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Intelligent Traffic Control System

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Abstract: ***For metropolitan cities traffic is the most critical problem. Traffic control becomes more important to provide people with trouble-free, safe driving and pollution free life. The research is intended to build a density dependent dynamic signalling system for traffic.Upon detecting the traffic density at the junction, the signal timing adjusts automatically. A camera structures the traffic system. The camera-captured image is processed to calculate the number of vehicles on the image.The camera also identifies the siren and the green light for emergency vehicles such as ambulance, fire engine and so on.Based on vehicle count on the road, the visual basic programming is used to control the glowing time of traffic light. The Arduino controller is a single microcontroller that is used to instruct the LED to glow.A GPS Guided Vehicle Auto Pilot Program.The technology deployed to support intelligent transportation systems and looks into the potential of wireless sensor network technology with the aim to power consumption and reduce cost estimation and the same time enhancing efficiency of service and flexibility.***

Keywords: Arduino Controller, GPS, LED, RFID Readers, Web Camera.

INTRODUCTION

Over the past hundred years, the advances in the automotive industry have made our cars more powerful, easier to drive and operate safer and more energy efficient and also environmental friendly.The use of vehicles for personal urban mobility, today's automobiles lack flexibility in design, are not built to specifications, have a large footprint in physical size and take up large real-life road and parking spaces[1].Future technological advances are expected to address these challenges and build vehicles with efficient electrical drive systems, wireless communication capabilities with other road infrastructure vehicles, and information technology to provide enhanced navigation, safety, fuel efficiency, and traffic management capabilities[2].

These issues can be unravelled by persistently detecting and altering the traffic lights timings relying upon the real traffic load, which can be accomplished by the picture handling strategies. The nearness or nonattendance of vehicles inside certain range can be recognized by the best possible camera. The traffic signal is changed on traffic thickness. The key highlights of building up a smart traffic control framework is to diminish blockage and expenses, to empower backup ways to go and to improve the foundation limit[3]. In the field of picture preparing, edge recognitions assume an indispensable job in which the picture limits join issues. Proposals can be settled by recognizing the unexpected change in the dim/surface level in a picture.Traffic blockage is viewed as the most concerning issues in the urban conditions. Traffic issues will be broadly expanding as a normal consequence of the developing number of transportation means and current low quality framework of the streets. Likewise, numerous investigations and insights are produced in creating nations that demonstrated that the greater part of the street mishaps are because of thin streets and the dangerous increment in the transportation implies. The clock based traffic framework is appropriate just for light traffic which utilizes a predefined time setting for its handling. For overwhelming traffic framework, a versatile framework is required which could deal with the traffic thickness. The fundamental disadvantage of summed up traffic control framework is high need circumstances and crisis conditions are hard to identify. This desires the need of savvy traffic control framework to make it reasonable to deal with all conditions and to take choices consequently[4].

Proposed Method

The traffic system has to give emergency incidents a greater priority. Due to lack of knowledge of the traffic density, the current traffic scheme causes several traffic

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problems.To be changed the road rules to avoid incidents. These problems need to be solved for efficient operation of existing traffic system[5].The vehicles are sensed and processed in the proposed system using imaging techniques. This helps prevent the need for electronic sensors. To capture image frames, a web camera is placed to the traffic light.The aim of the proposed system is to reduce congestion in the absence of vehicles on the road, and to reduce the time taken for the system. For the calculation of the vehicle it needs further attention by estimating the metal content of each vehicle[6].

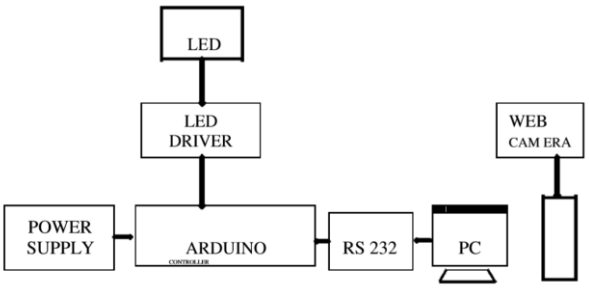

Figure 1: Traffic Control System

1. *Hardware Module:*

A USB-based web camera is used for various image processing tasks and a general purpose PC is used as a central unit.The model is made up of a few toy cars and Light Emitting Diodes (LEDs), which can be used as a reference for the real world traffic light control system.LED is used to represent the traffic signal network, and drivers are used to control voltage flow to LED as the resistors[7].

2. *Software Module:*

Apart from writing code and uploading to the board, the open source Arduino software is also used for controlling the LED lights. The ITCS consists of a series of two RFID readers in each direction of a road crossing, separated by some distance, and has a central computer system (CCS) to control them all.As a vehicle passes by a scanner, it tracks the vehicle through the attached RFID tag and retrieves data from its electronic product code (EPC).The EPC consists mainly of Vehicle Identification Number (VIN). The VIN is an industry standard, and each car has a unique VIN of 3.The VIN can be compared to individual vehicle records through a table look-up process and all information such as size, weight, age, registration, pollution control status, and owner identification can be retrieved[8].

