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# AUTOMATIC MOVABLE DIVIDER FOR TRAFFIC MANAGEMENT

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***Abstract:*** In recent years, proportionally increase in numbers of automobiles on the roads. Although the count of vehicles using the roads has increased, the static road infrastructure is almost the same and is unable to cope with changes like congestion, unpredictable travel-time are taking a serious shape. Traffic congestion has been one of the major concerns faced by the metropolitan cities today in spite of measures being taken to reduce it. It has emerged as one of the main challenge for developers in urban areas for planning of sustainable cities with traffic free lanes.The main aim of this project is to reduce the traffic congestion in our daily life. The problem with Static Road Dividers is that the number of lanes on either side of the road is fixed which cannot be varied. Since the resources are limited and population as well as number of vehicles per family is increasing, there is significant increase in number of vehicles on roads. This calls for better utilization of existing resources like number of lanes available without any additional resources. The situation is worse when an emergency vehicle has to wait for other vehicles to give way at intersections with traffic lights.

***Index Terms*** **– IR Sensor , Arduino Microcontroller, RFID sensor, Stepper Motor**

## I. INTRODUCTION

Road Divider is generically used for dividing the Road for ongoing and incoming traffic. This helps keepingthe flow of traffic; generally, there is equal number of lanes for both ongoing and incoming traffic. The problem with Static Road Dividers is that the number of lanes on either side of the road is fixed. Since the resources are limited and population as well as number of vehicles per family is increasing, there is significant increase in number of vehicles on roads. This calls for better utilization of existing resources likenumber of lanes available. For example, in any city, there is industrial area or shopping area where the traffic generally flows in one direction in the morning or evening. The other side of Road divider is mostly either empty or very under-utilized. This is true for peak morning and evening hours. This results in loss of time for the car owners, traffic jams as well as underutilization of available resources. With the smarter planet application proposed below, we will also eliminate the dependency on manual intervention and manual traffic coordination so that we can have a smarter traffic all over the city. An Automated Road divider can provide a solution to the above-mentioned problem effectively. The fact that the device is of light weight and compact, it can easily be carried in a purse or in the soles of shoes or heels.

Here Low, Medium and High density of traffic value will be identified using IR sensors and lane will be moved using gear motors. Countries around the world are day by day facing problem of traffic congestion due to increase in number of vehicles in society Although the number of vehicles using the roads has increased, the static road infrastructure is almost the same and is unable to survive with changes like congestion, unpredictable travel time delays and road-accidents that are taking a deals with study of traffic.

## II. LITERATURE SURVEY

| Sl. No | Paper Title | Author | Observation |
|---|---|---|---|
| 1. | Execution of versatile road divider using web of things (IOT) | Hemlata Dalmia, kareddy Damini and Aravind Goud Nakka | This project aim is to formulate a mechanics of automated road divider that can shift lanes, so that we can have number of lanes in the direction of the rush. The cumulative impact of the time and fuel that can be saved by adding even one extra lane to the direction of rush will be significant. |
| 2. | Traffic density management using movable road divider and Radio frequency identification (RFID) | Gangadhar immadi, Amina Anwar, Puthiyaveettil, Ramakant A, Samaya mannuru Thakur, Surya Kumari. | This project is employed to eliminate traffic congestion and chaos in the traffic system as well as paves way with a dynamic technique. The focal point of this project is introducing and implementing a dynamic divider, where the divider moves to extend the lane on the side with the denser traffic. |

## III. PROBLEM IDENTIFICATION

1. The current road divider system is mostly static, which means it does not adjust to changing traffic patterns and road conditions. This can result in accidents and Congestion, especially during peak hours or when there are roadblocks or accidents.
2. Due to heavy current day traffic ambulances are also facing difficulty in reaching the hospitals on time.

