Movable Road Divider with Help of Sensors

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ABSTRACT: Currently dramatic increase in road traffic congestion has had serious effects for individuals, the economy, and the environment, particularly in urban regions in most of the world's major cities. The goal of utilizing a road divider in traffic is to separate the incoming and outgoing traffic vehicles. Automobiles increase in number as the population grows, but resources are limited, resulting in more vehicles on the road. The project's major goal is to make the most of every second in order to save a human life while travelling in an ambulance. A Movable Road Divider can help with this. We are not employing a machine and operating it manually in the proposed model, but rather operating it automatically with the help of IoT and sensors.

KEYWORDS: Traffic controls, Road, Dividers, Movable Road etc.

I.   INTRODUCTION

We see a lot of scenarios when there is a lot of traffic on one side of a road divider and no traffic on the other side. It is feasible to control the divider position automatically in these scenarios, reducing traffic congestion. We can also grant traffic clearance for the ambulance when needed by moving the divider. In this project, we are building a movable road divider that will move in response to traffic density or flow. The IoT (internet of things) gathers real-time data about vehicle traffic in order to determine current traffic operations and flow conditions. The sensors will be linked to each other as well as to the divider's other components. Infrared and ultrasonic sensors are the instruments we're utilizing to detect traffic density. Using movable road dividers in areas such as Hinjewadi during peak hours reduces traffic congestion, allowing for the most efficient use of the existing route. Due to its pervasive effects, road traffic congestion is one of the most difficult issues that current road traffic authorities and citizens are confronted with. Among all of these consequences, the delay in emergency services delivery to the emergency location is the most serious because of the cost in lives lost, injuries sustained, and financial damages caused in the event of fires, vehicle accidents, terrorist attacks, and other disasters. It's not unexpected, given that many cities throughout the world have had the same traffic conditions for decades. In the evolution of road transportation, there has been no significant advancement or technological adaption.

II.   LITURATURE SURVEY/BACKGROUND

A study was conducted on Western express road close to Goregaon, Mumbai, in Reference, a 10 lane road was chosen once noting the congestion points. The western express highway was so selected to understand the current traffic scenario for long distances. A survey was carried out for a span of 7.00 am to 9.00 pm ,data collected from the survey was no. of vehicle passing a point, speed of vehicle and concluded by saying speed of the vehicle reduces significantly during the peak hours.1

The concept of movable road dividers were from the 90's ,the reason was that there was traffic congestion from that period. At that period the machine was called as zipper machine , which is used to shift the divider from one lane to another lane. It was introduced in earlier 90's and the first working model of zipper machine was bought by Hawaii department of transport in late 90's. The machine contains a s-shaped inverted conveyor channel which lifts the barrier segment weighing almost 450kgs.The minimum length of the machine is 100feet.The barrier segment is attached to the machine and whenever there is traffic congestion the machine will move and along with the machine the barrier segment that contains the divider also moves resulting in the width of the lanes.2

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.3

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.4

Nowadays, the metro cities like Hyderabad, Mumbai, Delhi etc. are facing difficulties of arising traffic and congestion every day. There are many different situations where various strategic methods are applied to solve those. The difficulty with general 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 automobiles per family are increasing. 5

Freeway traffic control is a broad research area, not only interesting for its applicative perspective, but also highly motivating for theoretical investigations. This research topic has been developed in the last decades by different research groups worldwide and still offers open problems and issues to tackle which may be a source of inspiration for the community of control engineers and scientists.6

III.   OBJECTIVE

- To investigate traffic congestion and road conditions.
- Identification of study area
- To suggest material selection for road divider.
- Comparison between movable road divider and traditional road divider
- To develop and recommend movable road barriers that are appropriate for the location.
- To design and feasibility outcome of movable road divider for study area.

IV.   RELATED WORK

In recent years, the number of automobiles on the road has increased proportionally to the rate of development in major centers around the world. Despite the fact that the number of vehicles on the road has increased, the road infrastructure has remained mostly unchanged and is unable to cope with changes such as traffic congestion, unexpected travel times, and catastrophic road accidents. Despite the fact that attempts have been done to alleviate and lessen traffic congestion, it remains one of Pune's biggest challenges. It has become one of the most significant issues for developers in Pune when it comes to creating sustainable cities. take the necessary steps. Pune traffic is hectic and boisterous by nature. The size of the traffic jam must be determined before it can be defined and appropriate solutions found. This paper's major goal is to better understand recurring traffic congestion, how to assess it, what precautions to take, and what solutions to take. Widening existing roads or constructing new ones will only result in more traffic, which will continue to climb until peak congestion returns to its prior level. The entire amount of space available for the development of roads, trains, and other modes of transportation within the city is limited. Instead of the typical option of enlarging the roadways, this paper will address the use of movable traffic dividers as a congestion release mechanism for Pune in traffic-prone regions. For traffic management in cities, an intelligent control system has been developed. The moveable traffic divider assists them in determining road capacity so that they can get the most out of existing roads.

