Nresponse value is " +Nresponse,10,90);
    return N, Nresponse;
    }
    else {
       Nresponse="negative1";
dispN1.clearRect(0,0,dispN.width,dispN.height);
  dispN1.fillText("N value is " +N,10,60);
  dispN1.fillText("Nresponse value is " +Nresponse,10,90);
      return N, Nresponse;
    }
  }
if (N==2) {
  if (confirm( "Danger caution 2")==true) {
      Nresponse="positive";
dispN1.clearRect(0,0,dispN.width,dispN.height);
  dispN1.fillText("N value is " +N,10,60);
  dispN1.fillText("Nresponse value is " +Nresponse,10,90);
    return N, Nresponse;
    }
      else {
       Nresponse="negative2";
dispN1.clearRect(0,0,dispN.width,dispN.height);
  dispN1.fillText("N value is " +N,10,60);
  dispN1.fillText("Nresponse value is " +Nresponse,10,90);
        return N, Nresponse;
    }
}
  if (N==3) {
    alert("No Manual Control");
    AN=0;
```

```
    dispSN1.fillText("value of AN is " +AN,10,30);
    return AN,NotificationOfLanes();
  }
}
function SNotification() {
  //SECONDARY NOTIFICATION CANVAS START
  var dispSN=document.getElementById("SN");
  dispSN.style.backgroundColor="white"
 var dispSN1=dispSN.getContext("2d");
  dispSN1.font="14px TimesNewRoman";
  dispSN1.fillStyle="black";
  //SECONDARY NOTIFICATION CANVAS END
  if (Nresponse=="positive"){
    N=0; AN=1;
dispSN1.clearRect(0,0,dispSN.width,dispSN.height);
    dispSN1.fillText("value of AN is " +AN,10,30);
   return N, AN;
  }
  if (Nresponse=="negative1" && N==1){
    N=2;
dispSN1.clearRect(0,0,dispSN.width,dispSN.height);
   dispSN1.fillText("value of N is " +N,10,30);
    return N,Notification();
  }
  if (Nresponse=="negative2" && N==2){
    N=3;
dispSN1.clearRect(0,0,dispSN.width,dispSN.height);
    dispSN1.fillText("value of N is " +N,10,30);
    return N, Alarm();
  }
}
function Alarm() {
```

```
if (N==3) {
dispSN1.clearRect(0,0,dispSN.width,dispSN.height);
    alert("No Manual Control");
    AN=0;
    dispSN1.fillText("value of AN is " +AN,10,30);
return AN,NotificationOfLanes();
}
}
function NotificationOfLanes() {
  if (AN==0 && nl==1) {
  dispS1.fillStyle="red";
  dispS1.fillText("lane stop(Nalpha)",10,140);
  dispCR1.fillStyle="red";
  dispCR1.fillText("lane stop(Nalpha)",10,140);
}
  if (AN==0 && nl>1) {
  dispS1.fillStyle="red";
  dispS1.fillText("change lane sent",10,140);
  dispCR1.fillStyle="red";
  dispCR1.fillText("lane change activated",10,140);
}
}
function TestCase() {
 var testcase = document.getElementById("input").value;
switch(testcase){
  case "1":
    if ((ar==10) && (vb="on limit") && (sp1>sp2) && (sp1>40) && (sp2>40)) {
    dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
 dispTS1.fillText("upload '1' in the notification box",10,40);
      return N=1;
    }
    if ((ar==5) && (vb="on limit") && (sp1>sp2) && (sp1>40) && (sp2>40)) {
```

```
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
   dispTS1.fillText("Activated retarder(speed2=speed1),EBD,Nnl,CN",10,40);
      AN=0;
   NotificationOfLanes();
    }
    if(N==3) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
  dispTS1.fillText(" Activated retarder(speed1=speed2) and CN",10,40);
      }
    if (ar>10) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
    dispTS1.fillText(" SAFE DRIVE",10,40);
    }
 break;
case "3" :
if ((ar==3.5) && (vb="on limit") && (sp1>sp2) && (sp1>20) && (sp2>20)) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
  dispTS1.fillText("upload '1' in the notification box",10,40);
      return N=1;
    }
    if ((ar==2.5) && (vb="on limit") && (sp1>sp2) && (sp1>20) && (sp2>20)) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
    dispTS1.fillText("Activated retarder(speed2>speed1),EBD,Nnl,CN",10,40);
      AN=0;
   NotificationOfLanes();
    }
    if(N==3) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
    dispTS1.fillText(" Activated retarder(speed1=speed2) and CN",10,40);
      }
    if(ar>3.5) {
  dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
```

