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Smart Traffic Signal Control & Vehicle Monitoring System

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ABSTRACT

In this paper, I propose a Smart Traffic Signal Control & Vehicle Monitoring System using a sensor network. It designed and implemented in a way where fines are autonomously registered. The system architecture is classified into three layers; the sensor network, the traffic flow model policy, and the Vehicle Monitoring System. The sensors are deployed on the lanes going in and out the intersection. These sensors detect the number of vehicles and send their data to the nearest Control Unit which, determines the Traffic Signal duration depending on the number of vehicles approaching a specific intersection. Coping with dynamic changes in the traffic volume is one of the biggest challenges in Smart Traffic Signal Control.

The main contribution is the real-time adaptive control of the traffic lights and monitoring of the vehicles violating the traffic rules. The main aim is to maximize the flow of vehicles and reduce the waiting time while maintaining fairness amongst the other traffic lights. Each traffic signal is connected to a control unit that collects information from the sensor nodes.

1. INTRODUCTION

Smart Traffic Signal Control & Vehicle Monitoring System's purpose is to develop a Smart Traffic Signal Controlling system where the total waiting time is according to the dynamic and vehicle density on the traffic signal. In addition to minimizing the average traffic waiting time, I would like to see a road system which can optimize the traffic flow by utilizing the free roads.

Tremendous amount of time and power is wasted due to a green traffic light with no cars passing on its lane. This paper presents a real-time adaptive system based on wireless sensors that has the potential to establish a new era of traffic control and surveillance because of its low cost and potential for large scale deployment.

2. OVERVIEW OF PROPOSED SYSTEM

2.1 Problem statement

To design a smart traffic signal controlling system which can be efficient for smooth traffic flow? Also to develop an automated system to raise fine against traffic violators.

2.2 Solution

The system consists, mainly, of the wireless sensor network , the control unit and the vehicle monitoring system. The wireless sensor network composed of group of sensors situated on the road. They generate traffic information such as number of cars based on processing of the sensor data. The information is then sent to the nearest control unit. The intersection control agent collects the information from the sensor nodes to analyze traffic conditions and take actions such as adjusting the traffic light durations.

Whereas the Information sent by the sensor is also used to monitor the vehicles violating the traffic rules such as crossing over the Stop Line or Violating the traffic signal. The Vehicle Monitoring System has a Camera which has the ability to detect the Vehicle's Number. Violators can be captured with a proof of violation and the image can be sent to the Vehicle's owner with a fine. The Vehicle monitoring System can evolve as a great system to detect traffic violators and charge the vehicles with fine immediately. This system can be an add on to the Security of the citizens by monitoring the activities on the street. The Traffic officials need not chase down the traffic violators to charger the, the smart traffic signal control & vehicle monitoring system can do this job.

3. HARDWARE & SOFTWARE REQUIREMENTS

The system has both hardware and software requirements-

3.1 Hardware

The Hardware requirements of this system consist of Sensors to detect the vehicles and also Cameras which is used to capture the vehicle violating the traffic rules.

3.2 Software

The Software requirements of this system consisis of software which is used capture the vehicles number and send a Challan to the vehicle owner through message on their registered mobile number.

4. ARCHITECTURE OF THE PROPOSED SYSTEM

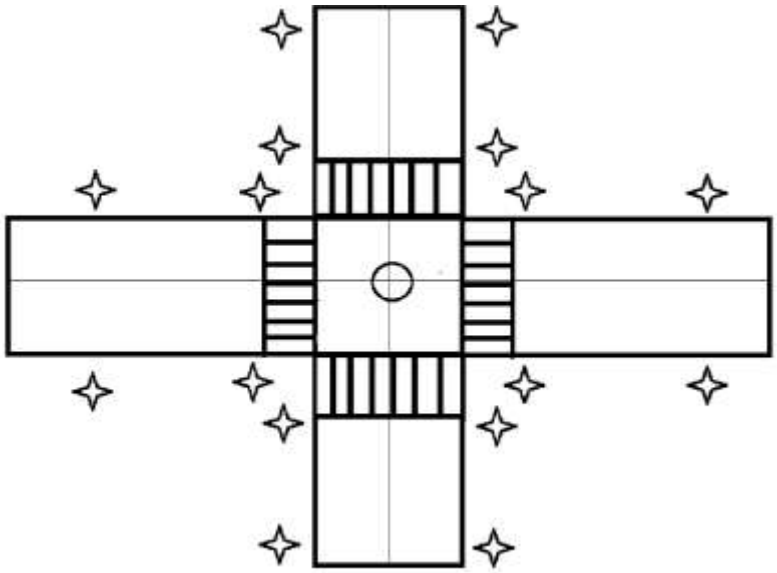

Fig. 1. Architect of Proposed System

The Star marks in the diagram represent the sensors which are installed along the road side. A pair of sensor is installed on each direction, one just before the zebra crossing which will detect the car crossing the Stop line and the other pair of sensor is installed a distance which is used to get the count of the vehicles waiting on the signal.

The Circle in the centre represents the Signal and also the Camera which is used to catch the Vehicle number. If any vehicles violate the traffic signal, the camera automatically captures the image of the vehicle and the fine is charged on that vehicle number.

5. CONCLUSION

This work proposed to assist traffic police in doing their works instead of standing at Traffic Signal to control the Traffic light and also to catch the vehicles violating the traffic light. The main objective was to develop a traffic lightt management system to control the time of red and green light and also the traffic violation method, which could help traffic in the city to be more intelligent.

The research main contribution is to charge fines simultaneously from drivers and then send a detailed SMS to the driver on the registered mobile number of the vehicle. Also, it assists the police officers in their local points to perform individual tasks.

6. FUTURE WORK

There is a huge room for improvement in Smart traffic signal control. There can be system which can be added which can clear up the lane for Ambulance or Fire Fighting vehicles during Emergency. Further the Pedestrian Road Crossing can also be taken into consideration.

7. REFERENCE

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