## IV. METHODOLOGY

As Industrialization is increased the use of automobiles is increased, due to this traffic management system has become tedious. In order to tackle this problem, we came with a Concept of providing modern traffic management system using automatic moveable divider. The project consists of different sensors to take input and move the divider according to the input signal provided from sensors. The IR sensors is used to count the number of vehicles on both sides of the rode i.e., left and right side of the lane. As the density of the vehicles start increasing on the right the specially designed moveable divider starts moving towards left side extending one lane. Similarly, when

density of traffic is increased more on left side of lane, divider starts to move towards right side of the lane by extending single lane for left side. At the time of shifting of the divider the loud alert sound is given so as to notify the people on the road. Another added advantage is that RFID readers are placed on the both sides of the rode, when an ambulance is approaching the rode, these readers will detect the ambulance and extend a lane for ambulance so as to provide a way for it and making it to reach the hospital on time.

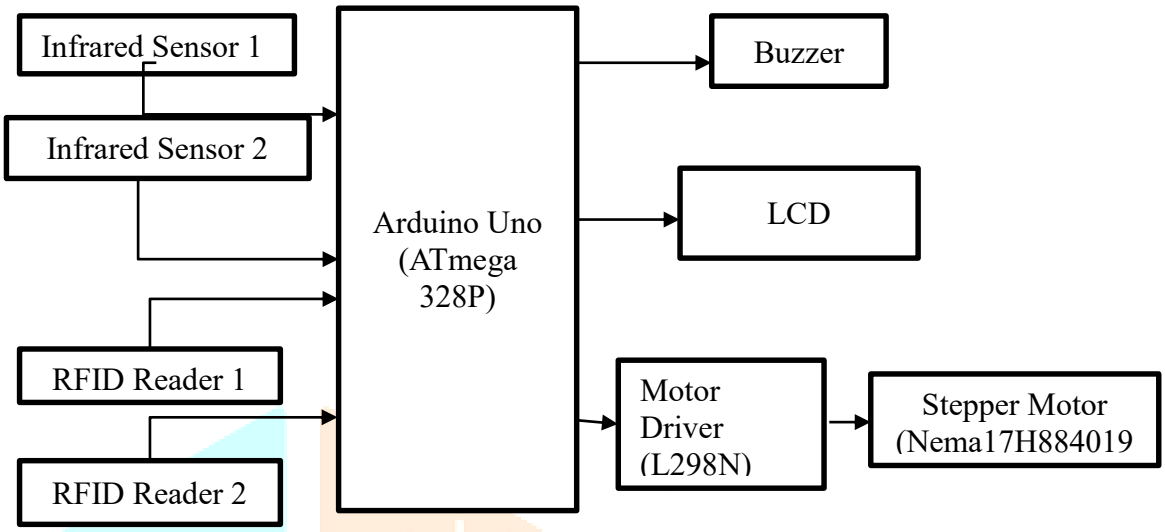


**Figure 4.1: Block diagram of Project Proposed**

### 4.2 Working of the proposed system

There are following modes to describe how divider is shift from their fixed position and how they provide the free space to vehicles:

Modes Of Working:

A. Mode 1:

As shown in figure that if one side of the lane of the road is having high traffic as compare to other then the divider will shift to the other which is having less traffic on the road and also saves the passenger time so that they reach their destination in proper time.

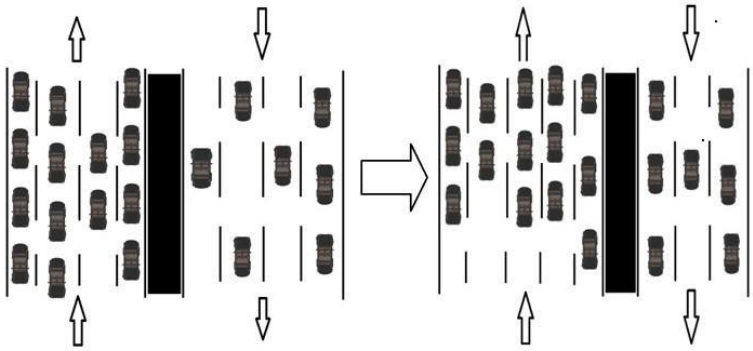

**Figure 4.2.1: Left Side Traffic**

B. Mode 2:

Fig. 4.3is similar to that of fig4.2 which will provide the same information as that if the number of vehicles of one lane is more as compare to other than the divider will shift to another lane of the road which is having less traffic.

