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SMART CITY TRAFFIC CONTROL SYSTEM

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Abstract

Every city in the downtown areas around the world faces a major problem due to heavy traffic, especially during the peak hours. Traditional traffic signals used in manging the traffic allots a fixed time for managing the traffic in a junction of a four way or a two-way crossroads and cannot adjust to account for changes in traffic. The proposed system provides a scheduled crossing time that is automatically adjusted based on the traffic. A long green light is assigned using the proposed to the particular side of the crossroad that faces heavy traffic. For this the suggested model uses IR sensors installed in every 5 meters of the road to detect objects.

Keywords: JSFiddle, cellular Network, archetype, traditional industries.

1. Introduction

The absolute volume of traffic in road traffic today affects the safety and efficiency of traffic conditions. About one million people die each year in road accidents. Road safety is an existing issue in traffic management. One possible way is to deliver traffic information to the vehicle so that it can be used to analyze the traffic environment. This is achieved by exchanging traffic information between vehicles. All vehicles are within the area, requiring a cellular network that can self-organize and function without infrastructure support. A complete comparative analysis of all models developed in all industries was carried out, highlighting the

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strengths and weaknesses of these developed management systems and, based on the gaps in the literature, over traditional industries. Smart transportation plays best performance in smart cities. The proposed system provides a scheduled crossing time that is automatically adjusted based on the traffic. A long green light is assigned using the proposed to the particular side of the crossroad that faces heavy traffic. For this the suggested model uses IR sensors installed in every 5 meters of the road to detect objects.

2. Problem Definition

Much research has been written to overcome the shortcomings of standard traffic light systems. Various methods of determining traffic density include vehicle detection such as IR sensor and YOLO technique to capture the vehicle and mark the density that are categorized based on vessel. Computing and the IoT system have made this possible. This study uses different strategies to provide more accurate results.

In the existing system, each traffic signals have a traffic polices to control the traffic manually. So, it leads to large number of traffic policies are needed in real time, but it not possible to allocate each signal for one traffic police. Many traffic signals junction, one path is may have heavy traffic but the signal will work on fixed time only so it leads to heavy traffic in the cities

So, some of the disadvantages faced through the existing system are

- Wastage of time.
- Sometimes Emergency vehicles are stuck in the traffic, which leads to death.

The proposed method overcomes the listed disadvantage using intelligent traffic management engaging the computing and the Internet of things.

3. Proposed Methodology

This proposed methodology provides a solution for congestion, ambulance clearance, and other emergency transportation and tracking. Traffic management is based on lane traffic density. Even without traffic, people have to wait on one side. The traffic light remains red for the allotted time, so the driver has to wait until the traffic light turns green. The solution to this

puzzle is to create a system that monitors traffic flow on each route and adjusts the timing of traffic lights accordingly. In addition, synchronization of traffic lights at adjacent intersections is also required. In the current scenario there is no meaningful solution to the problem. As a result, this archetype was created to provide a successful answer. We provide solutions for traffic jams, ambulance and other emergency vehicle permits, and tracking with proposed methods. This will be automatically done with the help of IoT.

Advantages

- The long time waiting in the traffic signal will be reduced by using this system
- Emergency vehicles also travel quickly and it leads to saving the life of a person.

