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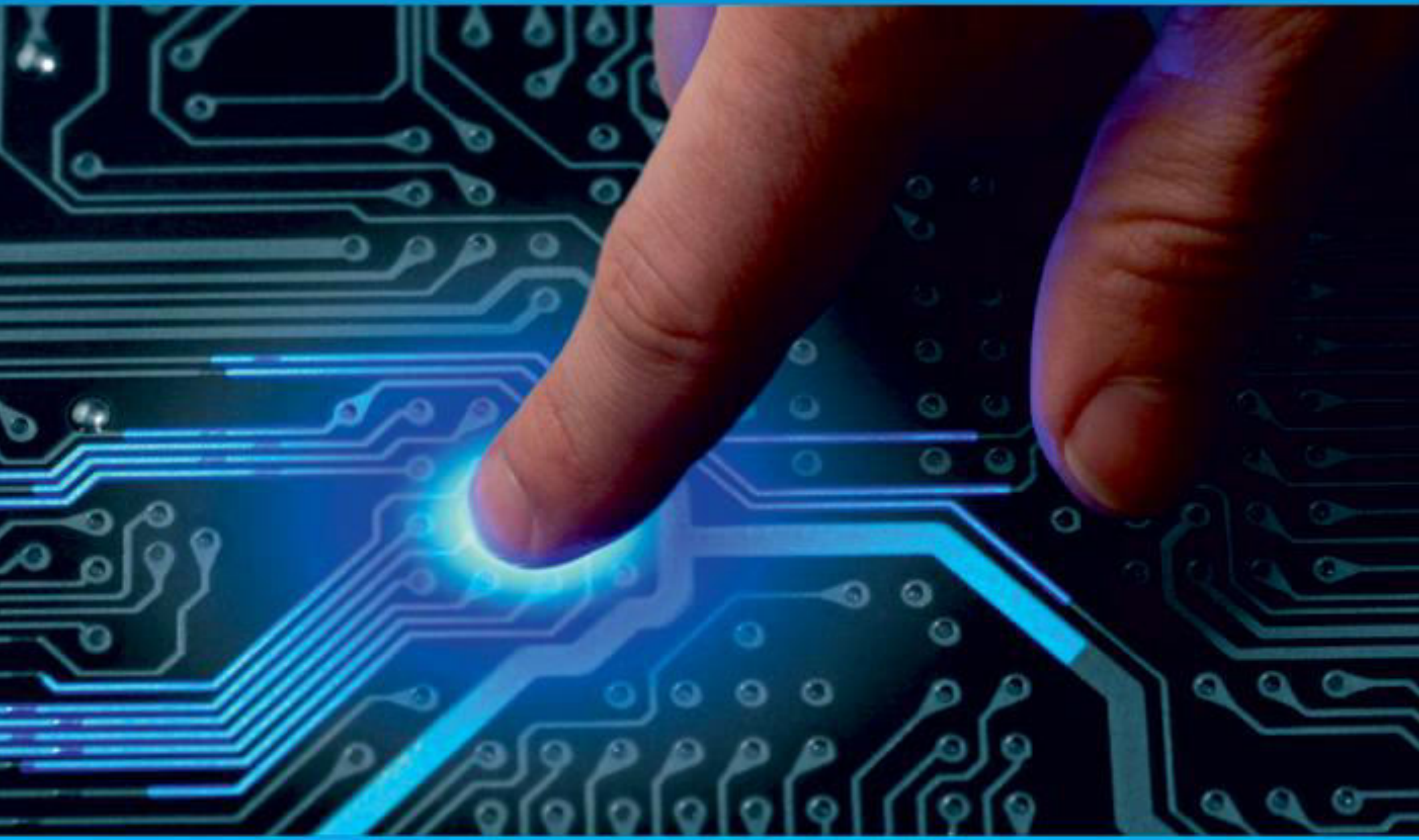

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IOT Deployed Automatic Smart Movable Road Divider

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ABSTRACT: The Smart Movable Road Divider is a device that can be moved to relieve the traffic in cities and clear a passage for emergency vehicles. In this paper it focuses on reducing traffic. The Road Dividers that are now in place have an equal number of lanes. Typically, the other lane of the Road Divider is underutilised in morning and evening hours. To clear this, a Smart Movable Road Divider is used, which uses IR sensors and ultrasonic sensors to move the divider dependent on the volume of traffic. The divider is moved to the other side of lane if there is more traffic on one side. Then, thanks to IOT, the traffic density is stored in the cloud.

