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AUTOMATIC TRAFFIC LIGHT INTENSITY CONTROL AND DETECTION OF STOLEN VEHICLES

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Abstract- The main objective of this project is to design an intelligent auto traffic signal control system. Traffic congestion is one of the major issues to be considered. Generally Vehicular traffic intersects at the junctions of the road and are controlled by the traffic signals. Traffic signals need a good coordination and control to ensure the smooth and safe flow of the vehicular traffic. During the rush hours, the traffic on the roads is at its peak. Also, there is a possibility for the emergency vehicles to stuck in the traffic jam. Therefore, there is a need for the dynamic control of the traffic during rush hours. Hence, I propose a smart traffic signal controller. 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. The system is based on ATmega 8Amicro controller, IR sensors and Radio Frequency Identification (RFID) technology. This system control the traffic lights in the control section, stolen vehicles can be found using analyzing the details of the vehicles with previously registered Database using RFID.

Keywords—dynamic control, ATmega 8Amicro controller, IR sensor, RFID.

INTRODUCTION

Traffic signals have been an indispensable element of our transportation networks since their inception and are not likely to change form or function in the foreseeable future. While traffic signals ensure safety of conflicting movements at intersections, they also cause much delay, wasted fuel, and tailpipe emissions. Frequent stops and starts were induced by a series of traffic lights often frustrates drivers. In arterial driving, the complex and unknown switching pattern of traffic signals makes accurate travel time estimation or optimal routing often impossible even with modern traffic-aware in vehicle navigation systems. Much of these difficulties arise due to the lack of information about the current and future state of traffic signals. In an ideal situation in which the state of a light's timing and phasing is known, the speed could be adjusted for a timely arrival at green. One can expect considerable fuel savings in city driving with such predictive cruise control algorithms. When idling at red becomes unavoidable, knowledge of

remaining red time can determine if an engine shutdown is worthwhile. A collision warning system can benefit from the light timing information and warn against potential signal violations. Future navigation systems that have access to the timing plan of traffic lights can find arterial routes with less idling delay and can also provide more accurate estimates of trip time.
The main technical challenge to deploying such in-vehicle functionalities is in reliable estimation and prediction of signal phase and timing .Uncertainties arising from clock drift of fixed-time signals, various timing plan of actuated traffic signals, and traffic queues render this a challenging and openended problem. Direct access to signal timing plans and real time state of the light is prohibitively difficult due to hundreds of local and federal entities that manage the more than 330,000 traffic lights across the United States alone. Even when such access is granted, much effort and time must be spent on structuring information from various municipalities in standard and uniform formats. The more recent emphasis on dedicated short range communication technology for communicating the state of traffic signals to nearby vehicles has safety benefits but requires heavy infrastructure investments and even then is limited by its short communication range.

To overcome some of these difficulties, in this paper, the first aim is to collect the information of moving emergency vehicles using IR sensor to provide them clear path. This system can do the following,

i) Minimize long waiting time,
ii) Achieve smart automatic traffic signal control without human interrupt,

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iii) Less chance of accident due to red light violation it gives priority to vehicles like ambulance, Fire brigade, VIP vehicles etc.

IR SENSOR

In this project, the transmitter section includes an IR sensor, which transmits continuous IR rays to be received by an IR receiver module. Hereby we placed the IR sensor in the road on any one side, it transmit the IR rays from the IR transmitter, during the transmission whether the vehicle cross the road the IR rays gets reflected from the vehicle. The IR rays which is reflected from the vehicle is then received by the IR receiver.
An IR output terminal of the receiver varies depending upon its receiving of IR rays. Since this variation cannot be analyzed as such, therefore this output can be fed to a comparator circuit. Here an operational amplifier (op-amp) of LM358 is used as comparator circuit.

When the IR receiver does not receive a signal, the potential at the inverting input goes higher than that non-inverting input of the comparator IC (LM339). Thus the output of the comparator goes low, but the LED does not glow. When the IR receiver module receives signal to the potential at the inverting input goes low. Thus the output of the comparator (LM 358) goes high and the LED starts glowing. Resistor R1 (100), R2 (10k) and R3 (330) are used to ensure that minimum 10 mA current passes through the IR LED Devices like Photodiode and normal LEDs respectively. Resistor VR2 (preset=5k) is used to adjust the output terminals. Resistor VR1 (preset=10k) is used to set the sensitivity of the circuit Diagram. Read more about IR sensors.

