

Review Article

Design the Sensor for Control the Traffic Light Time as Dynamic for Efficient Traffic Control

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Abstract: Soft driving is a major concern of societies all over the world. Most of people are killed or seriously injured due to accidents each year, various investigation show that speeding is main cause of road accidents. The major key region is growing at a rapid speed. The average speed of vehicles is one of the main parameters that have been widely used particularly in road safety equipment designing and road working. The road safety equipments are affected by some other parameters such as type of road, days and type of vehicles either heavy or light. In this paper, a survey had been conducted to study the efficient performance of road safety equipments to control the traffic.

Keywords: Average Speed, Genetic Algorithm, Road Safety, Traffic Light System.

1. INTRODUCTION

Traffic congestion is a serious problem in many cities and rural areas also. So we can say that around the world. Traffic congestion is a major challenge in the many and most populated cities. When we can travel to two different places within the same city then it is difficult for the traveler in traffic. Sometimes due to traffic congestion problems the people lose many things like time, opportunities. Traffic congestion also directly impacts the industries areas. Due to traffic problem there is a loss of productivity from workers are effect by traffic congestion, delivery of products are also effect by traffic because delivery gets delayed. All of the above thereby the costs goes on increasing.

To solve the congestion problems, new facilities have to been developed and provide new infrastructure also, but at the time it make difficult again. When we can provide new infrastructure there is a big disadvantage of making new roads is that the surroundings become more congested. That's why we have to improve the system instead of making new infrastructures. For example, most of the countries are working on their existing systems to resolve these problems. When we can manage transportation then mobility also improves the safety and traffic flows.

When we can enhance route guidance systems, public transport, traffic signal improvements and incident management, congestion problem can be reduced from the analysis of US department of transportation, it has been found that one major reason of congestion is the reoccurring of congestion. Due to reoccurring congestion, the roads have been used repeatedly. The non-recurring congestions which are caused due to traffic incidents, special events, work zones, weather etc. Reoccurring events reduces the capacity and reliability of the transportation system.

The main goal of traffic research is to optimize traffic flow of people and goods also. As the number of road user's increases and resources of infrastructures are limited, the intelligent control of traffic will be a very serious issue in the future. There are several models for traffic simulation. The flow of traffic constantly changes, which depends on the time of day, the week, and the year is also a complication. Roadwork and accidents further influence complexity and performance. Our main concern is with the Traffic Control Light System. The Traffic Lights are explained as below.

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1.1 Traffic Light System

A traffic light system is used to minimize the traffic on road. Traffic safety equipment are used to road safety like as signaling device positioned at an intersection and road divider to indicate when the traveler have to ride, drive, walk. The traffic lights commonly have three main light colors, such as the red light is stop and the meaning of green light is to go whether the yellow light means ready to go. For the pedestrians, there are only two light colors one is red and other is green light. There are many benefits of traffic light system, besides reducing the number of accidents. The government makes few rules to overcome this problem such as punished to all those do not obey the traffic rules. The traffic control lights placed at the location where risk of accident is high or large jam is create. Increasing the numbers of traffic lights also have problems those are as below:

1.1.1 The Heavy Traffic Jams

With advance in technology, the number of vehicle on roads are increased, those creates the traffic jams. The jams are usually at the main intersections in the morning time, before and after the office hour. So that's all reasons are effect the time of people.

1.1.2 The Road User Waits

The traffic light used as road safety equipment on road, but sometimes traffic lights is the cause of wasting of time for people. At the certain junction, but sometimes the red light are occur but there is no traffic, the road users should wait until the red light convert into green light. If peoples run the red light, then they have to pay the fine.

1.1.3 Emergency Vehicle Stuck Jam

Because of traffic jams, the emergency vehicle, such as police cars, ambulance and the fire brigade stuck at the traffic lights, because the users are waiting for green traffic light. It is very critical problem, emergency become more complicated. As above, we mentioned the main problems with the traffic lights. There are various techniques to solve these problems. All these techniques are reviewed under the literature survey.

2. LITERATURE REVIEW

Leena Singh *et al.*, in [1] Real-time traffic signal is an important part of the urban traffic light system. It provides effective traffic control for complex traffic network problems those are the challenging problems. The new model uses GA which is implemented in MATLAB tool. The new model optimizes the timing of traffic light signal in real time and then provides optimum green time duration for all the four phases depending upon the traffic conditions. An "intelligent" intersection traffic control system was developed. The developed system takes "real time" decisions to adjust the light durations.

Javier J. Sanchez *et al.*, in [2] studied a model is which depends on Genetic Algorithms for optimization, on Cellular Automata for Simulation of Function, and also on the Beowulf Cluster for parallel execution. Up to date traffic network optimization has been faced using the Trial-And-Error method. This method cannot ensure that the whole searching space is covered. We propose a new method, a non-deterministic optimization one to solve this task. In this work we optimize traffic light cycles.

