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Advanced Traffic Monitoring System

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Abstract: ***Traffic is one of the major problems in developing countries. India loses very potential business everyday due to traffic. In the process, people tend to brake rules, overspeed. Many lives are lost due to violations of traffic rules. the current traffic light system has a specified 'time' for which the lights turn red, green, irrespective of the density of vehicles on that side. Major drawback being handling the emergency vehicles and showing them the way. This project provides an alternative for the same. It can be used to monitor the speed of the vehicle in the area using IR sensors and in case of violation generating a challan. The project is designed to develop a system which perform execution based on density of vehicles. In this model, we use ATMEGA 8, which provides the signal timing based on the congestion. Also, with the help of technology used in radio-controlled vehicles, emergency vehicles can be dealt with easily.***
Index Terms: Traffic Density, Congestion

I. INTRODUCTION

India is the second most populated country in the world. It is one of the fastest growing economies, with one of the major issues being the increase in the number of vehicles on the road, increasing chaos. There is no balance in between the number of vehicles and the infrastructure, the number of vehicles on road are increasing whereas as the infrastructure remains same. Due to which, India requires a different and effective traffic system to deal with the situation and the violations. With the help of this project , we aim at building a better and effective traffic system to curb the problems faced in today's date

II. LITERATURE REVIEW

A. Components Used

1) ATMEGA: The ATmega8 provides 8 Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 512 bytes of EEPROM, 1 Kbyte of SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible Timer/Counters with compare modes, internal and external interrupts, a serial programmable USART, a byte oriented two wire serial interface, a 6-channel ADC (eight channels in TQFP and QFN/MLF packages) with 10-bit accuracy, a programmable Watchdog Timer with Internal Oscillator, an SPI serial port, and five software selectable power saving modes.

2) IR Sensor: In this IR detector and transmitter circuit the IC 555 is working under MONOSTABLE mode. The pin 2 i.e. trigger pin and when grounded via IR receiver, the pin 3 output is low. As soon as the IR light beam transmitted is obstructed, a momentary pulse actuates the relay output (or LED). The IR transmitter is simple series connected resistor network from battery. The timing capacitor connected to pin 6 and 7 to ground. The time can be varied as per requirement by changing the R value.

3) Microcontroller 89S52: The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded

control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

B. Related Work

A study on Density based traffic signal system advocates changing the signal time based on the traffic density to ameliorate traffic congestion problem [12]. The grayscale image extracted from the image captured is used to calculate a threshold. To implement the study Raspberry Pi microcontroller can be used. This study uses a camera placed on top of the traffic signal to capture images which are used to detect the number of vehicles and then calculate the traffic density. The grayscale image is converted into a threshold image which then is used to produce the Contour Image.

This paper is organized as follows. Section 1 covers an introduction to the topic. Section 2 contains a literature review. It enlists the components used to make the system and covers related work. Section 3 highlights the proposed work. Section 5 shows the results and observations while section 6 lays out a conclusion.

III. PROPOSED WORK

The project contains assembly of a traffic light junction with 2 IR sensors installed on one side. Mostly, the traffic lights operate normally until heavy traffic is present on one side. The IR sensors are used to detect the presence of heavy traffic. In case of heavy traffic, the IR sensor reports to the ATMEGA 8 microcontroller. The traffic lights work normally for a period of 3 seconds until the required traffic light turns green. Now, this signal will remain green until the traffic on that road is normal. Once normal traffic conditions are met, the timer restarts and all the four traffic signals work normally again. In Vehicle Speed Monitoring System, we use 2 IR sensors, IR sensor1 and IR sensor2. These IR sensors are fixed at a distance. When vehicle comes on road the IRsensor1 detect vehicle entry and IR sensor2 detects vehicle exit. The microcontroller internal timer and counter starts and automatically, calculates vehicle speed the vehicle and displays on LCD. The entire hardware runs automatically with the help of embedded C programming dumped into Microcontroller 89S52. IR sensors will also monitor the speed, if the speed of the vehicle, if it is more than the prescribed speed limit, a buzzer will start. In case of emergency vehicle, a signal is transmitted using the radio signal and the passage is given, by keeping the traffic light green for that side. After the passage, again a signal is transmitted by the emergency vehicle after which traffic lights operate normally.