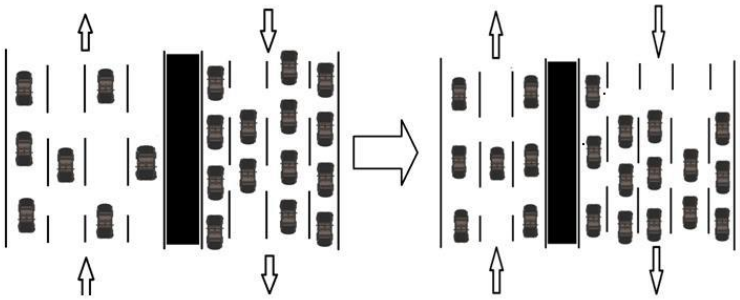

**Figure 4.2.2: Right Side Traffic**

C. Mode 3:

Fig.4.4 tells the information is that if the traffic of one-lane road is same as the other lane road then the divider will not shift from place this situation and it easily handled the traffic on both sides this situation is named as constant divider.

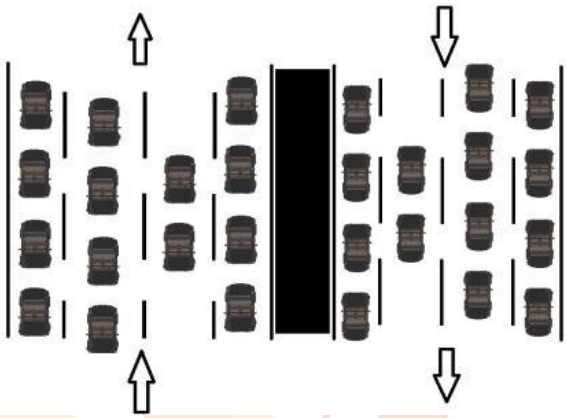

**Figure 4.2.3: No Traffic**

D. Mode 4:

Fig.4.5 is a more important mode. In this mode the divider will shift according to that is if the ambulance is present on the left-hand side of the road then the divider will shift to other side or vice-versa so that the ambulance will first go out and reach their destination in a proper time and saves the lives of human which is more important for us.

