Smart Movable Road Divider

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Abstract: **Road dividers are often used to divide the road further and closer traffic. This helps to maintain the continuity of traffic. In this case, there are an equal number of routes in both incoming and outgoing traffic. Be that as it may, in some areas, such as industrial or shopping malls for a large part of the broadcast a one way to the first half in the morning or at night and another road is unpaved. It consumes more time of the public and leads to time loss. It means assembling a smart road divider up to that point a moving or moving motor separator a method that links the rise of the acceleration hour grid. Such the type of traffic frame part sets the time as and fuel. It can include 1 other route based on traffic at a certain source. And very smart application listed below, hand-based reliance as well the relationship of manual traffic has diminished. ESP32, sensors and boards are used. The sensors are mounted on dividers heard the continuation of traffic according to which the divider moves to other lane having less traffic density. By using the separator upgrade, we can provide emergency vehicle traffic permit if required. It provides a high level of feedback on the road issue.**

Keywords: - Road Divider, traffic density, ESP32, Ultrasonic Sensors, IR Sensors, DC motor, L298N motor driver.

I. INTRODUCTION

Countries around the world are facing a crisis over traffic congestion due to the increase in the number of vehicles. Despite the fact that the number of vehicles using the road has been increased, the stationary foundation is almost equal and cannot adapt to conditions such as confinement. The problem with the unmovable road divider is, it can't move towards less traffic density lane. This requires the optimal use of available assets as a number of accessible methods. To overcome this problem, we built a moving road divider that relied on the advancement of traffic. The sensors are used with the ESP32 to get information from sensors and use the ESP32 Bluetooth model to detect emergency vehicles and the way to get to the destination on time. For instance, road dividers with IR sensors. We see that there will be having high traffic density on one side of the road than the other. In this type of situation, it can be considered a controlled area due to the fact that it reduces traffic problems. And road divider moves in preference with emergency vehicle irrespective of traffic density. A moving road divider helps with road boundary planning, in order to achieve optimal profitability through the use of a current roadway. By using the separator upgrade, we can provide emergency vehicle traffic permit if required.

II. MOTIVATION

Our idea is to calculate the robot tool an integrated road divider that can move the paths, so that we have a continuous number of routes to the run. Total the effect of time and fuel can be saved by adding one more way to control traffic congestion and make a way for the emergency vehicles to reach their destination in time so that it can save the lives. The smart request proposed below, will moreover get rid of relying on manually pleading and manual traffic communication for continuous monitoring of traffic anywhere in the city.

III. LITERATURE REVIEW

In Reference [1], the paper reducing traffic congestion with the help of image processing. Here the signal poles were fixed with cameras and cameras can take a picture then processed it. After getting the image effects processing timer was determined by signal lights.

In Reference [2], discussed how to reduce traffic density. Here PIR sensors were used to detect traffic congestion. Based on the results obtained time calculators for the red and the green lights were fixed.

In Reference [3], the survey has been made on the road of western express near to Goregaon, Bombay. A10-lane road was selected having points of congestion. The west express highway has been selected to understand the current long-distance traffic status. Research is done 7.00am to 9.00pm, data collected from the above study was number of vehicles passing a road and velocity of vehicles. He concluded that the vehicles density was decreasing during peak hours.

In Reference [4], it suggests a way to reduce traffic congestion using two standard and extended dividers. The author demonstrated the results in a single traffic using ultrasonic sensors, but in real time traffic congestion can be on more than one side.

In Reference [5], a study was conducted covering the wagholi chowk traffic volume on the Pune-Nagar highway and indicating a major traffic problem in the area.

In Reference [6] a review is provided on cost effectiveness using a moving road divider. Rate of congestion marked on the basis of fuel combustion in working hours, pollution and losses occur annually when the 2018 annual data is presented.

The algorithm was designed for the performance of the IoT Traffic Signing System Based on Traffic Congestion [7], but the worst thing here was that traffic congestion data was not protected during the transmission of traffic signal control information.

Reference [8] has a proposal using an IoT-based approach to analyzing traffic congestion. Photos are taken using a standard camera and analyzed using a cloud-based approach. The model was started using this method using raspberry pi and servo motors however the performance of this method is a major concern over the cost of its implementation.

References [9] have suggested the use of a smart temporary detector that will fold in and out of the road. This approach utilizes RFID-based ambulance detection and recovery identification opens up emergency vehicle routes. This method seems very attractive because of the actual applications. But the implementation is very difficult.