RFID

Radio frequency identification reader which is placed on the road with some safety precation. The RFID reader which read the information which is stored in RFID tag. It is wireless, use of electromagnetic fields to transfer data. The RFID tag is placed on the vehicles.

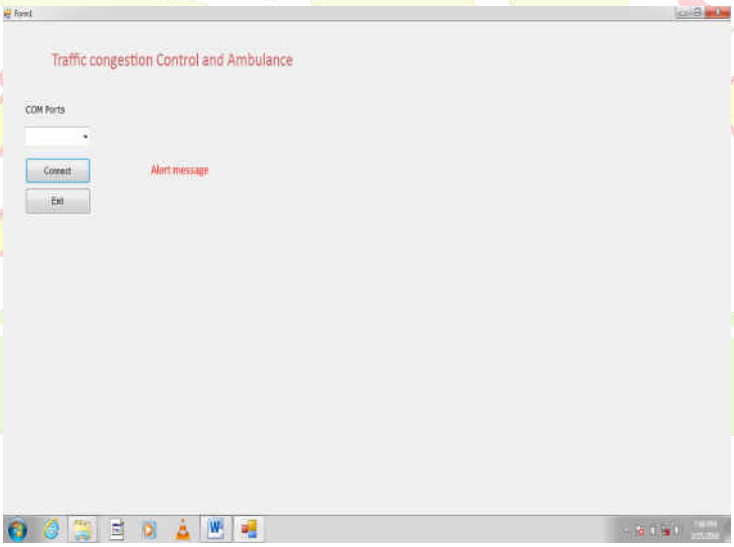

Fig2:output of alert message

The starting display of the output is shown in fig2. The reader reads the information and then transfer it to the micro controller. The micro controller receive the information and compare the vehicle number. Whether the vehicle number is stored already in the micro controller that is same as that of recently passed vehicle, then the output displayed is same as that of fig3. Whether the vehicle number is not stored in the micro controller, then the output displayed is same as that of fig4.

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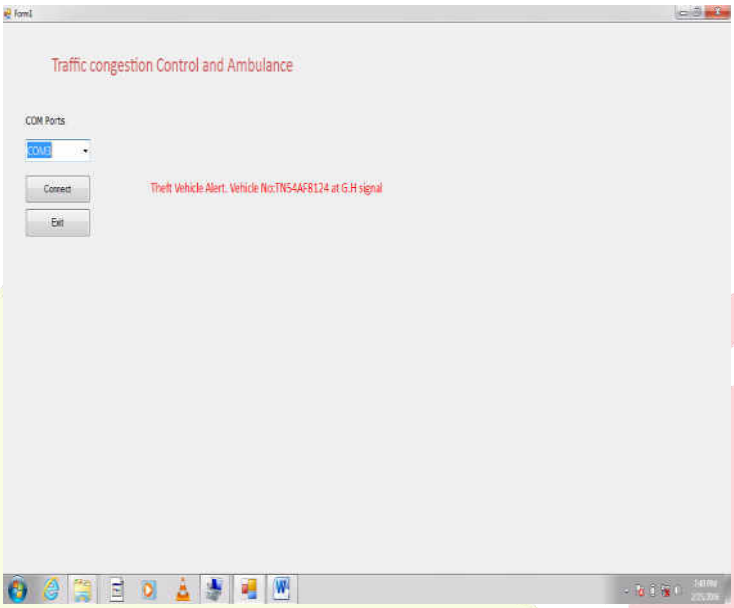

Fig3:output of detection of vehicles(a)

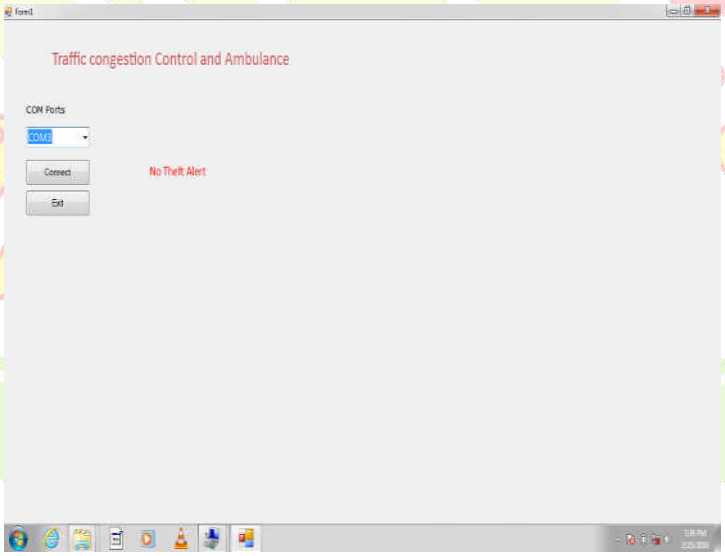

Fig4:output of detection of vehicles(b)