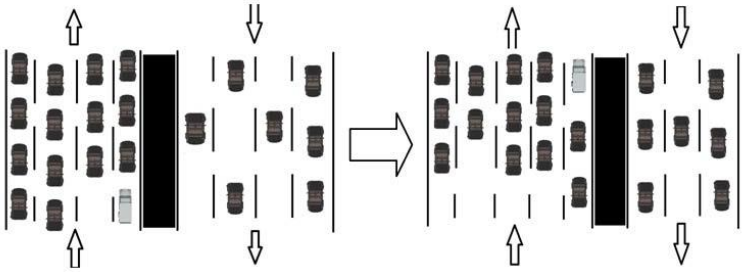

**Figure 4.2.4 : Ambulance presence**

### 4.3 Program for Arduino Uno

```
#include <SPI.h>
#include <MFRC522.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
 //Includes the Arduino Stepper Library
#include <Stepper.h>
// Defines the number of steps per rotation
const int stepsPerRevolution = 310;
```

```
// Creates an instance of stepper class
// Pins entered in sequence IN1-IN3-IN2-IN4 for proper step sequence
Stepper myStepper = Stepper(stepsPerRevolution, 4, 5, 6, 7);

LiquidCrystal_I2C lcd(0x27, 16, 2);

#define SS_1_PIN 10
#define SS_2_PIN 9
#define RST_PIN 8

int value1 = 0;
int value2 = 0;
int pos = 0;

MFRC522 rfid(SS_1_PIN, RST_PIN); // Instance of the class
MFRC522 rfid1(SS_2_PIN, RST_PIN); // Instance of the class
MFRC522::MIFARE_Key key;
// Init array that will store new NUID
byte nuidPICC[3];

void setup() {
  lcd.init();
  lcd.backlight();
  pinMode(2, INPUT);
  pinMode(3, INPUT);
  pinMode(1, OUTPUT);
  myStepper.setSpeed(30);

  Serial.begin(9600);
  Serial.print("Starting.....");

  lcd.setCursor(0, 0);
  lcd.print("    Automatic ");
  lcd.setCursor(0, 1);
  lcd.print("Moveable Divider");
  delay(5000);
  lcd.clear();

  lcd.setCursor(0, 0);
  lcd.print("Left");
  lcd.setCursor(5, 0);
  lcd.print(value1);
  lcd.setCursor(8, 0);
  lcd.print("Right");
  lcd.setCursor(14, 0);
  lcd.print(value2);
  lcd.setCursor(0, 1);
  lcd.print("Pos");
  lcd.setCursor(5, 1);
  lcd.print("Centre  ");
}
void loop() {
  lcd.setCursor(0, 0);
  lcd.print("               ");
  lcd.setCursor(0, 0);
  lcd.print("Left");
```

```
  lcd.setCursor(5, 0);
  lcd.print(value1);
  lcd.setCursor(8, 0);
  lcd.print("Right");
  lcd.setCursor(14, 0);
  lcd.print(value2);
  RFID();
  RFID1();
  int left = digitalRead(2);
  int right = digitalRead(3);

  if (left == LOW) {
    Serial.println("Yes");
    value1 = value1 + 1;
    Serial.print("left=");
    Serial.println(value1);
    lcd.setCursor(0, 0);
    lcd.print("Left");
    lcd.setCursor(5, 0);
    lcd.print(value1);
  }
  if (right == LOW) {
    Serial.println("Yes");
    value2 = value2 + 1;
    Serial.print("right=");
    Serial.println(value2);
    lcd.setCursor(8, 0);
    lcd.print("Right");
    lcd.setCursor(14, 0);
    lcd.print(value2);
  }
  delay(500);
  if (value1 >= value2 + 5 && pos == 0) {
    pos = -1;
    lcd.setCursor(0, 1);


 lcd.print("Pos");
    lcd.setCursor(5, 1);
    lcd.print("Right(T) ");


    Serial.println("Moving Right");
    digitalWrite(1, HIGH); //buzzer
    moveright();
    digitalWrite(1, LOW);
  }
  else if (value2 >= value1 + 5 && pos == 0) {
    pos = 1;
    lcd.setCursor(0, 1);
    lcd.print("Pos");
    lcd.setCursor(5, 1);
    lcd.print("Left(T)  ");
    Serial.println("moving Left");
    digitalWrite(1, HIGH); //buzzer
    moveleft();
```

```
    digitalWrite(1, LOW);
   }
   else if (pos != 0 && !(value1 >= value2 + 3) && !(value2 >= value1 + 3)) {
    if (pos == -1) {
     digitalWrite(1, HIGH); //buzzer
     moveleft();