Block Diagram

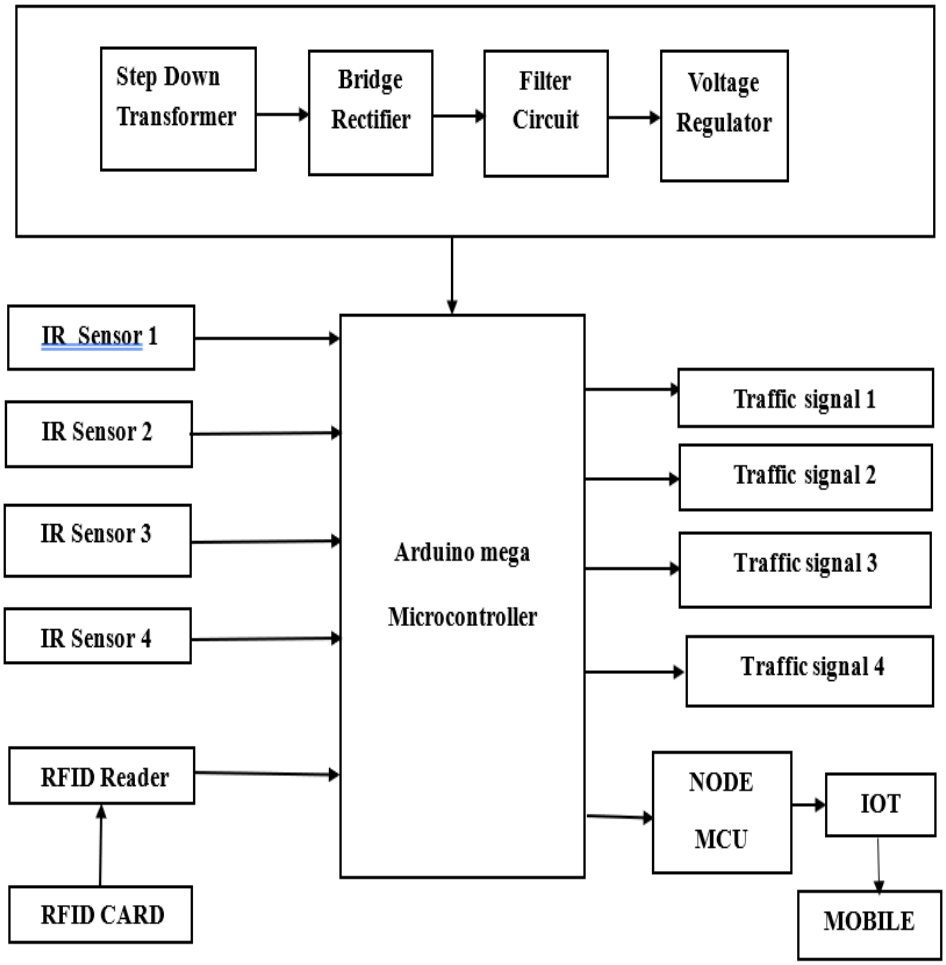

Figure 3.1. Block Diagram

The step down transformer, bridge rectifier, voltage regulator , filter circuit are used for the power supply to the Arduino. The transformer is used to reduce the power supply from the mains as 230V to 9V. Rectifier is used to convert the AC supply into DC supply. Filter is used to remove the ac ripples and make pure dc supply. Power supplies, sensor nodes, microcontrollers, LCDs, traffic lights are used for the system work. For emergency vehicle, GSM module or RF transmitter and receiver is used for priority to make green signal to pass the vehicle and accidents that were not considered by existing traditional traffic light control systems.

IR sensors or sensor nodes are placed in all directions (North, South, East, West). Electronic devices that sense part of their surroundings are called infrared sensors. Both the heat and motion of an object can be detected with an infrared sensor. An IR transmitter and an IR receiver form these sensors. It is installed at regular intervals on the roadside and counts the number of cars traveling in each lane.

4. Result

Software

Simulation Output

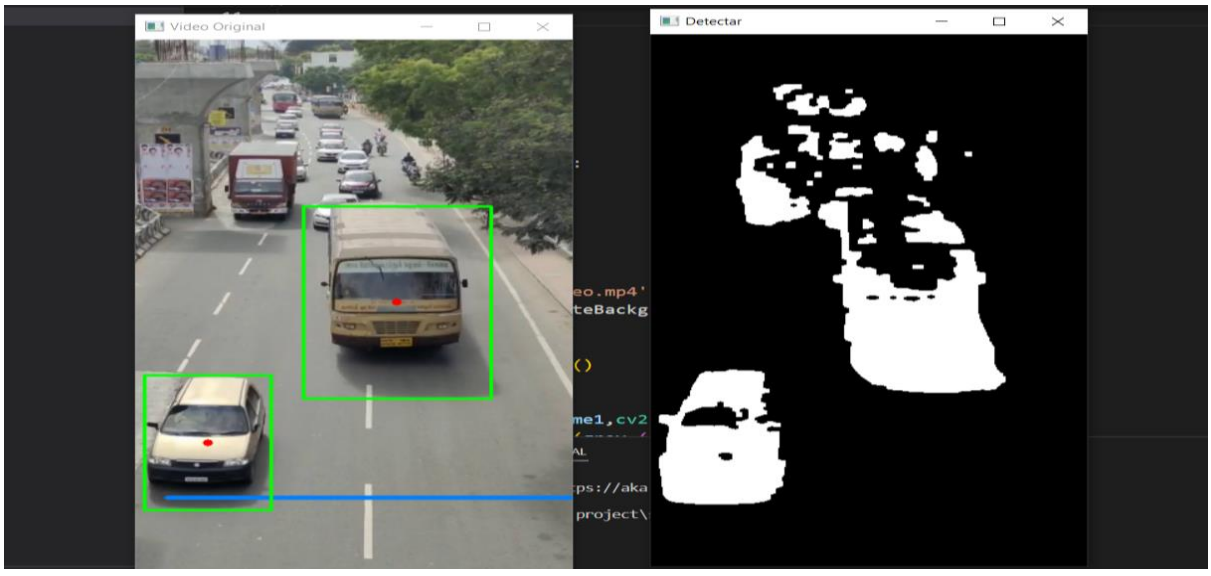

Figure 4.1. simulation for the traffic control in less density.

