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# INTELLIGENT TRAFFIC CONTROL SYSTEM FOR SMART AMBULANCE

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**Abstract**

**People's numbers have risen tremendously because of industrialization and urbanization. This means that the number of vehicles on roadways has also increased. The resulting traffic jams and congestion are major obstacles for emergency vehicles like ambulances, which are unable to reach their destinations in time, resulting in the loss of human life. The "Intelligent Traffic Control System (ITCS) for ambulance" appears to be our solution to this problem to some extent. The proposed system helps to alleviate traffic congestion by turning all red lights on the ambulance's route to green, allowing it to proceed to its destination without delay. Ambulances can be registered on the network using an Android app. This application notifies traffic signal servers of an emergency by sending an emergency command along with the ambulance's current location via GPS and its intended direction of movement. The ambulance's current location is used to locate the nearest signal. When an ambulance approaches, the signal turns green, and the traffic returns to normal. Traffic lights can be controlled remotely to save time in an emergency, making this project a lifesaver.**

## I. Introduction:

Today, the world's development is moving at a breakneck pace. Keeping up with the ever-increasing number of people and vehicles on the road is becoming increasingly difficult and dangerous as a result of technological advancements, and the healthcare industry faces its own unique set of challenges in this regard. As a result, major cities are plagued by traffic gridlock. Many countries' transportation systems are adversely affected by traffic congestion. Tragedy in the roads has a significant impact on ambulance service. Ambulances frequently transport critically ill or injured patients who must be transported to a hospital as quickly as possible so that they can receive the treatment they need to survive. Patients can die if the ambulance takes too long to arrive at the hospital. Most heart attacks can be treated if the ambulance arrives at the hospital in time, according to studies. 95 percent of the time. This necessitates the traffic on the road moving over to allow room for the ambulance. However, there are times when the ambulance gets stuck in traffic, which results in a lot of wasted time. The Internet of Things (IoT) is a new emerging technology that has the potential to help us overcome these limitations. Wireless and wired networking tools can be used to connect various software implementations and hardware devices. The internet is used to link and control the various IoT components. As a result, IoT has had a significant impact in the modern era because it helps to digitally represent the

object and elevates itself above the object itself. Our 'Intelligent Traffic Control System for Smart Ambulance' is described in this paper. The main goal of this system is to enable the ambulance to reach a specific location without having to stop anywhere until it reaches the destination. Ambulance drivers will be able to monitor and control traffic lights in this paper. The status of the patient, such as critical or non-critical, is also taken into consideration. This data is then used to send it to a hospital for further treatment. The driver sends the vehicle in the desired direction based on the severity of the situation. Depending on the command, that particular signal is made green to make way for the ambulance, and the other signals are changed to red at the same time. As a result of using this method, the ambulance is able to get to its destination in the shortest amount of time possible.

## II. Literature Review

Calculating the health parameters in [1] relies on the use of hardware. A PC in an ambulance is connected to a server via serial communication to store the data. The traffic is controlled by RF communication. In this paper, health monitoring and traffic control systems are combined. Health monitoring system data will be collected and sent to the hospital server via a PC. The driver of the ambulance uses a keypad in the ambulance to direct traffic. Both systems will operate in tandem. The doctor in the hospital keeps an eye on the patients' vital signs. The ambulance's driver could simultaneously manipulate the signals. Congestion detection can be added to the GPS navigation system to make this system more useful in the real world. When an ambulance arrives at a traffic light junction, IR (Infrared) sensors can be used to change the traffic lights. This is the main goal of the paper in [2]. Global System for Mobile Communication-based devices in the ambulance system notify doctors of the patient's condition and direct them to the nearest hospital, where they can expedite the patient's healing. As long as the traffic light receiver doesn't take into account any other factors when determining which Ambulance's transmitter will get a chance to transmit, this could be the case. Cloud computing can handle the massive amounts of data generated by these devices, and it can also be used to issue commands to the devices themselves, as shown in [3]. The Internet of Things (IoT) and the cloud are the foundations of this endeavor. Traffic signals and ambulances will be connected in this project so that traffic lights will respond to an ambulance's presence. The application requires a certain amount of bandwidth so that the ambulance and the traffic light can communicate instantly.

