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Iot Based Intelligent Traffic Control System with Automatic Fine System and Pollution Detection

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ABSTRACT

The project is aimed at designing a density based dynamic traffic signal system where the timing of signal will change automatically on sensing the traffic density at any junction. Sometimes higher traffic density at one side of the junction demands longer green time as compared to standard allotted time We, therefore propose here a mechanism in which the time period of green light and red light is assigned on the basis of the density of the traffic present at that time. This is achieved by using IR(Infrared sensors). Once the density is calculated, the glowing time of green light is assigned by the help of the microcontroller.The sensors which are present on sides of the road will detect the presence of the vehicles and sends the information to the microcontroller where it will decide how long a flank will be open or when to change over the signal lights. In subsequent sections, we have elaborated the procedure of this framework. and in this project we will add automatic fine system using RFID Reader that people will drive in footpath. the reader present footpath sides and cards fixed in the cars or bikes will detect if they go from footpath automatically scan and makes fine send to traffic office. And we can detect smoke amount of polluted air in the traffic signal areas by using the smoke sensors and monitors the pollution value at the traffic area.

Keywords:Traffic modules, IR sensors, Smoke sensor, LCD display, Node MCU, RFID Reader.

Introduction

Road congestion in India is mostly attributable to the country's massive population. As the global population rises, so does the need for transportation infrastructure. Statistics show that an average of one person dies every four minutes as a result of a traffic accident. For difficult challenges in transportation management, the tried-and-true solutions are no longer enough. To solve such difficult issues, we need to create new approaches that are smarter, more efficient, and less costly. With the volume of traffic, it's crucial to implement efficient measures for managing it and preventing any and all losses attributable to it. Predicting a high traffic density for a network section allows us to prepare for it. If there are roads in the area, the guidance system might attempt to veer around the danger zone. Also, any traffic management system may alert drivers that various sensors and procedures are being utilized to detect the traffic and, therefore, resolve the traffic issue. We now have more traffic accidents, congestion, disputes, and bottlenecks as a result of the greater number of cars using our roads. In this case, traffic lights are currently timed in accordance with the volume of traffic. It causes cars to remain idle in one lane while the other suffers from inadequate traffic flow. Installation and upkeep of infrastructure needed for fixed sensors may be expensive [3]. Another drawback is that such technologies have very small local regions of usage, meaning that a large number of devices must be deployed to provide a good picture of the traffic situation across a large area. Estimating travel times, particularly in congested metropolitan settings, is often imprecise.

LiteratureReview

Highway traffic analysis relies heavily on three variables: density, velocity, and flow. Estimating the space mean speed and density in real time is an important input for comprehensive geographical and temporal coverage of the road network, which is necessary for effective traffic management and control. The adaptive traffic control system uses data collected from vehicles, such as their locations and speeds, to fine-tune the timing of the lights at intersections. Standardized wireless communication protocols and on-board vehicle sensors are also required features of this system. Many algorithms for managing traffic signals are put into practice. The deployment of intelligent traffic lights that broadcast safety alerts and traffic data suggests a smart city framework for VANET. Several routing protocols have been discussed and compared within that framework

Existing System

This traffic light uses an Arduino UNO microcontroller to create an automation function together with an Infrared sensor (IR sensor) to detect the density of the traffic. All vehicles pass through the traffic light is measured and processed accordingly to delays.

