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Automatic Intelligent Traffic Controller and Operation Mode

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Abstract - *Traffic congestion is the biggest problem faced by densely populated countries like India, China etc. So, our project focuses on mainly two areas-Ambulance, and Traffic density control. Here we used the IR sensor to identify the density of the vehicle and the emergency on the road. Generally, the IR transreceiver will be placed on the road side at a certain distances that is to find the vehicle density by taking the input and output counts of the vehicles. In a case of emergency vehicle we can place the IR sensor transmitter in the vehicle and place the IR sensor receiver on the road side that's 50 yard apart for the traffic light signal to identify the emergency vehicle from the other vehicles. If in a case of high road density at any lane of the roads the traffic signal to the high density area will be in green light which after some time goes back to red when the density is considerably less. In a case of emergency to pass the lights will be turned to green. This project also implements the use of road spikes that act as a barrier when vehicles try to pass when there is a stop signal on, which is ineffective due to emergency mode.*

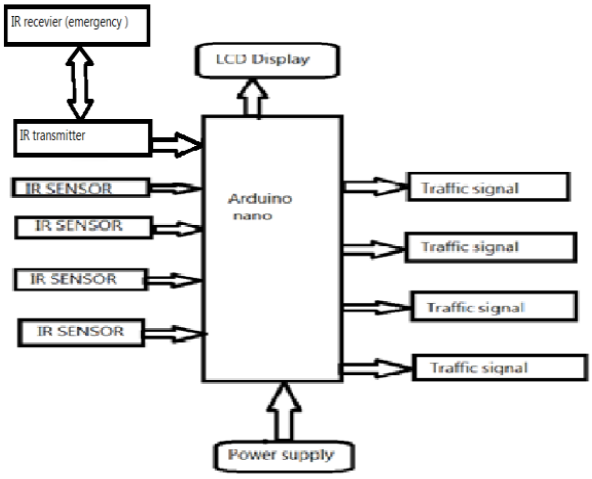
Key Words*: *IR sensor, Arduino, LCD display, LED lights, DC motor.

1. INTRODUCTION

Rapid advances in scientific understanding and global economic activity have resulted in a significant increase in the volume of automotive activity for human and product mobility, necessitating greater road construction. Controls for vehicular movement, as well as controllers, are thus a crucial requirement of modern society. In existing projects of traffic management system and controls, the methods are time based traffic system, which has disadvantages of requiring more human power and more time wastage, also uncontrollable traffic. In this proposed method, the model is designed and built in a way that reduces time wastage and increasing traffic control system. This project made use of IR sensor and Arduino to calculate the density of traffic thereby managing and reducing the traffic times.

This paper further goes on using the road spikes for reducing the rash driving. The spikes can be controlled by the Arduino according to the situations. These situations are determined by the traffic modes where in this project it is taken as, when there is a stop signal the spikes will be at their ON position, if not OFF. In situations like emergency vehicle passing through the lights will be green and the spikes will OFF.

2. METHODOLOGY



The first in the methodology we explain the working of the IR sensor. The IR sensor are the interconnected with Arduino. The IR sensor are place in the rod side and the using to calculate vechicle count near to the traffic light signal. The IR sensor are count the vehcile by the passing the IR transrecevier. On the one side of the traffic light signal we place the two IR transrecevier which have the distances between each other of about 20 meters. The one of the IR transrecevier are using to count the input of the vehicle and the other IR transrecevier are usind as the count the output of the vehcile. When the input and output of the vehicle are equal the traffic light signal are working in the normal delay timing. When the input are increases and output side is zero the IR transreceiver are consider that the high traffic density and in road lane the green light delay will be increases automatically and remaining road line the red light delay will be increses.

The LCD display we are place the display to show the timing delay of traffic signal and changes in the high traffic time delay. The LCD display intergated with the Arduino and the output delay are shown in the display.

The power supply for the Arduino by the power adapter or the mini HDMI cable. Here we are using the small DC motor to drive the spike in the road lane.

3. DESCRIPTION OF THE COMPONENTS

IR sensor module

LCD display

LED light (Green & Red color)

Arduino

Dc motor

3.1. IR sensor module

A device that can send and receive infrared data is known as an infrared transceiver. These devices are most typically used in communications, although they can also be used for other purposes. Infrared transceivers are frequently produced by infrared equipment manufacturers and can be obtained at electronics and hardware stores. An infrared transceiver can be used for a variety of purposes.

Here the IR sensor module are using to the count the vehicle IN and OUT on the road lane. The difference between IN and OUT count of the vehicle we calculate the density of the traffic.

