PRESIDENCY UNIVERSITY

A Report on

"SMART TRAFFIC LIGHT MANAGEMENT SYSTEM"

A technical project work submitted in partial fulfilment of requirement for the award of the degree of

Bachelor of Technology

In

Computer and Communication Engineering

By

Nanabala Kiran Kumar (20181CCE0059)

Sai Suhaas G S (20181CCE0079)

Shravan N R (20181CCE0085)

Supriya T S (20181CCE0090)

Vyshnavi S (20181CCE0102)

Under the guidance of

Mr. Afroz Pasha & Ms Amreen Ayesha

Professor, Dept.Of CSE

SMART TRAFFIC LIGHT MANAGEMENT SYSTEM

Aim: In this project, we are going to manage traffic light system using IR sensor and ESP8266.

Components:

- Arduino MEGA
- IR Sensor
- LED's
- Jumper Wire
- Breadboard
- ESP8266
- Resistor
- Push Button
- Power cable
- TTL connector

Abstract:

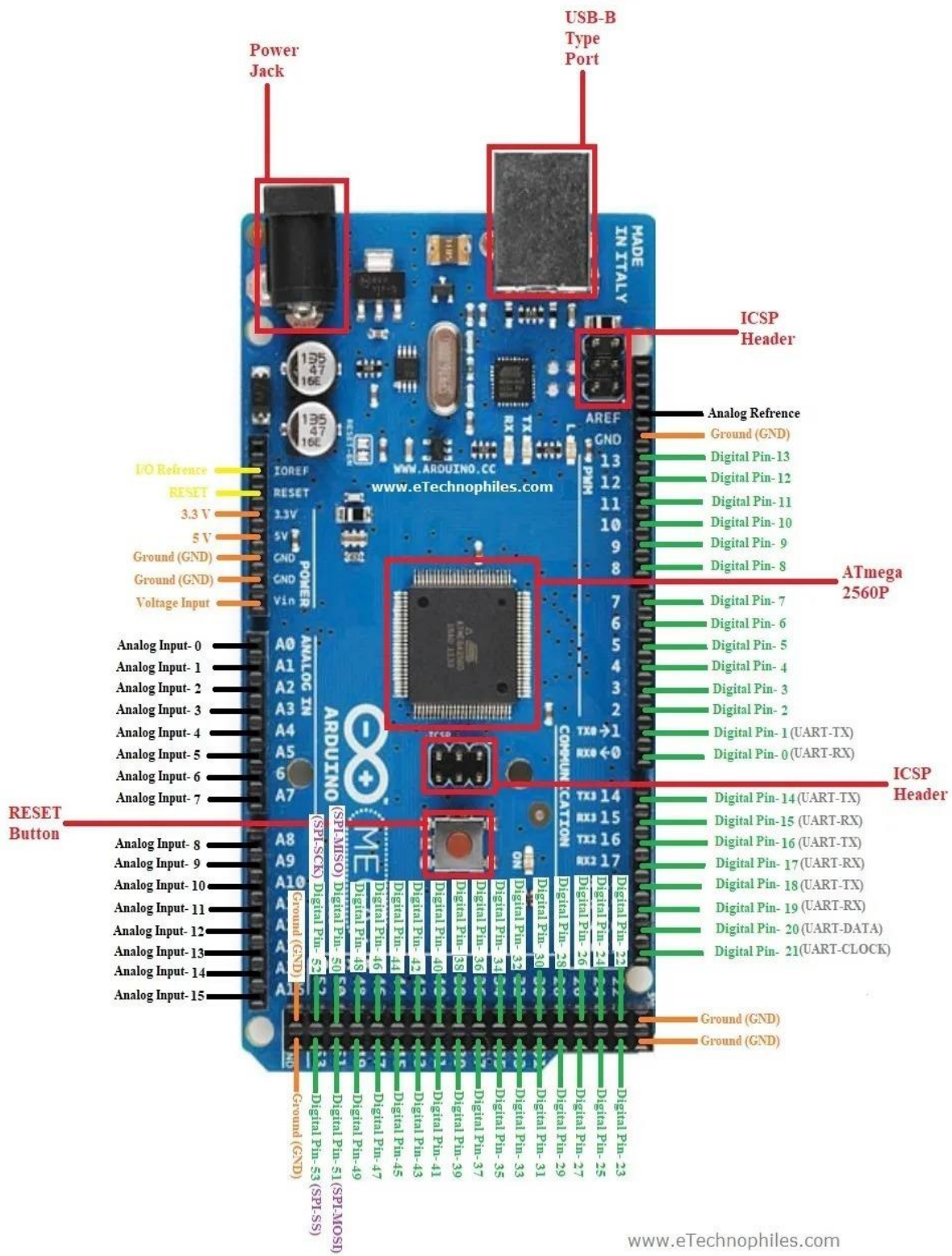
Traffic signal management is one of the major problematic issues in the current situation. Such scenarios, every signal are getting 60 seconds of timing on the road at a regular interval, even when traffic on that particular road is dense. As per our project, we will be optimizing the timing interval of the traffic signal purely depends on the number of vehicles on that particular roadside. The major advantage of this system is that it can able to decrease the more waiting time for the drivers to cross road signal. In this model, we are using the IR Sensors and ESP8266. Using our project will be liable to determine expected required timing as per provided inputs to the signal which is vehicles count. The input of these systems is vehicles counts on each side of the road from crossing signal. And this input will be determined on much time is to be provided. "Project on this system are traffic network and real-time traffic sub-networks".

