

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Special Issue 4, April 2018

Four Wheeler Detection and Traffic Prevention on One way Road

Amreen S¹, Divyapriya V², Anju.A³

Department of Information Technology, KCG College of Technology, Chennai, India^{1,2}

Assistant Professor, Department of Information Technology, KCG College of Technology, Chennai, India³

ABSTRACT: One of the most promising applications and most need of the hour, Vehicle Detection, for driver assistance has received considerable attention over the last years. There are at least three reasons for the blooming research in this field: first, the startling losses both in human lives and time wasted during the traffic congestion; second, the availability of feasible technologies accumulated within the campus (available sources) and alert; and third, the public and college need has paved the way for creating intensive modules to implement in real time. This project provides a critical survey of implementing recent vehicle detection systems appeared in the literature with modifications according to the personal needs and priority. With the mounted sensors at the junctions of the college and highway road, the entrance of the college to deduct the vehicle and alert the driver or public about the entrance or exit of the vehicle at either junction. The goal of this project is to provide an indication to the college bus drivers about the presence of four on the college road. This will help the drivers to move into the college road very easily without having any traffic tension. To make this possible this system is developed and to prevent traffic in the road and reach the college on time.

KEYWORDS: Vehicle detection, Sensors, Signal, Display, Prevent traffic

I. INTRODUCTION

One of the major challenges faced by the people during their travel through the one lane road is that they find much difficulty on finding the vehicle coming in the opposite direction. Around 70.3% of the roads in India are one lane road that is rural roads. The major part of roads in India is one lane roads. The colleges and schools are constructed in the interior part of the cities where the only way to reach the building is the one lane road. As the mode of transportation to reach the school or college is through four wheeler vehicle. The drivers of the school and college bus find difficulty to reach their educational institution on time due to traffic caused by the vehicle coming on the other side. The main intension of the proposed system is to provide an indication to the college bus drivers about the four wheelers which are coming on the opposite direction. This will help the drivers to move into the road very easily without having any traffic tension. KCG College of Technology is one such institution, where only way to reach the college is through the one lane road. Considering the college premises this system is developed.

To make this possible we propose our system "Four Wheeler Detection in KCG road" to prevent traffic in the road and reach the college on time. To provide the accurate signal to the driver a traffic semaphore is used. The vehicle is detected by the Ultrasonic sensor. The main purpose of using these ultrasonic sensors is to detect any moving object (four wheeler) at a distance from 0 to 2.5 meters.

II. RELATED WORK

Object detection

An literature survey was made to find an working of object detection system which is the core part of this system. Many researchers have proposed different ideas to detect the object. In the paper "OBSTACLE DETECTION USING ULTRASONIC SENSORS" the author has made a study on the sensor and proposed the best sensor which can detect

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an object most accurately. In that an ultrasonic sensor is being used. Any object that is present opposite to the user or moving object can be detected using this sensor. The ultrasonic sensors can be used in such a way that, when it emits the sound waves it is incident on the object opposite to the sensor and that object reflects back. When ultrasonic waves are incident on an object, diffused reflection of the energy takes place over a wide solid angle which might be as high as 180 degrees. This reflection will indicate the presence of an object. The ultrasonic sensor transmits sound waves and receives sound reflected from an object.

Thus some fraction of the incident energy is reflected back to the transducer in the form of echoes. Based on the distance of the object we can get the echo response, if the object is very close to the sensor the sound waves will return quickly, but if the object is far away from the sensor, the sound waves takes longer to return. But if objects are too far away from the sensor, the signal takes so long to come back (or is very weak when it comes back) that the receiver cannot detect it. For distance calculation, the time taken for the sound waves to reflect back is taken for consideration. The sensor uses the time it takes for the sound to come back from the object in front to determine the distance of an object. The distance to the object (L) can then be calculated through the speed of ultrasonic waves (v) in the medium by the relation, where 't' is the time taken by the wave to reach back to the sensor and 'θ' is the angle between the horizontal and the path taken. It can measure from 0 to 2.5 meters, with a precision of 3 cm^[1]. Hence the research work is concluded by stating that the ultrasonic sensor HCSR-04 has more efficiency in detecting the object.

In another research work "ELECTRONIC WALKING STICK FOR BLINDS" there are two sensors used for the detection of obstacle for the blind person, one is the IR sensor and the other one is the Ultrasonic sensor. Once the object is detected the shape of the object, the distance between the object and the person is identified. The shape and the distance are informed to the blind person.

Proposed system uses this Ultrasonic sensor due to its high efficiency in detection of the vehicle. And also the obstacle length can also be calculated by using two ultrasonic sensors at the same place. This paper infers that for the detection of vehicles, ultrasonic sensors can be used. But for communicating between the ArduinoHC12 communications module can be used, that can handle the communication at a distance of 1.8km with high speed of transmission of signals. This range is very much suitable for the KCG road in which the system is going to be implemented.

III. PROPOSED SYSTEM

The proposed system has two core technical modules one is the vehicle detection and another is the communication. This system consists of the design of circuit which can detect the vehicle and indicate the driver on the other side using an traffic semaphore. The components used in this system is that

Ultrasonic sensor

Ultrasonic sensor HCSR-04 is used in the implementation of this system. The Ultrasonic sensor HCSR-04 has a high efficiency of detecting the object which is about 1 to 5 meters apart.