3.2. LCD display

A liquid-crystal display is a flat-panel screen or other electronically controlled optical device that uses liquid crystals and polarizers to modulate light. Liquid crystals do not directly emit light, instead relying on a backlighting or reflector to create colors or monochrome images. Preset letters, and seven-segment displays, such as those seen in a digital clock, are all examples of devices that use these displays. They all employ a same basic technology, but arbitrary images are created using a matrix of smaller pixels, whereas other displays use larger elements. LCDs can be switched on (positive) or off (negative).

The LCD display we using for to show the time delay of the traffic signal and vehicle count number are also shown in the display.

3.3. LED light

The term LED is refers as "Light Emitting Diode". In comparison to incandescent light bulbs, Led light bulbs produce light up to 90% more effectively. A microchip receive an electrical current, which ignites the very tiny light source known as LEDs, resulting in visible light. LED lights do not release UV rays and do not contain any toxic chemicals. LED lights also assist save on materials because one LED light can handle the task of around 25 incandescent bulbs over its lifetime.

Here the LED light are refers the traffic signal lights.

3.4. Arduino

The Arduino UNO is an ATmega328P-based microcontroller board. It features 14 digital input/output pins (six of which can be used as PWM outputs), six analogue input, a 16 MHz ceramic resonator, a USB ports, a power jack, an ICSP header, and a reset button. It comes with everything you'll need to get started with the microcontroller; all you have to do is plug it into a computer via USB or power it with an AC-to-DC adapter or battery.

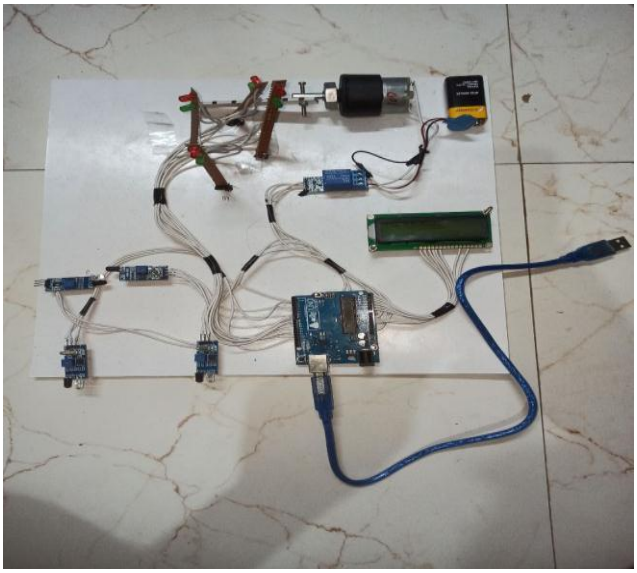
The Arduino uno is main controller and its given the time delay signal for the traffic light. The input for Arduino are given by the IR sensor place on the road lane the power supply are given by the power adapter or mini HDMI cable.

3.5. DC motor (Stepper)

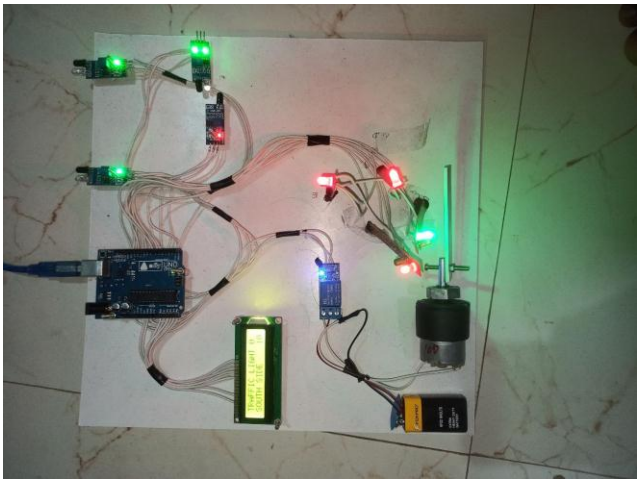
Electrical energy is converted into mechanical energy by DC motors, which are rotational electrical machines (Rotation). The DC motor which operates in the 5V direct current. The RPM (revolution per minutes) of the motor is 400-500 RPM.

The 5V DC motor we are using to drive the spikes mechanism on the road lane traffic system.

4. WORKDONE



HARDWARE RESULT



6. CONCLUSION

The traffic light control system can proposed to the reduced the human traffic police requirement and reduce the time waste in the traffic peak time. In the proposed Arduino is the main controller and the control the time delay for the traffic light. This paper further goes on using the road spikes for reducing the rash driving. The spikes can be controlled by the Arduino according to the situations. These situations are determined by the traffic modes where in this project it is taken as, when there is a stop signal the spikes will be at their ON position, if not OFF.

7. FUTURE SCOPE

The Below listed are the main future scope of this project

1. Will help to reduce the human traffic police requirement in the peak traffic time.

2. The time waste in the traffic peak hour can save and avoid the accident due to heavy traffic

3. This System is Cost effective, Efficient and user Friendly in its operation.

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