

Study on Adaptive Traffic Management System

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ABSTRACT:

With the rapid development of urban areas results in increased number of automobiles which makes a hindrance to control the traffic. Today growing congestion is one of the major transport problems which the world is facing and this can be clearly seen through continuous traffic jams in our day to day life. This leads to inefficient management of traffic. Traffic reporting can help to reduce congestion and avoid traffic problems. We present adaptive traffic management system which deals with congestion problems where new durations are implemented in real time by optimizing signalized intersection plan duration. This project of adaptive traffic management system is used to avoid congestion at busy intersections and to have a system in such areas where it is not possible to alert the ongoing traffic in real time. By using RF technology and wireless sensors as inputs to the circuit so as to inform the incoming vehicles in time We are employing remote data display screens where latest information about the traffic jam is displayed on the screen as well as broadcasting on FM bands.

KEYWORDS: Congestion Control, FM Broadcasting, RF Technology, IR Sensor

I. INTRODUCTION:

In the developing world, the migration from rural to urban areas is constantly increasing. Due to the rapid urbanizing and industrializing leads to increase in number of vehicles This is the major cause of congestion. Although the earlier proposed methods of traffic management do not serve efficient in performance, cost, and the maintenance.

Different methods are adopted by systems now-a-days which include traffic related sensor, GPS based methods, triangulation method, smartphone based method that are used to have smooth flow traffic in heavy roads. But these methods have certain disadvantages in terms of cost, performance and other environment conditions. For GPS based method, only vehicle equipped with GPS receiver will receive the route status, others will deal with same problem.

The method we are proposing in this system is the need for present traffic jams found almost at every intersection on a busy road. As the number of vehicles increases with a steep ratio, the need for wider roads is necessary. But at intersections the scenario of traffic in India is totally different with red signal jump and the quality of roads the total traffic movement is almost limited to approx. 5-10 Km/hr. At this pace, the traffic in a certain lane gets accumulative due to less no. of vehicles crossing the intersection at their green signal. So to add up the intersections are the main arteries of the city blocking almost at every intersections.

In our method we are using RF technology as medium to broadcast the information on a busy intersection to all the vehicles approaching the intersection. We are employing remote data display screens where latest information about the traffic jam is displayed on the screen as well as broadcasting on FM bands so that if driver does not pay attention to the display, he can hear the same information on FM radio also and take subsequent diversions thereby reducing the overall blockage at the intersection.

II. OPERATING PRINCIPLE:

The project takes great care of the busy traffic and resolve the issue of congestion by using simple techniques like RF technology, FM broadcasting and reception by which the situation of congestion is displayed over the LCD placed at certain distance and also this is broadcasted over the FM receiver installed in the vehicles.

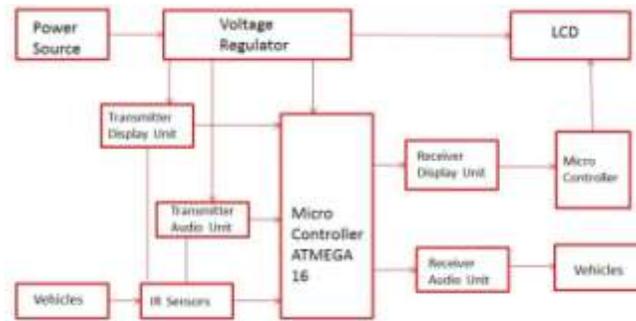


Fig 1. Block diagram depicting the design of project

In the layout of project, as shown in Fig1 The power source is provided to the unit for which the mains supply is turned down to 12v by the step down transformer, from here on bridge rectifier does the work to convert this supply into DC. This is passed to the voltage rectifier which converts it into 5v DC, this supply is used in the diff. sections.

This power source supply is as shown in Fig2., to power the microcontroller, encoder, decoder, LCD. Also to the LED's depicting as the traffic light.

