

Construction of Smart Road Barriers To Avoid Traffic Problem Using Iot

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Abstract- Road barrier is basically used for separating the road for ongoing & incoming traffic. For the most part there is equivalent number of lanes for both ongoing & incoming traffic. Now a days most of people facing the major problem is traffic congestion & it is a serious issue. Traffic congestion may cause by so many reasons such as inadequate road width, movement of more vehicles, obstacle in the road causes blockage. In many cities traffic jam caused by inadequate road width. most of traffic roads are dived into lanes or multi-lane roadways. Lanes are designed with road surface markings. Major highways often have two multi-lane roadways separated by a median or a barrier. Many times multi-lane roadways are also not sufficient to carry the bulk traffic. To overcome these traffic problems, we are proposing a smart construction with IOT deployed to make road barrier movable automatically when high traffic appears. These smart barriers are designed for more convenient to position, move, retrieve and are made available an additional path. It helps to avoid traffic problem & make useful for the people.

Keywords- IOT, barrier, Raspberry-pi, traffic control, vehicle counting, image processing.

I. INTRODUCTION

Barrier is just a fence put in place to prevent moving of vehicles from one place to another or to keep the vehicles within their roadway and to prevent the collision with other vehicles in opposite direction. Now a days most of people facing the major problem is traffic congestion & it is a serious issue. Traffic congestion may cause by so many reasons. Such as inadequate road width, movement of more vehicles, obstacle in the road causes blockage. In many cities traffic jam cause by inadequate road width. There are some solutions for this major problem.

- Increasing number of lanes
- Widening of roads
- Use of public transport etc.,

By the above solutions we are still facing traffic problem and failing to resolve it. Most of traffic roads are

divided into lanes or multi-lane roadways. Lanes are designed with the road surface markings, major highways often have two multi-lane roadways separated by a median or a barrier. Many times multi-lane roadways are also not sufficient to carry the bulk traffic. The main problem everywhere towards the cities is traffic problem. Basically most of industries or IT companies starts their working hours in the morning session and closes evening times. So, the people are too hurry to reach their works and to reach their homes during the morning and evening session. By these obviously traffic level on the road will be high in each part of the day. Road Divider is conventionally utilized for isolating the Road for ongoing and incoming traffic. Incoming vehicles towards city will be high during the morning session of the day whereas outgoing vehicles from the city will be high during second part of the day. It says incoming path contains high traffic in the morning and outgoing path contains low traffic. Similarly, outgoing path contains high traffic in the evening and incoming path contains low traffic. Since the road contains a fixed road divider, it is difficult to find solution for the above mentioned traffic problem. To overcome this problem, we are proposing IoT Deployed Smart Road Divider to avoid traffic problem.

II. EXISTING SYSTEM

Here the barrier between the two roads is mechanically shifted from one side to another side of road at required time by using the barrier transfer machine (zipper machine). A machine is required to move the barrier. In smart moveable barrier method, the barrier made to move based on sensors. To adopt this system, we need a proper construction with IoT deployed.



Fig 1: zipper machine

III. PROPOSED FRAMEWORK

To overcome these traffic problems, we are proposing a smart construction with IoT deployed to make road barrier moveable automatically, when high traffic appears. These smart barriers are designed for more convenient to position, move, retrieve an additional path and are made available in length of 1.1m (1100mm) , height of 800mm , width of 500mm. these barriers are made of metal or a plastic. metal or plastic barriers are light in weight, portable and cost effective than concrete barriers. These are much easy to install, maintenance, replacement and to carry them. It requires less labour intensive because of their light weight and portability. For plastic barriers polyethylene plastic is used. Polyethylene plastic comes in variety of excellent colours which are allow than to be visible from a longer distance. Since barriers are made of metals and plastic, they are 100% recyclable for the safety performance. The barriers are made as per the specifications of NCHRP (national cooperative highway research program) making them more effective in containing at vehicle failure

Barrier design

The barriers which consist of hallow section, which provides space for electric purpose. At the bottom surface of the barrier wheels are fixed for the purpose of horizontal movement of barrier. The wheels are inserted in to metal track which is made with suitable dimensions and fixed to the road surface.

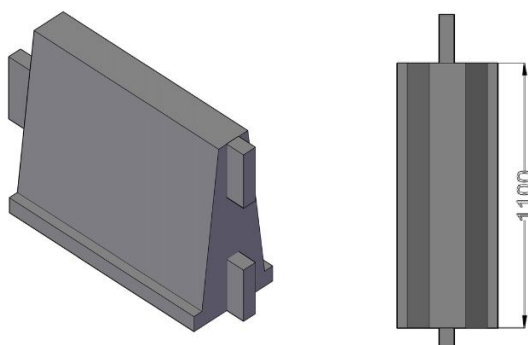


Fig 2: Isometric view of Barrier

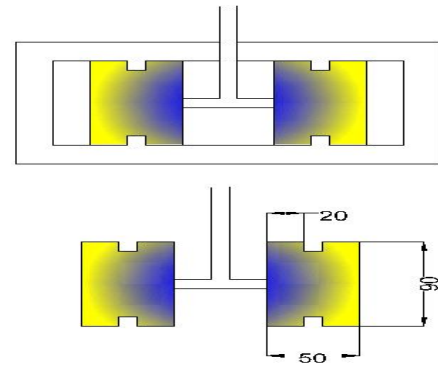


Fig 3: Set of wheels.