KEYWORDS: Sensors, Road divider, Buzzer, LCD Display

I. INTRODUCTION

Due to the number of cars growing daily, several nations around the world are experiencing traffic congestion issues. Despite an increase in the number of vehicles, the road infrastructure remains mostly unchanged, making it unable to adapt to changes like unforeseen travel delays, traffic, and accidents. The number of lanes on either side of the road are fixed with a static road divider, which is its biggest drawback. There is a huge growth in the number of cars on roadways due to the limited resources, growing population, and rising number of cars per family. In today's world, managing traffic on the roads has become a serious issue. The patient's life may be in danger as a result of the ambulance's need to wait for minutes to hours to clear traffic congestion in a variety of situations where it gets stuck in traffic. Growing traffic and road surfaces are associated with a number of serious environmental concerns, including traffic jams, congestion, various types of pollution, and associated health difficulties. Traffic congestion eventually leads to slow speeds, which lengthens travel times, which is one of the biggest problems in big cities. When there is a lot of demand, the interaction between the vehicles slows down the flow of traffic, which causes some congestion. Any mode of transportation could experience this; however, the essay will concentrate on traffic congestion on public highways. Extreme traffic jams develop when demand exceeds a road's capacity. A traffic jam or traffic snarl-up is a term used informally to describe a group of fully stopped cars that has been stationary for a while. This study, which offers the functionality of route clearance, was offered as a solution to these issues and as a means of saving numerous lives. Because of the constant number of lanes on either side of the lane, static roadways have this issue.

Despite the fact that resources and population are constrained, there is a large growth in the number of automobiles on the road, which allows for greater utilisation of available resources like the number of lanes. The major goal of this article is to advance traffic management by eliminating gridlock, managing high-density traffic, and cutting travel times during rush hours in order to find a better and more ingenious solution to the aforementioned traffic issues. In the proposed work, a module that is utilised to gauge traffic density has been built. In all the roads the IR sensors are used to count the vehicles. The divider is moved to the otherlane to clear traffic so vehicles move without traffic. Every thirty seconds, the cloud is updated with the traffic density. In comparison to Static Road Dividers, this reduces traffic congestion and saves time.

The entire essay is organised as follows; Section I discusses the literature review. The current state of the problem of traffic congestion is covered in Section Ill, along with the appropriate solutions and how they will be put into practise. The outcomes of the suggested model are covered in Section IV, and Section V summarises the entire paper.

Il. RELATED WORK

Before delving further into the specifics of our intelligent moveable road divider, we will briefly explore some of the current traffic congestion control systems.

In a work titled "Controlling of Traffic using Movable Road Dividers," S. Jyothirmayee et al. This article suggests movable traffic dividers for urban areas. This approach assists in setting up the road capacity to maximise the use of the road system.ErFaruk Bin Poyen et al. [2] telling about a current traffic light system that would adjust itself based on the amount of traffic at intersections. The traffic control system, in which each individual vehicle is provided with a frequency of radiowhich identifies the cars on a specific path during a set length, was explained by RajeshwariSundar et. al. [3] as a way to pass emergency vehicles easily. A vehicle count-based system execution was created by ShabbirBhusari et al. [4] based on vehicle density. When traffic density is calculated, signals are assigned based on how many vehicles are present. A traffic light system based on density was created by K Vidya et al. [5]. In large cities all throughout the world, traffic congestion is a serious issue. Calculating the number of vehicles on each side of the lanes results in a longer green light than the traffic signal's standard alloted time if the density is higher on one side of the intersection. In their article on road traffic analysis using image processing, PriyankaKanke et al. [6] made the suggestion. This study presents a computer-based traffic flow analysis and monitoring application. In order to analyse road traffic while taking into account the limitations, technologies for image processing and pattern recognition are used. Reducing Emergency Services Response Time in Smart Cities: An Advanced Adaptive and Fuzzy Approach was the title of a paper by SoufieneDjahel et al. [7].

Ill. PROPOSED SYSTEM

- In this proposed system, a module has been developed based on microcontroller that consists of anultrasonic sensor which is used for measuring the traffic density in this case and two dividers normal and extended.
- When the signal turns red, the traffic density is measured and the action should take place before the signals turns into green. If the traffic density is high then the extended divider comes up and the normal divider goes to ground position.
- Since the traffic density is high a message is delivered stating that 'Alert PLS traffic density is high, extended dividerisup'tothe nearest traffic controlroom.
- If the traffic density is normal then no type of action is taken and the normal divider is up and the extended divider is toground level.
- In this case the traffic density is normal then a message is delivered stating that 'Traffic density isnormal.
- Normaldividerisupandtheextendeddivideristogroundleveltothenearesttrafficcontrolroom.
- Since it is a demo module, we are just showing for the one way of traffic flow.