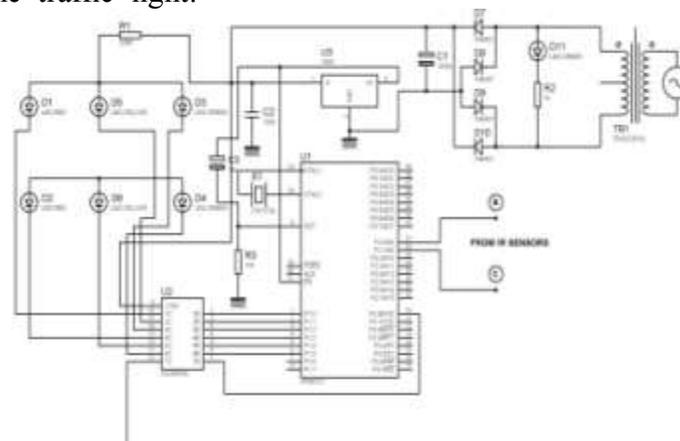


Fig 2. Circuit showing power supply to diff. sections

Now the other section is as, the set of 2 IR sensor assembly is placed and the algorithm is set such that when the first sensor set senses the incoming vehicle it sends high signal to the microcontroller and the another sensor set remains on low. The no. of vehicles entered is monitored and if the same no. of vehicles does not exit the other sensor set then it also sends the high signal to the controller. Thus, when both sends high signal there occurs the situation of congestion, which is send as data signal to the encoder which converts it into parallel form and this is carried over to the RF transmitter module in real time as shown in Fig3. Through the antenna the information is radiated, and the RF receivers receives this information wirelessly in real time and send it to the decoder which decodes the signal and send it to the microcontroller which processes the signal and send it to the LCD which is placed at a certain distance before, where the congestion occurs. The LCD displays the message of congestion as shown in Fig3. for the vehicles drivers to see so that they take another route to get saved from busy traffic and also save their time.

On the other hand, if the driver missed to see the message over LCD, in that case we are also including technique in the project to broadcast the message of congestion which can be heard in the vehicle over FM knowing which they can de-route.

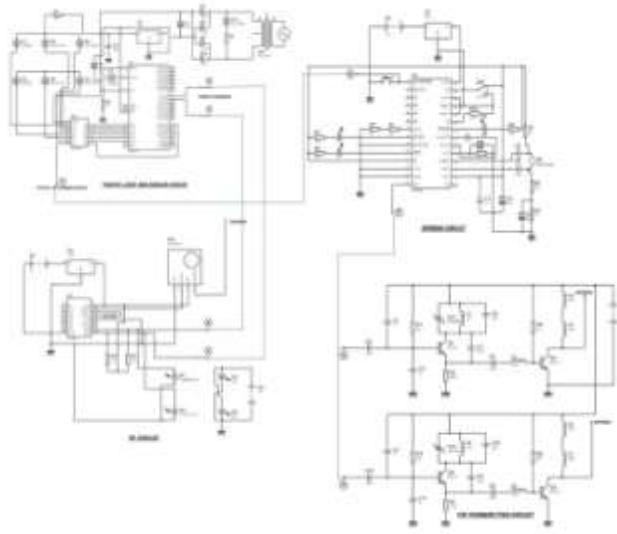


Fig 3. Circuit depicting the implementation design

To implement this SPDT relays are used by which the APR9600 voice playback and recording IC unit is powered. Through this IC the message which is to be displayed and broadcasted is recorded and the same is then transferred over FM Transmitter, here a specific frequency is tuned over which the message is radiated through antenna. When the vehicle enters this traffic section, the FM installed in the vehicle acts as FM receiver over which this message of congestion will be heard. Thus, these two techniques are employed in the project to reduce the situation of traffic jams.

III. FUTURE WORK:

This paper is proposed to reduce the congestion in the traffic. In the future prospect, when this will be employed over numerous traffics, in concern with the government then frequencies will be selected accordingly to hear the message. Thus it will help in reducing the congestion to wider extent and thus will save the time of the people.

IV. REALISTIC CONSTRAINTS:

- The constraint with this project arises in the frequency band which is selected for information transmission.
- A particular frequency is jammed so as to broadcast the information.
- The assembly of sensors should also be synchronized properly so that it can easily and efficiently regulate the traffic irrespective of different densities of the different vehicles.

V. CONCLUSION:

This implementation concludes that the traffic congestion can be reduced with the above techniques easily with the assistance of government to broadcast the information over numerous frequencies. The challenge was to receive the information in real time accurately and also to receive the same from the tuned frequency which is very well achieved from the implemented design and explained in this paper.

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