

SMART SIGNALING TRAFFIC CONTROL SYSTEM

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ABSTRACT

The aim of the Intelligence traffic management system is built up a traffic management system by dealing with the fuel supply of vehicles. Due to the ever-increasing traffic demand, modern societies with well-planned road management systems, and sufficient infrastructures for transportation still face the problem of traffic congestion. This results in loss of travel time, and huge societal and economic costs. Constructing new roads could be one of the solutions for handling the traffic congestion problem, but it is often less feasible due to political and environmental concerns. An alternative would be to make more efficient use of the existing infrastructure. Our proposed work will manage the existing traffic system to follow an automatic real-time situation regarding situation based system. We analyzed various traffic roads and the road having highest traffic will get the signal the stop signal. These vehicles will get automatically stopped by disconnecting the fuel supply to the vehicle. It is real time operating management which is too difficult but we able to do microcontroller based traffic control system. Traffic control problem is a big problem in our country at present and we hope this real-time technique will to solve the problem and it also saves fuel.

Keywords: CCD, ATCS, TX/RF receiver.

I. INTRODUCTION

Traffic congestion is a severe problem in many modern cities around the world. Traffic congestion has been causing many critical problems and challenges in the major and most populated cities. To travel to different places within the city is becoming more difficult for the travelers in traffic. Due to these congestion problems, people lose time, miss opportunities, and get frustrated. Traffic congestion directly impacts the companies. Due to traffic congestions there is a loss in productivity from workers, trade opportunities are lost, delivery gets delayed, and thereby the costs goes on increasing. To solve these congestion problems, we have to build new facilities and infrastructure but at the same time make it smart. The only disadvantage of making new roads on facilities is that it makes the surroundings more congested. So for that reason we need to change the system rather than making new infrastructure

There is also necessity of reducing the consumption of fuel in our nation. Vehicle is the biggest factor which utilizes the fuel. Due to abundant use of vehicles there is a huge requirement of fuel. Therefore India needs to make large amount of investments abroad for the fuel supply. It indirectly affects on the cost of fuel in our country. Now it becomes our personal responsibility to take a respective step towards fuel conservation. This can be achieved by making vehicles off when they are in steady state. This is the condition at traffic signal.

The system we are designing 'Fuel Conservation for Vehicles at Traffic Signal' is the automatic control system implemented for automatic control over congestion of vehicles at traffic signals. At the traffic signal when the vehicle is in steady state fuel supply automatically gets disconnected i.e. when red signal glows. The vehicles get started when there is the indication of green signal.

II. RELATED WORKS

Many countries are working to manage their existing transportation systems to improve mobility, safety and traffic flows in order to reduce the demand of vehicle use. By enhancing public transport, route guidance systems, traffic signal improvements, and incident management, congestion can be improved greatly from the statistical analysis of US department of transportation in 2007[2], it has been found that half of the congestion caused is due to the recurring congestion. Due to recurring congestion, the roads have been used repeatedly when they were not supposed to be used twice. These congestion problems are recurring congestion problems are caused due to poor guidance of travellers. The other half of the congestions are due to the non-recurring congestions which are due to traffic incidents, work zones, weather on special events. Non-recurring events dramatically reduce available capacity and reliability of the entire transportation system. The researches done on these goals would be started by stating about the simulation model created by Schaefer, Upchurch and Asbur (1998) which evaluated the freeway lane control signing. The simulation showed that lane control had some influence that lane control had some influence on congestion. Chen and Yang (2000) have created an algorithm [1] to find a minimum total time path to simulate the operations of traffic light control in a city. After them, many researchers worked on these problems and ultimately Wen and Yang (2006) developed a dynamic and automatic traffic light control system for solving the road congestion problem.

In May2013, Optimization of Fuel Cost and Emission Using V2V communication [3] sponsored by IEEE Intelligent Transportation Systems Society. This paper focuses on using traffic light signals to communicate with approaching vehicles. The communication can be traffic-light-signal-to-vehicle (TLS2V) and vehicle-to-vehicle (V2V). Based on the information sent, the vehicle receiving the message adapts its speed to a recommended speed (SR), which helps the vehicle reduce fuel consumption and emissions.

Area Traffic Control System (ATCS) [4] is an indigenous solution for Indian Road Traffic, which optimizes traffic signal, covering a set of roads for an area in a city. It is an intelligent traffic signal control system that use data from vehicle detectors and optimize traffic signal settings in an area to reduce vehicle delays and stops.

But these systems are not cost effective solutions for traffic monitoring and are not useful in reducing the consumption of fuel. Till now the step towards conservation of fuel is considered while manufacturing of vehicle.

Now days, fuel consumption is the serious issue which deals with vehicles in India. In order to control excess fuel consumption we came with an invention of an idea of saving the fuel at traffic control system, The Intelligence Traffic Control System.

At traffic signal during the dedicated time, vehicles are not in motion and this is the event at which we can save the fuel. Here fuel can be saved by disconnecting the fuel supply to vehicle. This can be done manually but sometime it does not happen. That's why we came with the solution that would automatically cut off the fuel supply. This will effectively save the fuel consumed by vehicle and also controls the traffic.