The YOLO technique detects the vehicle using cameraand caputure images using the cctv installed at traffic signals. Detecting vehicles using image processing and calculating traffic density. The Traffic density is sent to server for calculating green signal time. Using this time scheduling is done. Traffic signal timer is updated. Initially, the green signal time of the each lane is set to a default value(20).when the red signal timer of the next signal reaches 0, the number of vehicles at that the signal is detected and the green signal time is set accordingly. This process continues for all the signals. After some time, it can be seen that traffic in lane 1 has increased. As a result, the green signal timer is set to a higher value to accommodate this change. Similarly, as the number of vehicle is less in the lane moving upwards, the green signal timer is set to a lower value.

Application

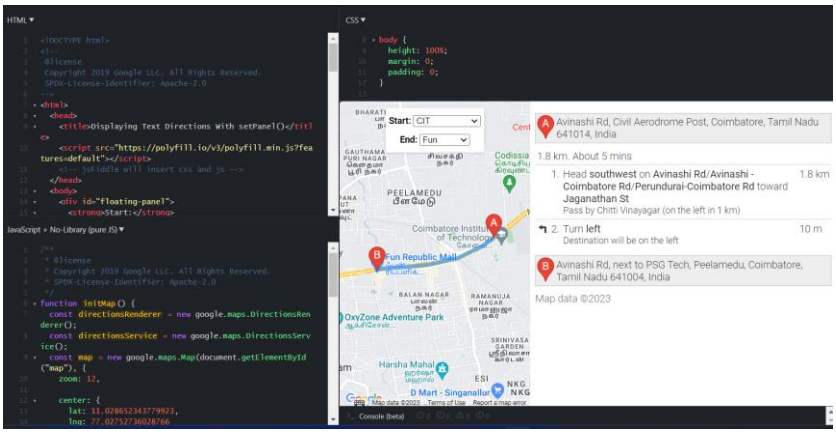

Figure 4.2. App for the shortest route

Users can modify and run HTML, JavaScript, and CSS code on a single page using the online IDE JSFiddle. Usually in google maps, the color coding is mentioned for showing the density but in this app density are showed by accurate percentage for density which can give the shortest route based on the density.

Hardware

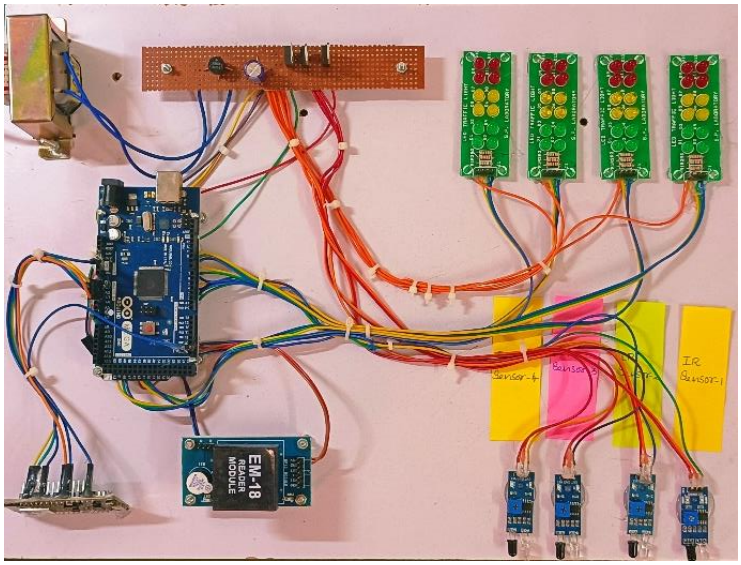

Figure 4.3. Hardware setup

The hardware layout for this project is shown in Figure 3.6. The infrared sensor provides information to the Arduino board, which provides the required output based on the density of vehicles present in the lane.

5. Conclusion and Future Scope

In this work, smart city traffic control system based on density was created for maintain the traffic and reduces the time for users and makes easy to control the traffic by police. For emergency vehicle, GSM module or RF transmitter and receiver is used to set priority to emergency vehicle and allow them to quickly pass through the heavy traffic, this was not considered in the existing traditional traffic light control systems.. In particular,the study shows the automated functional system to control the traffic based on the density for every lane. In future the stakeholders can manually operate this system via an Android application linked to the traffic lights.

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