

Design and Implementation of Smart Movable Road Divider using IOT

B Durga Sri¹, K Nirosha¹, Sheik Gouse¹

¹Department of Information Technology

MLR Institute of Technology

Hyderabad, Telangana

E-mail: durga.sree14@gmail.com

Abstract — Road Divider is generically used for dividing the Road for ongoing and incoming traffic. This helps keeping the flow of traffic. Generally, there is equal number of lanes for both ongoing and incoming traffic. 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 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. Our idea is to formulate a mechanism of automated movable road divider that can shift lanes, so that we can have more 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 the rush will be significant. With the smart 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 movable road divider can provide a solution to the above-mentioned problem effectively. This is possible through IOT. IOT refers to Internet of Things where the actual digitalization comes into picture. Here sensors play a major role. We can achieve this using Arduino board. The sensors placed on the dividers sense the flow of traffic whether flow of traffic is smooth or not? If the flow is smooth on either side then there is nothing to worry but the lane which is having more traffic, the divider is moved to a certain distance to the smoother lane in order to smoothen the busy lane.

Keywords—Raspberry – pi, image processing, traffic control, Vehicle counting, Arduino Board, Pi Camera, Ultrasonic sensors Sensors.

I. INTRODUCTION

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 cars per family is increasing, there is significant increase in number of cars on roads. This calls for better utilization of existing resources like number of lanes available. The main aim of this project is to take the traffic controlling to a new era.

The mission of this project is to;

- To avoid the traffic congestion.
- To control high Traffic intensity
- To reduce time of journey in rush hours

The purpose of the project is to decrease the time of journey in the peak hours and to avoid traffic congestions and to provide a better and a smarter solution for the above said traffic problems. The problem with Static Road Dividers is that the

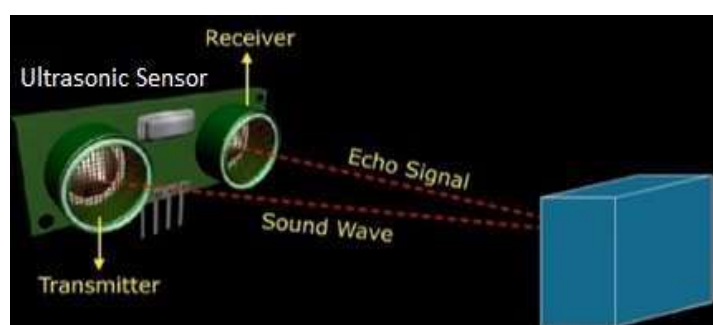


Fig. 1. Basic structure of ultrasonic sensor

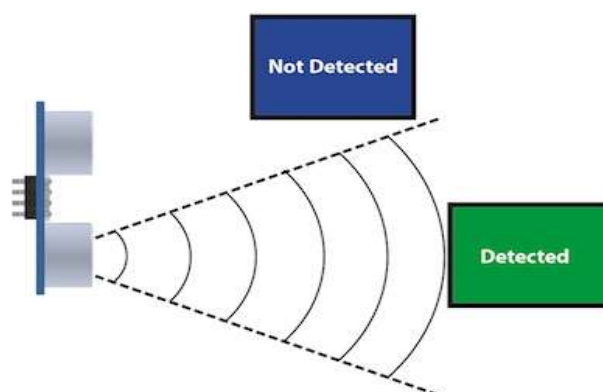


Fig. 2. Working of ultrasonic sensor

number of lanes on either side of the road is fixed. Since the resources are limited and population as well as number of cars per family is increasing, there is significant increase in number of cars on roads. This calls for better utilization of existing resources like number of lanes available.

The scope of the project is which Deals with internet of things to reach every individual who drive their vehicles to avoid problems occurred during journey like traffic congestion.

Figure 1 & 2 explains about the structure and working of ultrasonic sensor

II. RELATED WORK

In [1] Conventional traffic signal system is predicated on fastened time idea assigned to every aspect of the junction that can't be varied as per varied traffic density. a while it'll be not give sufficient time to pass vehicles as a result of traffic light time is pre outline.

In [2] Now a day's traffic downside square measure increasing thanks to the increasing range of vehicles and also the restricted resources provided by this infrastructure. Because of this, there's a desire to attend longer before of the signals .

In [3] India is that the second most thickly settled Country within the World may be a quick growing economy. it's seeing exaggerated no of road congestion issues in its cities. Infrastructure growth is slow as compared to the expansion in range of vehicles, because of house and price constraints.

In [4] they propose a system for dominant the traffic signal by image process. The system can find vehicles through capture camera pictures rather than mistreatment electronic sensors embedded within the pavement.