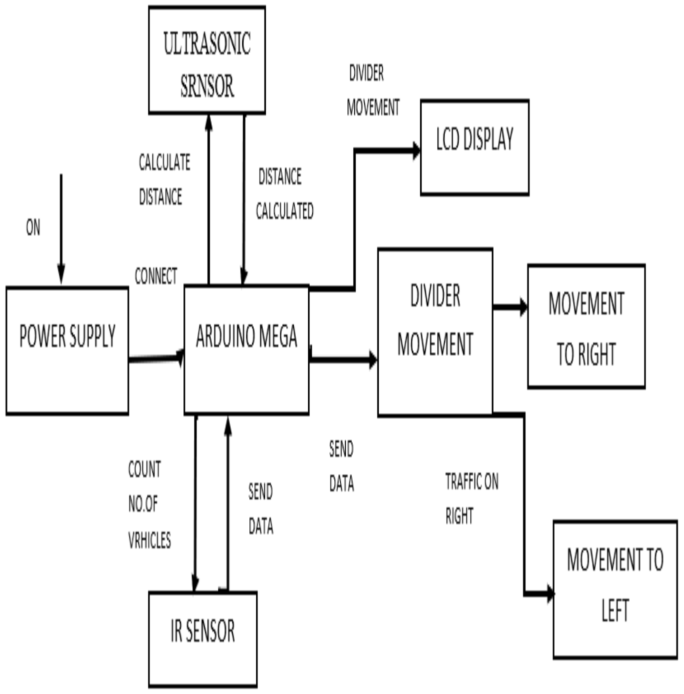


Fig.1.Proposed System Diagram

IV. PSEUDO CODE

The suggested system's steps are to be followed:

- Step 1: When the power supply is on the microcontroller and other components should be switched on and be ready to do their respective work.
- Step 2: when all the components start working, First IR sensor has to count the number of vehicles on each side of the lane and have the status ready.

• Step 3: If there is traffic in lane I, it indicates that the IR I is high in that lane.

• Step 4: If there is traffic in lane 2 even though the IR 2 is high at that lane.

- Step 5: It indicates medium traffic in lane I if the IR I and 2 are high.

• Step 6: If Lane 2 has significant IR I and II traffic, Lane 2 will show medium traffic.

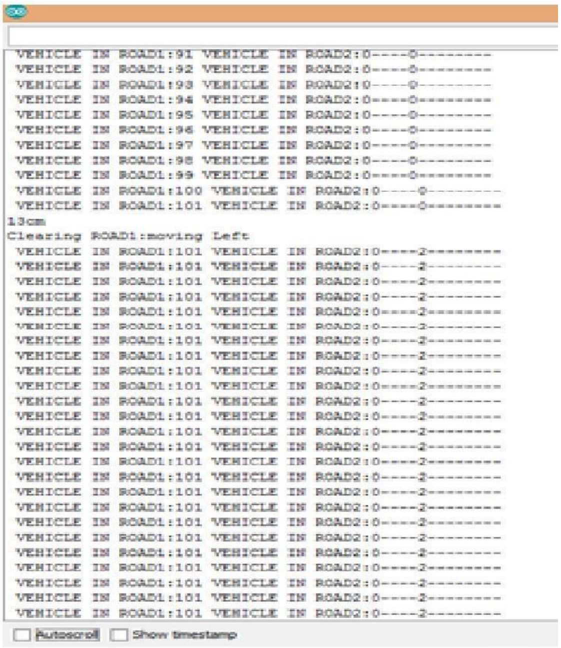
• Step 7: If the IR I, 2 and 3 are busy at lane I, it will show busy conditions there and the divider will shift toward lane 2.

• Step 8: The divider moves towards lane I if the IR I, 2 and 3 are high at lane 2. If this is the case, it will also show high traffic in lane 2.

- Step 9: The divider returns to its initial position once the traffic flow is normal.

V. SIMULATION RESULT

IR sensors that are installed on each side of the movable road divider were used in the experiment to measure the traffic density by detecting the presence of vehicles. . The divider shiftstothe other side to provide greater volume of the to clear the traffic, so vehicles movesvery smoothly in the congested area depending on the vehicle counts, counted by the IR sensors. To alert drivers to give way. For the divider for their safety purpose, an LCD display is employed. Using motors, the divider is moved. The Arduino serves as the project's central processing unit and manages all divider activity and cues.



