

# Digital Alert System For Traffic Control

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## ABSTRACT

One of the main problems in our cities is traffic. This content of research proposes new solution to traffic control. The main design is to control the traffic automatically and adding human inelegancy to that automatic controller. Traffic congestion has been one of the fundamental problems faced by modern cities since the wide usage of automobiles. Just a normal few minutes trip to the convenience store may take up to half an hour due to traffic jam or slowdown. According to the police, congestions are actually the cause of some issues like road rage, road bullies & major accidents. This project will talk about traffic congestion and the remedies that may help to improve the situation using IR sensor and Microcontroller (AT89S52).

**Keywords :** Embedded system, Microcontroller, IR Sensors, Traffic congestion, Transmitter and Receiver.

## I. INTRODUCTION

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market.

An embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded & lower end embedded systems. High-end embedded system - Generally 32, 64 Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc. Lower end embedded systems - Generally 8 or 16 Bit Controllers used with a minimal operating systems and hardware layout designed for the specific purpose.

## II. OBJECTIVE

Now a day in metro cities traffic is one of the main

factor for delaying of transports and travelling. Increasing number of vehicles is causing more traffic jam day by day. This can be managed by some guidance of having right track on right time. But this also can't be done without digital assistance. In our project we are trying to prepare the system which will be able to calculate the intensity of traffic crowd according to number of people or vehicle entered in the specified path or road or signal. This system will be controller based circuit with LCD monitoring system which will provide assistance by showing the intensity of traffic as "High intensity traffic" or "Low intensity traffic". In this project we will use IR sensors to count the number of vehicle passed from specific place like signal, toll or circle. IR Sensors used on either sides of the road send logic commands for the LEDs at the output to get glowing for a patch ahead. A programmable microcontroller is engaged to provide different duty cycle for different intensities at different density conditions. This will provide the better information for the travellers for taking proper and less time taking path to reach their destiny.

## III. OVERVIEW

Traffic congestion problem is a phenomenon which contributed huge impact to the transportation system in country. This causes many problems especially when

there are emergency cases at traffic light intersections which are always busy with many vehicles. A traffic light controller system is designed in order to solve these problems. Traffic control establishes a set of rules and instructions that drivers, pilots, train engineers, and ship captains rely on to avoid collisions and other hazards. Motorists depend on traffic control devices to avoid collisions and travel safely to their destinations. Traffic control devices for highway travel include signs, signal lights, pavement markings, and a variety of devices placed on, over, near, or even under, the roadway. They can work independently on timers, or connect to a computer-controlled system that operates over several intersections. In a computerized system, traffic detectors are placed at several locations generally in the pavement. "Modelling and simulation of highway traffic using a cellular automation approach. The purpose of this paper is to discover how Cellular Automata (CA) can be applied to traffic flow simulations. First, we introduce the three types of traffic model: microscopic traffic model, macroscopic traffic model and microscopic traffic model. Second, to evaluate dynamic traffic flow, we developed a traffic flow simulator that uses cellular auto Mata model. We extend the existing CA models to describe the influence of a car accident in single-lane and double-lane traffic flow model. We also add the lane changing rules to simulate the reality traffic condition. By simulation, we analyses all possible situations.

## **IV. MATERIALS AND METHODOLOGY**

### **4.1 IR SENSOR**

An Infrared (IR) sensor is used to detect obstacles in front of the robot or to differentiate between colours depending on the configuration of the sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, its resistance and correspondingly, its output voltage change in proportion to the magnitude of the IR light received. This is the underlying principle of working of the IR sensor.

### **4.2 VOLAGE REGULATOR**

Voltage regulator ICs are available with fixed (typically 5, 12 and 15V) or variable output voltages. The maximum current they can pass also rates them.

Negative voltage regulators are available, mainly for use in dual supplies. Most regulators include some automatic protection from excessive current (over load protection) and overheating (thermal protection). Many of fixed voltage regulator ICs has 3 leads. They include a hole for attaching a heat sink if necessary.

### **4.3 MICROCONTROLLER**

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.

### **4.4 TRANSFORMER**

Transformer is a major class of coils having two or more windings usually wrapped around a common core made from laminated iron sheets. It has two cols named primary and secondary. If the current flowing through primary is fluctuating, then a current will be inducted into the secondary winding. A steady current will not be transferred from one coil to other coil.

In the power supply we use step down transformer. We apply 220V AC on the primary of step down transformer. This transformer step down this voltage to 6V AC. We Give 6V AC to rectifier circuit, which convert it to 5V dc.

### **4.5 RESISTORS**

A resistor is a two-terminal electronic component designed to oppose an electric current by producing a

voltage drop between its terminals in proportion to the current, that is, in accordance with Ohm's law

$$V = IR$$

Resistors are used as part of electrical networks and electronic circuits. They are extremely commonplace in most electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy, such as nickel/chrome). The primary characteristics of resistors are their resistance and the power they can dissipate. Other characteristics include temperature coefficient, noise, and inductance.

