

# Smart Movable Road Divider with Ambulance Priority System Using IoT

<sup>[1]</sup> Subhashitha D, <sup>[2]</sup> Dr. Mukthi S L<sup>[1]</sup> PG Student, <sup>[2]</sup> Asst. Professor<sup>[1][2]</sup> VLSI Design and Embedded Systems, Bangalore Institute of Technology, Bengaluru, INDIA

**Abstract:** Basically a road divider is used as a barrier to separate the road for the vehicles which are moving in two different directions. As we have seen around us these road dividers are static i.e., they cannot be shifted/moved from one place to another. We have also witnessed a very high traffic only on one side of the road during peak/rush hours. When there is a high traffic it causes accidents and also many emergency vehicles get stuck in this traffic, which may result in loss of life. Therefore an efficient system is proposed here where smart movable road divider is implemented which will work based on the road density. The ambulance priority system is also included here which provides a free path for the ambulance using RFID tags and RFID reader. Vehicle signal violation can also be detected in this proposed project.

**Index Terms—** Arduino Mega 2560, IR sensors, RFID tags and RFID readers.

## I INTRODUCTION

Traffic has become a major problem in the developing cities or underdeveloped cities. If the vehicle is stuck in traffic this will not only affect the time taken to travel but also the fuel is wasted. Whenever a person gets stuck in traffic a huge amount of carbon dioxide, scientifically expressed as CO<sub>2</sub>, will be inhaled. This affects a person's health too. Due to this everyday traffic jam illegal activities like robbery, chain snatching are also increasing. The population across the globe is increasing day by day but there are no proper developments taking place to manage with the increasing population. This is because the resources which are available to us are very less. Therefore a move has to be made such that the available resources should only be utilized in a better way possible.

With all the above concerns a need has been developed for reducing the traffic flow. The government is also trying its best to reduce the traffic. Various rules are also made the government such as parking the vehicles on busy roads, waiting on busy roads are all prohibited but also the traffic overcrowding problem is not decreasing. Looking at all these problems that have been faced by the people daily, this paper has tried to provide a better solution for the day to day increasing traffic. Hence in this work a smart movable road divider is implemented, which can change its original position

based on the density of the vehicles on both side of the divider. As the emergency vehicles are also facing a lot of problem due to traffic congestion, a priority is given to these vehicles also. The signal violation is considered as one of the offence which has to be intimated immediately. Hence if any signal violation is caused by the normal vehicle, an alert message will be sent to the nearby traffic police station using a Wi-Fi module.

This paper is divided as follows: section II is about the literature survey, section III is the methodology that has been used, section IV is the results obtained from this project, and the section V is the conclusion of the paper.

## II LITERATURE REVIEW

Pranav Maheshwari et.al. [1] proposed a paper on reducing the traffic congestion with the help of image processing. Here the signal poles were fixed with the cameras and these cameras can capture the image then processed it. After obtaining the results of the image processing a timer was decided for the signal lights.

Er Faruk Bin Poyen et al. [2] discussed how to reduce the traffic density. Here the PIR sensors were used to obtain the traffic density. Based to the obtained results the timers for the red and green lights were fixed.

B.Nandhu Rathi et.al. [3] Presented a solution to provide a free path for emergency vehicles easily, to detect stolen vehicles by using an intelligent traffic control system,

here emergency vehicles are equipped with RFID tags, hence the signal changes automatically. The densities of the vehicles are calculated with the help of IR sensors.

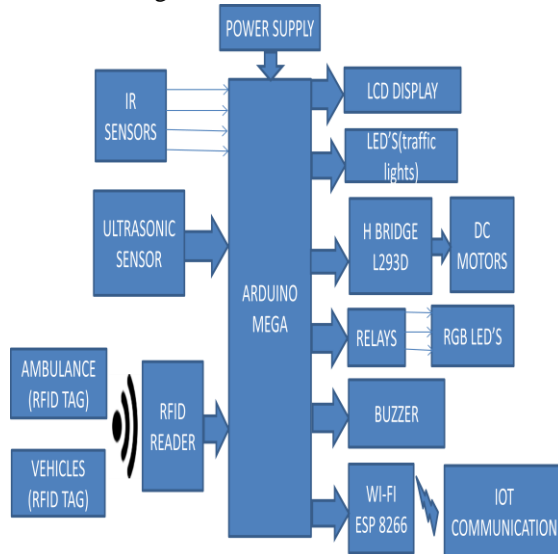
SabeenJavid et.al. [4] Proposed a paper to manage the traffic using Iot. Here with the help of cameras and sensors the signal light duration was decided. With the help of RFID's emergency vehicle were also given precedence.