Introduction:

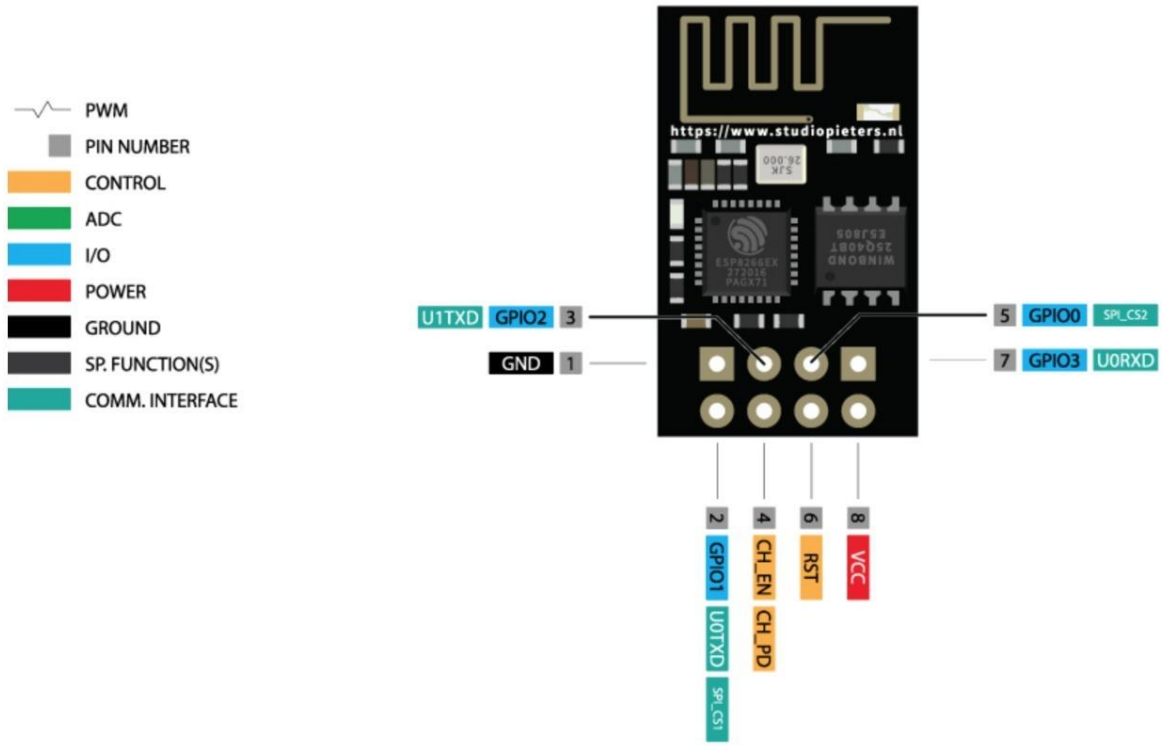
Smart traffic lights or Intelligent traffic lights are a vehicle traffic control system that combines traditional traffic lights with an array of sensors and artificial intelligence to intelligently route vehicle and pedestrian traffic. They can form part of a bigger intelligent transport system.

Pinout diagram:

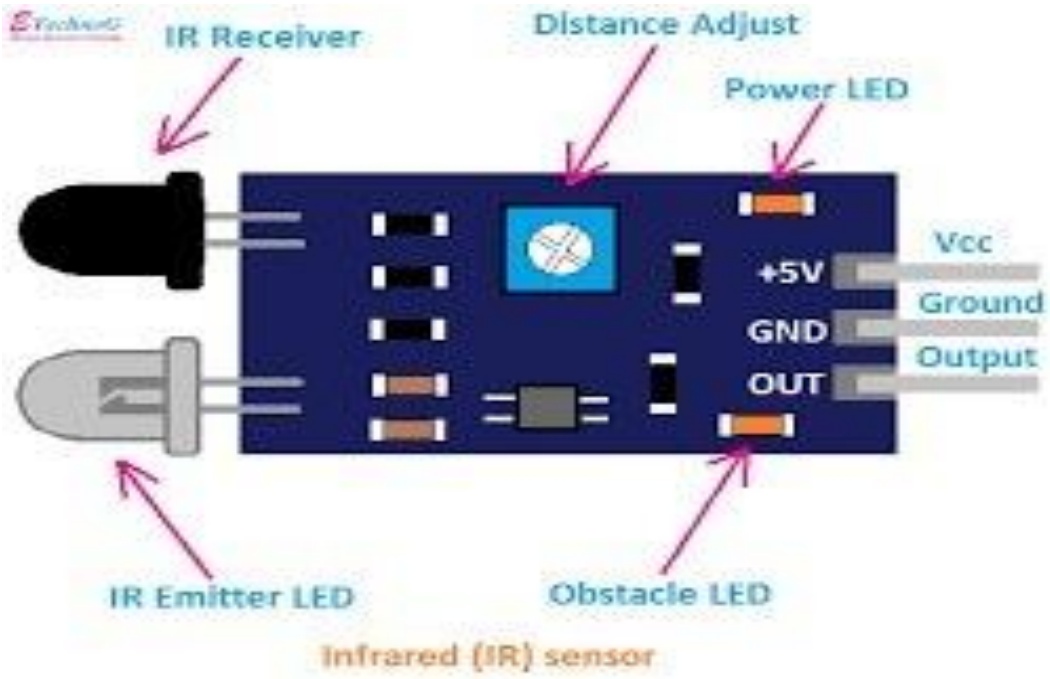
Arduino mega:



ESP8266/ESP01:



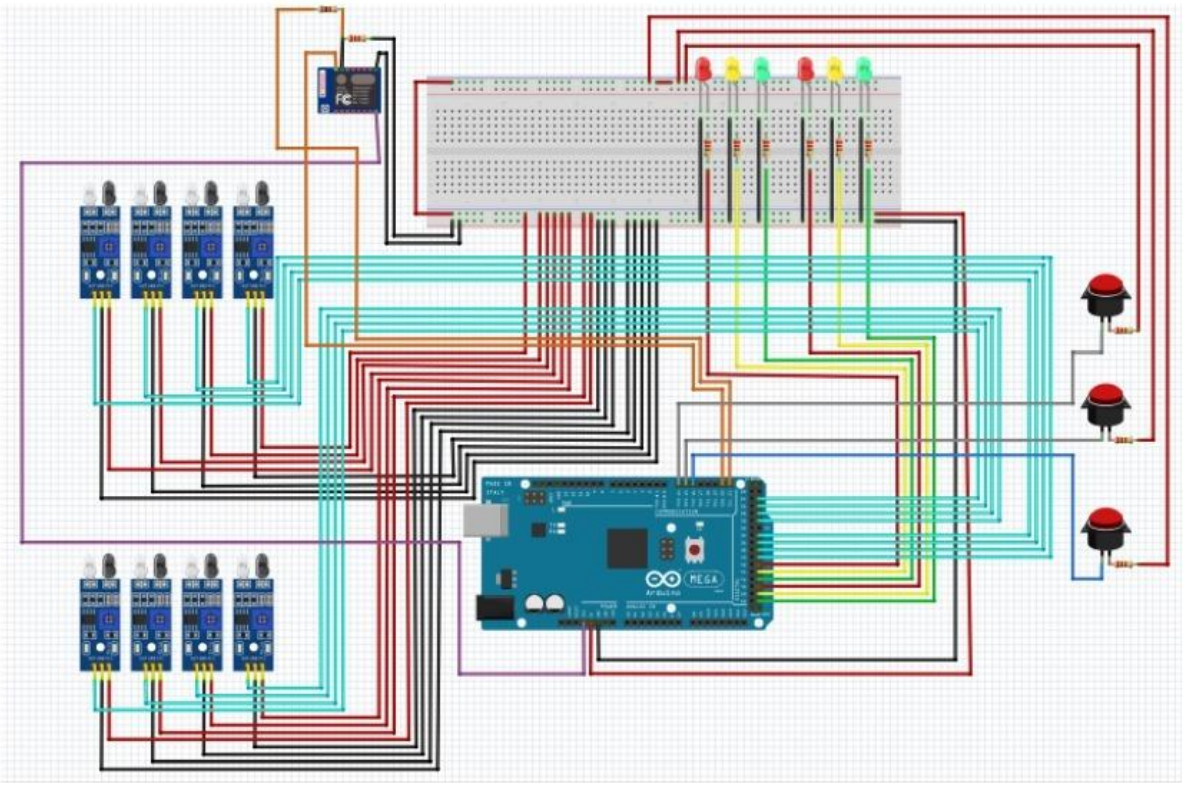
IR sensor:



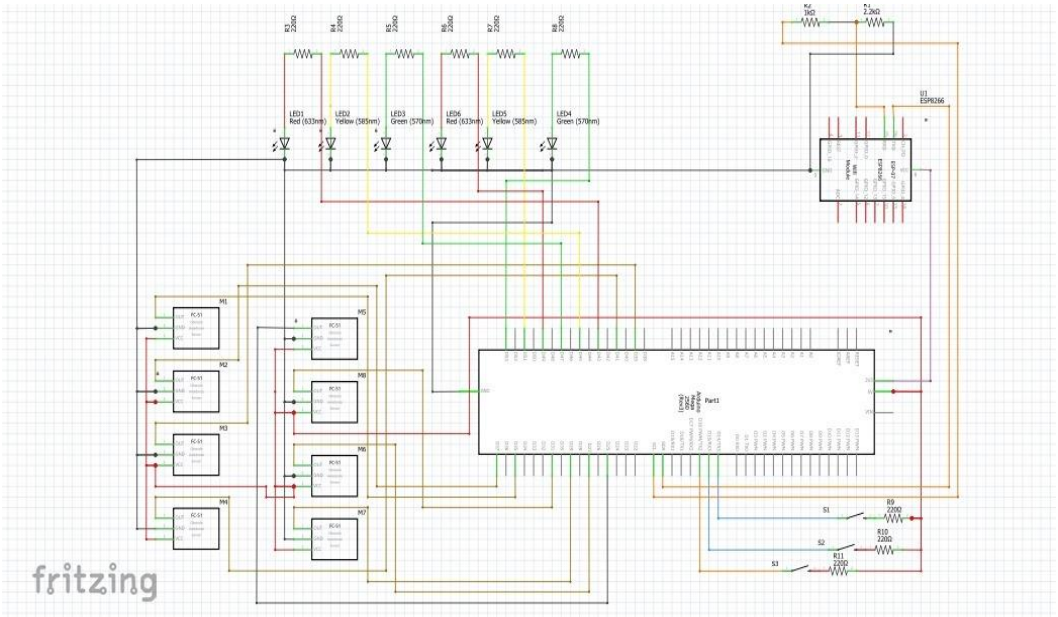
Circuit connections:

Component name	Quantity	Pin details
ESP8266	1	GND RX-0 TX-1 EN-3.3V VCC-3.3V
Push button	3	GND VCC-5 V OUT-14,15,16
LED	6	GND OUT-41,43,45,47,49,51
IR SENSOR	8	VCC-5 V GND OUT- 25,27,29,31,33,35,37,39
Resistor	9	----------

Circuit diagram:



Schematic:



Code:

```
#define BLYNK_TEMPLATE_ID "TMPL_Gb1W769"
#define BLYNK_DEVICE_NAME "IOT PROJECT"
#define BLYNK_AUTH_TOKEN "CF20R6gqMNK57IbbpWV2uSqUGIWhAMYi"

#define BLYNK_PRINT Serial
#include <ESP8266_Lib.h>
#include <BlynkSimpleShieldEsp8266.h>

char auth[] = BLYNK_AUTH_TOKEN;

char ssid[] = "GRP_15"
char pass[] = "12345678";

#define EspSerial Serial1
#define ESP8266_BAUD 38400

ESP8266 wifi(&EspSerial);
int tr1=43;
int ty1=45;
int tg1=47;

int tr2=49;
int ty2=51;
int tg2=53;

int time,i,k=1,t=0;
```

```
int p1=0,p2=0,p3;

unsigned long change_time;
int tir1,tir2,tir3,tir4;
void setup()
{
  Serial.begin(115200);
  EspSerial.begin(ESP8266_BAUD);
  delay(10);
  Blynk.begin(auth, wifi, ssid, pass);
  pinMode(tr1, OUTPUT);
  pinMode(ty1, OUTPUT);
  pinMode(tg1, OUTPUT);

  pinMode(35, INPUT);
  pinMode(37, INPUT);
  pinMode(39, INPUT);
  pinMode(41, INPUT);

  pinMode(tr2, OUTPUT);
  pinMode(ty2, OUTPUT);
  pinMode(tg2, OUTPUT);
  pinMode(25, INPUT);
  pinMode(27, INPUT);
  pinMode(29, INPUT);
```

```
  pinMode(31, INPUT);


  pinMode(14, INPUT);
  pinMode(15, INPUT);
  pinMode(16, INPUT);


  digitalWrite(tg1,HIGH);
  digitalWrite(tr2,HIGH);
}
void ambulance()
{
  p1=digitalRead(14);
  p2=digitalRead(15);
  Serial.print("p1:");
  Serial.print(p1);
  Serial.print("     ");
  Serial.print("p2:");
  Serial.println(p2);
  if(p1==1 || p2==1)
  {
    Serial.print("Its an emergency at traffic lane");
    if(p1==1)
    {
      Serial.println(" 1");
      activateSignal1();
    }
```

```
   else
   {
    Serial.println(" 1");
    activateSignal2();
   }
  }
  Serial.print("ambulance code ");
  Serial.println(k);
  k++;
}
void waiting(int waittime)
{
  change_time=millis();
  Serial.print(waittime);
  Serial.print(" ");
  Serial.print(change_time);
  Serial.print(" ");
  while(millis()-change_time<waittime)
  {
   t=0;
  }
  Serial.println(millis());
}
void retTime(int ir1,int ir2,int ir3,int ir4)
{
  Blynk.run();
```

```
 tir1=digitalRead(ir1);
 tir2=digitalRead(ir2);
 tir3=digitalRead(ir3);
 tir4=digitalRead(ir4);

 if (tir1==0)
 {
  time=20;
  if (tir2==0)
  {
   time=30;
   if (tir3==0)
   {
    time=40;
    if(tir4==0)
    {
      time=50;
   }
   }
  }
 }
 else
 {
  time=10;
 }
}
```

