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Efficient Ambulance Routing and Traffic Clearance System

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ABSTRACT

Traffic delays are a major issue, especially when ambulances trying to get to hospitals on time. We aim to reduce the total number of patients that reach the hospital too late by using an automated traffic signal control system. Ambulances would be given priority under this method, keeping them from becoming left in traffic. The system finds ambulances approaching traffic signals using an Arduino Nano, Buzzer, LED light, and a camera. This could save lives by accelerating the patients' journey to the hospital.

Keywords: Arduino nano, Buzzer, laptop camera, LED light. serial cable.

1. INTRODUCTION

The growing population in nations like India leads to issues like congestion on roads, uncooperative behavior, and an increase in accidents. For example, the Indian Government believes that traffic accidents claim the lives of sixteen people each hour in major cities like Delhi, Hyderabad, and Chennai. Traffic congestion causes delays, dropped fuel, and monetary losses. They also contribute to excessive pollution, which is bad for the environment, humans, and animals. Life-threatening traffic congestion frequently impedes emergency vehicles. An ambulance detection and traffic-free system is suggested as a solution to these problems. The goal of this system is to guarantee that ambulances get to their destinations without being delayed by traffic.

2. Literature Review

The related work has been reviewed [1] Title: Smart Traffic Management System to Ambulance Clearance in Urban Areas: An IOT Approach. Writers: P. S. Deshpande, S. R. Sawant, and A. S. Thakur. 2017. In this study, an IoT-based system for effective traffic clearance and ambulance routing in metropolitan areas is proposed. The system prioritizes the transportation of ambulances using sensors and traffic control technologies. [2] Title: Internet of Things-Based Intelligent Ambulance Traffic Management System. P. R. Kumar and A. S. Manoj wrote this. The year is 2018. To lessen the delay in ambulance, services brought on by traffic congestion, this article offers a smart ambulance traffic clearance system that uses Internet of Things technologies. [3] Title: Developing and Putting into Practice an IoT-driven Smart Ambulance Clearance System. Authors: Singh, S. K., and R. S. Gupta. The year is 2019. To optimize ambulance routing and traffic clearance, the article describes the design and implementation of an Internet of Things (IoT)-based smart ambulance clearing system that uses sensors and communication technologies. [4] Title: Ambulance Traffic Clearance System Utilizing IoT in Real-time. N. S. Patel and S. K. Chauhan wrote this. 2020 is the year. To speed up ambulance response times in cities, this article suggests an IoT-based real-time ambulance traffic-clearing system. [5] Title: A Review on IoT-based Smart Ambulance Traffic Clearance System.

Writers: R. R. Jadhav and V. R. Patil. 2021 is the year. To improve ambulance services, the paper gives a general overview of IoT-based smart ambulance traffic clearance systems, stressing both their advantages and disadvantages. [6] Title: Intelligent Traffic Management System for Emergency Vehicles based on the Internet of Things. M. A. Khan and S. S. Ahmed wrote this. The year is 2018. To speed up reaction times and enhance traffic flow, this study describes an intelligent traffic management system based on the Internet of Things that gives priority to emergency vehicles, such as ambulances. [7] Title: An Examination of IoT-driven Intelligent Ambulance Traffic Management Systems Writers: A. K. Singh and S. K. Mishra. The year is 2019. An overview of IoT-based smart ambulance traffic clearance systems is given in this survey, along with a discussion of their problems, technologies, and architecture. [8] Title: IoT-based Traffic Light Priority System for Emergency Vehicles. Writers: S. A. Patel and A. S. Ansari. 2017. The purpose of this study is to enhance response times and decrease waits for emergency vehicles, such as ambulances, by implementing an IoT-based traffic signal priority system. [9] Title: Smart Ambulance Clearance Traffic Management System Based on the Internet of Things. Singh, A. K. and Singh, R. K. The year is 2018. This paper describes the smart traffic management system for ambulance clearance based on the Internet of Things and aims to reduce traffic congestion and improve response times. [10] Title: Smart Traffic Management System to Emergency Vehicle Clearance Based on the IoT. Writers: K. R. Reddy and S. N. Prasad. The year is 2019. The article describes a smart traffic management system based on IoT that gives priority to emergency vehicles, such as ambulances, to enhance their clearing during emergencies.

3. PROPOSED SYSTEM

The process contains both software and physical components.

3.1 HARDWARE DESCRIPTION

Arduino nano, Buzzer, laptop camera, LED light, serial cable

3.2 HARDWARE DESCRIPTION

3.2.1 Arduino Nano:

Using sixteen digital pins, the Arduino Nano is a versatile microcontroller-based device. It may use for almost any work, from small to massive industrial-scale actions. Also, it is used to create prototypes and new applications.