Hemlata Dalmia et.al. [5] Developed a project on movable road divider which used to change its position based on the density of traffic. RFID was also used to detect the arrival of the emergency vehicles.

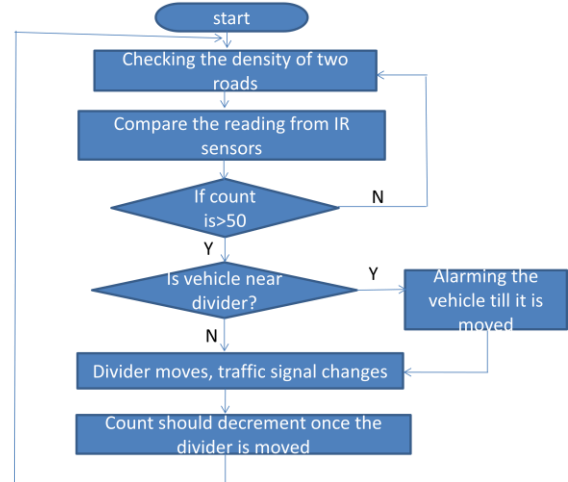
Satya SrikanthPalle et.al. [6] Proposed a paper to decrease the traffic congestion problem. Here with the help of IR sensors the vehicle density was calculated, and then the divider changed its position. Using RF transmitter and the receiver the arrival of emergency vehicles were known.

**III METHODOLOGY**

In this project Arduino mega is used for the controlling actions. It will receive inputs from IR sensors, ultrasonic sensors and RFID reader. The output will be produced by the LCD, LED'S, DC motors, RGB LED'S, buzzer and through IoT communication.



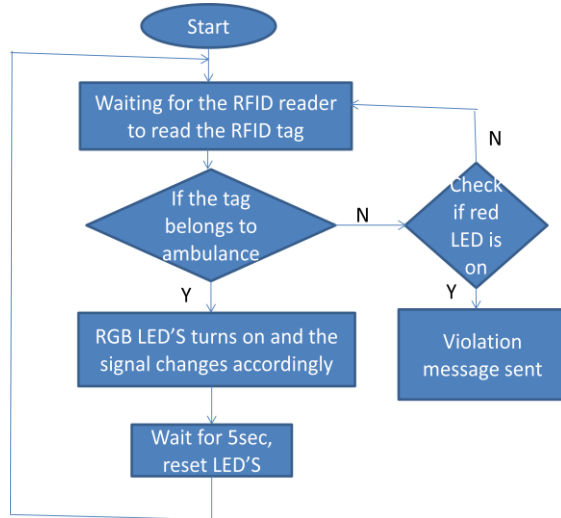
**Fig 1: Block diagram**



**Fig 2: Flow chart for traffic density condition**

**A. Traffic density condition**

- The first step is to check the density of the roads using IR sensor.
- Then the obtained value has to be compared with each other.
- Here the threshold is set to be 50 that mean if in any road, IR sensor reading is above 50 the divider and signal actions are required.
- After this if there are any vehicle near the divider, alarming is provided. Then the divider is moved creating more lanes for the denser side. After the vehicles are passed the divider and signal comes back to its original arrangement.



**Fig 3:** Flow chart for ambulance detection and traffic violation

**B. Ambulance Detection and traffic violations**

- RGB LED's will be deployed on two sides of the road
- Whenever the Arduino receives the signal from RFID reader, RGB LED's connected on road side will start glowing, if it belongs to the emergency vehicles.
- Ambulance will be detected for 100 mts away in this project so accordingly respective signal will clear the Path for the Ambulance.
- Using RFID which will be attached to every vehicle, traffic violations can be detected. Using ESP8266 the authentication message will be sent to the local traffic police station.

