



# AUTOMATIC MOVABLE SMART ROAD DIVIDERS SOLUTION TO TRAFFIC CONGESTION PROBLEMS

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**Abstract :** The road dividers are used for separating the continuous traffic. The issue with static road dividers is that the number of lanes on either side of the road is constant. In many situations we can see there is huge traffic congestion problem on one side and other side there will be no traffic and also in peak hours the flow of traffic is highly inclined in one direction. Our aim is to formulate a mechanism of automatic movable smart road dividers solution to traffic congestions problems that is recognize the vehicle density on each side of the road and adjust the roadway dividers accordingly. IR sensor, Arduino UNO, dc motor, L293D motor driver is used. The sensor are used to measure the density of traffic and by using Bluetooth module we can provide for emergency vehicle traffic permit if required. By using this technology we can build road and we can minimize difficulties related health, time saving and road becomes smart.

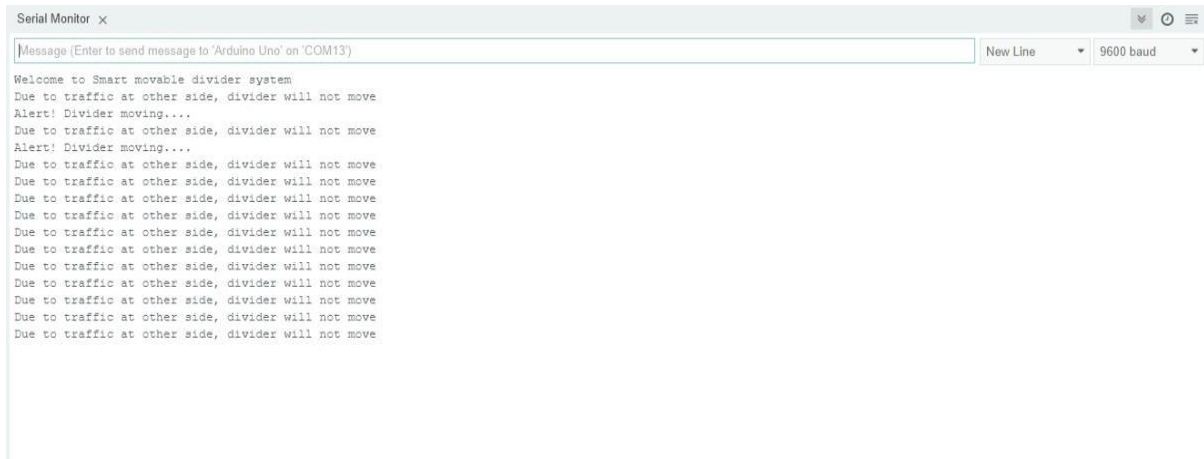
## INTRODUCTION

The Automatic movable smart road dividers are the solution for the controlling the traffic and gives more importance to the emergency vehicles during the huge traffic hours. As there will be huge traffic on one side of the divider of a road and other side there is no much traffic. In this case, it is possible to control the divider position. By controlling the position of divider, it can be helpful for the emergency vehicles to reach their destination. The device is designed such a way that the driver of emergency vehicles and the traffic police can operate and control the divider position during emergency situations. This can be done using the wireless Bluetooth connection such as serial Bluetooth terminal App. This app is installed in the mobile of the users. So that the user can operate easily in emergency cases. The divider position can be moved based on the traffic areas on either side of the road by using the IR sensors along with the Dc motor. The entire operation is controlled by the micro controller called Arduino uno. The smart road divider is very flexible to use. It gives the way for the emergency vehicles irrespective of traffic density

## PROCEDURE

The traffic intensity is measured using the IR sensors which are located on the either side of the road. The IR sensors which generates the infrared rays, records the time for which infrared rays are being reflected. Based on the readings of the reflection time on the either side of the road divider, the IR sensors detects the density of the traffic on both the sides of the divider and the divider is moved towards the side which has lower traffic density by providing an extra lane to higher density side. The reflection of infrared rays indicates the vehicles passing by the road and the reflection time is proportional to the number of vehicles, velocity of the vehicles and the number of lanes. In order to detect the obstacles when the divider is moving, ultrasonic sensors are used. It is important to know whether there are any obstacles while the divider is moving. The obstacles are generally the vehicles moving along the lane. Once the obstacle is detected by the ultrasonic sensor the divider immediately stops moving and alert the vehicles to clear the lane using a beep sound. After the vehicles or obstacles are cleared the divider continues to move along its path until the lane is occupied by the divider.