```
  dispTS1.fillText(" SAFE DRIVE",10,40);
    }
 break;
  case "8" :
  if ((radar==1) && (sp1<40) && (vb="on limit") && (ar<10) && (sp2==0)) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
   dispTS1.fillText("activation of EBD",10,40);
      AN=0;
   NotificationOfLanes();
  }
    if ((radar==1) && (sp1>40) && (vb="on limit") && (ar<10) && (sp2==0)) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
      dispTS1.fillText("activation of ABS,EBD",10,40);
      AN=0;
   NotificationOfLanes();
    }
    if ((radar==-1) && (vb="on limit") && (ar1<1||ar2<1||ar3<1||ar4<1)) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
      dispTS1.fillText("activation of ABS,EBD",10,40);
      AN=0;
   NotificationOfLanes();
    }
    if(N==3) {
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);
      dispTS1.fillText(" Activated retarder(speed1=speed2) and CN",10,40);
      }
 break;
}
}
function refresh() {
  dispR1.clearRect(0,0,dispR.width,dispR.height);
dispS1.clearRect(0,0,dispS.width,dispS.height);
```

```
dispN1.clearRect(0,0,dispN.width,dispN.height);

dispSN1.clearRect(0,0,dispSN.width,dispSN.height);

 dispCR1.clearRect(0,0,dispCR.width,dispCR.height);
dispTS1.clearRect(0,0,dispTS.width,dispTS.height);

dispE1.clearRect(0,0,dispE.width,dispE.height);

}

//CONTROL ROOM FEED

function feed() {

  var fd=document.getElementById("feedd");

  var F=fd.value;

 var fdd=document.getElementById("feeddd");

 var

FF=fdd.value; dispCR1.clearRect(0,0,dispCR.width,dispCR.height);

dispS1.clearRect(0,0,dispS.width,dispS.height);

dispE1.clearRect(0,0,dispE.width,dispE.height);

   dispCR1.fillText(F,10,60);

  dispS1.fillStyle="red";

  dispS1.fillText(F,10,60);

  dispE1.fillText(F,10,60);

   dispCR1.fillText(FF,10,60);

  dispS1.fillStyle="red";

  dispS1.fillText(FF,10,60);

  dispE1.fillText(FF,10,60);

}
```

Algorithm to Python Code

```
# SAFETY AND SECURITY SYSTEM TO AUTOMOBILES

from colorama import Fore, Back, Style

from tkinter import *

from tkinter import messagebox

top = Tk()

top.geometry("1000x1000")

entry = input(" What type enrty it is(radar/emergencyvehicle) ?  ");