III. EXISTING SYSTEM

Barrier transfer machines, conjointly called zipper machines or road zipper, area unit significant vehicles accustomed transfer concrete lane dividers, like jersey barriers, that area unit accustomed relieve hold up throughout rush hours. Several alternative cities use them briefly throughout construction work. The lanes created by the machine area unit generally cited as zipper lanes. One advantage of barrier systems over alternative lane management treatments (i.e.: cones, overhead directional lights) is that a solid, positive barrier prevents vehicle collisions because of motorists crossover into opposing traffic flow. a drawback is that lane widths is slightly reduced.

Operation:

The vehicle contains Associate in Nursing formed, inverted conveyor channel in its framing that lifts the barrier segments (which could weigh over one,000 pounds (454 kg)) off the paved surface and transfers them over to the opposite facet of the lane, reallocating traffic lanes to accommodate multiplied traffic for the presently dominant (peak) direction. These barriers square measure coupled beside steel connectors to form a durable however versatile safety barrier. The minimum length for a few barrier systems is a hundred feet (30 meters). The length will vary supported application and also the quantity of barrier required to effectively deflect Associate in Nursing errant vehicle. Some barrier systems have four rubber feet on rock bottom of every phase "to increase the constant of friction between the barrier part and also the road surface". Another variant of the machine uses 2 narrower machines running in cycle. This setup tends to be utilized in reversible lanes (also referred to as control flow lanes) once the barrier is employed to divide 2 directions of



Fig. 3. Explains the working of existing system

traffic—the narrower machines square measure less of associate degree impediment to traffic in either direction.

- To management the traffic in rush hours this existing system is Road Zipper.
- This Road Zipper machine

IV. PROPOSED SYSTEM

To reduce the holdup, we tend to propose our plan of dominant the road divider for an additional lane as per would like with the assistance of IOT.

1. As per the holdup ascertained in our lifestyle through the time period cameras.
2. We gather the info collected from the cameras and send them to cloud for analyzing the traffic.
3. In analysis half, the info are going to be analyzed mistreatment raspberry pi through image process.
4. After analyzing, the required action is performed whether or not to push/pop the divider.
5. To build the higher than aforesaid proposal we tend to need ton of funds and time.

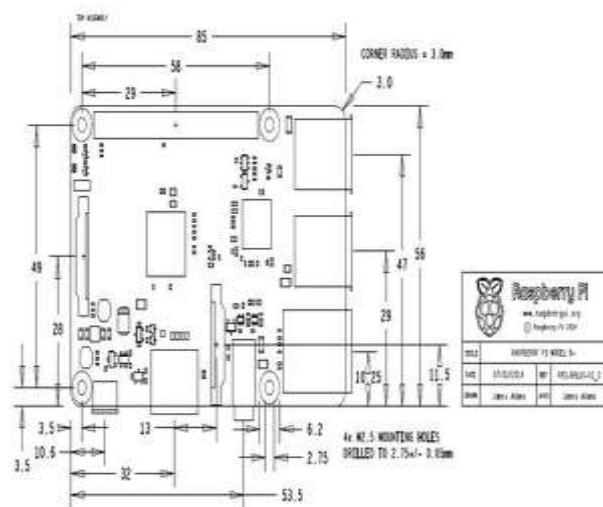


Fig. 4. Desig of proposed system

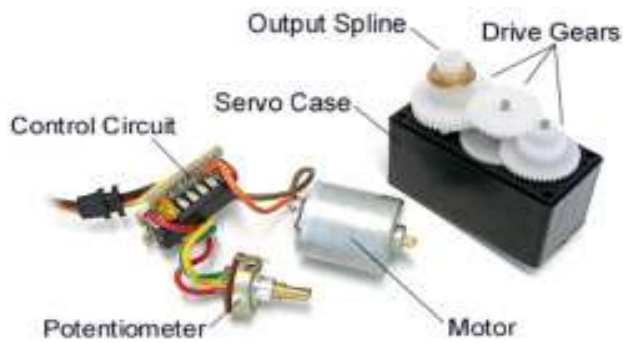


Fig. 5. Guts of a servo motor (L) and an assembled servo (R)

6. So, for nonce we tend to square measure coming up with our paradigm in Movable Mechanism (left/right) rather than push/pop mistreatment Arduino. The main advantage in the system is No human power is required

V. EXPERIMENTAL SETUP

The working of the project mainly works on the movement of barriers which can be done internally with the help of servo motors are around for a protracted time and square measure utilized in several applications. Little in size however pack a giant punch and are terribly energy-efficient. These options enable them to be wont to operate unmanned or guided toy cars, robots and airplanes. Using an electrical signal, motor is operated. This will determine the movement of shaft. Installation involves connecting the ribbon cable to the CSI instrumentation on the Raspberry Pi board. This will be a bit tough, however if you watch the videos that demonstrate. However it's done, you should not have any hassle.