     digitalWrite(1, LOW);
    }
    else if (pos == 1) {
     digitalWrite(1, HIGH); //buzzer
     moveright();
     digitalWrite(1, LOW);
    }
    pos = 0;
    lcd.setCursor(0, 1);
    lcd.print("Pos");
    lcd.setCursor(5, 1);
    lcd.print("Centre(T)  ");
    value1 = 0;
    value2 = 0;
    lcd.setCursor(0, 0);
    lcd.print("Left");


    lcd.setCursor(5, 0);
    lcd.print(value1);
    lcd.setCursor(8, 0);
    lcd.print("Right");
    lcd.setCursor(14, 0);
    lcd.print(value2);
   }
  }

  void moveleft() {
   Serial.println("clockwise");
   myStepper.step(stepsPerRevolution);
   delay(500);
  }

  void moveright() {
   Serial.println("counterclockwise");
   myStepper.step(-stepsPerRevolution);
   delay(500);
  }

  void RFID() {
   //Serial.println("pirmais");
   SPI.begin(); // Init SPI bus
   rfid.PCD_Init(); // Init MFRC522
   for (byte i = 0; i < 6; i++) {
    key.keyByte[i] = 0xFF;
   }
   // Look for new 1 cards
   if (!rfid.PICC_IsNewCardPresent())
    return;
   // Verify if the NUID has been readed
```

```
  if (!rfid.PICC_ReadCardSerial())
    return;

  // Store NUID into nuidPICC array
  for (byte i = 0; i < 4; i++) {
    nuidPICC[i] = rfid.uid.uidByte[i];

  }
  lcd.setCursor(0, 0);
    lcd.print("   Ambulance!   ");
  Serial.print(F("Right: "));
  printDec(rfid.uid.uidByte, rfid.uid.size);
  Serial.println();
  if (pos == 0) {
    Serial.print("Move Left");
    lcd.setCursor(5, 1);
    lcd.print("Left(A)   ");

  digitalWrite(1, HIGH); //buzzer
    moveleft();
    digitalWrite(1, LOW);
    pos = -1;
    delay(5000);
  }
 else if (pos == 1)
{
    Serial.print("Move Center");
    lcd.setCursor(5, 1);
    lcd.print("Centre(A)");
    digitalWrite(1, HIGH); //buzzer
    moveright();
    digitalWrite(1, LOW);
    pos = 0;
    delay(5000);
  }

  // Halt PICC
  rfid.PICC_HaltA();

  // Stop encryption on PCD
  rfid.PCD_StopCrypto1();
  SPI.end();
}

//=============================================
void RFID1() {
  //Serial.println("otrais");
  SPI.begin(); // Init SPI bus
  rfid1.PCD_Init(); // Init MFRC522


  for (byte i = 0; i < 6; i++) {
    key.keyByte[i] = 0xFF;
  }

  if (!rfid1.PICC_IsNewCardPresent())
```

```
 return;
// Verify if the NUID has been readed
if (!rfid1.PICC_ReadCardSerial())
  return;
// Store NUID into nuidPICC array
for (byte i = 0; i < 4; i++) {
nuidPICC[i] = rfid1.uid.uidByte[i];
}

lcd.setCursor(0, 0);
  lcd.print("   Ambulance!   ");
Serial.print(F("Left: "));
printDec(rfid1.uid.uidByte, rfid1.uid.size);
Serial.println();
if (pos == 0) {
  Serial.print("Move Right");
  lcd.setCursor(5, 1);
  lcd.print("Right(A)   ");
  digitalWrite(1, HIGH); //buzzer
  moveright();
  digitalWrite(1, LOW);
  pos = +1;
  delay(5000);
}
else if (pos == -1) {
  Serial.print("Move Center");
  digitalWrite(1, HIGH); //buzzer
  moveleft();
  digitalWrite(1, LOW);
  pos = 0;
  lcd.print("Centre(A)");
  delay(5000);
  }

// Halt PICC
rfid1.PICC_HaltA();

// Stop encryption on PCD
rfid1.PCD_StopCrypto1();

SPI.end();
}
```

