International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 07, 2020
ISSN: 1475-7192

SMART TRAFFIC SYSTEM

Pranav S Ram[1], Radhika Rajan[2], Rahul MR[3], Deepika M P[4]

Abstract

An increase in the number of vehicles which is not followed by the number of roads can lead to excesive congestion, especially in big cities. The regulation of Law Number 22, Year 2009 explains that there are seven types of vehicles that are prioritized on the road. Conventional methods of traffic light systems are unable to deal with the ongoing issues surrounding congestion. The current traffic light models are not suitable to tackle problems such as traffic jams, ease of access for emergency vehicles and the prevention of accidents. Our present traffic light systems are based on microcontrollers and microprocessors which are predefined hardware which functions according to the programmed code. They are not flexible on the real time basis. Due to the fixed time intervals of red, yellow and green signals, the waiting time is more and the vehicle uses more fuel. The proposed project will focus on two aspects of implementation. First and foremost, to make traffic light controlling more efficient. This system will intelligently decide when to alternate signals based on the intensity of traffic on each lane, which is detected by sensors on each lane. This will ultimately increase the efficiency of the traffic flow. The second is a manual mode which allows authorized officials to control the signals. This is intended for use during the time of emergency.

Index Terms—Arduino applications,traffsense,smarttraffic

Introduction

Cities are growing in leaps and bounce with all public facilities. But there are many limitations and hurdles in overall development of cities, especially in India. Smart traffic management and control plays an important role in each cities.When we are travelling in a city we must follow the traffic rules if not it create chaos or traffic jam which leads to many problems like accidents, damage to vehicles,loss of fuel, increase in air and noise pollution etc. This all causes due to our approach not following traffic rules. This may happen especially at junction or at signal where there is no traffic police to monitor or signal is turned off. This is routine work almost in all cities including metro cities. There is need of automated system which will monitor the traffic and dynamically control it. We are in a need of this system since number of vehicles and so the traffic is increasing day by day in all cities.Full implementation of this system can help in reducing traffic problems.

RELATED WORKS

The traffic light system proposed in[1] is an intelligent traffic signal control system by using image processing and video processing using cameras fixed on the sides of the roads. In a study proposed[2], it is mentioned that, when implemented in real time, fast moving traffic was not recognised efficiently. Vague identification of vehicles

[1] Department of Computer Science and Engineering(of Aff.KTU), ASIET (of Aff.KTU), Ernakulam, Kerala, pranavsram9@gmail.com
[2] Department of Computer Science and Engineering(of Aff.KTU), ASIET (of Aff.KTU), Ernakulam, Kerala, radhika.raj398@gmail.com
[3] Department of Computer Science and Engineering(of Aff.KTU), ASIET (of Aff.KTU), Ernakulam, Kerala, rahul.mr1698@gmail.com
[4] Department of Computer Science and Engineering(of Aff.KTU), ASIET (of Aff.KTU), Ernakulam, Kerala, deepika.mpm@gmail.comEmail: sumesh.it@adishankara.ac.in

Received: 26 Apr 2020 | Revised: 24 May 2020 | Accepted: 28 Jun 2020

using image and video processing results in a significant change in time. In different scenarios, failure of detection using image and video processing may arise, then, android application can be used. In the study, the number of points passed by the vehicle and how the alternative methods in the detection of lanes and the location of the crossing which is passed are not mentioned. G.S.Khekare[5] proposed a vehicular ad-hoc networks (VANETs) that is a typical example of a variety of networks in wireless technologies. Their methodology is based on the smart city framework that will transfer information about traffic conditions and help drivers choose a suitable direction to prevent traffic congestion. S.Badura et al.[6] introduced a new model for intelligent traffic systems that consolidate monitoring features through existing cameras at intersections and allow users to access data using data delivery systems. Image analysis and modeling of previous designs are important elements of monitoring, and data transfer is performed on a mobile ad-hoc network. A.S.Salama[7] presented a design of an integrated intelligent system for managing and controlling traffic lights with the help of photoelectric sensors. The FPGA processor was used in this model. One of the most important criteria in this system is the installation and implementation of sensors, because the traffic lights are scheduled and controlled according to the sensor values based on an algorithm with a proper relative weight for each of the directions. In addition, the system can be programmed for emergency scenarios, such as passing the president, ministers, ambulances and fire engines through a technology based on active radio frequency detection. There are lots of studies in this area,[3][4] recently published.

PROPOSED SYSTEM- COMPONENT DESCRIPTION

Regulated power supply

To drive Microcontroller and discrete component circuit a regulated power source required. Here we have design 5V regulated power supply using LM7805 Regulator. Which can step down 12V AC/DC source to constant 5V by using rectifiers and filters? For rectification we have use 1N4007 diode as bridge rectifier and after that we have connected 1000uf/16V electrolytic capacitor as charge storage capacitor to fed constant voltage to regulator. After that regulator is connected with 100nf capacitor, which work as filter means it pass block DC and pass AC. So, if any AC component reaches their than it will ground that signal and protect regulator from being damage. After regulator Same electrolytic capacitor is used to store charge.