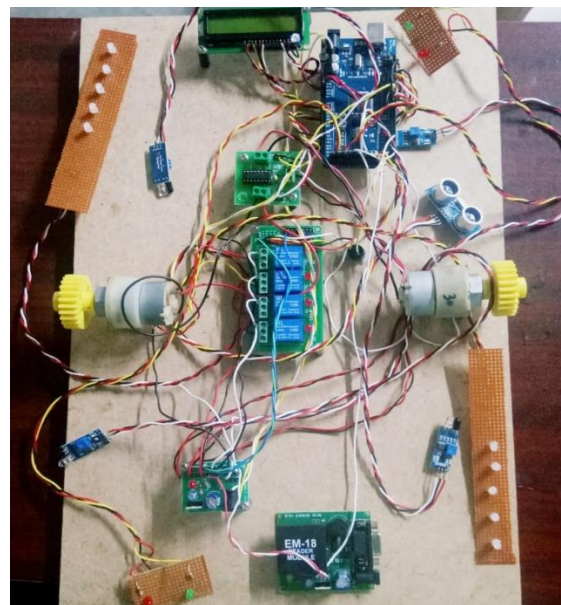
**C. Overall working**

Here we use 4 IR sensors, two for each road. At the road's entry point the IR sensor was used to increment the vehicle count whereas the exit point sensor was used to decrement the count. This was helpful to find if the vehicles got cleared at the road. So based on the density the divider movement was controlled. If any object is sensed by the ultrasonic sensor the divider movement will stop. All the actions of the road divider will be displayed on the LCD screen. Smart traffic light controlling is also included in this project. When ambulance with RFID tag arrives, the RFID reader sends the message to Arduino

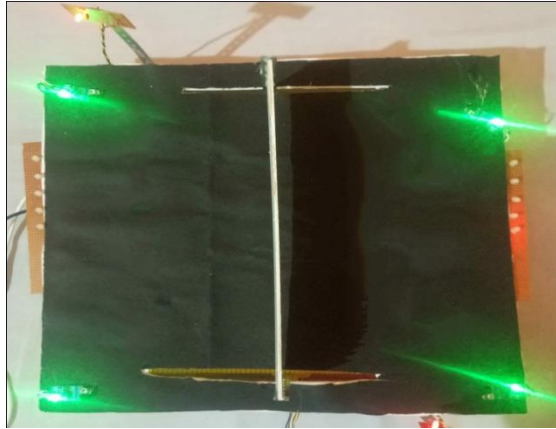
about an emergency request. Therefore the signal of the corresponding road changes to green and the traffic is cleared immediately. To intimate the drivers about the arrival of the ambulance, RGB LED'S glow in the red color. The other side of the road will have green glowing RGB LED'S. If the normal vehicles skip the signal then the RFID reader scans the RFID tag and the corresponding vehicle number will be sent to the TCP/UDP app. The overall set up of the project is as shown below.

**IV. RESULTS**

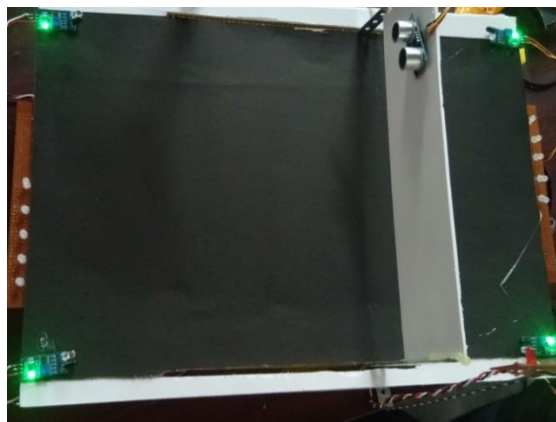
The experiment was done on smart movable road divider with ambulance priority system and obtained the following results.