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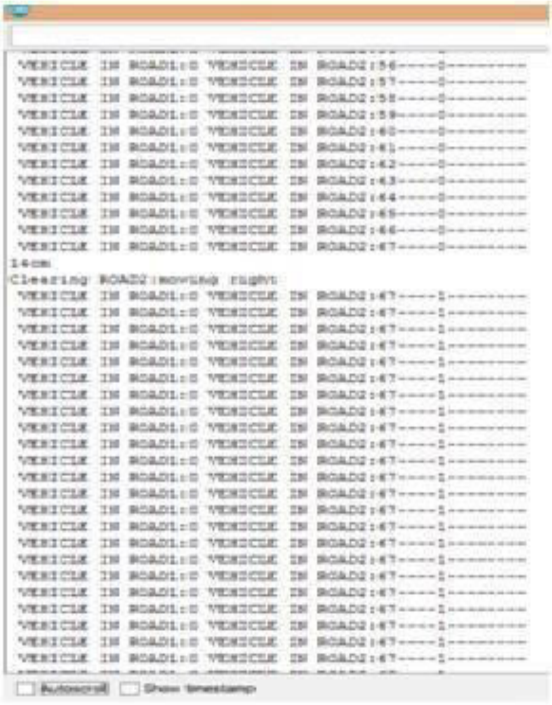
 VEHICLE IN ROAD1:91 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:92 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:93 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:94 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:95 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:96 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:97 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:98 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:99 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:100 VEHICLE IN ROAD2:0----0--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----0--------
13cm
Clearing ROAD1:moving Left
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
 VEHICLE IN ROAD1:101 VEHICLE IN ROAD2:0----2--------
```

Fig 2:- Screenshot of divider moving left

Illustrates a prototype of a moveable road divider, where more traffic is in lane I and the divider is moved to lane 2. The buzzer lets the drivers and people to know that the divider is moving.

Illustrates the prototype of a moveable road divider, in which when traffic in lane 2 is heavy, the barrier is moved to lane I after notifying vehicles by a buzzer, and it is then moved back when traffic is light.

The drivers will get the information of the traffic through LCD . The display in lanes I and 2 reads "No Traffic" when there is no traffic on either lane. For each of the two lanes, the traffic density is shown. The LCD display will say "Reduced Traffic" in relation to the lanes if there is less traffic. "Medium Traffic" will be displayed on the LCD if the volume of traffic is moderate.When traffic is more, the LCD displays "High Traffic," a buzzer sounds to signal that the divider will be moving, and after the alert message the divider moves toward the less traffic.



```
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:56----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:57----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:58----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:59----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:60----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:61----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:62----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:63----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:64----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:65----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:66----0---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----0---------
14cm
Clearing ROAD2:moving right
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
 VEHICLE IN ROAD1:0 VEHICLE IN ROAD2:67----1---------
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Fig 3:- Screenshot of divider moving right

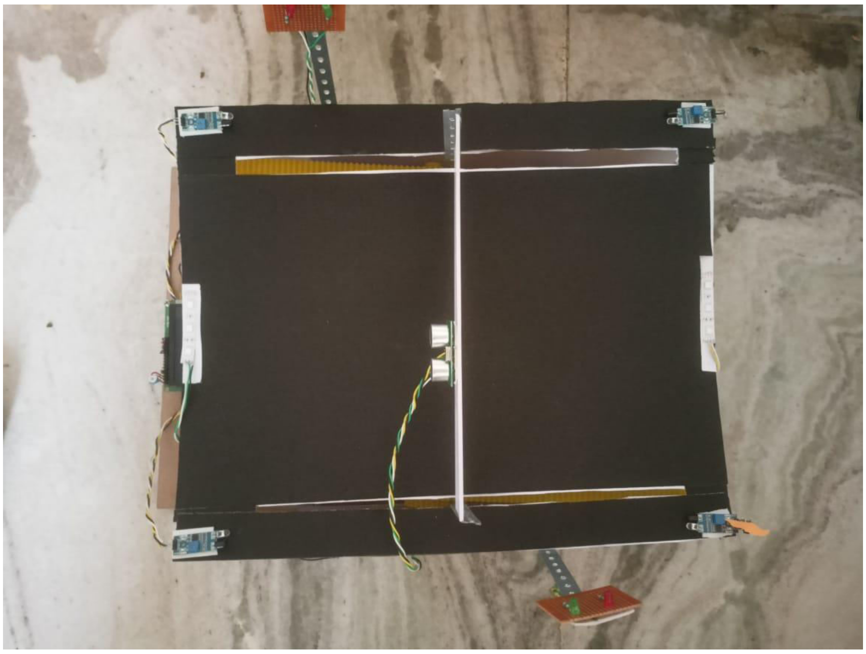

Fig 4 : Model diagram

VI. CONCLUSION AND FUTURE WORK

Beginning with an analysis of the issues with traffic congestion in specific areas, we conducted a thorough survey on the causes and effects of traffic congestion.its issue. To lessen traffic and cut down on travel time to make smarter and better decisions while travelling during peak times we have a solution for the aforementioned traffic issues. Proposed a prototype model of a Movable Road Divider. By cleverly detecting the traffic flow on each side of the divider and divider moves accordingly, this concept seeks to minimise traffic and save time and fuel. By alerting the cars of the divider's impending arrival, this also improves safety measures. Additionally, this enables the user, to avoid the movement of divider manually by traffic police or any people, in accordance with needs and to create a clear road for emergency vehicles, so that vehicles are not stuck at traffic.

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