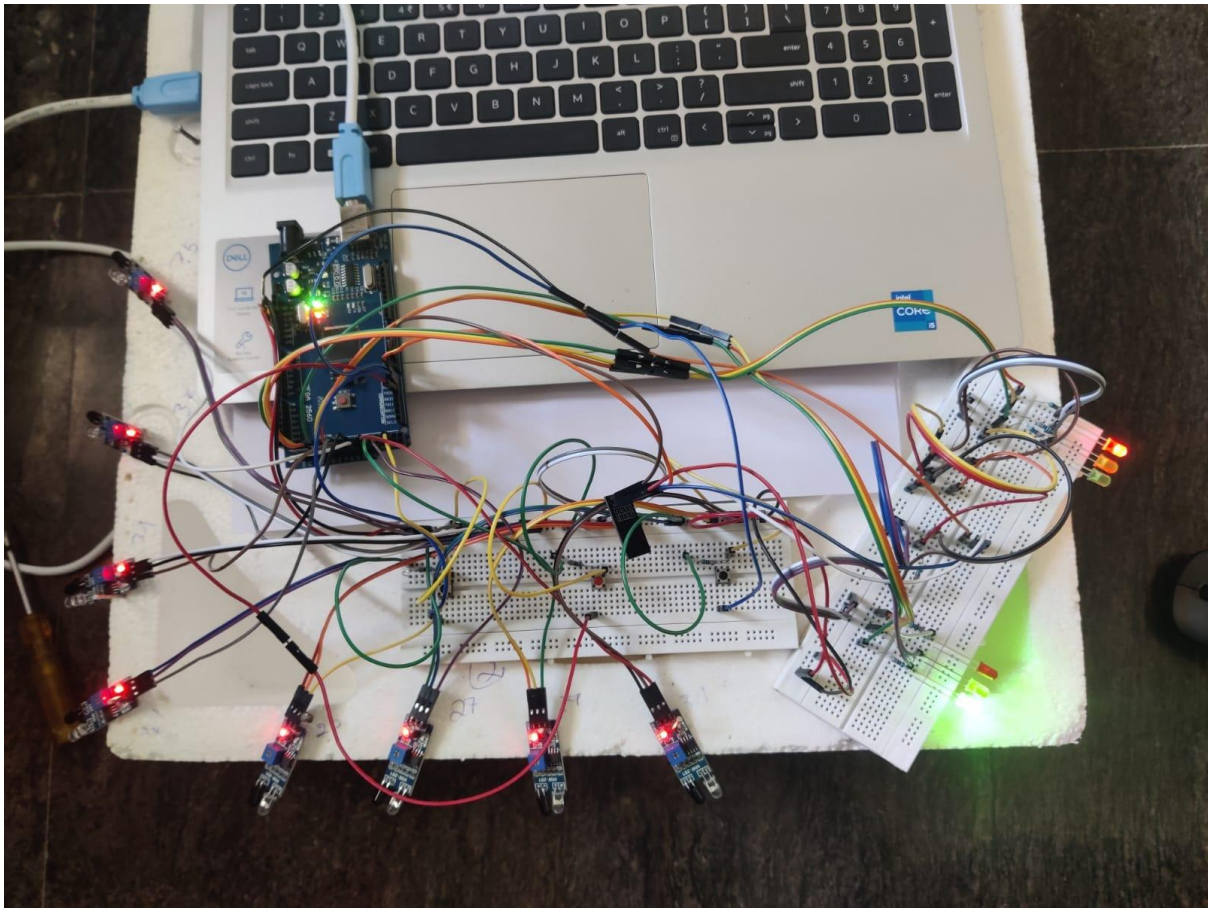
```
void activateSignal1()
{
  digitalWrite(ty2,HIGH);
  digitalWrite(tg2,LOW);
  waiting(500);
  digitalWrite(tr2,HIGH);
  digitalWrite(ty2,LOW);
  digitalWrite(ty1,HIGH);
  digitalWrite(tr1,LOW);
  waiting(500);
  digitalWrite(tg1,HIGH);
  digitalWrite(ty1,LOW);
  while(p3!=1)
  {
   Serial.println("still an emergency");
   p3=digitalRead(16);
   Serial.print("p3:");
   Serial.println(p3);
  }
}
void activateSignal2()
{
  digitalWrite(ty1,HIGH);
  digitalWrite(tg1,LOW);
  waiting(500);
  digitalWrite(tr1,HIGH);
```

```
  digitalWrite(ty1,LOW);

  digitalWrite(ty2,HIGH);
  digitalWrite(tr2,LOW);
  waiting(500);
  digitalWrite(tg2,HIGH);
  digitalWrite(ty2,LOW);
  while(p3!=1)
  {
    Serial.println("still an emergency");
    p3=digitalRead(16);
    Serial.print("p3:");
    Serial.println(p3);
  }
}

void loop()
{
  digitalWrite(ty1,HIGH);
  digitalWrite(tg1,LOW);
  waiting(500);
  digitalWrite(tr1,HIGH);
  digitalWrite(ty1,LOW);

  ambulance();
  retTime(35,37,39,41);
```