Traffic Light

The Traffic lights consist of three universal coloured lights: the green light allows traffic to proceed in the indicated direction, the yellow light warns vehicles to prepare for short stop, and the red signal prohibits any traffic from proceeding. Similarly as traffic light we have used four light pair of three color lights Red, Green and Yellow. These light timing is control by Atmega8 controller.

Ultrasonic Sensor

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. Here we have used our ultrasonic sensor to measure density of traffic. This ultrasonic sensor work on reflection of

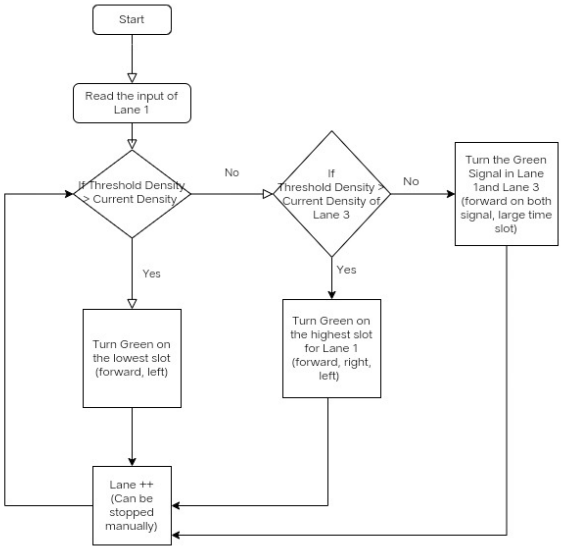
sound principle. Sensor has one transmitter module with amplifier circuit and Receiver with discrete component. This ultrasonic sensor work on 40KHz frequency so no impact of other sound over which is not of 40Khz.

WORKING

We use four ultrasonic sensors to measure the density of traffic of each road respectively, they can be placed on the road with respect to user's choice. These four ultrasonic sensors are connected with ATmega328 controller which will check each ultrasonic sensor and with respect to data collected from all the ultrasonic sensosr, it sends command to Atmega328 controller to change timing of lights. When traffic reach to ultrasonic sensor then sense the presence of vehicle, and if vehicle stay

Fig. 1. Ultrasonic sensor

more than 5 second there then controller of ultrasonic send command to controller of light that that there is traffic increase so with respect to ultrasonic sensor, the green light time for that road is increased.



CONCLUSION

Nowadays, traffic congestion is a main problem in major cities since the traffic signal lights are programmed for particular time intervals. However, sometimes the demand for longer green light comes in at the one side of the

junction due to huge traffic density. Thus, the traffic signal lights system is enhanced to generate traffic-light signals based on the traffic on roads at that particular instant. The advanced technologies and sensors have given the capability to build smart and intelligent embedded systems to solve human problems and facilitate the life style. Our system is capable of estimating traffic density using ultrasonic sensors placed on either side of the roads. Based on it, the time delay for the green light can be increased and we can reduce unnecessary waiting time.

REFERENCES

[1] S. K. Asare and R. A. Sowah, ”Design and development of a microcontroller based traffic light control system using image processing techniques: — A case study prototype for Legon-Okponglo Junction, University of Ghana,” 2012 IEEE 4th International Conference on Adaptive Science and Technology (ICAST), Kumasi, 2012, pp. 59-64, doi: 10.1109/ICASTech.2012.6381066.

[2] Morarescu and C. Canudas-de-Wit, ”Highway traffic model-based ˇ density estimation,” Proceedings of the 2011 American Control Conference, San Francisco, CA, 2011, pp. 2012-2017, doi: 10.1109/ACC.2011.5991298.

[3] Dinesh Rotake, Swapnili Karmore, 2012. Intelligent Traffic Signal Control System using Embedded System. Innovative Systems Design and Engineering 3(5), pp.11- 20 [online] Available from: http://www.iiste.org [Accessed 26th Oct., 2018]

[4] M. Z. Talukder, S. S. Towqir, A. R. Remon, and H. U. Zaman, “An IoT based automated traffic control system with real-time update capability,” 2017 8th Int. Conf. Comput. Commun. Netw. Technol., pp. 1–6, 2017.

[5] G. S. Khekare, “Design of emergency system for intelligent trafc system using VANET,” in Proceedings of the 2014 International Conference on Information Communication and Embedded Systems, ICICES 2014, Chennai, India, February 2014.

[6] S. Badura and A. Lieskovsky, “Intelligent traffic system: Cooperation of MANET and image processing,” in Proc. 1st Int. Conf. Integr. Intell. Comput. (ICIIC), Bangalore, India, Aug. 2010, pp. 119–123.

[7] A. S. Salama, B. K. Saleh, and M. Eassa, “Intelligent cross road traffic management system (ICRTMS),” Computer Technology and Development (ICCTD), 2010 2nd International Conference on. 22/7/2017, pp. 27–31, 2010

Received: 26 Apr 2020 | Revised: 24 May 2020 | Accepted: 28 Jun 2020