The main modification in this barrier is, the wheels are fixed to the barrier. Each barrier consists of two set of wheels on both ends shown in fig-3. In one set of wheels two wheels are fixed in a metal case. The outer box of the wheel available in 19 x 9 cm. whereas 19 cm wide and 9 cm height, length depends upon the width of road.

The box type metal case placed at a road level along width wise during the construction of road either it may be a concrete road or bitumen road. Extra rod type projection given one side and other side hole provided to insert the rods of other barrier to make strong bonding.

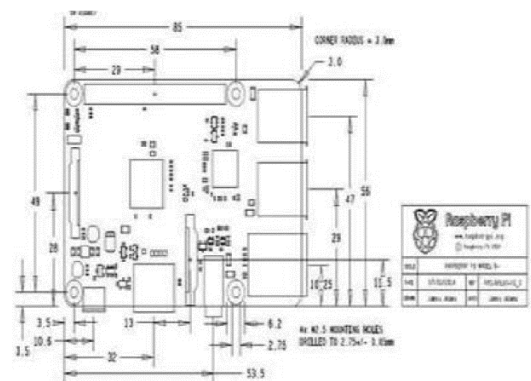


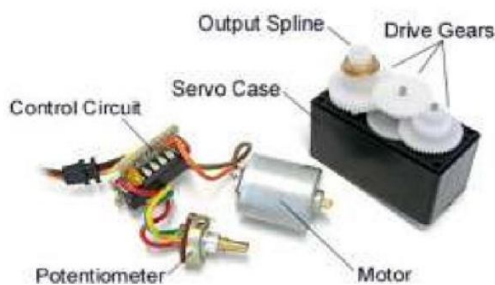
Fig. 4: Construction Prototype

Smart design

To make barrier moveable mechanical components are used similarly to make automatically moveable, we have design and deployed IoT to the proposed system.

The components are used such motors, driver, gears, circuit controls, Arduino micro controller etc. The motors are mechanical component that are used to make barrier movable physically towards the specified direction. The control circuits and Arduino microcontroller are used to design automatic function to the mechanical components. So, the mechanical components are instructed by the Arduino micro controller to

make barriers movable physically during the high traffic congestion appears. There are two ways of implementing automatic functions of barriers. One is based on sensors and another is based on timer. First case, lets consider sensors. Sensors are used to detect the number of vehicles on the road. And it keeps track of traffic data. Here the condition applied based on the data detected by such as when the number of vehicles are high, then the sensors passes the signal to Arduino micro controller. One the Arduino sensors the signal from the sensors and it make the motor movable, meanwhile the barrier moves automatically. Second case the timers are used to make automatic movable of barriers. We have to determine the timings that the period which contains high traffic. The time period which is specified, could be used to make barriers movable for the particular specified time. Here the timer is set to the state which contain high traffic (for instance traffic will be high during the morning part and evening part of the day). The timer functions such as whenever the set state of time appears then the time passes the signal to Arduino micro controller and micro controller transfer the signal to mechanical components to move the road barriers. So, when the traffic is low the barrier should move to its initial state or position. Hence forth we can implement the above combo methods simultaneously.



IV CONCLUSION

The main intension of this project is to minimize the traffic congestion problem. By providing the smart mechanism to the road barriers, it makes automotive barrier or automatic moveable barrier. It implies whenever the high traffic occurs then the smart barriers response to resolve the traffic problem. By adopting this method, it reduces man power and it helps to avoid zipper machine each time high traffic occurs. Internet of Things helps to make very smart. These kinds of constructions are implemented towards commercial cities where it helps to travellers in time consuming. The working of proposed system completely depends on timers and sensors according to the smart system

REFERENCES

- [1] Naveen N, Sowmya C N, "IoT Deployed Automatic Movable Smart Road Divider to Avoid Traffic Problems", IJCST, India, Volume 7 Issue 1, Jan - Feb 2019 ISSN:23478578
- [2] K.Vidhya, A.Bazila Banu, Density Based Traffic Signal System", Volume 3, Special Issue 3, March 2014
- [3] Priyanka Khanke, Prof. P. S. Kulkarni , "A Technique on Road Tranc Analysis using Image Processing", Vol. 3 Issue 2, February 2014.
- [4] Rajeshwari Sundar, Santhoshs Hebbar, and Varaprasad Golla, Implementing intelligent Traffic Control System for Congestion Control, Ambulance Clearance, and Stolen Vehicle Detection" IEEE Sensors Journal, Vol. 15, No. 2, February 2015
- [5] Ms.Pallavi Choudekar, Ms.Sayanti Banerjee , Prof.M.K.Muju, Real Time Traffic Light Control Using Image Processing" Vol. 2, No. March. s