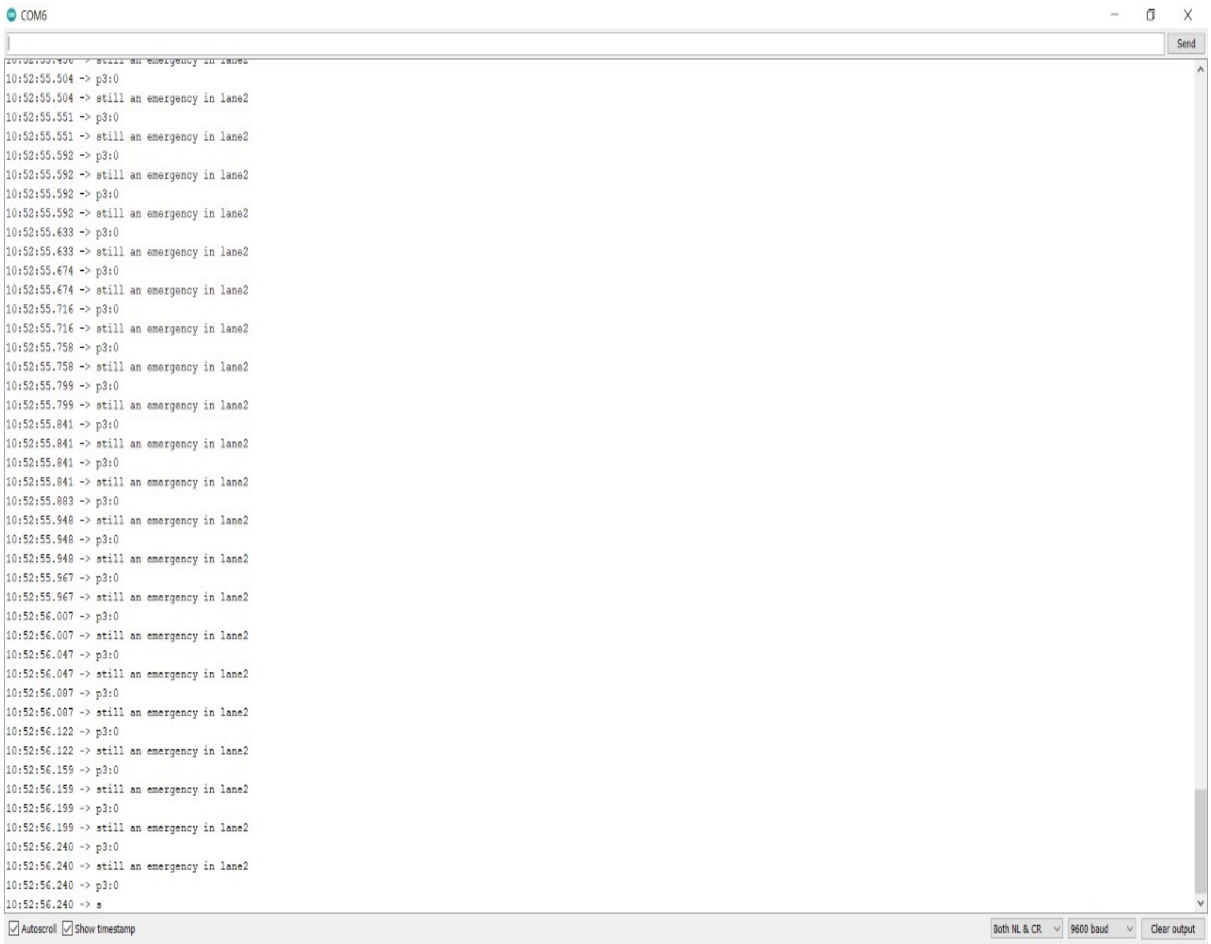
```
Serial.print("time");
Serial.println(time);

digitalWrite(ty2,HIGH);
digitalWrite(tr2,LOW);
waiting(500);
digitalWrite(tg2,HIGH);
digitalWrite(ty2,LOW);
for(i=0;i<time;i++)
{
  ambulance();
  waiting(995);
}
digitalWrite(ty2,HIGH);
digitalWrite(tg2,LOW);
waiting(500);
digitalWrite(tr2,HIGH);
digitalWrite(ty2,LOW);

ambulance();
retTime(25,27,29,31);
Serial.print("time");
Serial.println(time);

digitalWrite(ty1,HIGH);
digitalWrite(tr1,LOW);
```

