

## Density Based Traffic Control System Using Microcontroller

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**Abstract-** As the technology is improving day by day many things get controlled automatically. Here we are trying to design the project to automate the traffic control system. This system consists of multiple methods which can be used in traffic control light system. The project is aimed at designing a density based dynamic traffic signal system where the signal changes automatically on sensing the traffic density at the junction. Now-a-days traffic signaling system works on time basis which may arise a problem if one lane is operational than other. To optimize this problem traffic is measured in terms of density. We therefore propose a mechanism to avoid traffic congestion at the junction by measuring the density of vehicles on each path and the green light glows to that particular path in whichever the traffic is high. This paper presents traffic congestion.

**KEYWORDS:** Traffic control system based on density (TCSD), Congestion avoidance system (CAS).

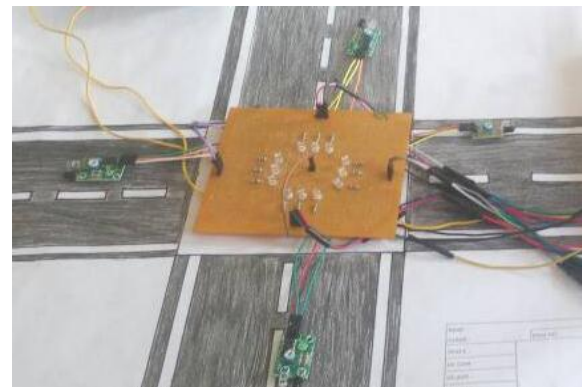
### INTRODUCTION

Traffic congestion as become a major issue in today's world. Most of the working hours are wasted in signal this brings down the productivity of individual. Therefore in order to get rid of these problems or to reduce them to significant level newer ideas need to be designed and implemented. As a result we are implementing a density based traffic control system where a sensor can be used to get the information or count of vehicles on each path at the junction. Sensors are deployed on either sides of the path at the junctions. Existing traffic light systems have timers that are set at regular intervals. This leads to wastage of precious time in order to control this situation we have proposed a system which consists of two parts: Traffic control system based on density (TCSD), Congestion avoidance system (CAS). TCSD controls the change of traffic light based in number vehicles on each road at the junction. CAS is a traffic routing

that chooses the shortest path to reach the same destination with least time.

### METHODOLOGY

The system describes to overcome the traffic at the junction. Here the main objective is to calculate the density of vehicles on the particular path and clears the congestion in whichever path the traffic is high. Second objective is traffic routing in which finding different path to reach the same destination in a shortest time using a single source shortest path algorithm.



### HARDWARE SPECIFICATION

ATMEGA8	CONTROLLER
IR	SENSORS
PCB	BOARD
LEDS	
POWER	SUPPLY
RESISTORS	

### ATMEGA8 CONTROLLER

Atmega8 microcontroller is commonly termed as 8051. It is internally Harvard architecture complex instruction set computer, single chip microcontroller series developed by Intel in 1980 for use in embedded system. The main heart of this traffic system is microcontroller. Here we use port 1, port 2, port 3 of microcontroller.

**PCB BOARD**

It mechanically supports and electrically connects electronics components using conductive tracks, pads and other features fetched from copper sheets laminated on to a nonconductive substrate. In this traffic system LEDS and RESISTORS are soldered on PCB BOARD.

**IR PROXIMITY SENSORS**

IR sensor is a sensor able to detect a presence of nearby objects without any physical contact. Proximity sensors often emits an electromagnetic field or a beam of electromagnetic radiation and looks for changes in the field or returns signal. In this traffic system four IR sensors are interfaced to port 2 of microcontroller.

**LEDS**

LED is a two led semiconductor light source. It is a PN junction diode which emits light when activated. The low energy consumption, low maintenance and small size of LEDS has led to use as status indicator and display on variety of equipment and installation. In this traffic system four red, four green, four yellow LEDS are arranged like a traffic light in junction. LEDS are connected to port 1, port 3 of microcontroller.

**RESISTORS**

Resistor is a passive two terminal electrical component that implements electrical resistance as a circuit element. Resistor reduces current flow, adjust signal level, bias active elements and terminate transmission lines. In this system we used 330 ohms resistors which are soldered to a PCB board along with LEDS.

**IMPLEMENTATION MODULE**

In this traffic system for a few seconds it behaves like a normal traffic light. If the density of vehicles in a particular path is high then the output of a sensor in that particular path becomes logic 0 otherwise logic 1. By receiving the output of these IR sensors we write a program to control the traffic congestion. If we receive logic 0 from any of these sensors then green LED glow to that particular path and gives red signal to all other paths.

IR sensor consists of IR receiver and IR transmitter. IR transmitter looks like an led and emits

IR rays these IR rays are received by the IR receivers. When it is receiving the IR rays the resistance is very low. The operating voltage of IR receiver and IR transmitter is 2 to 3v. These IR pairs are placed in such a way that when an obstacle is placed in front of these IR pairs IR receiver should be able to receive IR rays.

If there is a heavy traffic at the junction then we can implement traffic routing. Considering the path as a single source finding the different routes attached to these path then vehicles can take a diversion to a different route to reach the same destination in shortest time. This can be done by using shortest path algorithm.

**PROPOSED WORK**

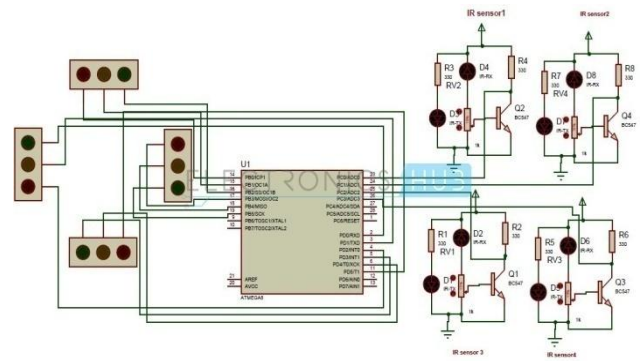


Fig. Density Based Traffic light System Circuit.

In this traffic control system IR sensors and LEDS are interfaced to a microcontroller based on programming. In whichever path the congestion is high green light glows to that particular path.

**CONCLUSION AND FUTURE WORK**

This paper proposes a traffic control system using microcontroller and IR proximity sensor. The advantage of proposed system includes monitoring and controlling the traffic congestion based on number of vehicles. It is cost effective. This paper also proposes a traffic routing using algorithm for the traffic control in a junction. The algorithm helps in finding the shortest path considering a single source to reach the destination.

**FUTURE SCOPE**

Developing an SMS based signaling which will help when accident occurs at the traffic junction.

Detecting the emergency vehicles such as ambulance and fire engines using a sensor and clearing a traffic in that particular path at the junction. This kind of traffic signal management approach when properly designed, operated and maintained yields significant benefits like less congestion and saving fuel consumption

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