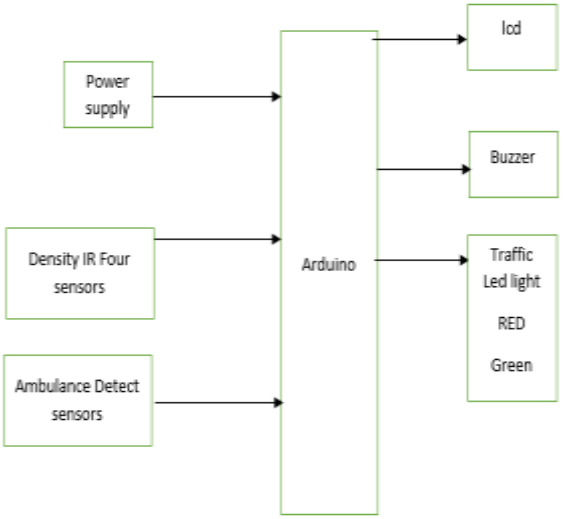



Fig 1. Block Diagram

### Arduino

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development

Environment), which is used to write and upload the computer code to the physical board.

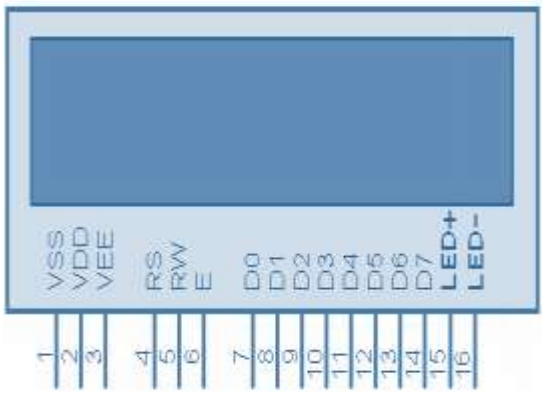
The key features are −

- Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.
- You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
- Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable.
- Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.

Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

**Alphanumeric LCD**

Liquid Crystal Display also called as LCD is very helpful in providing user interface as well as for debugging purpose. The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers.




In 8-bit mode, the complete ASCII code is sent at once along with the control signals. But in 4-bit mode, the data is divided into two parts, i.e. MSB & LSB, and are called upper nibble & lower nibble. The control signals are RS, R/W & E. RS is used to select the internal registers i.e. data register & command register. R/W is used to set the mode of LCD to read mode or write mode. E is used as chip select and is used to push the data internally to the corresponding registers.

To transfer the data/command in 8-bit mode, the data is written to the 8-bit data bus after selecting the required register and setting the mode to write mode. The E signal pin is then given a high to low signal to transfer the data. To transfer the data/command in 4-bit mode, the higher nibble is first written to the MSB of the data port and the E is given a high to low signal. After a little delay or when the LCD is not busy, the lower nibble is transferred in the same procedure.

**Ir Sensor**

The infrared phototransistor acts as a transistor with the base voltage determined by the amount of light hitting the transistor. Hence it acts as a variable current source. Greater amount of IR light cause greater currents to flow through the collector-emitter leads. As shown in the diagram below, the phototransistor is wired in a similar configuration to the voltage divider

The variable current traveling through the resistor causes a voltage drop in the pull-up resistor. This voltage is measured as the output of the device

**Relay**

Electrically operated switches are known as relays. Electromagnets are commonly used to switch mechanisms in relays, but other methods are also employed. Relays are used in applications where a low-power signal is required to control a circuit or where multiple circuits are controlled by a single signal. Over long distance telegraph lines, the first use of the relay was to repeat the signal from one circuit and retransmit it to a different one. Early computers and telephone exchanges relied heavily on relays for logic operations. A contactor is a particular type of relay capable of handling the high power needed to directly drive an electric motor. Solid-state relays use a semiconductor device activated by light to switch power circuits without using any moving parts. Protective relays are used to protect electrical circuits from overload or faults; in modern electric power systems, these functions are performed by digital instruments still referred to as "protection relays".

**Result**

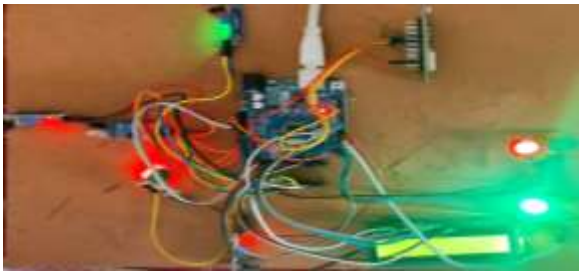


Fig1: The working of Traffic signal


Fig 2: Indication for clearing the road

**Conclusion**

This paper is used to enhance the traffic light control system by clearing the traffic jam very quickly. This system helps the emergency vehicle by reducing the time delay. Hence if this system is utilised many lives will be saved A traffic light system has been designed and developed with proper integration of both the hardware and the software. This interface is synchronized with the whole process of the traffic system. Automatically, this project could be programmed in any way to control the traffic light model and will be useful for planning proper road system.

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