



# AUTOMATIC TRAFFIC SIGNAL CONTROLLER USING ARDUINO

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## ABSTRACT

Traffic congestion and accidents caused by more than speeding vehicles have been a major cause for anxiety in societies due to their negative effects such as stress to commuters, release of more toxic fumes into the atmosphere, accidents and loss of productive hours. The enhancement of Traffic Light Controller utilizing ultrasonic sensor and microcontroller. The Paper is designed for structuring a thickness based dynamic traffic signal framework where the planning of signal will change as a result on detecting the traffic density at any road junction. This paper offers an move toward for handling traffic congestion and over speeding offenders. This system uses infrared sensors as counters to measure the traffic density in each lane. The infrared sensors are also for speed detection with a Bluetooth module and Bluetooth serial monitor. These sensors are interfaced with the traffic light through a micro controller. The signal timing changes automatically on sensing the traffic density at the junction. The microcontroller used in this project is ARDUINO. In instance of any vehicle in emergency condition or on the other hand in emergency like VVIPs, a SMS is send to Traffic Control Authority, who has the control of microcontroller empowers microcontroller. The implementation of the prototype design show that traffic control and speed detection using infrared sensors and Arduino Atmega 2560 give a better performance and the time taken to clear traffic at an intersection reduced significantly with 60% time saved

## I. INTRODUCTION

The First traffic sign was found by Detroit police officer named Lester Wire like two shading, red-and-green light with a signal in 1912. Then in 1920, William Potts update the preceding map of traffic light. William brought the tri-shaded red, yellow, and green lights generally utilized today. As the number of vehicle users always increase and wealth provided by current infrastructures are partial, intelligent control of traffic will develop into a point of focus in the future. Avoiding traffic jams is advantageous to both environment and economy. In our research we focus and optimization of traffic light controller in a city using IR sensor and developed using Arduino. The principal reasons why overcrowding exists on the roads is due to the increase in the number of vehicles. The number of vehicles outnumber the capability of the available infrastructure such as good roads, traffic light and road regulators.

As population of urban settlers increases, the need to acquire personal vehicle for transport increases, and traffic congestion increases as the number of vehicles increases mutual with an lack of correct infrastructure. The national government and councils abandon to follow up on the approaching danger of increased blockage until it ultimately occurs. The roads of the city do not make bigger in size alongside an inexorably vehicle dependent populace. The rapid add to in the number of vehicles without a rapid increase in road networks is the main cause of congestion which is a major worry in the society.

While it may be tricky to totally tackle congestion, there are a few different ways to control its future rate of increment. While trying to address this issue, varied researchers have designed and executed certain techniques to help ease traffic in major roads. Without question, most traffic lights presently being used today have kept on serving the need for which they were produced. Nonetheless, a new method that will help to fight the issue of traffic congestion largely as automation is a leaning which developed countries are imbibing in order to minimize accident and maximize efficiency. The design would reduce the frequent occurrence of accidents resulting from the lack of patience by road users.

Over-speeding is one of the main reasons of accidents on our roads will also be limited. The current traffic signal framework is controlled with postpones where the sign change timings are fixed and don't depend upon current traffic stream. The current traffic density should be moved up to settle the serious traffic jam issues. So here we propose a straight forward and continuous traffic signal



framework that intends to solve frequent issues and improves the traffic framework. The framework depends on MEGA 2560 Microcontroller that helps to control traffic thickness using Ultrasonic sensors mounted on either side of every street and dynamic development space with various levels. Our system will be helpful for solving the vast greater part of the traffic jam issues incident these days.

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## II. LITERATURE REVIEW

**Uttara E. Prakash, Athira Thankappan, Vishnupriya K. T., Arun A. Balakrishnan (2018):** Density Based Traffic Control System Using Image Processing, Proceedings of 2018 International Conference on Emerging Trends and Innovations in Engineering and Technological Research.[1]

**M. A.A. Parkhi, Mr. A.A. Peshattiwari, Mr.K.G. Pande “Intelligent Traffic System Using Vehicle Density”:** Yeshwantrao Chavan College of Engg., Nagpur. International Journal of Electrical and Electronic Engineers, 2016.[2]