IV. RESULTS

System monitors the input from the IR sensors and calculates the density and the speed of the vehicles. If the density is more on one side, the green light turns on for that side and in case a reception is received from an emergency vehicle, the passage is cleared for that side is cleared first. Figure 1 shows an observation table. The working of the project can be seen in the table. Set speed limit is the maximum value set by the user for the speed limit of the vehicle. Speed of the vehicle is the observed value for the speed. As we can observe, if the speed of the vehicle is more than the set speed the buzzer goes off. Figure 2 shows a block diagram of the system while figure 3 shows the actual project.

S.No.	Power LED	Set speed limit	Speed of vehicle	Buzzer
1.	ON	0.006kmph	0.003kmph	OFF
2.	ON	0.006kmph	0.005kmph	OFF
3.	ON	0.004kmph	0.002kmph	OFF
4.	ON	0.004kmph	0.005kmph	ON
5.	ON	0.004kmph	0.007kmph	ON

Fig1. Observation Table

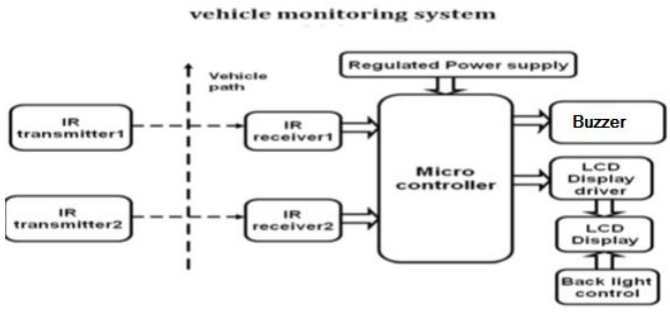

Fig. 2 Block Diagram of Vehicle Speed Monitoring System

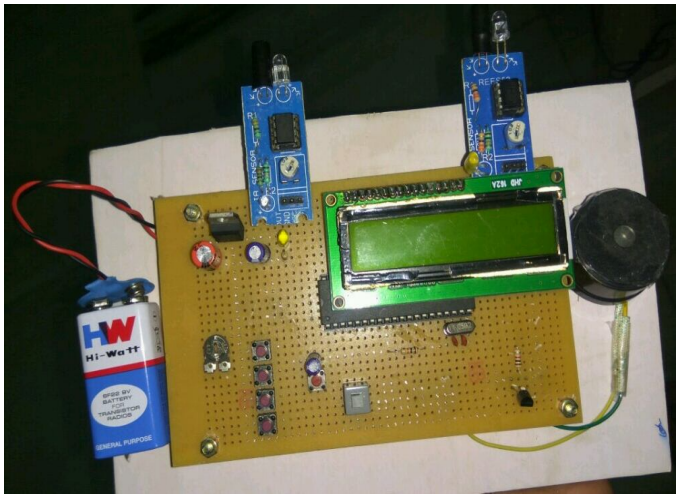

Fig.3. Picture showing vehicle speed monitoring system

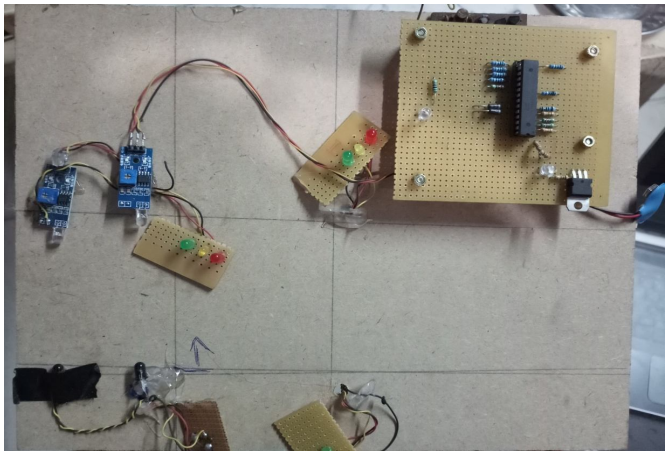

Fig.4. Advanced Traffic Light System

V. CONCLUSION

This proposed system reduces the possibilities of traffic jams, caused by high red-light delays and provides the clearance to the emergency vehicle, to an extent and successfully. Here we designed the system with the purpose to clear the traffic in accordance with priority. In this system, we find the traffic density using IR sensors. The road with the highest priority is cleared first. The proposed system also gives importance to the ambulance. If any ambulance is waiting in a signal then the particular lane is given a higher priority and the traffic in that lane is cleared. Also identify the speed range of the vehicles, if the speed is more than the prescribed speed range, then automatic challan is generated to curb the violations.