IV. METHODOLOGY

For the proposed program, a module contains an IR sensor used to measure traffic congestion. As the vehicle passes through the lane in which IR sensor mounted on the nearby road divider, the IR sensor make vehicles count and send information to ESP32. Based on the vehicle count, traffic jam determined on both sides of the divider. If there is a high traffic on the road that information displayed on the LCD display. Also, the lane to which the divider has to move is displayed. If there is no traffic congestion, then the road divider doesn't move.
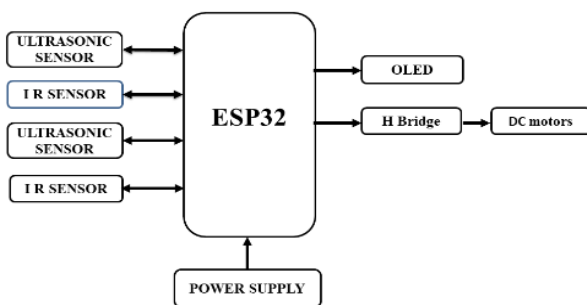

Fig 1: Block Diagram

A. Calculating traffic congestion using an Infrared sensor

Infrared sensors are mounted on a two-way street divider. They are used to calculate traffic congestion on both sides as a percentage. Infrared sensors take reading for a time that has been set and record the time when infrared radiations are reflected back by touching a vehicle. The infrared radiations reflection shows a vehicle passing by on the road and the time of reflection is equal to the vehicles count, the vehicles speed and the lanes count. The reflection count study obtained from both lanes is calculated to percentages. These are used to check high traffic congestion among the two lanes and then the separator moved to the lower side of the congestion.

B. Processing data for road divider movement

For the movement divider along road, this model calculates which lane of the barrier has high vehicles count. By looking at the vehicle density percentage on both sides, the model shows left and right lane traffic congestion on LCD display. based on this method direction divider movement has been displayed. Ultrasonic sensor is mounted on divider used in alerting system in the presence of a vehicle on its way and move it as safely as possible.

C. Using Ultrasonic sensors determine obstacles while divider is moving

If the traffic congestion percentage on both the two lanes is accessible then the divider initiates to move, it is required to check if there are any vehicles nearby for the movement of road divider. Ultrasonic sensor is used to find vehicles along the way to the divider movement and measure distance between the divider and the vehicles to restrict the movement of the divider all of a sudden to avoid accidents. If the vehicles are nearby to restrict the divider movement, the divider movement stops quickly then points vehicles to leave the way. As vehicles leave the way, the road divider moves on continuously until divider occupies the lane.

D. Detection of emergency vehicles

Emergency vehicles are mounted with the Esp32 Bluetooth module with sender MAC address and Esp32 Bluetooth module with receiver MAC address is mounted on the road divider. If the emergency vehicles stuck in traffic, the Esp32 sender MAC address matches with Esp32 receiver MAC address and divider moves to other lane to make a way for emergency vehicles to reach their destination in time to save lives.

The proposed system is explained using flow chart is as shown in fig 2:
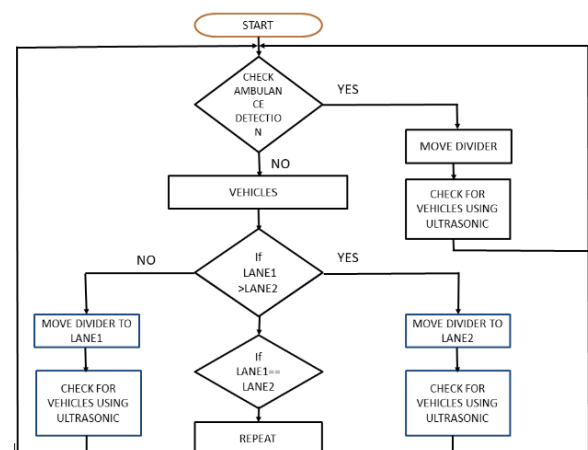

Fig 2: Flow Chart

V. RESULT

The experiment was done on smart divider by prioritizing emergency vehicles and obtained the following results.

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Fig 3: High traffic density at right side of the lane
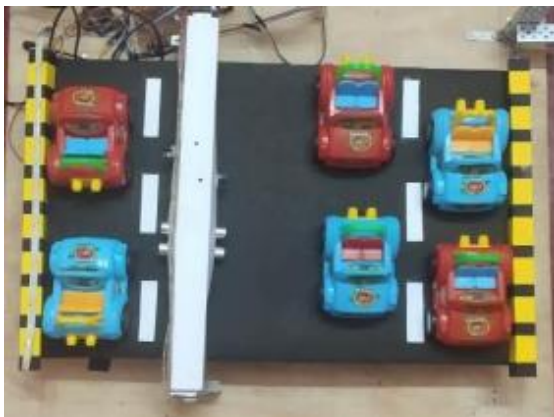

Fig 4: LCD displaying traffic density

Fig 5: Final divider position

VI. CONCLUSION

The separator is called 'Smart' because it works on to get the vehicles count through the sensors thus sending a message to move the smart divider successfully. In short, the movable divider is able to manage and solve traffic congestion on one side of the road with the other side having less traffic congestion. This is proposed that the program offers a free and guaranteed ambulance system to reach its destination without delays and save lives. It also slows down travel time in higher hours and save time and fuel. Icon feasible, secure requirements, reduces cost of maintenance with a few limiting cables.

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