Fig no-1 source:- google

V. METHODOLOGY

There were two stages to the project investigation. The primary data was acquired through literature research that included web searches as well as an examination of eBooks, manuals, codes, and journal papers. Following the review, the problem statement is formed, and the sample is prepared for detailed study and analysis. This project will be carried out according to the flow chart below: The following is a basic description of the project's layout:

1. Collection of Literature

2. Establish a problem statement

3. Choosing a research topic

4. Hinjewadi Traffic Survey

5. Sensors, materials, and PCU method research

6. A comparison of fixed and movable road dividers was conducted.

7. Expenses

8. Put it into action

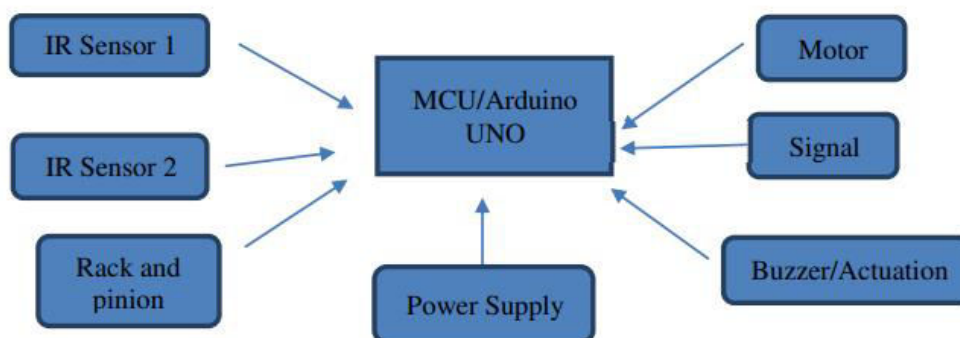| Year	Population	Increase in population per year	Incremental increase
2017	60,93,800		
2018	62,75,748	1,81,948	
2019	64,51,618	1,75,870	6078
2020	66,29,347	1,77,729	1859

T=3968.5, D=178515.66,

$P_n = P_0 + n.D + n.(n+1)/2 *t$

P2030=8632771.1   ……. (Calculated By Incremental Increase Method)

FLOW CHART OF METHODOLOGY

VI. PROCEDURE OF MODEL

The major goal of this project is to automate the process of changing road dividers and to notify users of the status of the alterations. This method is also used to avoid concerns with accidents. Because road accidents are

becoming more common in India these days. Using IR transceivers, this project determines the state of each automobile and tells the microcontroller. This research is utilized to avert car collisions, saving important human lives and minimizing losses. As a result, this initiative is beneficial to road transportation departments.

According to a recent survey conducted by social analytics, Indian road traffic has the greatest drawbacks. The fundamental goal of our proposed approach is to eliminate this disadvantage. The artificial road barrier is a novel concept that we are offering here. Sensors are used for the successful approach, H-bridge is used for execution, and ATmega328 microcontroller is used for regulating activities. The proximity sensor detects the car when it approaches the simulated spot and sends its signal to the microcontroller. The H-bridge is used to move the divider forward and backwards. A regulated 5V, 500mA power supply is used in this project. The voltage regulator is a 7805 three terminal voltage regulator.

VII.   RESULT AND DISCUSION

Currently, the increase in road traffic congestion has led to severe consequences on individuals, economy and environment, especially in urban areas in most of big cities worldwide. The purpose of using road divider is to separate the incoming and ongoing of traffic vehicles in peak hours. With increasing population, the vehicles are increasing, but there is limited resources which leads to more number of vehicles on roads The main aim of the project to use every second efficiently. This can be achieved with a Movable road divider. In the proposed model, we are not using a machine and operating it manually rather operating it automatically with the help of sensors.

This technique, to some extent and successfully, decreases the likelihood of traffic jams produced by high traffic density areas and offers passage to emergency vehicles. Emergency vehicles are given an uninterrupted passage that may save lives. Once developed, it will have a significant impact on daily life.

VIII.   CONCLUSION

We introduced sensor-based traffic control technologies in this project. We conclude that it offers a powerful alternative for enhancing an existing system with a new one. When the intensity is set to medium, the divider moves a short distance. When the intensity is high, the divider moves a long way. The concept also includes a solution for ambulance traffic clearance. The algorithm can be tweaked further to improve the system's accuracy. The proposed system will have a larger future scope in that users will be able to acquire traffic information on their computer or laptop. In 2017 traffic density in pune is and now upcoming years in 2030 the population increases by 20% so this technique gives more productivity to reduce the traffic.

REFERENCES

 1. Venkatesh P, Santhosh R, Naikar Namratha, Subramanya K S. Iot Deployed Automatic Movable Smart Road Divider To Avoid Traffic Problems. Vol 4.; 2020. Www.Pices-Journal.Com 2. S.Jyothirmayee, G.Vamshi Krishna, J.Nanditha Bsy. Controlling Of Traffic Using Movable Dividers. Int J Adv Eng Res Dev. 2018;5(04 April,2018):5. 3. Scad Institute Of Technology, Institute Of Electrical And Electronics Engineers. Proceedings Of The International Conference On Intelligent Sustainable Systems (Iciss 2017) : 7-8, December 2017. 4. By O, Shinde S, Mahyawanshi T, Malani U, Kamble S, Mahapadi A. Innovation 2020 Movable Road Divider For Organized Vehicular Traffic Control With Monitoring Over Internet Of Things (Iot). Vol 10.; 2020. Www.Ijsrset.Com 5. Keerthan Aj, Likhith Hd, Chetan Hs, Kiran Kp Dsm. Automatic Movable Smart Road Dividers-Iot Based Solution To Traffic Congestion Problems. Vol 5.; 2020. Www.Ijisrt.Com 6. Silvia S, Cecilia P, Simona S, Antonella F. Freeway Traffic Control: A Survey. Automatica. 2021;130. Doi:10.1016/J.Automatica.2021.109655

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