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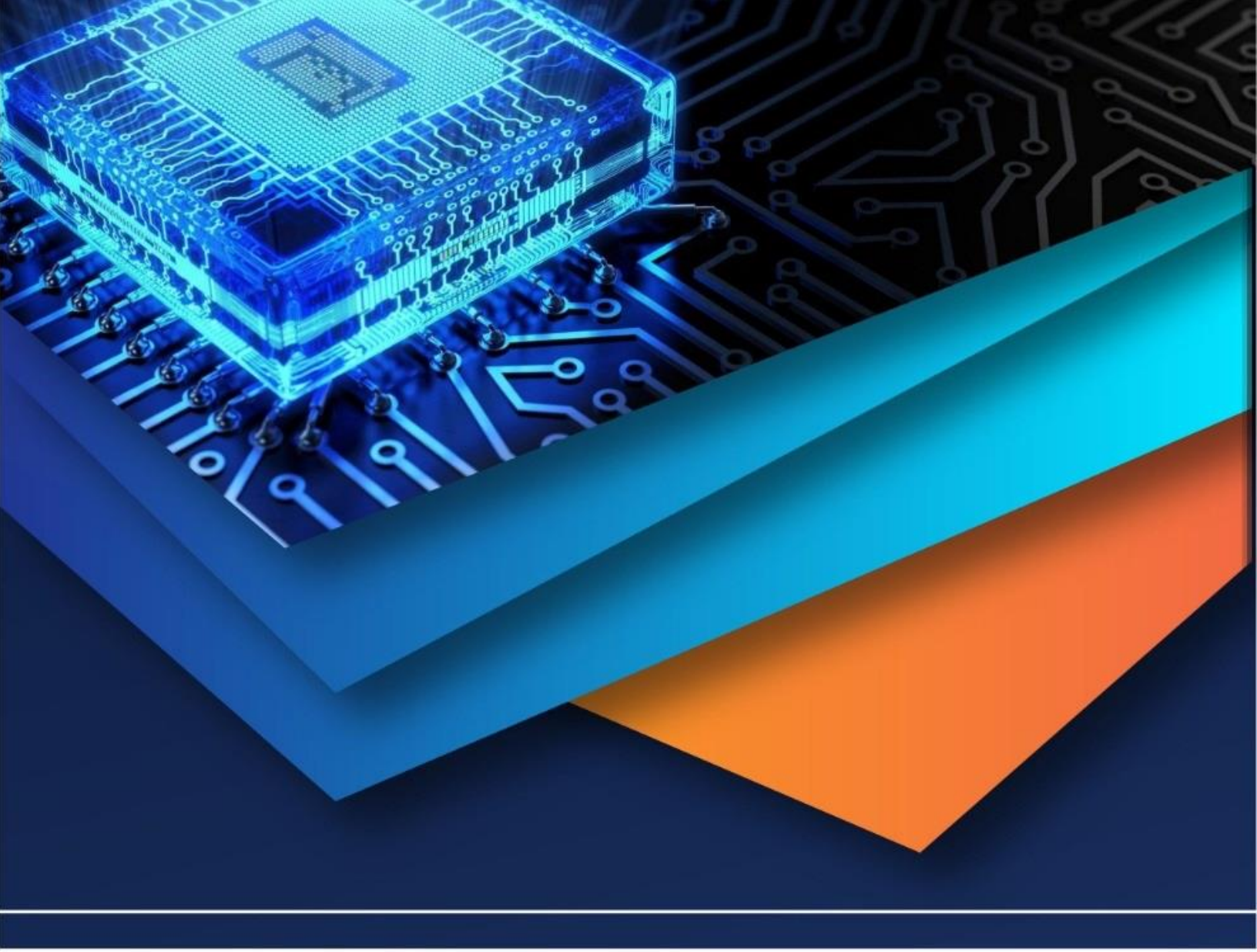

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