if entry == 'radar':
```

```
val = input(" enter value of Radar type(front/side) : ");
if val == 'front':
    Location = input("Enter the location coordinates: ");
    NL = input("Enter the number of lanes: ");
    vibration = input("Value of vibration sensor (onlimit/limitcrossed)? ");
    ar = input("Enter the distance: ");
    sp1 = input("Enter the speed of your vehicle: ");
    sp2 = input("Enter the speed of other vehicle: ");
    if (vibration == 'limitcrossed' and NL == '1'): print(Back.RED + "lane stop due to ACCIDENT at the location: ",Location);
    elif (vibration == 'limitcrossed' and NL > '1'): print(Back.RED + "lane change due to ACCIDENT at the location: ",Location);
    elif (val == 'front' and ar == '10' and sp1 > sp2): messagebox.showinfo("Danger caution 1",
                                                    "distance is low and speed is more than the nearby vehicle, So please slow down you vehicle"); top.mainloop();
    elif (val == 'front' and ar == '5' and sp1 > sp2): messagebox.showinfo("Danger caution 2",
                                                   "distance is very low and speed is more than the nearby vehicle, So please slow down you vehicle"); top.mainloop();
    elif (val == 'front' and ar == '2.5' and sp1 > '20' and NL == '1'): print(
        Back.RED + "lane stop at the location: ", Location); messagebox.showinfo(
        "SWITCH ON OF ABS, EBD AND CONTROL ROOM NOTIFICATION",
        "Distance is out of range and speed is more than the permitted range. Hence no manual control,"); top.mainloop();
    elif (val == 'front' and ar == '2.5' and sp1 > '20' and NL > '1'):
        print(Back.RED + "lane change at the location: ", Location); messagebox.showinfo(
            "SWITCH ON OF ABS, EBD AND CONTROL ROOM NOTIFICATION",
            "Distance is out of range s speed is more than the permitted range. Hence no manual control,"); top.mainloop();
    else:
        print(" SAFE DRIVE/wrong input");
elif val == 'side':
    Location = input("Enter the location coordinates: ");
    NL = input("Enter the number of lanes: ");
    vibration = input("Value of vibration sensor (onlimit/limitcrossed)? ");
```

```
    ar1 = input("Enter the distance(by side1): ");

    ar2 = input("Enter the distance(by side2): ");

    ar3 = input("Enter the distance(by side3): ");

    ar4 = input("Enter the distance(by side4): ");

    if (vibration == 'limitcrossed' and NL == '1'): print(Back.RED + "lane stop due to ACCIDENT at
the location: ", Location);

    elif (vibration == 'limitcrossed' and NL > '1'): print(Back.RED + "lane change due to
ACCIDENT at the location: ", Location);

    elif (val == 'side' and (ar1 == '0.8' or ar2 == '0.8' or ar3 == '0.8' or ar4 == '0.8')):
messagebox.showinfo(

        "Danger caution 1", " Side distance is low"); top.mainloop();

    elif (val == 'side' and (ar1 == '0.5' or ar2 == '0.5' or ar3 == '0.5' or ar4 == '0.5')):
messagebox.showinfo(

        "Danger caution 2", " Side distance is very low"); top.mainloop();

    elif (val == 'side' and (ar1 == '0.3' or ar2 == '0.3' or ar3 == '0.3' or ar4 == '0.3') and NL == '1'):
print(

        Back.RED + "lane stop at the location: ", Location); messagebox.showinfo(

        "SWITCH ON OF ABS, EBD AND CONTROL ROOM NOTIFICATION",

        "Distance is out of range and speed is more than the permitted range. Hence no manual
control,"); top.mainloop();

    elif (val == 'side' and (ar1 == '0.3' or ar2 == '0.3' or ar3 == '0.3' or ar4 == '0.3') and NL > '1'):

        print(Back.RED + "lane change at the location: ", Location); messagebox.showinfo(

            "SWITCH ON OF ABS, EBD AND CONTROL ROOM NOTIFICATION",

            "Distance is out of range and speed is more than the permitted range. Hence no manual
control,"); top.mainloop();

    else:

        print(" SAFE DRIVE/wrong input");

elif entry == 'emergencyvehicle':

  LocationE1 = input("Enter the start location: ");

  LocationE2 = input("Enter the end location: ");

  print(" Control room: ");

  print(Back.RED + "Emergency vehicle is starting from ", LocationE1, " to ", LocationE2);

  messagebox.showinfo("EMERGENCY VEHICLE ATTENTION", "Please give way to the
emergency vehicle ");