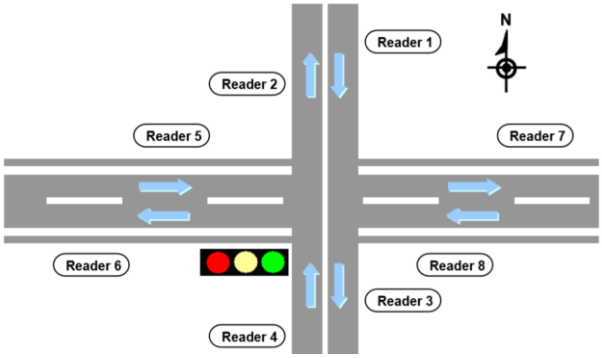

Figure 2: A Road Crossing with RFID Readers

The data obtained is then sent through wireless or wired channels immediately to the CCS, as considered convenient at that location. The CCS contains a central database processing system (CDPS) for storing vehicle data, and a decision-making portion (DMS) for traffic signals control.

Central Database Processing System:

The CDPS consists of two parts:

a. A dynamic database which temporarily stores the records of vehicles currently passing the crossing.
b. A permanent archive that holds all vehicle documents that have passed the crossing.

The dynamic database is broken down into several sections. This arranges the vehicles EPC data according to their route and travel direction.Whenever a vehicle travels to or from the crossing, it is identified by the two readers in its direction and transmitted the data obtained to the CCS with some time gap in between.The two readers' order of response dictates the vehicle's direction of travel (whether it's going to or away from the crossing). The vehicle data will then be sent to any part of the database which corresponds to its travel path and direction[9].

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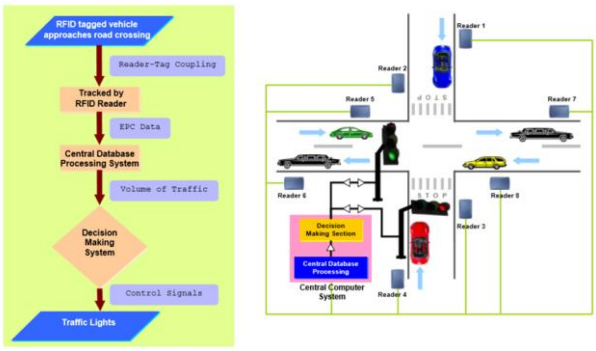

Figure 3: Flowchart and Diagrammatic Representation of ITCS using RFID

The volume of traffic therefore takes into account the priority given to each vehicle at the present time of the day and also the priority attributed to the two roads at the crossing.Some statistical parameters, such as inter-arrival time or inter-departure time, can also be determined on the basis of the available data, which will aid in future research.Once a vehicle has passed the crossing, that is to say it has gone out of the readers control, its data is transferred from the dynamic database to the permanent database where it is stored along with its travel path, both arrival and departure directions, and time.

Building the GPS Navigating Algorithm:

There are several parts to autonomous GPS navigation.

a. Determination of current location
b. Identifying destination
c. Choose the possible route
d. Identifying the current headed direction with respect to destination direction.

It has single motor with a differential system to power the rear wheels.It is a front and rear suspension system that supports smooth street mobility.The research used the RC car to repair sensors and controls, then disassembled them.The motors have to work according to the microcontroller's signals.Based on the built algorithm, the microcontroller unit analyses the data from the GPS sensors and the sonar sensors and gives the engines power[10].

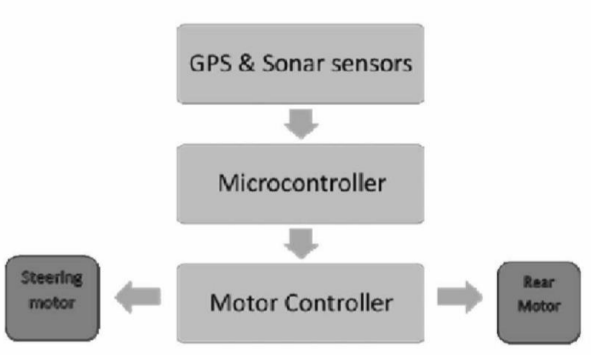

Figure 4: Block diagram of the rover

CONCLUSION

The system is based on a simple concept of vehicle RFID monitoring, can work in real-time, improve traffic flow and protection, and save costly constant human involvement in a fully automated manner.The advantages that ITCS can bring in traffic management systems have been demonstrated in detail which vouches for their effectiveness.Nevertheless, tracking every vehicle is morally acceptable, or not, and whether it is against one of the basic civil rights, privacy, is a debatable matter.As an auto piloting system such as in aircraft, this system can be applied to the motor vehicle. One problem facing drivers most of the time is getting bored when driving long distances like on highways.Drivers can rest whenever they want without stopping the vehicle by applying this program to the vehicles.A USB-based web camera is used for various image processing tasks and a general purpose PC is used as a central unit. The model is made up of a few toy cars and Light Emitting Diodes (LEDs), which can be used as a reference for the real world traffic light control system. LED is used to represent the traffic signal network, and drivers are used to control voltage flow to LED as the resistors.

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