Arduino UNO

Arduino Uno is the miniature microcontroller. This will communicate with the ultrasonic sensor and Arduino is the core component of this system. Arduino Uno has 14 digital input/output pins

HC12 Communication module

HC12 is a wireless communication module which is a new generation multi port communication module. Message transmission and reception is done by HC12. An HC12 has range of about 1.8 km it can transmit the message up to 1.8 km.

In this system the vehicle is detected using Ultrasonic Sensor HCSR-04. The sensor use is of high capacity of find the four wheeler vehicle. Two ultrasonic sensors are used in this system. Both the sensors are kept three meters apart since it should detect only the four. To differentiate two wheelers and four wheelers two ultrasonic sensors are used in this system. The sensors are placed at specific distance.

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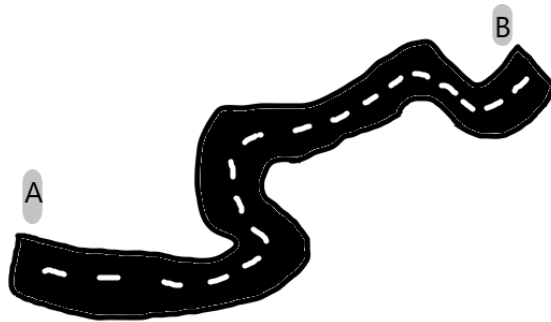


Figure no: 1 road map

An dense one lane road is considered the aim is to indicate presence of a vehicle on the road to the other end of the road as shown in Figure 1. At both the end of the road A and B the system is installed. The system consists of two ultrasonic sensors, Arduino, HC12 and a traffic semaphore. When a vehicle is detected at side A the traffic semaphore is changed to indicate the presence of vehicle on the road.

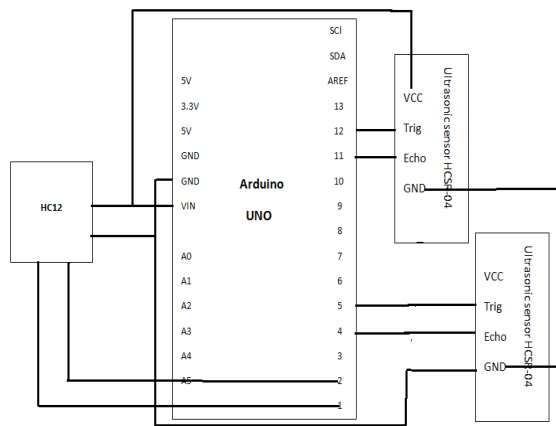


Figure no:2 Circuit Diagram for Transmitter

The Ultrasonic sensors are given unique id and it is connected to the Arduino UNO. The Ultrasonic sensor has 4 pins a vcc, ground, trigger and echo. On giving 5V input to the Ultrasonic sensor it emits sound wave. When an object crosses the sensor the wave is disturbed and it is reflected back to the sensor. The wave is emitted from the echo pin and the reflected wave is received by the trigger pin.

Once the trigger pin is set to high the arduino will process the signal and finds the direction of the vehicle. The Arduino will process the signal only when both the Ultrasonic sensor set its trigger pin at same time. On finding the path of the four wheeler the Arduino will transmit the signal to other Arduino which is kept on the other side of the road. And the signal on the other side is changed. The design of the circuit is shown in the Figure no-2.

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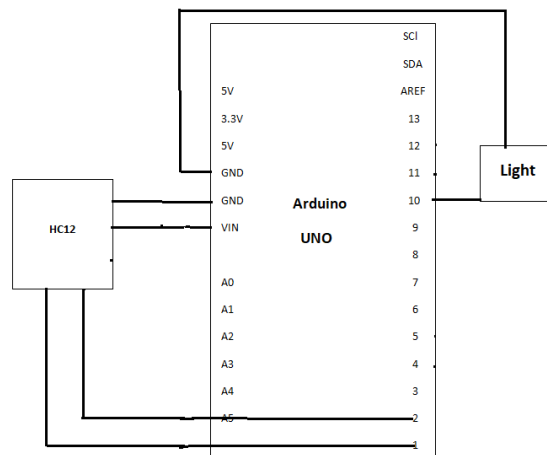


Figure no-3 circuit diagram for receiver

When the HC12 receives a message it will process the message as shown in Figure no-3. On receiving the signal the Arduino will set the signal in accordance with the scenarios. Following Scenarios are considered while implementing this system.

Vehicle entering into the college road

Vehicle detected using ultrasonic sensor and the other three signals turn into red. When the object leaves out, the signal is set to the normal form.

Even after seeing the red signal, if some vehicle enters the road.

The time delay is calculated and the nearest signal to the bus will be turned to yellow. This represents the existence of vehicle.

When the vehicle moves to the other end of the lane.

That vehicle is detected, the signal nearer to the bus is turned to green which indicates that the bus can move freely.

IV. CONCLUSION

When a vehicle comes into the college road, it is detected and the signal on the other end of the road is turned to red. After a time delay when the detected vehicle pass the other end of the road then the signal is turned to green. Future enhancement can be made by considering more scenarios.

REFERENCES

1. "A Smart Infrared Microcontroller-Based Blind Guidance System" Amjed S. Al-Fahoum, Heba B. Al-Hmoud, and Ausaila A. Al-Fraihat Active and Passive Electronic Components
2. "Obstacle Detection using Ultrasonic Sensors" Prof. D. S. Vidhya Miss Delicia Perlin Rebelo, Department of Electronics and Telecommunication
3. "An Electronic Walking Stick For Blind" Shashank Chaurasia, K.V.N Kavitha School of Electronics Engineering VIT University, Vellore