  top.mainloop();
```

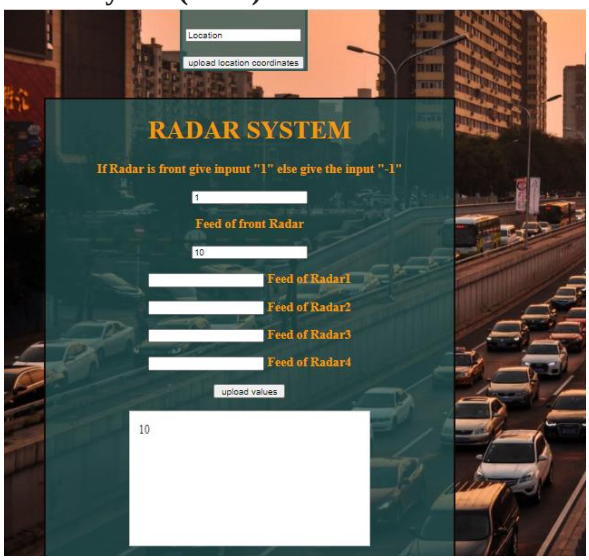
else:

print(Fore.RED + "Refresh/re-run and Please enter a valid input ")

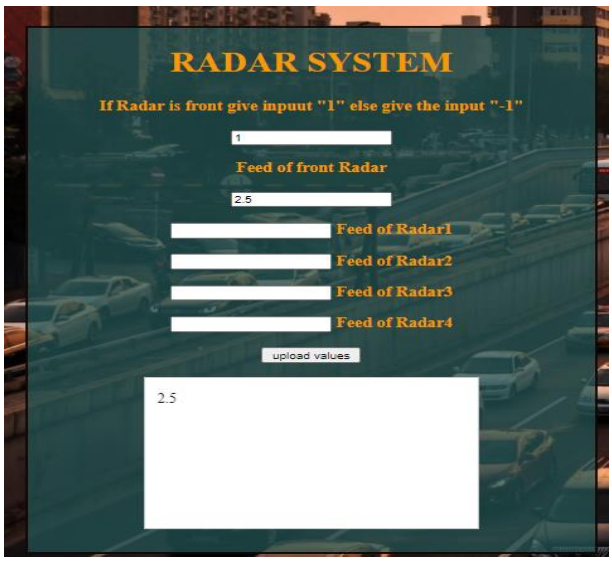
The result of this code will be similar to the HTML code and must be executed in Pycharm or in Jupiter. If an error is displayed, please check the indent errors cased due to spacing.

RESULTS AND DISCUSSIONS

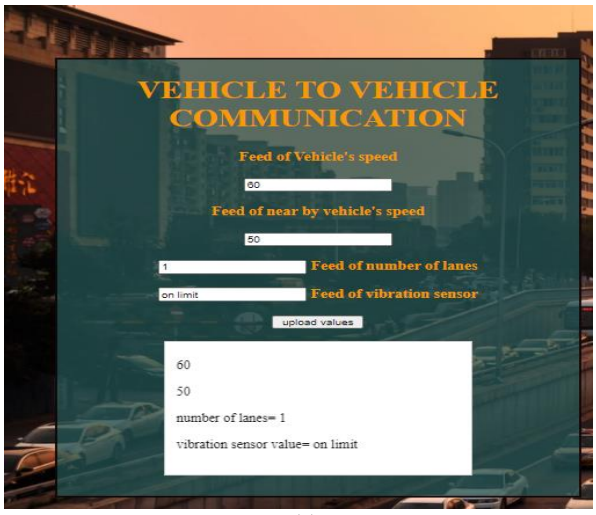
Radar-system(front)



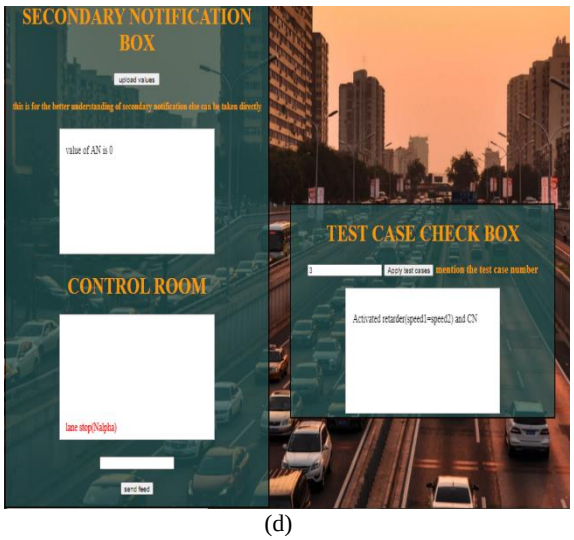
(a)



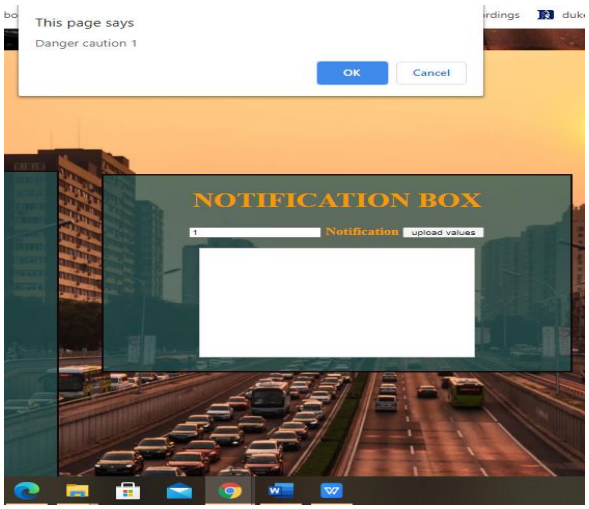
(b)



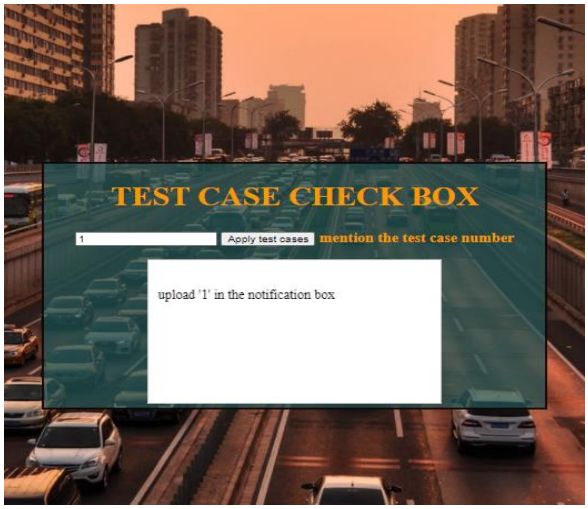
(c)



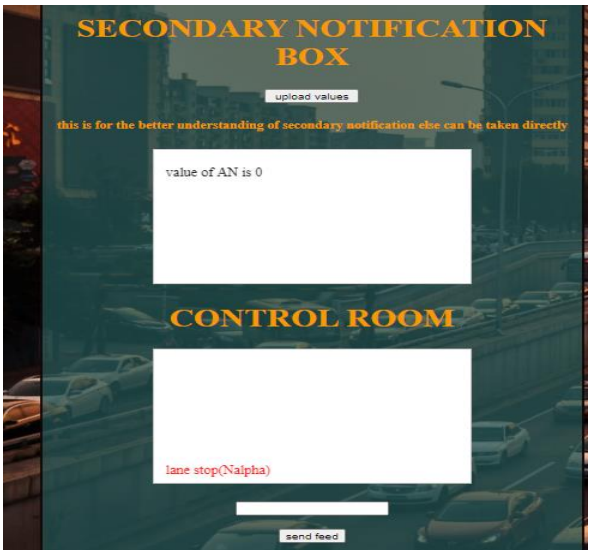
(d)



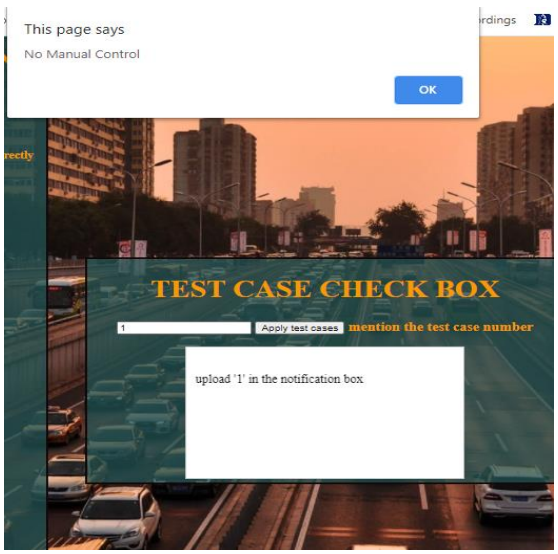
(e)



(f)



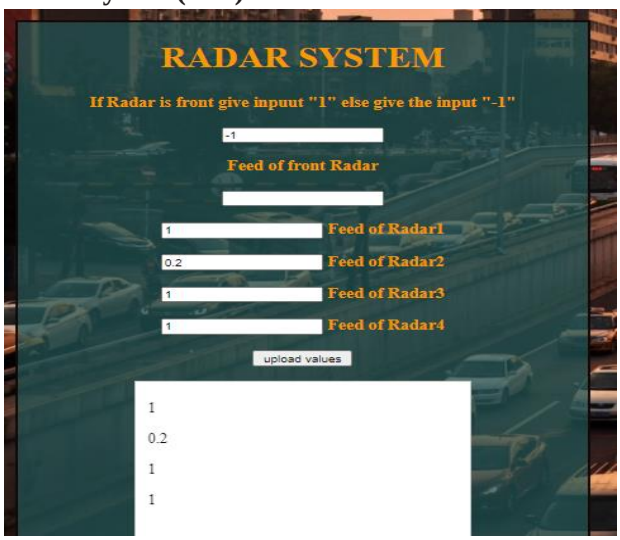
(g)



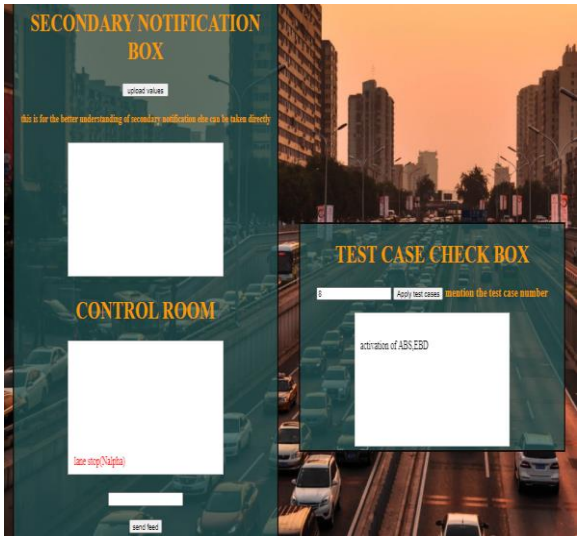
(h)

Figure 11. Simulation results of Radar system front-side that includes the step by step result of the processes using the algorithm, starting from (a) to (h) at different values.

Radar system(side)



(a)



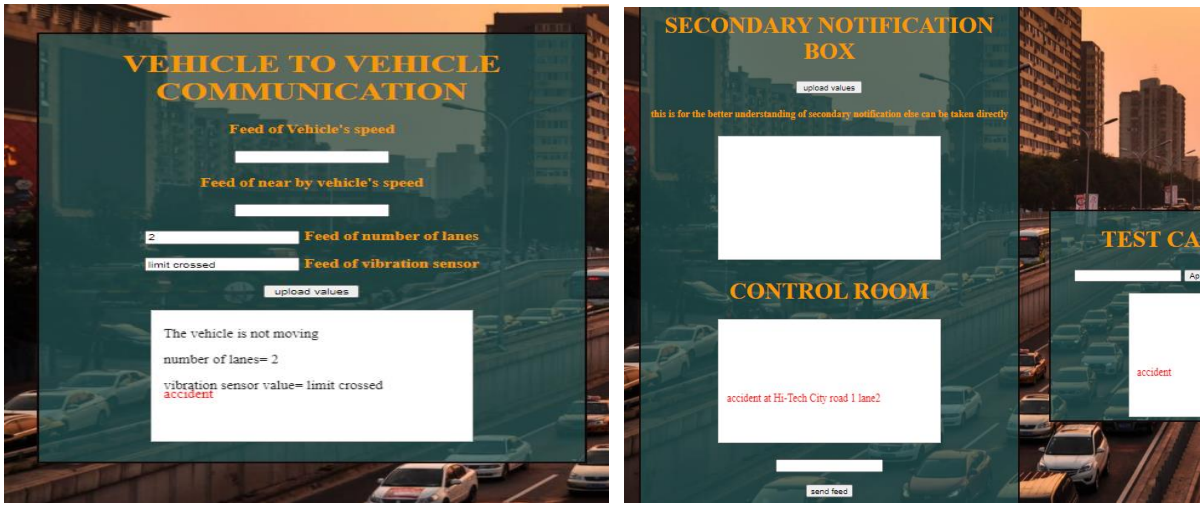
(b)

Figure 12. Simulation results of Radar system sideways that includes the step by step result of the processes using the algorithm, starting from (a) to (b) at different values.

Location Feed

Figure 13. Simulation of location that includes the step by step result of the processes using the algorithm, at different values.

Accident alert



(a) (b)

Figure 14. Simulation results of Accident alert system that includes the step by step result of the processes using the algorithm, starting from (a) to (b) at different values.

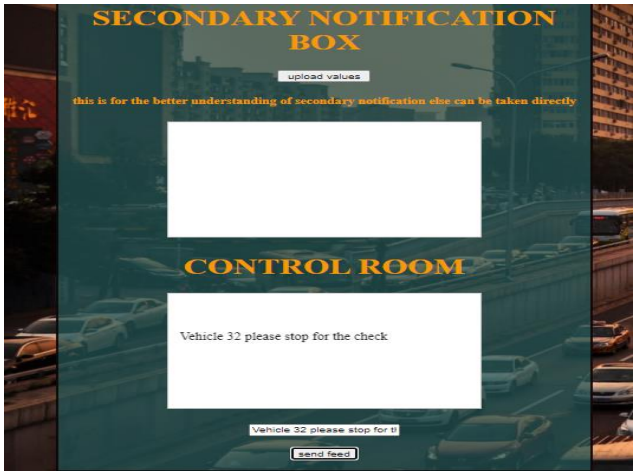