Halim Ceylan *et al.*, in [3] traffic signal and traffic assignment problem are optimized by using GA. Signal duration is described by network cycles and by the offsets between the joints. The objective function in this paper is the performance index (PI) of network. Genetic Algorithm (GA) is uses the inversion of PI as the fitness function. The results show that the GA is simpler than heuristic algorithm. Furthermore, results from the tests conducted on road network shows that the performance index is improved significantly.

Javier J. Sánchez-Medina *et al.*, in [4] optimization techniques such as genetic algorithms (GAs) for the optimization; cellular-automata-based micro simulators for traffic light times; and Multiple-instruction-multiple data (MIMD) also called Beowulf cluster multicomputer of excellent price/performance ratio described positive experience with the optimization of traffic lights in cities. A distinctive feature of this paper is the large scale of the underlying grid. Using the supplied maps and statistics, we have simulated the present-day traffic behavior. Additionally, we have optimized the traffic signal times, yielding better results with regard to several predefined parameters.

Suhail M. Odeh *et al.*, in [5] describes an intelligent traffic light system to manage the congestion problem because of high flow of traffic. The authors take two main highways and four intersection areas for the experimental study of system. The data regarding the flow of traffic and other parameters are collected from a video imaging system which captures the images. These images are used to detect and count the number of vehicles. All the collected data, images are transferred to another system based on GA. The system depends on rules those are used to set the green light interval time.

Martin Kelly *et al.*, in [6] the values of the parameters governing the simulations are identified through the use of a genetic algorithm. In a first instance, we will continue pursuing experiments with the current model in order to identify additional optimums; then we will extend the current experiments by comparing with other techniques and evaluating the current model under different congestion situations. Second, another model is planned which will tackle re-routing of emergency vehicles only. We are also

planning to combine these two models together where both regular and emergency vehicles are re-routed and traffic globally optimized. Third, as most simulations of car traffic control, we are using a square grid of routes for modeling the city.

Emad I Abdul Kareem *et al.*, in [7] the traffic flow in urban areas is managed by using traffic lights. But the light system causes long time for vehicles to wait till there is traffic or there is no traffic. In urban areas there is a fixed number of traffic cycle. To improve the traffic light configuration, the current monitoring system needs to be improved. The other option is to add additional component to the traffic light system, which will be capable to find the three cases such as empty, crowd and normal and stored that in the memory. This study has to develop an intelligent vision traffic light monitoring system via associative memory in order to demonstrate an improvement in traffic light configurations. To improve traffic light, an Intelligent Traffic Light Monitor System using Memory to reduce wasting of fuel due to unnecessary waiting times at intersections and the wasted time and lost lives of vehicle users.

K. T. K. Teo *et al.*, in [8] studied the optimization of traffic light systems to control traffic. The traffic light systems are made to control the flow of traffic in the intersections to make sure that traffic flow is within control in the traffic network. When there is high traffic flows that cannot be controlled by the current traffic light systems then the long queues are made at the intersection areas. Genetic algorithm is used to get the optimal solution for the reduction of queue length and to control the traffic flow. Genetic algorithm takes queue length of traffic as input. The output is the optimized duration of green time. The results of Genetic algorithm are improved for the incoming traffic when the red light is turn on.

Shailendra Tahilyani *et al.*, in [9] studied congestion problem of urban areas which becomes very critical. This problem increases with the increase in the number of vehicles. The unexpandable traffic infrastructure also causes congestion. New lane algorithm/techniques have been developed to solve this congestion problem and make the traffic flow smooth on roads. Genetic algorithms are used as optimization method. Finally, the results of the proposed algorithm are able to deal with this problem. A new approach is introduced to deal with the traffic congestion on the road networks. A new lane by pass based approach is introduced using genetic algorithms. The results are found satisfactory.

FUTURE WORK

3.1 Problem Formulation

- The current traffic light systems provide a fixed traffic control plan. The settings of these systems are based on traffic counts. The

monitoring and control of city traffic light is becoming a major problem.

- There are several types of conventional methods of traffic light control; however they fail to deal effectively with complex and time varying traffic conditions. There is a need to research on new types of highly effective practical traffic light controllers.
- In our work, we will propose a new development of a traffic light control system. This system will manage the time duration of RED and GREEN lights to decrease the traffic congestion at traffic light. Our system will reduce the delay, hi-jack etc.

3.2 Objective

1. To conduct a review of the traffic controlling systems.
2. To study the traffic congestion Problems.
3. Propose an Algorithm to make a dynamic traffic light system.
4. Make the duration of GREEN and RED lights a variable one according to the traffic volume.

4. CONCLUSION

The major key region of traffic congestion is unbalanced traffic light management system. The average speed of vehicles is one of the main parameters that have been widely used particularly in road safety equipment designing and road working. The road safety equipments are affected by some other parameters such as type of road, days and type of vehicles either heavy or light. In this paper, a survey had been conducted to study the efficient performance of traffic light system to control the traffic.

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