FIG 2.2.1: Arduino nano

3.2.2 Buzzer:

A buzzer is an electronic device that, usually using an electric system emits an audible buzzing sound. It is used as a signal in numerous applications, including factories, bells for doors, warnings, and computer games. The signal that produced can be anything from a steady buzz to a sudden, sharp noise that is meant to alert people to a particular situation. Buzzer processes are straightforward but efficient; they often use an electric coil to produce the characteristic buzzing noise. A sound indication device, such as a buzzer or beeper, can be electrically charged. Buzzers and beepers are frequently utilized in security systems, timers for training systems, and to verify user input, such as clicks on the mouse and typing.

FIG 2.2.2: Buzzer

3.2.3 laptop camera:

An on-user-looking video camera. While they are distinct systems that mount to a desktop computer's monitor, the camera is integrated into laptops. While the fact that a lot of webcam models come with a microphone, and many users choose to use earphones to get better-quality audio while taking video calls or taking selfies.

FIG 2.2.3 Laptop camera

3.2.4 LED Light:

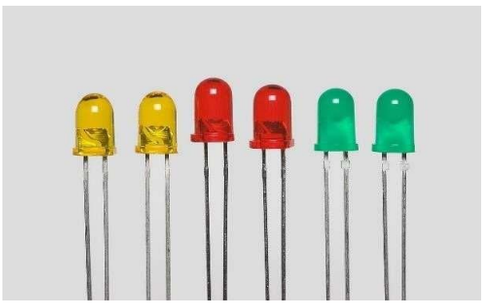


FIG 2.2.4 LED light

When current flows over a light-emitting diode (LED), an electronic device, light is emitted. Light appears as a result of the semiconductor's atoms and holes in it mixing. The energy needed for atoms to pass the band gap of a semiconductor impacts the shade of color of the light, which coincides with the energy of a photon. Using a lot of semiconductors or wrapping the semiconductor device with a film of illumination-emitting phosphor lets in the generation of white light.

3.2.5 serial cable:

A serial cable is a kind of cable which is used to transfer data via the serial communication protocol between two devices. The particular serial port used to control the format of the links. A blank modems cable is one which is wired particularly to connect two DTEs together.

FIG 2.2.5 Serial

Breadboard:

A technology circuit's semi-permanent model is constructed using a breadboard. Because they don't require solder breadboards are reusable in contrast to pro boards and stripboards. Due to this, the breadboards are also liked by students and are utilized in technology education

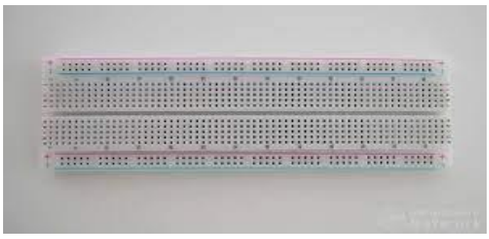


FIG 2.2.6 breadboard

2.3 SOFTWARE DETAILS

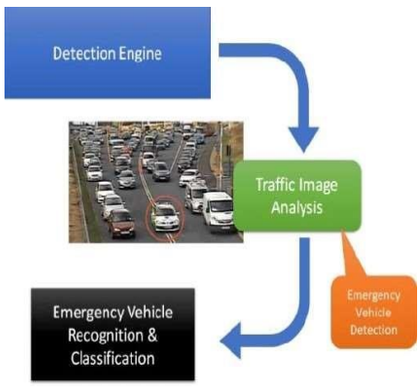
2.3.1 Arduino IDE:

Arduino is a free software hardware and software company, project, and user group that creates and manufactures single-board and microcontroller kits for use in the creation of electronic devices. The program can be downloaded under either the GNU General Public License or the GNU Lesser General Public License. A Creative Commons By-SA license covers the hardware components. This makes it easy for anyone to produce Arduino and share the software. You can buy retail Arduino

boards from licensed wholesalers or the official website.

FIG 2.3.1: Arduino IDE

BLOCK DIAGRAM



4. RESULT

Scenario 1: Detecting the ambulance.

The ambulance is a specially designed vehicle with healthcare equipment used to carry patients to treatment centers, like hospitals, The patient typically receives out-of-hospital health care while being transported. The ambulance will be detected in the traffic camera when it approaches nearby traffic.

Scenario 2: Traffic signal will be off.

light-emitting diode (LED), an electronic device, when the ambulance is detected in camera if in case the signal light is red then automatically it will off and alert to the people only for ambulance coming road.

Scenario 3: Making an alert with a buzzer.

The audio signal device often known as a buzzer can be mechanical or electromechanical. Buzzers commonly used in alarms, timers, and training systems. when an ambulance is detected, producing a continuous sound to alert all the people around immediately.

5. CONCLUSION

for the emergency of the ambulance, in real time using the web camera and Buzzer sensors we can clear the traffic jam that can ambulance reach the hospital as fast as possible. that will help the patient to take treatment medication as much as possible and faster. this is a new idea if the villages can implement this idea, it will save more people's lives it is a potentially innovative approach in an emergency time.

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