

# DENSITY BASED ON TRAFFIC SIGNAL CONTROL AND MANAGEMENT

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**Abstract:** Traffic congestion has become a critical issue in urban areas, leading to increased travel times, fuel consumption, and environmental pollution. Effective traffic signal control and management systems play a vital role in mitigating congestion and improving traffic flow. Traditional traffic signal control approaches rely on fixed timing plans, which may not adapt well to dynamic traffic conditions and varying demand patterns. In recent years, density-based traffic signal control methods have gained prominence as a promising solution to address these challenges.

This abstract presents an overview of density-based traffic signal control and management systems. The fundamental principle behind these systems is to dynamically adjust signal timings based on real-time traffic conditions and the density of vehicles at intersections. By utilizing advanced sensor technologies, such as loop detectors, cameras, and vehicle-to-infrastructure communication, these systems gather comprehensive data on traffic flow and queue lengths.

**Keywords:** Arduino UNO, IR Sensors, LED'S, Connecting wires

## I. INTRODUCTION

Density-based traffic signal control and management is an innovative approach to optimizing traffic flow at intersections. Traditional traffic signal control systems operate on fixed time intervals or pre-programmed signal plans, which may not adapt well to changing traffic patterns and congestion levels.

Density-based control, on the other hand, takes into account real-time traffic conditions to dynamically adjust signal timings and prioritize traffic movements based on the density of vehicles at the intersection.

## II. LITERATURE SURVEY

Uthara E. Prakash[1]” Density based traffic control system using Density image processing”a webcam used in each stage of the traffic light in order to take pictures of he roads where traffic is bound to occur.

Adwait sharma [2] “Density based traffic signalling system using Adwait image processing” Use of binary images captured at real-time and references images will be stored in the system.

Pallavi H.B, Aishwarya Shrikanth [3] Density based automatic traffic junction synchronization

The traffic congestion has become a predominant problem due to the rapid increase in the demand of vehicles.

Er. Faruk Bin Poyen [4] Density based traffic control Designed a density based dynamic traffic signal where the timing of signal will automatically on sensing traffic density Signals may increase delay both overall interaction with delay

