

Intelligent Adaptive Traffic Light Control

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Abstract:— Traffic congestion is one of the major problems, the world is facing today. Traffic monitoring and controlling is a difficult task. The aim of the traffic research is to optimize the flow of vehicular traffic and goods. One way to improve the traffic flow and safety of the current transportation system is to apply automation, intelligent and adaptive signal control methods. Adaptive traffic control and traffic density monitoring system aims at automatically adjusting released time of vehicles as per density available to the roads at the intersection. To reduce the manual work & utilize the time allotted by traffic signal effectively for better transportation system & to help the emergency vehicles to reach their destination faster. We are designing this project to control traffic light through microcontroller. It consumes less time & reduces human efforts. The main advantage of this project is traffic light control according to vehicles density on the roads. Fuel consumption and toxic gases emission can be reduced. Emergency vehicles can reach their destination in less time. This proposed system will be used to build a smart city with less traffic jams.

Keywords: Sensor module, controller, traffic density.

I. INTRODUCTION

The traffic lights have given many benefits to all road users. Besides reducing the number of accidents, it made the traffic flow smoothly and possibly could save people time. A traffic light, traffic signal is a signaling device positioned at a road intersection, pedestrian crossing or other location in order to indicate when it is safe to drive, ride or walk using a universal color code red, green and orange. Increasing the number of vehicle on road, have cause the heavy traffic jams. This happened usually at the main junctions commonly at the morning, before office hour and at the evening, after the office hour. The main effect of this matter is increasing time wasting of the people at the road. We are going to develop a system which consist the microcontroller, IR Sensors, trans-receiver and LCD. The proposed system tries to minimize the possibilities of traffic jams, caused by the traffic lights, to some extent by clearing the road with higher density of vehicles and also provides the clearance for the emergency vehicle if any.

II. BLOCK DIAGRAM

A) Functional block diagram

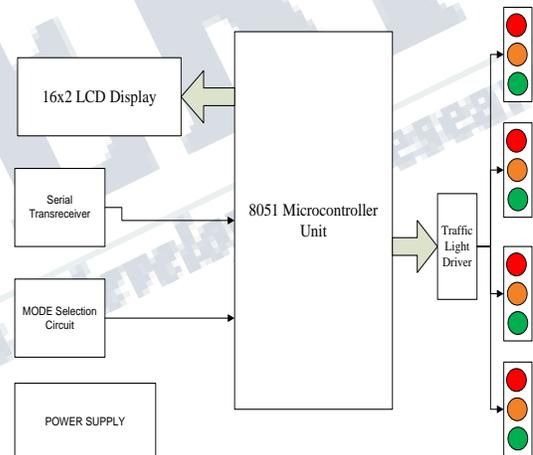


Fig.1 Block diagram of master

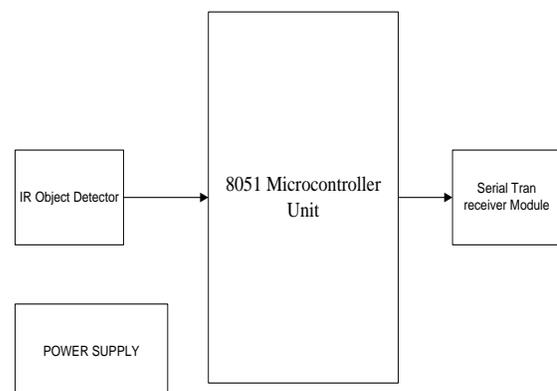


Fig.2 Block diagram of slave

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Figure shows basic blocks of intelligent adaptive traffic light control. Vehicles on the road are detected by the IR sensors. IR sensors are placed on intersections the output of the each IR sensor is given to the 8051 microcontroller unit. Microcontroller takes the count of vehicles from all four IR sensors and compare the count and as per requirement of the time it will give the time to the traffic light driver. Modes selection is used for the selection of modes. The four modes are traditional mode, adaptive mode, intelligent mode and emergency mode. LCD is used for to display the message. Serial transceiver is used for transmitting and receiving the signals.

B) Working

Intelligent adaptive traffic light control work in four modes-

1. Intelligent mode
2. Traditional mode
3. Emergency mode
4. Night mode

1. Intelligent mode - Every vehicle approaching the square has to pass through the sensing network. The sensing network consists of IR sensors mounted at such positions that all the vehicles passing through the sensing network cut the sensor. Whenever a vehicle cuts the sensor, the controller at transmitter section increases the count of vehicles. This action will be carried out simultaneously at four signal entries. This data from all four entries will be sent to a main microcontroller with the help of respective transceivers at each node. Based on different vehicles counts, the master takes the decision and manipulates with the traffic light delays.

2. Traditional mode- In the traditional mode, the traffic signal will work and signaled with fixed time interval .

3. Emergency mode- In this mode, when an emergency vehicle enter on the any road all the traffic signals stop and enters in emergency mode. As the receiver detected an ambulance all the controls goes to the road where the ambulance is detected and provide way to the ambulance. After passing ambulance the system will come back to the previous mode.

4. Night mode- During night mode due to less traffic only orange light will glow continuously.

III. IR SENSOR-

The IR sensor module is easy tool for motion detection. The main function of IR sensor is to detect the motion of vehicle, which changes continuously. We used

here four IR sensor, which counts the vehicles on the road and gives the data to master block.[3].

IV. CONTROLLER

The microcontroller is an computer on chip, used for performing various operations, such as transmitting or receiving data. The 8051 microcontroller is most commonly used and popular device[1]. 8051 microcontroller uses two different kinds of memory such as UV-EPROM and NV-RAM. The microcontroller has built in RAM, ROM, timers, serial ports, I/O ports, interrupts, clock circuits etc. The microcontroller is used in various applications such as robotics, washing machine, microwave oven etc.

V. CONCLUSION

The implementation of Intelligent Adaptive Traffic Light Control system will result in reducing traffic congestion providing way to emergency unit. The implementation will also result in providing a better life, reducing wastage of time.

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