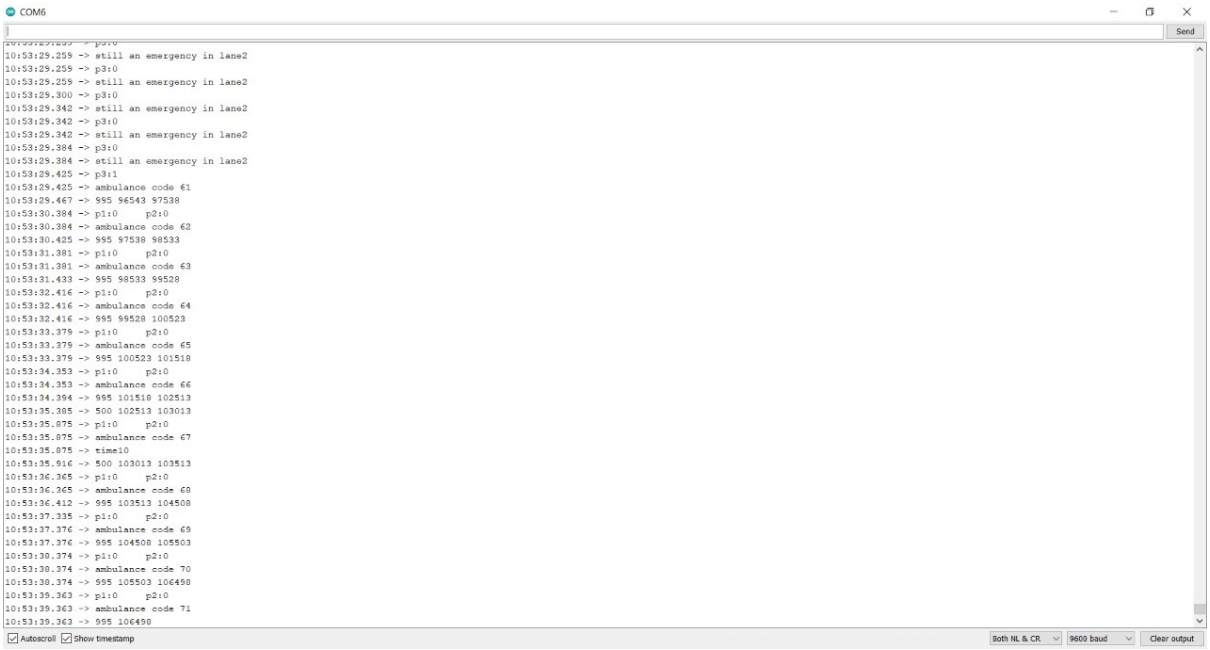
```
  waiting(500);
  digitalWrite(tg1,HIGH);
  digitalWrite(ty1,LOW);
  for(i=0;i<time;i++)
  {
    ambulance();
    waiting(995);
  }
}
```

Model screenshots:




COM6
Send
10:51:56.832 -> p1:0 p2:0
10:51:56.832 -> ambulance code 5
10:51:56.869 -> 995 3985 4980
10:51:57.813 -> p1:0 p2:0
10:51:57.849 -> ambulance code 6
10:51:57.849 -> 995 4980 5975
10:51:58.800 -> p1:0 p2:0
10:51:58.842 -> ambulance code 7
10:51:58.842 -> 995 5975 6970
10:51:59.814 -> p1:0 p2:0
10:51:59.814 -> ambulance code 8
10:51:59.855 -> 995 6970 7965
10:52:00.821 -> p1:0 p2:0
10:52:00.821 -> ambulance code 9
10:52:00.821 -> 995 7965 8960
10:52:01.795 -> p1:0 p2:0
10:52:01.795 -> ambulance code 10
10:52:01.836 -> 995 8960 9955
10:52:02.777 -> p1:0 p2:0
10:52:02.818 -> ambulance code 11
10:52:02.818 -> 995 9955 10950
10:52:03.800 -> 500 10950 11450
10:52:04.292 -> p1:0 p2:0
10:52:04.292 -> ambulance code 12
10:52:04.333 -> time10
10:52:04.333 -> 500 11450 11950
10:52:04.785 -> p1:0 p2:0
10:52:04.785 -> ambulance code 13
10:52:04.827 -> 995 11950 12945
10:52:05.774 -> p1:0 p2:0
10:52:05.774 -> ambulance code 14
10:52:05.815 -> 995 12945 13940
10:52:06.796 -> p1:0 p2:0
10:52:06.796 -> ambulance code 15
10:52:06.796 -> 995 13940 14935
10:52:07.768 -> p1:0 p2:0
10:52:07.802 -> ambulance code 16
10:52:07.802 -> 995 14935 15930
10:52:08.750 -> p1:0 p2:0
10:52:08.797 -> ambulance code 17
10:52:08.797 -> 995 15930 16925
10:52:09.705 -> p1:0 p2:0
10:52:09.705 -> ambulance code 18
10:52:09.705 -> 995 16925
Autoscroll
Show timestamp
Both NL & CR
9600 baud
Clear output


COM6
Send
10:52:55.504 -> p3:0
10:52:55.504 -> still an emergency in lane2
10:52:55.551 -> p3:0
10:52:55.551 -> still an emergency in lane2
10:52:55.592 -> p3:0
10:52:55.592 -> still an emergency in lane2
10:52:55.592 -> p3:0
10:52:55.592 -> still an emergency in lane2
10:52:55.633 -> p3:0
10:52:55.633 -> still an emergency in lane2
10:52:55.674 -> p3:0
10:52:55.674 -> still an emergency in lane2
10:52:55.716 -> p3:0
10:52:55.716 -> still an emergency in lane2
10:52:55.758 -> p3:0
10:52:55.758 -> still an emergency in lane2
10:52:55.799 -> p3:0
10:52:55.799 -> still an emergency in lane2
10:52:55.841 -> p3:0
10:52:55.841 -> still an emergency in lane2
10:52:55.841 -> p3:0
10:52:55.841 -> still an emergency in lane2
10:52:55.883 -> p3:0
10:52:55.948 -> still an emergency in lane2
10:52:55.948 -> p3:0
10:52:55.948 -> still an emergency in lane2
10:52:55.967 -> p3:0
10:52:55.967 -> still an emergency in lane2
10:52:56.007 -> p3:0
10:52:56.007 -> still an emergency in lane2
10:52:56.047 -> p3:0
10:52:56.047 -> still an emergency in lane2
10:52:56.087 -> p3:0
10:52:56.087 -> still an emergency in lane2
10:52:56.122 -> p3:0
10:52:56.122 -> still an emergency in lane2
10:52:56.159 -> p3:0
10:52:56.159 -> still an emergency in lane2
10:52:56.199 -> p3:0
10:52:56.199 -> still an emergency in lane2
10:52:56.240 -> p3:0
10:52:56.240 -> still an emergency in lane2
10:52:56.240 -> p3:0
10:52:56.240 -> s
Autoscroll
Show timestamp
Both NL & CR
9600 baud
Clear output



Individual Contribution:

Sai suhaas G S (20181CCE0079): major contribution in the connection of the components, execution and preparation of code.

Shravan N R (20181CCE0085): major contribution in the connection of the components, preparation of code and report.

Supriya T S (20181CCE0090): major contribution in the connection of the components, ppt and review.

Vyshnavi S(20181CCE0102): major contribution in the execution ,report and ppt.

Nanabala kiran kumar(20181CCE0059): major contribution in the review and ppt

Conclusion:

We conclude that the traffic can be reduced by varying the time that is fixed to change the signal lights based on the number of vehicles on both the side