III. PROPOSED SYSTEM

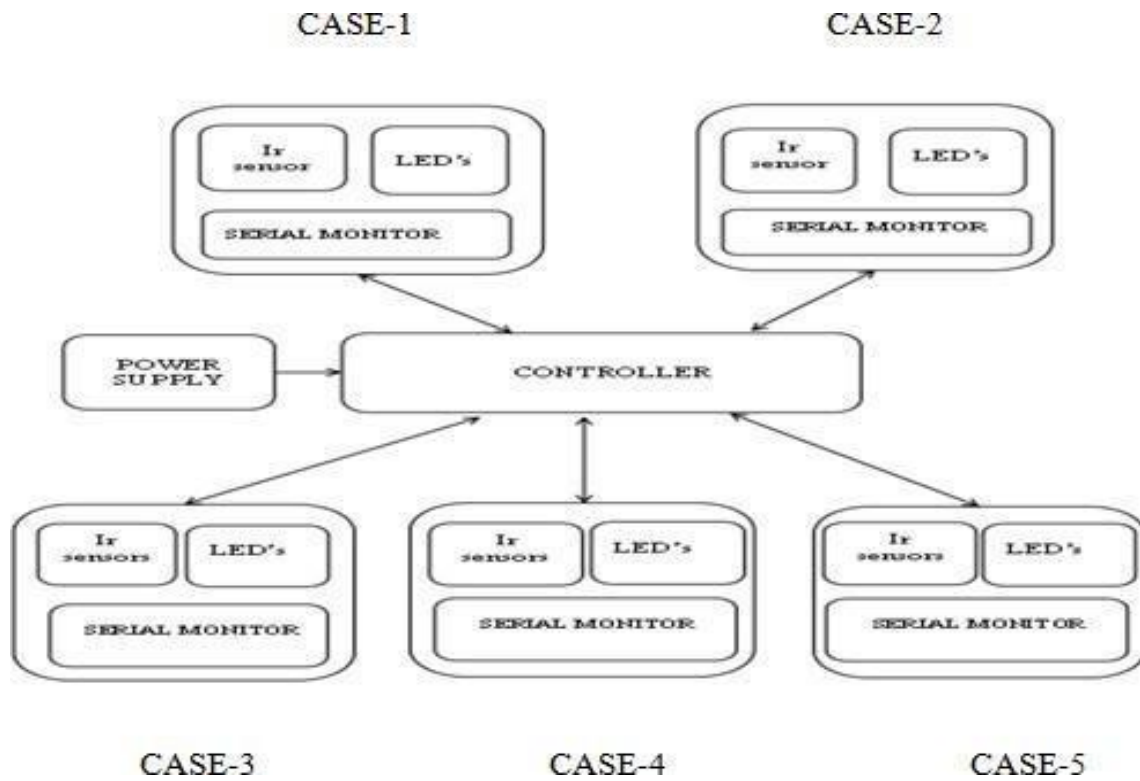


Fig 1 . System block diagram

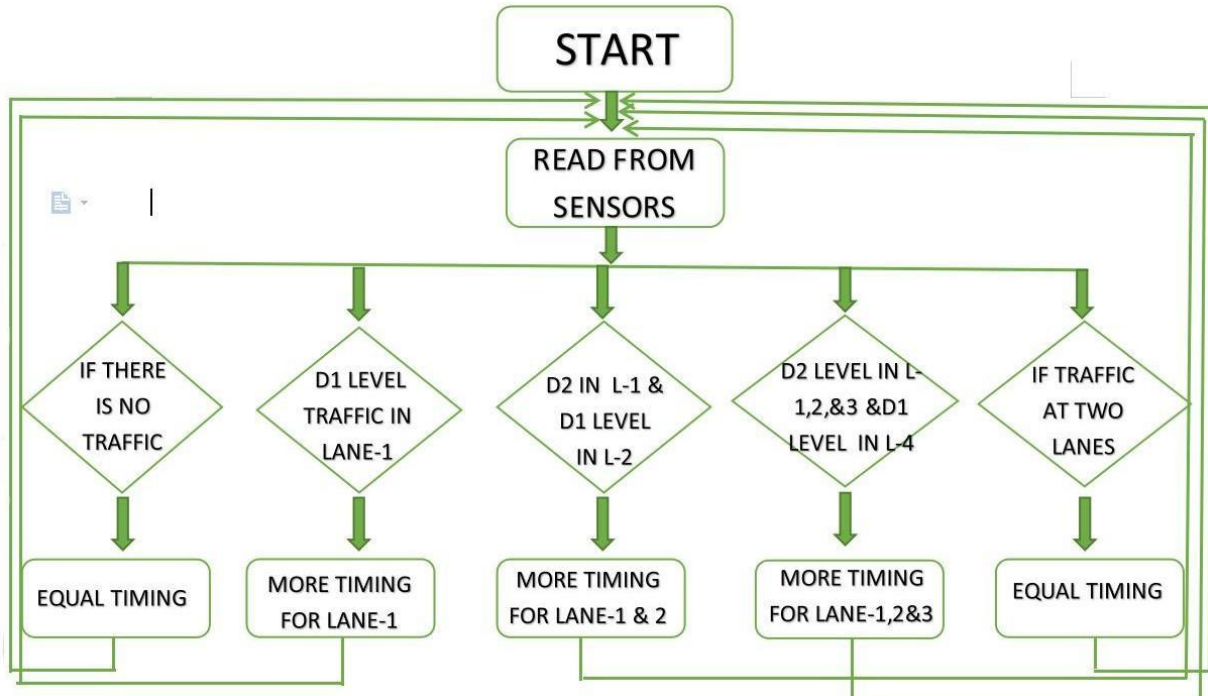
The above diagram shows the simple working of the system. After the power supply is given to the controller (Arduino Uno), the controller waits for the reading from the sensors and based on the readings from IR Sensors, It checks for the case that has been given in the program. According to the cases mentioned in the program , timings will be adjusted for all the four lanes, and this can be monitored on the Serial monitor display. The 5 cases is listed as below, If there is no traffic in all lanes, Case-1 will be considered. Here equal timing will be given for the four lanes. If there is D-1 level traffic in lane -1 then, Case-2 will be considered. Then more timing will be given for the Lane-1 than the other lanes. If there is D-2 level traffic in Lane-1 and D-1 level traffic in Lane-2 then, Case-3 will be considered. Then more timing will be given for the Lane-1 and then for Lane-2 than the other two lanes. If there is D-2 level traffic in Lane-1,2 & 3 and D-1 level traffic in Lane-4 then, Case-4 will be considered. Then more timing will be given for the Lane-1,2 & 3 than Lane-4. If there is D-2 level traffic in all lanes then, Case-5 will be considered. Here equal timing will be given for the four Lanes.