#### 4.6 LED

LEDs are semiconductor devices. Like transistors, and other diodes, LEDs are made out of silicon. What makes an LED give off light are the small amounts of chemical impurities that are added to the silicon, such as gallium, arsenide, indium, and nitride. When current passes through the LED, it emits photons as a by product. Normal light bulbs produce light by heating a metal filament until it is white hot. LEDs produce photons directly and not via heat, they are far more efficient than incandescent bulbs.

### 5. PCB DESIGNING

In this project we will use IR sensors to count the no of vehicle passed from specific place like signal, toll or circle. IR Sensors used on either sides of the road send logic commands for the LEDs at the output to get glowing for a patch ahead. A programmable micro-controller is engaged to provide different duty cycle for different intensities at different density conditions.

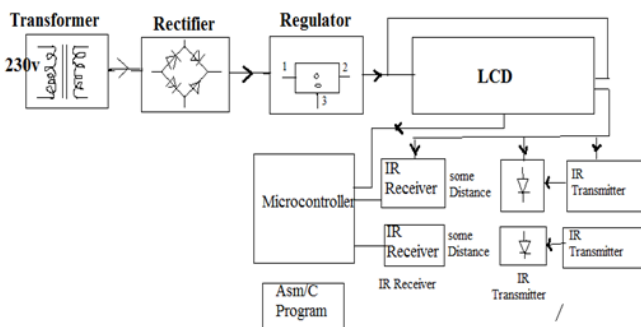


Figure 1. Block Diagram

#### 5.1 PCB LAYOUT

The entire circuit can be easily assembled on a

general purpose PCB board respectively. Layout of desired diagram and preparation is first and most important operation in any printed circuit board manufacturing process. First of all layout of component side is to be made in accordance with available components dimensions.

The following points are to be observed while forming the layout of P.C.B:-

- ✓ Between two components, sufficient space should be maintained.
- ✓ High voltage/max dissipated components should be mounted at sufficient distance from semiconductor and electrolytic capacitors.
- ✓ The most important points are that the components layout is making proper compromise with copper side circuit layout.

Printed circuit board (P.C.B.s) is used to avoid most of all the disadvantages of conventional breadboard. These also avoid the use of thin wires for connecting the components; they are small in size and efficient in performance.

#### 5.2 PREPARING CIRCUIT LAYOUT

First of all the actual size circuit layout is to be drawn on the copper side of the copper clad board. Then enamel paint is applied on the tracks of connection with the help of a shade brush. We have to apply the paints surrounding the point at which the connection is to be made. It avoids the disconnection between the leg of the component and circuit track. After completion of painting work.

#### 5.3 DRILLING

After completion of painting work, holes 1/23 inch (1mm) diameter are drilled at desired points where we have to fix the components.

#### 5.4 ETCHING

The removal of excess of copper on the plate apart from the printed circuit is known as etching. From this process the copper clad board with printed circuit is placed in the solution of FeCl with 3-4 drops of HCL in it and is kept so for about 10 to 15 minutes and is taken

out when all the excess copper is removed from the P.C.B.

After etching, the P.C.B. is kept in clean water for about half an hour in order to get P.C.B. away from acidic, field, which may cause poor performance of the circuit. After the P.C.B. has been thoroughly washed, paint is removed by soft piece of cloth dipped in thinner or turbine.

## V. CONCLUSION

Here the two objectives, that are, first, calculating the density of the vehicle road for the flow of the traffic smoothly without congestion and second, developing priority. Based Signalling which will help to give the priority to the emergency vehicles are studied successfully. This Traffic Signal Management approach when properly designed, operated and maintained yields significant benefits like less congestion. The proposed approach will consider not only the priority of the vehicles but also the density of the vehicles on the road and also will control the traffic light sequence efficiently and more accurately and the accuracy of the GPS is more than that of a Camera. This system aims at saving a large amount of man-hours caused by traffic problems and accidents, where prevention can save lives and property. It is able to manage priority emergency tag vehicles. As traffic congestion has been one of the fundamental problems faced by modern cities since the wide usage of automobiles. Just a normal few minutes trip to the convenience store may take up to half an hour due to traffic jam or slowdown. According to the police, congestions are actually the cause of some issues like road rage, road bullies & major accidents. This project explains about traffic congestion and the remedies that may help to improve the situation.

## VI. FUTURE SCOPE

This device can be further extended by making it wireless eliminating the bulk of wires and complexity. By making it wireless it can be made portable and easily accessible to all. It can be used for women security purpose by adding a GSM, GPS tracker in the circuitry which will track the location of the person in danger by making a particular gesture, and the location will be send to the nearest police station. It has a great scope in hospitals for the patients to express their need

or calling the nurse. Can be used in gaming zone by making electronic gloves using the flex sensors.

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