Emergency vehicle feed

(a) (b)

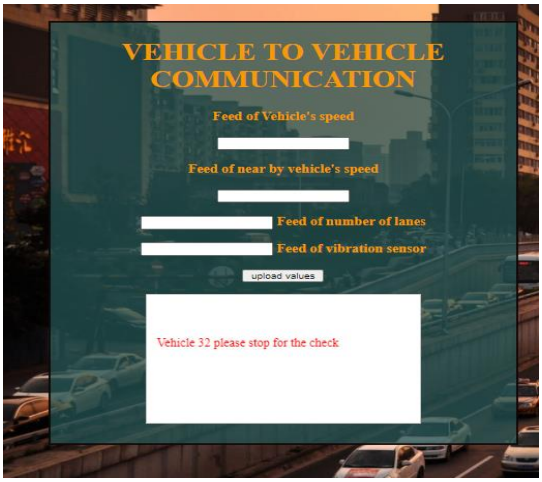
(c)

Figure 15. Simulation results of Accident alert system that includes the step by step result of the processes using the algorithm, starting from (a) to (c) at different values.

Control room feed



(a)



(b)

Figure 16. Simulation results of Location feed that includes the step by step result of the processes using the algorithm, starting from (a) to (b) at different values.

Benifits

Safety:

a) Vehicles of 3+ wheelers will adopt this system and hence there will be no accident caused majorly.

b) No collision due to :

1.Opposite vehicles

2.Signal jumping

3.Human errors

4.Vision disturbance

5.Rash overtake

6.Wrong route or lane

7.Mechanical errors.

8.Drowsiness

c) Clean traffic will be maintained.

e) No emergency will be delayed.

Security :

a) All the traffic data will be under the control of the police

b) Any accident caused due to 3- wheelers can be easily identified and rescued.

c) Movement of the vehicles can be monitored

d) Ghat section disabilities can be rectified

e) Terror activities can be reduced slightly

f) Vehicles have a secure environment

Legal Requirements

a) Control rooms have the ultimate authority to

1.Route the way of the traffic

2.Investigate any issue at the spot itself

3.Reject the approval to reach its limits if any of the equipment is not in a valid state or error state

4.Use the details of the vehicles when an incident is subjected to be filed in FIR

5.Seize the vehicle on the violations of the standards more than 3 times in its lifetime