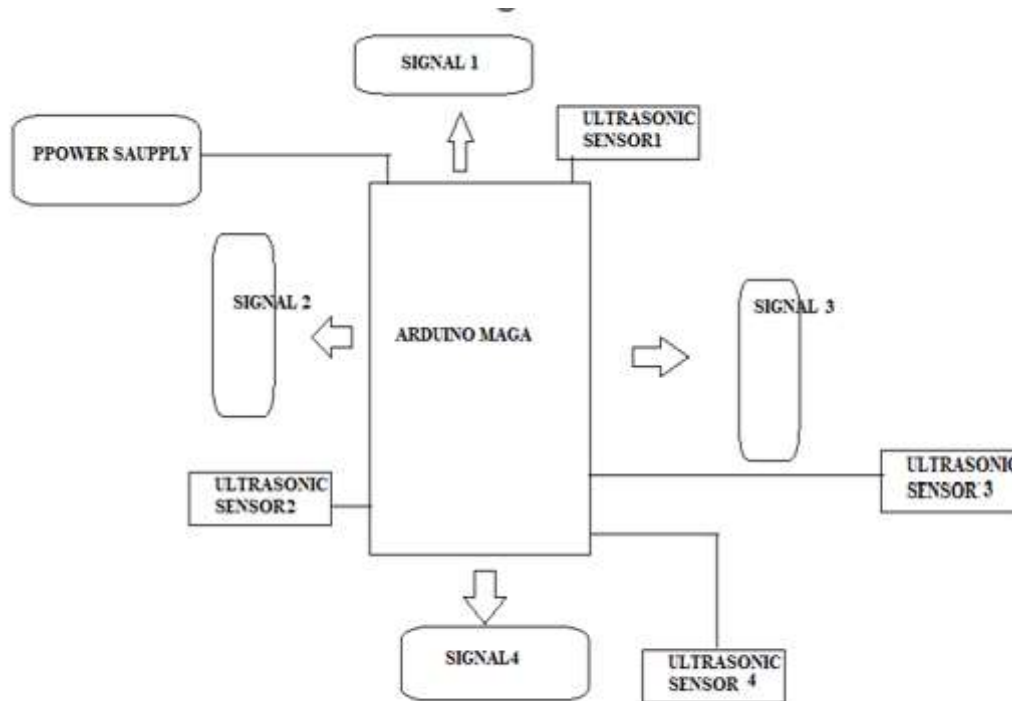
**C. Uzundu, S. Jamson, and F. Lai, "Exploratory study involving observation of traffic behaviour and conflicts in Nigeria using the Traffic Conflict Technique,"** "Exploratory study involving observation of traffic behaviour and conflicts in Nigeria using the Traffic Conflict Technique," Safety Science, vol. 110, pp. 273-284, 2018/12/01/ 2018.[3]

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### III. BLOCK DIAGRAM



#### A. ARDUINO MEGA 2560

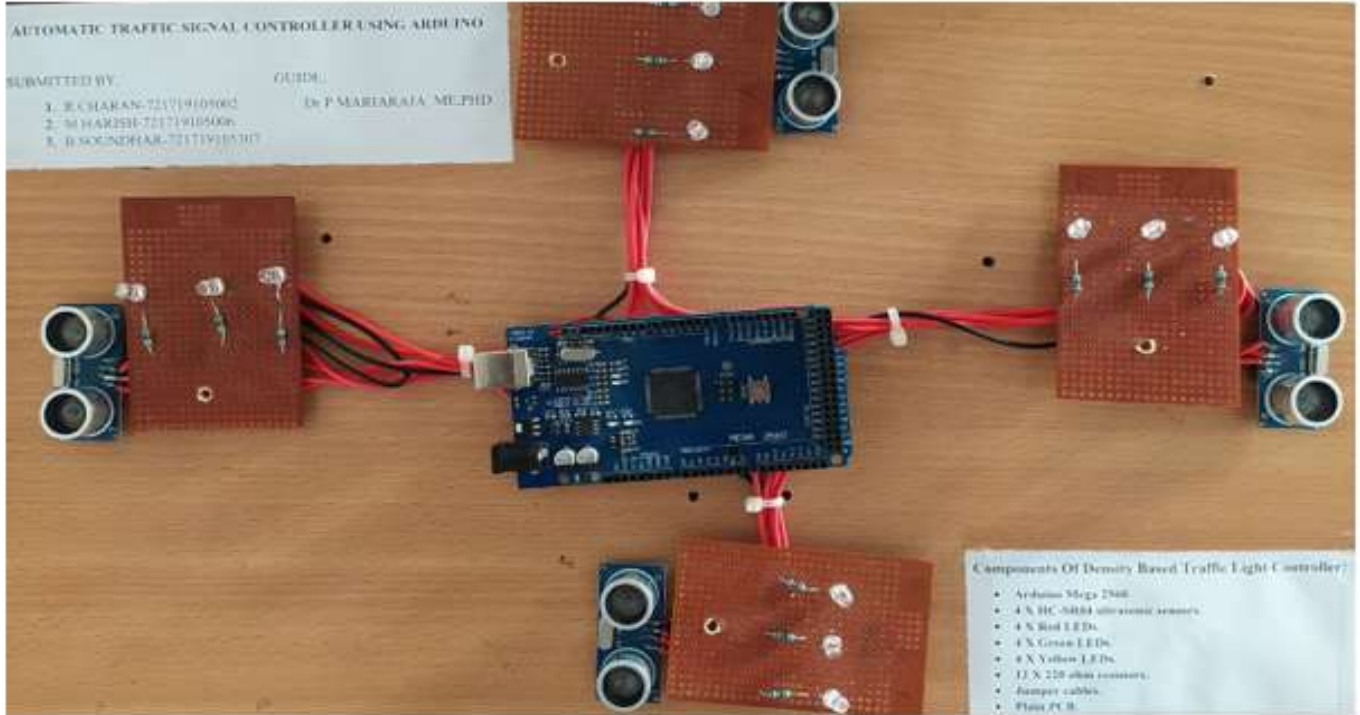
The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega is compatible with most shields designed for the Arduino Duemilanove or Diecimil.