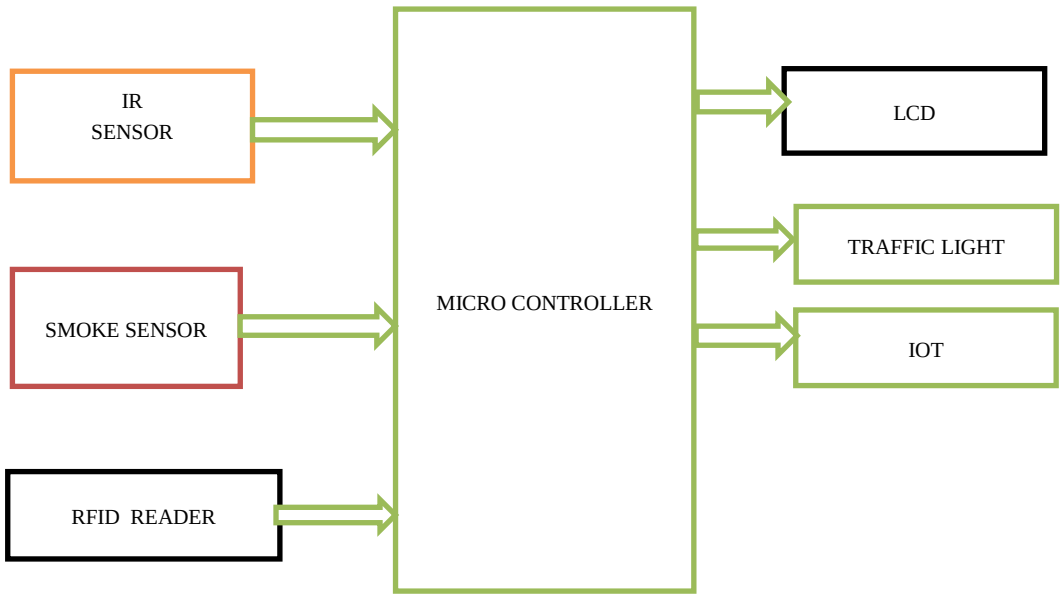
Proposed System

Each of the benefits listed above is an integral part of this Project, which illustrates an automated patient monitoring system. Any solution for traffic management might benefit from the suggested system, since it could be used to estimate and anticipate traffic density in real time. All the problems of the old traffic control system have been fixed.

METHODOLOGY:

The approach is based on the idea of adjusting the length of time traffic lights remain red or green dependent on how many vehicles pass through a certain stretch of road. The number of vehicles traveling down a four-lane road may be determined by using four sensors strategically positioned on each of the four sides of the route. Here, we propose a density-based traffic signal system that uses infrared (IR) sensors in place of the traditional traffic control system. Infrared (IR) sensors integrate both an IR transmitter and a corresponding IR receiver (photodiode) into a single device. These infrared transmitters and receivers will be placed on opposite sides of the road, at a predetermined distance [3]. The infrared sensors will pick up on the car's presence as it drives by and relay that data to the microcontroller. The microcontroller will monitor the volume of traffic and adjust the LEDs' on time accordingly. If the traffic density in a certain lane is greater than typical, the LEDs along that stretch of road will stay on for longer than usual. With an initial delay of 1000 ms for the traffic lights, the total time it takes for a green light to appear is 1000 ms Plus 1 ms. The hub of this embedded system is located there. LEDs and infrared sensors are connected to a microcontroller. For this project, you'll need four infrared (IR) sensors and eight light-emitting diodes (LEDs). Therefore, they are wired into any two available Arduino ports. The infrared (IR) sensor module has both a transmitter and a receiver. As soon as the sensor detects a moving vehicle, the comparator's output falls low; otherwise, it provides a high signal of either +5v or 3.3v.

Block Diagram



HARDWARE REQUIREMENTS:

RFID Reader:

The RFID Reader Board (EM-18) It employs radio waves to create a one-of-a-kind identifier and classification system for a wide variety of things. An RFID tag is used, and information is sent directly and instantly between the two devices. Vccgnd, LED/buzz, data0, data1, Transmitter(tx), and a select pin are all present (sel). Using the UART protocol, the device's transmitter pin may be connected straight to the microcontroller's reception pin. The RFID reader module includes both a transmitter (a radio frequency (RF) signal generator) and a receiver (a signal detector) in order to communicate with and read information from tags. High-frequency electromagnetic field waves are generated by a Radio Frequency (RF) module and an antenna in a Reader.

IR Sensor:

A sensor that detects and measures infrared radiation is known as an infrared (IR) sensor. William Herchel, an astronomer, stumbled across infrared radiation by mistake around the year 1800. After using a prism to isolate each hue of light, he found that the temperature just beyond the red light was the greatest. As the wavelength of IR is greater than that of visible light, it cannot be seen by the naked eye (though it is still on the same electromagnetic spectrum). All objects with temperatures over around five degrees Kelvin produce some amount of infrared light.