IV. METHODOLOGY

The Methodology of the Density based on traffic signals control and management:

1. connect 12v battery or adaptor to the development board.
2. 2switch on the supply.
3. burn the program to the atmega8 microcontroller by keeping the programming switch sw2 in program mode.
4. connect four ir sensors to port c.
5. connect leds to port b and port d. arrange all this led's same as like traffic lights.
6. arrange one ir sensor for each road.
7. now you can see the normal traffic system based on time basis.
8. now if you place any obstacle in front of any ir sensor, then the system allows the traffic of that particular path by glowing green light. Finally, turn off the board power supply.\

**FLOW CHART**



**HARDWARE IMPLEMENTATION:**

AURDINO UNO - Micro controller board based on the AT mwga328P. 14digital input/output pins and 6 analog inputs.  
 IR SENSORS-It measures the density of the vehicles as well as motion it is designed by LM358 ICR Transmitter and receiver pair, resistors of the range of kilo ohms

LED’S-Red, Yellow and green colour LED’ s are used for signals of red, yellow, green.

BREAD BOARD-Breadboards are used to help to connect components to complete basics circuit

**Software used - ARDUION** is the prototype makes use of Arduino to coordinates all the hardware

**V. CONCLUSION**

There is exigent need of efficient traffic management system in our country, as India meets with 384 road accidents every day. To reduce this congestion and unwanted time delay in traffic an advanced system is designed here in this project. With field application of this technology, the maddening chaos of traffic can be effectively channelized by distributing the time slots based on the merit of the vehicle load in certain lanes of multi junction crossing.

We have successfully implemented the prototype at laboratory scale with remarkable outcome. The next step forward is to implement this schema is real life scenario for first hand results, before implementing it on the largest scale. We believe that this may bring a revolutionary change in traffic management system on its application in actual field environment

**VI. FUTURE SCOPE**

The traffic check post may be connected by wireless transmitter by which the crossing ahead may be an anticipation of the traffic that approach

By connecting the sensors network with GPS connectivity and short wave radio transmission signals.



## REFERENCES

- [1] Mr.Sujoy Mondal ,7 years as an Assistant Professor in RCCIIT.
- [2] Intelligent Traffic Signal Control System Using Embedded System by Dinesh Rotake and Prof.SwapniliKarmore, Innovative Systems Design AndEngineering, ISSN 2222-1727 (paper) ISSN 2222-2871 (online), Vol. 3, No. 5, 2012.
- [3] Priority Based Traffic Lights Controller Using Wireless Sensor Networks by Shruthi K R and Vinodha K, International Journal of Electronics Signals and Systems (IJESS) ISSN: 2231- 5969, Vol-1 Iss-4, 2012.
- [4] Road Traffic Congestion Monitoring and Measurement using Active RFID and GSM Technology by Koushik Mandal, Arindam Sen, Abhijnan Chakraborty and SiuliRoy, IEEE. Annual Conference on Intelligent Transportation Systems, 2011.
- [5] Image Processing Based Intelligent Traffic Controller by Vikramaditya Dangi,Amolparab, KshitijPawar and S.S Rathod. UndergraduateAcademic Research Journal (UARJ), ISSN: 2278 – 1129, Vol-1, Iss-1, 2012.
- [6] B. Prashanth Kumar, B. Karthik — Microcontroller based traffic light controller, Department of Electrical Engg.