Fig. 6. Experimental set up / model

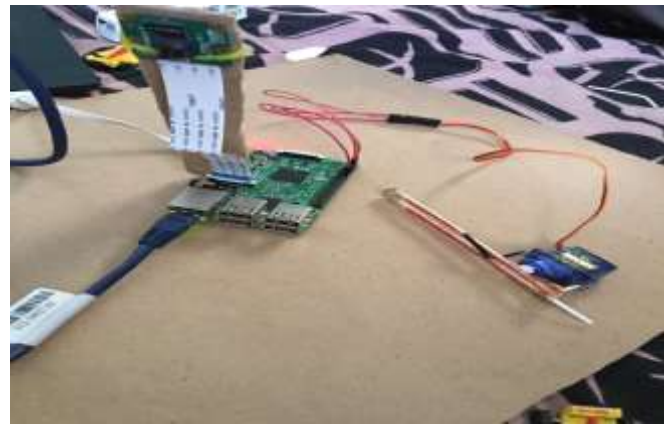


Fig. 7. A pi camera connected to observe the working of experimental results



Fig. 8. Prototype

I hooked up mine to a case employing a little piece of plastic and double-sided tape, as shown below:

Once the hardware is set up, you can move on to configuring the software. Connect to the camera:

VI. RESULTS AND DISCUSSION

The flex cable inserts into the connection settled between the local area network and HDMI ports, with the silver connectors facing the HDMI port. The flex cable connection ought to be opened by propulsion the tabs on the highest of the connection upwards then towards the local area network port. The flex cable ought to be inserted firmly into the connection, with care taken to not bend the flex at too acute Associate in nursing angle. the highest a part of the connection ought to then be pushed towards the HDMI connection and down, whereas the flex cable is command in a place.

- Update the SD card

In order to use the camera you want to be employing a recent OS that is aware of that the camera exists.



Select "Enable" and press "Enter".

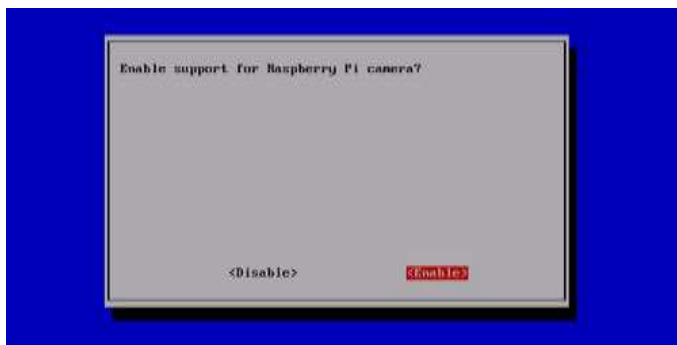


Fig. 9. Configuration shows the camera settings to ras-pi

- Enable camera in raspi-config settings

Reboot. If you're employing a contemporary image the raspi-config utility ought to load. If it doesn't then you'll be able to run it manually victimisation : `sudo raspi-config` Select the "Camera" possibility and press "Enter".

Updating your settings in operation and sanction native the camera mistreatment raspi-config did 2 things. It told your Pi that there's a camera hooked up and it supplementary 2 instruction utilities. Raspi still raspi id These permit you to capture still photos and HD video severally.

do

```
echo $effect
```

```
raspid -d -ifx$effect
```

done

VII. CONCLUSION

This projected system reduces the chances of traffic jams, caused by high red lightweight delays and provides the clearance to the emergency vehicle, to an extent and successfully. Here we have a tendency to design the system with the purpose to clear the traffic in accordance with priority. In this system, we discover the traffic density victimization Morphological filtering, and Blob analysis. The road with the very best priority is cleared 1st. The projected system



Fig. 10. Makes the lane free based on the traffic to have a smooth flow control

conjointly provides importance to the motorcar. If any ambulance is waiting in a very signal then the actual lane is given the next priority and also the traffic in this lane is cleared. Emergency vehicle is detected by victimization image processing. Whenever the emergency vehicle enters the lane, by victimization camera image, Morphological filtering and blob analysis detects vehicle and sends it to small controller. Small controller provides the high priority to the lane with the emergency vehicle and clears that particular lane.

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