## RESULTS AND DISCUSSION



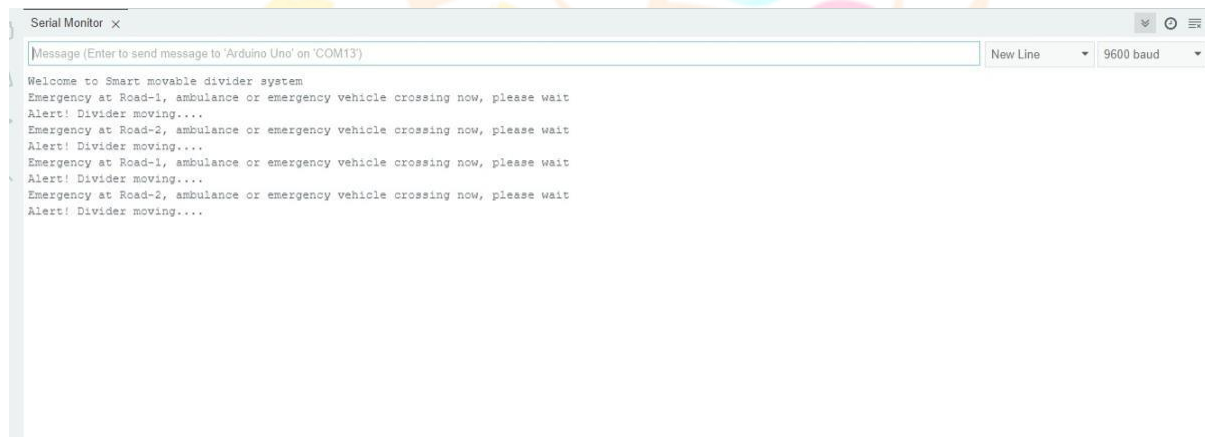
```

Serial Monitor x
Message (Enter to send message to 'Arduino Uno' on 'COM13')
New Line 9600 baud
Welcome to Smart movable divider system
Due to traffic at other side, divider will not move
Alert! Divider moving....
Due to traffic at other side, divider will not move
Alert! Divider moving....
Due to traffic at other side, divider will not move
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Due to traffic at other side, divider will not move
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Alert! Divider moving....
Due to traffic at other side, divider will not move
Alert! Divider moving....

```

Fig 1. Serial monitor output showing the road divider movement

In the smart road divider, the divider firstly providing the welcome message as it was already given in the code and basically IR sensors are used to detect the traffic density on the roads if the road-1 line is more denser (more traffic) than the road-2 line then the divider moves to road-2 line and provides the extra space for the vehicles to clear fast. If the road-2 line is more denser (more traffic) than the road-1 line then the divider moves to road-1 line and provides the extra space for the vehicles to clear fast. In this case one side of the road is with more traffic then it provides the alert message and divider moves and if both sides are equal then the divider will not move.



```

Serial Monitor x
Message (Enter to send message to 'Arduino Uno' on 'COM13')
New Line 9600 baud
Welcome to Smart movable divider system
Emergency at Road-1, ambulance or emergency vehicle crossing now, please wait
Alert! Divider moving....
Emergency at Road-2, ambulance or emergency vehicle crossing now, please wait
Alert! Divider moving....
Emergency at Road-1, ambulance or emergency vehicle crossing now, please wait
Alert! Divider moving....
Emergency at Road-2, ambulance or emergency vehicle crossing now, please wait
Alert! Divider moving....
Emergency at Road-1, ambulance or emergency vehicle crossing now, please wait
Alert! Divider moving....
Emergency at Road-2, ambulance or emergency vehicle crossing now, please wait
Alert! Divider moving....

```

Fig 2. Serial monitor output showing the road divider movement with respect to the emergency vehicle

In the smart road divider, the divider firstly providing the welcome message as it was already given in the code and if there is any emergency or government vehicle present in one part of the road then the road divider movement can be operated by the emergency vehicle driver or the traffic police present in that particular road, this can be achieved by using the Bluetooth module which the individual can connect and operate accordingly. In this case if the emergency vehicle is present at road-1, then the particular emergency driver can operate the divider movement and reach the destination with no any time delay. If in case the driver couldn't able to connect to Bluetooth module of device then the traffic police can connect and operate accordingly. If in case if the emergency vehicle is present at road-2, then the particular emergency driver can operate the divider movement and reach the destination with no any time delay.

## CONCLUSION

Smart road divider basically makes use of the IR sensors which are present either sides of the roads used to detect the traffic density continuously and divider movement is performed based on the density of traffic on either sides of the road. Divider moves to the lower denser side. Emergency vehicles or government vehicles present in the particular road line can reach to the destination at correct time. Emergency driver or traffic police connect to the Bluetooth module of device and operate based on their requirement.

## FUTURE SCOPE

Smart road divider device can work continuously if we use solar panels. This project can be further extended to identify and prioritize government vehicles like ambulances using RFID tags, this will help patients in ambulance to reach hospitals fast. It can even connect the data collected to the cloud so that people are able to know the traffic condition in particular area.

## ACKNOWLEDGEMENT

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## REFERENCES

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