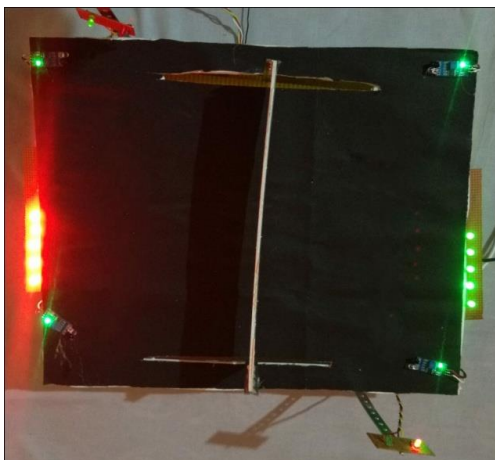
**Fig 4:** The project set-up



**Fig 5:** Divider at the center



**Fig 6:** Divider moved towards right side due to high density of traffic in road 1

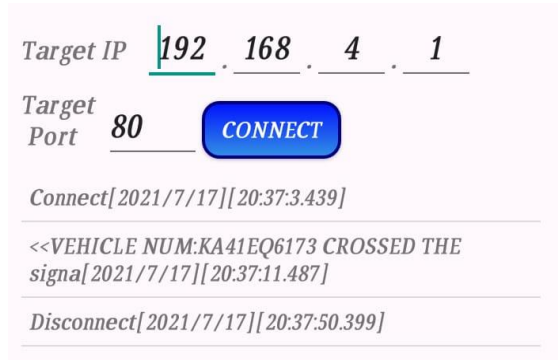


**Fig 7:** Ambulance at road 1 condition

As shown in Fig 7, the ambulance is arriving in road 1, therefore the RGB LED'S at road 1 are red and the signal is green. The other road has the opposite lights.



**Fig 8:** Messages displayed on the LCD screen



**Fig 9:** traffic violation details sent to TCP/UDP app

## V. CONCLUSION

Before starting this project a survey was done regarding the traffic density problem which was faced by many countries. The main aim was to provide a better solution to the traffic problem and to save lives. So this efficient system was designed and tested for the same. With the help of the smart divider traffic blocking problem was reduced. Whereas by using RFID system a free path was provided for emergency vehicles in a two way road and also signal violations were detected easily.

## REFERENCES

1. Pranav Maheshwari, Deepanshu Suneja, Praneet Singh, Yogeshwar Mutneja, "Smart traffic optimization using image processing", 2015 IEEE 3rd International conference on MOOC's, Innovation and Technology in Education (MITE), ISBN: 978-1-4673-9/15/\$31.00, 2015 IEEE.
2. Er. Faruk Bin Poyen, Amit Kumar Bhakta, B.Durga Manohar, Imran Ali, ArghyaSantra, AwanishPratap Rao, "Density based traffic control", 2016 International journal of advanced engineering, management and science (IJAEMS) , vol-2, issue-8, Aug-2016, ISSN:2454-1311.
3. B.Nandhu Rathi , M.Radha , T.U.Sugitha , V.Tharani and V.Karthikeyan, "Intelligent traffic control system for congestion control, emergency vehicle clearance and stolen vehicle detection", Asian journal of applied science and technology (AJAST), Volume 1, Issue 1, Pages 122-125, February 2017.
4. SabeenJavid, Ali Sufian, Saima Pervaiz, Mehak Tanveer, "Smart traffic management system using IOT", International conference on advanced communication technology (ICACT), ISBN: 979-11-88428-01-4, February 2018.
5. HemlataDalmia, Kareddy Damini, Aravind Goud Nakka, "Implementation of movable road divider using IOT", 2018 International conference on computing, power and communication technologies (GUCON), Galgotias university, Greater Noida, UP, India. Sep 28-29, 2018.
6. Satya SrikanthPalle, Sriraksha B M, Vibha H B, Yeshashwin i A , "Implementation of smart movable road divider and ambulance clearance using IOT", 2019 4th International conference on recent trends in electronics, information, communication and technology (RTEICT-2019), MAY 17th and 18th 2019.