## 5 RESULTS AND DISCUSSION

### 5.1 Traffic Management System

As mentioned above Problem Statement, the main objective of our project is To provide a better Traffic Management system to Reduce the Traffic jams.

- If one side of the lane of the road is having high traffic as compare to other then the divider will shift to the other which is having less traffic on the road and also saves the passenger time so that they reach their destination in proper time.

- If the number of vehicles of one lane is more as compare to other than the divider will shift to another lane of the road which is having less traffic.
- If the traffic of one-lane road is same as the other lane road then the divider will not shift from place this situation and it easily handled the traffic on both sides this situation is named as constant divider.

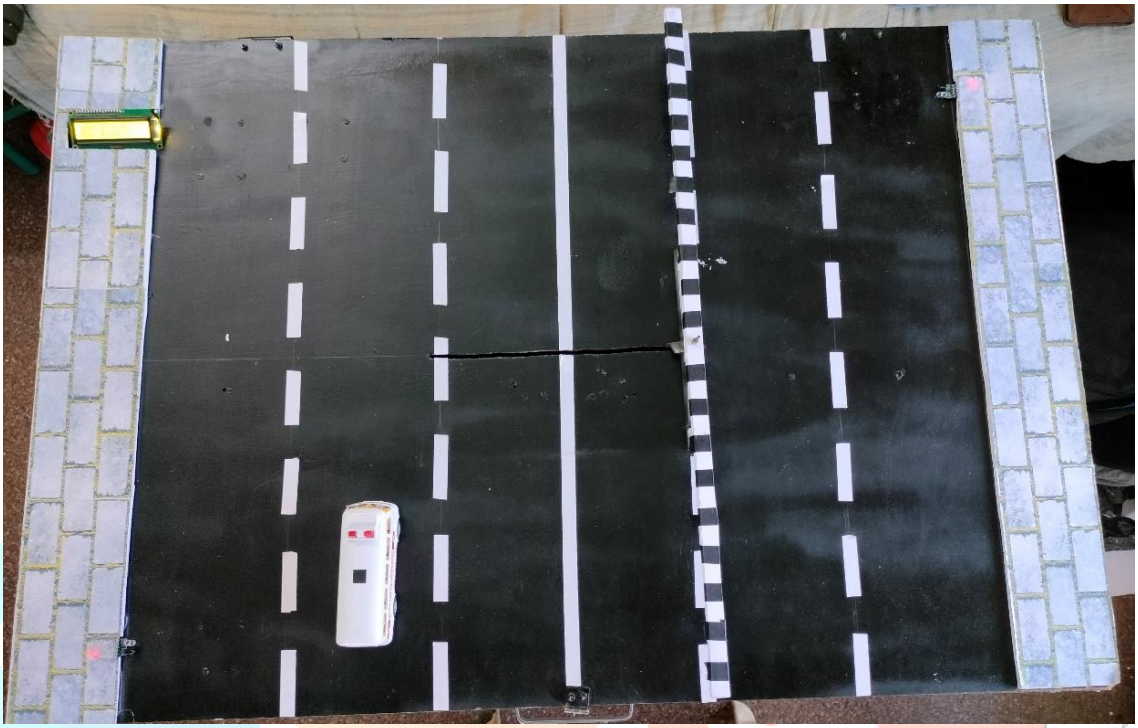

**Figure 5.1 : Divider is Moving**

### 5.2 Traffic Clearing for Ambulance

In this mode the divider will shift according to that is if the ambulance is present on the left-hand side of the road then the divider will shift to other side or vice-versa so that the ambulance will first go out and reach their destination in a proper time and saves the lives of human which is more important for us.


**Figure 5.2 : Divider is Moving due to presence of Ambulance**

## 6 CONCLUSION

In short movable divider is capable of handling and solves the problems of traffic jams on one side of the road with other side is free from high traffic congestion. This proposed system provides the free path for an ambulance which ensures the ambulance to reach the destination on time or without any delay and the life of humans is more important. It also reduces the time of journey in peak hours and save time and fuel. It is feasible, secure, and fewer requirements of wires which reduce the maintenance cost of this system.

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