b) All the control rooms are strictly instructed to act according to commandments set by the government.

c) The government must approve all the RULES set by the author of this project.

d) No part of this must be disabled or modified when in use.

e) All disputes are subjected to the highest court in the country.

f) Rash driving in the free zone(no vehicles) is allowed at the risk of the individual. If an accident happens by this, the fire department and dump yard department only go to the spot to attend their duties. No action of the case is booked in this type.

g) Becoming an obstacle to the emergency services leads to seizing of the vehicle if an appropriate explanation is not given and no approval from the control room.

h) Violation of the payment related instructions by the author of the project leads to a death sentence.

i) Damage to SSA is eligible to get insured only when accidents happen and warranty period of 2 years must be given to errors only.

Rules and instructions for the access of information of automobile

Rules:

1.Only when the vibration module activates gives the clear information about the vehicle to the control room and emergency services.

2.The radar range must be edited only by the manufacturer

3.If the communication between the vehicles or the control room fails, then the vehicle is considered as dead and control room has to take the necessary action.

4.The owner of the vehicle must link his bank account with the registration certificate of the vehicle in which the fine is immediately imposed after the confirmation of violation of rules.

5.Programming of the vehicles is set to descending order in a particular lane on all aspects.

6.The confirmation of the presence of the vehicle in the control room of the zone is done on the detection from both the vehicles. If not both the vehicles are treated as a dummy and an action will be taken with the immediate effect.

7.Tampering of the communication signals must be immediately reported to the authority of national security by the control room.

8. A customer must check all the test cases satisfaction before the purchase of the vehicle and the manufacturer or the vehicle agent must show the buyer and send the report to the manufacturing authority.

9.Sudden mall function of the SSA must be reported to the nearest control room and must maintain the least lane and the speed must not range more than 40kmph until the approval of “not a dummy” from the control room.

10.In the case of drowsiness of the driver an instruction of sleep will be done as specified, if still got ignored the vehicle will be reducing the speed and the camera of the car turns on and the driver must wash his face before the camera and that will be monitored by the nearest control room. On the approval of the control room, only the vehicle continues its journey.

11.The speed of the vehicle will inversely proportional to the curve of the road.

12.A partial moment on lanes will be treated as drowsiness.

Information access:

1.Only accessible to the control room when an accident happens.

2.If no incident happens and the information is required can be retrieved on the duly signed order form Hon'ble Chief Minister of the state/ Hon'ble Prime Minister of the country/ Hon'ble President of the country.

3.Violation of the above leads to a death sentence.

Demerits of the project

a) .Must be adopted by everyone in the country

b) Only for the vehicles more than 3 wheels.

c) Extra cost must be paid for the purchase of a vehicle which will be included in the price of the vehicles.

d) Cost Issues

1.Damage leads to change of the equipment

2.Errors lead to a change of part itself

3.Manufacturing accuracy of 70% minimum is needed else the manufacturer gets losses.

CONCLUSION

The protection of vehicles from accidents is done as explained in the result, in 3 kinds of ways where the detailed process is given in the algorithm and design of the system is done clearly. The necessary rules for the implementation of the project were also specified in order to gain 100% result of the project.

Hence this project allows the vehicles to be manual completely unless and otherwise the accident is going to happen. Once the accident is sensed, the safety of the vehicle becomes the priority.

Future Scope:

a) The ignition of the vehicle by the driver is done only by inserting the original Registration certificate card containing chip which will be approved by the control room standards.

b) Percentage of alcohol content check before the start of the vehicle is done and when approved by the control room standards the car starts.

c) Could be introduced for the autos and bikes if some more system design is done.

d) Solar panels can be added with nano windmills for natural power generation.

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