Most of the traffic control system now a day in developing countries are works based on fixed time concept, the time for Green/Red signals are previously set on the basis of expected traffic densities. Such systems are not dynamic and yields poor results in many situations. Comparatively newer trend is the use of close circuit Charge Coupled Device (CCD) cameras at traffic junctions and in high density areas for surveillance. But compared to the huge amount of money spend by the govt. for just the surveillance system is inefficient.

Various conditions are taken under consideration while implementing this idea. Before automatically disconnecting the supply, the speed of the vehicle should be within specified lowest range and if necessary then only the supply should get disconnected that is in case if there is very less time remaining for the green signal to glow.

III. EXPERIMENTAL WORK



Fig. 1: Block Diagram of Transmitter

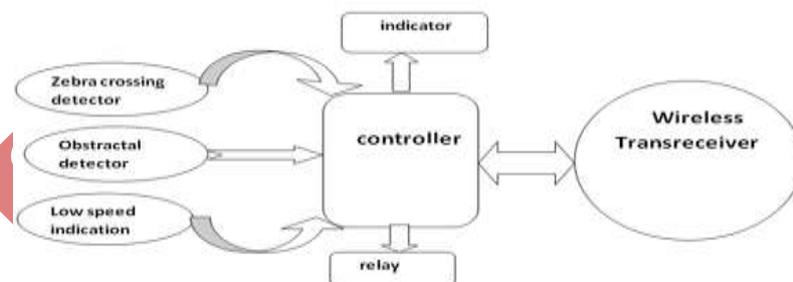


Fig. 2: Block Diagram of Receiver

The present invention provides for a wireless, cost effective, easy to install Intelligence Traffic Control System in order to effectively save the fuel consumed by vehicle and also to control the traffic. The basic mechanism of this system is based on wireless network and controller. We have assigned different codes to traffic signal. Each traffic signal contains a reference code which is transmitted in all direction with the help of RF transmitter. When green signal is ON, a particular code which we have assign to it only transmits for a short duration.

The RF receiver which is installed in the vehicle will receive the code and compare it with vehicle code. For eight different directions we have assign 000 to 111 codes which as follows:

000 for North, 001 for North East, 010 for East, 011 for South East, 100 for South, 101 for South West, 110 for West, 111 for North West

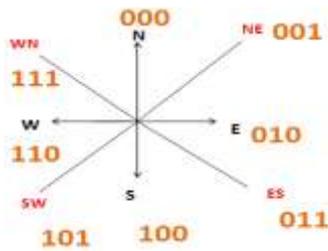


Fig. 3: Codes According to Roads

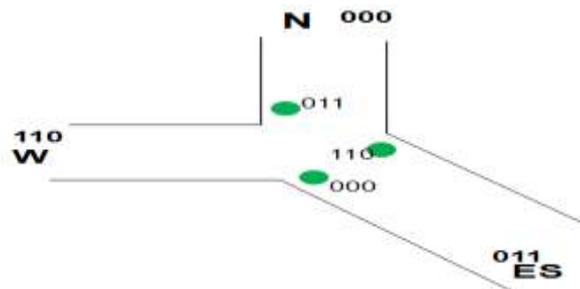


Fig. 4: Codes Assigned to Poles

Compass is fitted in the vehicle to detect the direction along which the vehicles are to be positioned. Once the direction has been finalized the signal is given to the controller. The controller compares the code which is generated from compass with reference code. The direction can be identified with help of digital compass. When the two codes exactly match, then only the vehicles are allowed to move without any interruption.

If the code is mismatch it means the red signal is now ON. In this case, first it checks the condition for zebra crossing. A standard range is prescribed say 100 meters, based on the traffic conditions of the respective signal. As the vehicle enters into the zone, system firstly checks the condition for zebra crossing. If the vehicles are on the zebra crossing then it disconnects the supply of fuel of vehicle from fuel tank by using relay contact.

If this condition is not satisfied then it will go for next condition that is obstacle detection. If the detector finds the obstacle with the minimum spacing between two vehicles then it can disconnects the supply of fuel. As the vehicles are entered into the specific range the system gives an indication, to slow the speed of vehicle. The time duration of signal is also displayed on it.

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IV. CONCLUSION

Most of the traffic control system now a day in developing countries are works based on fixed time concept, the time for Green/Red signals are previously set on the basis of expected traffic densities. Such systems are not dynamic and yields poor results in many situations. Comparatively newer trend is the use cameras at traffic junctions and in high density areas for surveillance. But compared to the huge amount of money spend by the govt. for just the surveillance system is inefficient.

Smart signing traffic control system provides a best solution for controlling the traffic, saving the fuel and avoids violence against traffic rules. The fuel consumed by single vehicle for 60 seconds doesn't make much difference in consumption of fuel, but if we consider number of vehicles present at traffic signal, it will definitely make large difference. Through our project, we can save huge amount of fuel.

At the zebra crossing near traffic signal, the vehicles are turned off automatically, Due to this eventually the government rules are being followed and this ultimately reduces the pollution. Pollution is also one of the factors which we have considered. Carbon Dioxide and methane leaking through the vehicles reduces by 27% to 30%.

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