#### B. ULTRASONIC RANGING MODULE HC – SR04

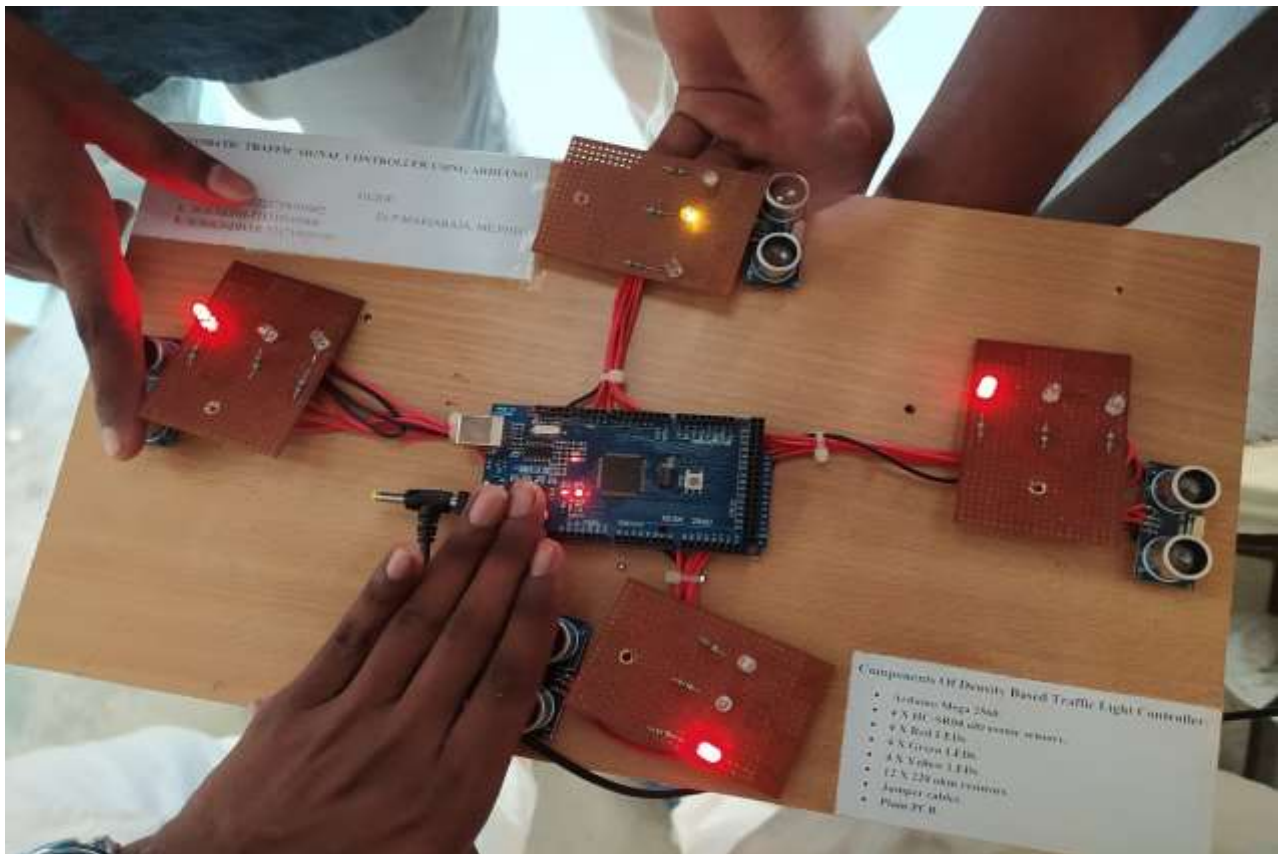
Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules include ultrasonic transmitters, receiver and control circuit. Using IO trigger for at least 10us high level signal. The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back. IF the signal back, through high level, time of high output IO duration is the time from sending ultrasonic to returning. Test distance = (high level time velocity of sound (340M/S) / 2.



#### IV. HARDWARE PICTURE



#### V. OUTPUT





## VI. CONCLUSION

The density Of traffic is controlled using ultra violet sensors. UV sensors help us to detect the vehicles there In a lane using uv sensor, based on that traffic light are operated. UV sensors are less in value and work more effective. This project can be taken to next level using cameras and sound sensors for work to be more effective, main concern can be given by using cameras and sound sensors like in the holder of an ambulance or a police emergency and etc.

## VII. FUTURE SCOPE

Automatic traffic signal controller have many advantages compared to time based traffic control and also We can save considerable amount of time. We can avoid unnecessary occurrence of traffic jams which causes public inconvenience.

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