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ATMEGA 8A MICRO CONTROLLER

The **AVR** is a8-bitRISC single-chip micro controller, which was developed by Atmel in 1996. The AVR was one of the first microcontroller families to use on-chip flash memory for program storage. The Atmega8 has 23 I/O ports which are organized into 3 groups:

- Port B (PB0 to PB7)
- Port C (PC0 to PC6)
- Port D (PD0 to PD7)

B port is used as a serial communication port, C port is used as analog to digital converter and D port is used as external timer and counter. The ATMEGA8 has some special features: they are high performance, low power Atmel AVR 8-bit microcontroller, high endurance non-volatile memory segments.

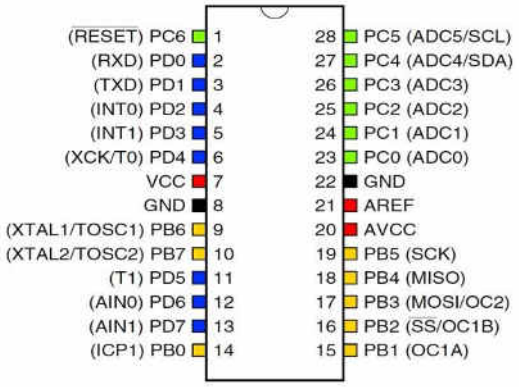

Fig.a. Pin Configuration

PROPOSED SYSTEM

In this paper, we propose two approaches, the first approach - to take details about vehicle using RFID reader and analyzing for detection of stolen vehicles. The second approach - to process the input data by Computer and Micro controller and finally display it on the traffic light signal to control the Closed Loop System.

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Reader Unit

Reader unit is the unit that is responsible for reading the information about the vehicle number by using RFID reader which is fixed in the road. The information of vehicle number is stored in the tag, which is fixed in the vehicles. The information is already stored in the micro controller, it compare the information which is already stored and also with corresponding to the reader information. And then, the output will be displayed in the LCD display and also in the prolific USB-to-serial comm port in the system.

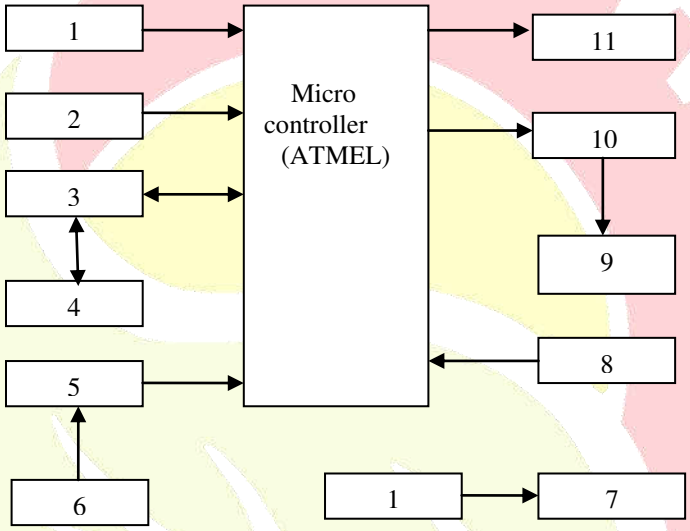

Fig1:Block diagram

1. Power supply
2. IR sensor
3. RS 232
4. Personal computer
5. RFID reader
6. RFID tag
7. IR transmitter
8.IR receiver
9. Traffic signals o4
10. Switching circuit
11. LCD display

CONCLUSION

In future this system can be used to inform people about different places traffic condition. data transfer between the microcontroller and computer can also be done through telephone network , data call activated SIM This technique allows the operator to gather the recorded data from a far end to his home computer without going there. Traffic lights can be increased to N number and traffic light control can be done for whole city by sitting on a single place.

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