Intelligent Traffic Signal with Zebra Crossing Stoppage

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ABSTRACT: In order to promote smart city and to provide our contribution to Prime Minister's effort towards the amelioration of cities we have proposed Intelligence traffic control system. India's population is increasing day by day and so do the vehicle and their rush in metro cities. As we all are aware about the current scenario of the traffic congestion and accidents caused by it. Presently, the traffic system is based either on manual control by traffic police or on constant /fixed time allotment for each signal and lane side. With this paper we want to emphasize upon automated traffic control system and fine system for violation of rules. Here we are using MICRO CONTROLLER, SENSORS, LED for implementations.

KEYWORDS: Intelligence traffic control, Microcontroller, Sensors, led.

I.INTRODUCTION

The proposed system deals with the two different concepts linked with each other. Firstly with the density of the traffic and upgrading the time accordingly. For this we have divided the complete lane in 3 zones the 1st zone intakes low densities or less number of vehicle in this zone the time allotted for the green signal will be of usual timing without any alteration, zone 2 consists of medium range of vehicles under this case time allotment will be changed and would be increased to few seconds and on zone 3 where the traffic density exceeds the range the time allotment for green signal will further be increased. Secondly, dealing with the zebra crossing stoppage violation; basically the zebra lines are made for the pedestrians to be utilized during the RED signal, but there are many drivers who stand their vehicle on the zebra line during the signal stoppage, making it difficult for the pedestrians to cross the lane. Thus, imposing the buzzer system for alarming the driver to move their vehicle from the zebra line.

II.LITRATURE SURVEY

The system compromises of AT89C51 controller as the controlling unit, which is interfaced with the sensors connected across the lane on different defined zone on receiving the signals from the sensor the controller switches the time slot according to the programming. Red, Yellow and Green LEDs are used to indicate the traffic signals. If any vehicle stands on the zebra line then the sensors fixed across the line sends signal to controller and on its response the controller switches to Buzzer from OFF state to ON state to alert the driver.

III.SYSTEM OPERATION

The lane is divided in three zones and each zone is installed with the pair of trans-receiver sensor i.e. on either side of the lane across its width. Microcontroller is the Controlling unit which is interfaced with sensors as their input and buzzers as the output device. As the density of traffic increases for the described zone the sensors senses the density and sends signals to controller, the controller in its response upgrades the time slot of the signal as provided by the programmer. And similarly the sensors installed across the zebra line senses the vehicle if present during the RED signal, and informs the controller which in return TURNS ON the Buzzer; installed over the signal post. This is used to

alert the driver to move away from the zebra crossing. If the driver ignores the alarm and continues to stay on the zebra line then one more alarm is provided if he continuous to stay on it then necessary actions will be initiated by the traffic police.

IV.HARDWARE DESCRIPTION

A. Micro controller

This is the basic controller of the embedded system. It can be consider as the mother board of any system as it controls the working of system. Here, we have considered ATMEGA 16 belonging to AVR family.
Features:

- It has low power CMOS 8-bit controller with AVR RISC
- Its throughput is up to 16MIPS per
- It has 32 General purpose working registers
- 16 Kbytes In-System programmable flash memory
- 512 bytes of EEPROM, 1K byte SRAM
- Three timer/counter for comparison
- Internal and external interrupts
- Serial programmable USART+I2C protocol

B. IR Sensors

Infrared radiation is an electromagnetic wave with wavelength of 700nm to 1 mm. The infrared sensors are the sensors that detect/measure infrared radiation or change in the radiation from outer source or inbuilt source. The IR is emitted by a IR Light Emitting Diode (LED) and received by photodiode, phototransistor or photoelectric cells. During the process of detection, the radiation is altered, between process of emission and receiving, by object of interest. The alteration of radiation causes change in received radiation in the receiver. This property is used to generate desired output with help of associated electronic circuit.

C. LED

In Light Emitting Diodes (LEDs), electrical energy flowing through it is directly converted into light energy. It is an optical semiconductor device that emits light when voltage is applied. They works only in forward bias condition. The brightness of the emitted light depends upon the material used for constructing LED and forward current flow through the LED. Here, we have used led to represent traffic lights i.e. in RED, YELLOW and GREEN COLOR.

D. BUZZER

 A buzzer is in the mechanical form of a small cylindrical shape, with electrical connection for direct mounting on rigid printed circuit. The loudness of such a buzzer is about 85 dB / cm. It requires a DC voltage to operate. Here, we are using piezoelectric buzzer. It is simply the assembly in a single housing, a piezoelectric transducer and an electronic control. Everything is then supplied with a simple DC voltage, usually between 3V and 20V, and requires a current of 10 mA and 30 mA.
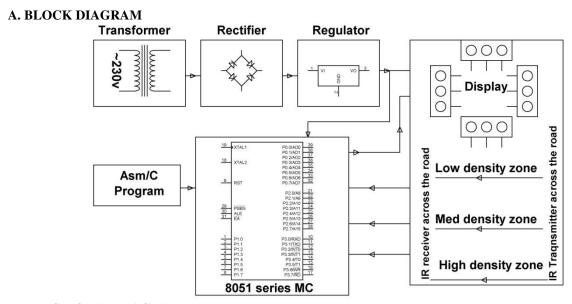
V.DESIGN DETAILS

A. BLOCK DIAGRAM

B. FUNCTIONAL DIAGRAM

VI. RESULT AND CONCLUSION

The proposed methodology has been successfully implemented in prototype. In our prototype we have used 8 watts solar panel which delivers power to complete circuitry. We have marked density zone, where the sensors are placed and another pair of sensor are placed in zebra crossing zone. Here we have placed the sensors side by side (i.e. its transmitter and receiver have been placed side by side) but for actuation we have to place both transmitter and receiver facing each other. Thus, during red signal sensing vehicles on density zone, as programmed the microcontroller

switches the red signalling time from 9 sec to 15 sec and during green signal under zebra crossing zone, the controller switches the buzzer on until the vehicle is replaced or moved from that zone.

Further more to this for real time implementation led sensors can be replaced with the practical ones. Even for betterment the project can be modified with image processing technology using MATLAB which can deal with the flaws of present prototype. This involves picture capturing method for determining the current density. This would certainly help the traffic police for solving congestion problems.

Thus, with the above methodology we can replace the existing traffic control system with the advance intelligence traffic system. As the cities are developing towards the smatter ones the traffic congestion can hinder its development. Thus, adopting the smatter system we can not only reduce the traffic problem but can also lessen the efforts of traffic police for their continuous patrolling.

VII. FUTURE SCOPE

In advancement to the proposed technology we can even go through image processing rather than using sensors for determining the traffic density, this technique can be adopted for real time implementation.

In addition to this we can add solar panel for the power supply instead of using traditional ac source.

We can even impose the fine system for rule violation using RFID concepts.

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