.MQ 2 Gas sensor:

The MQ2 sensor is one of the most widely used in the MQ sensor series. It is a MOS (Metal Oxide Semiconductor) sensor. Metal oxide sensors are also known as Chemiresistors because sensing is based on the change in resistance of the sensing material when exposed to gasses.

The MQ2 gas sensor operates on 5V DC and consumes approximately 800mW. It can
detect LPG, Smoke, Alcohol, Propane, Hydrogen, Methane and Carbon Monoxide concentrations ranging from 200 to 10000 ppm.

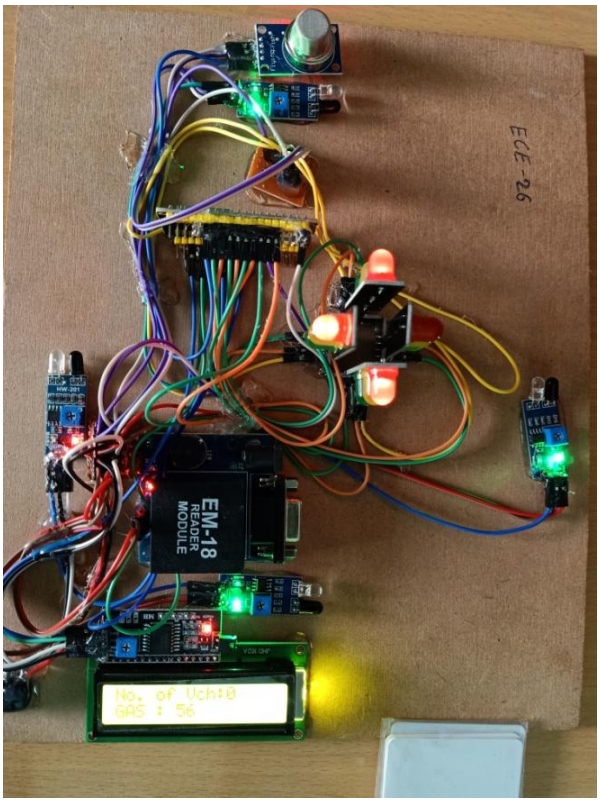
LCD:

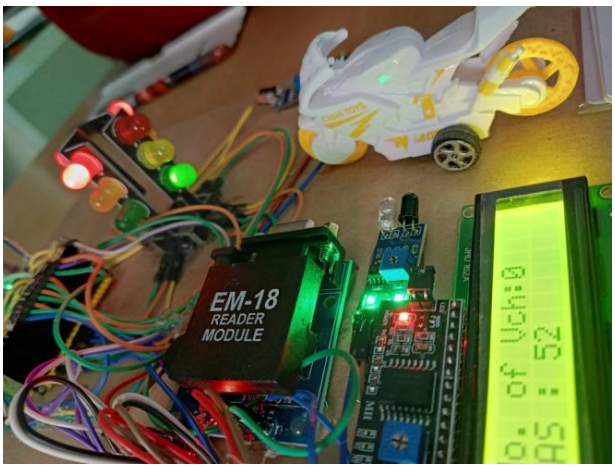
we always use the devices which are made up of LCDs such as CD players, DVD players, digital watches, computers, etc. These are commonly used in the screen industries to replace the utilization of CRTs. Cathode Ray Tubes use huge power when compared with LCDs, and CRTs heavier as well as bigger. These devices are thinner as well power consumption is extremely less. The LCD 16×2 working principle is, it blocks the light rather than dissipate. This article discusses an overview of LCD 16X2, pin configuration and its working.

Traffic Lights:

Included below is information on the Traffic Light Module, which simulates a two-way traffic light complete with pedestrian signals and the option to imitate a malfunctioning light. The Traffic Light Training System, Model 8075-1, is both engaging and lifelike because of the care with which it mimics genuine traffic signals.

RESULT AND CONCLUSION





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