IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Design And Fabrication Of Emergency Braking System In Four-Wheeler

Dr.Harish Harsurkar[1],Prof.Husain Shaikh[2], Suraj Prakashrao Chavhan[3], Shailesh Hariba Naik[4]

[1]HOD Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

[2]Asst.Professor Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

[3]Student Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

[4]Student Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

Abstract –

IC engines are so advanced that their speed becomes a major disaster. The advanced braking system improves braking techniques in cars. It replaces complete braking systems for cars and deals with the concept of Automatic Braking System that provides a solution. The project is built with an ultrasonic transmitter, ultrasonicreceiver, Arduino UNO R3 board with PIC microcontroller, DC gear motor, Servomotor, and mechanical brake arrangement.The ultrasonic sensor produces a frequency signal (0.020-20)KHZ. It is transmitted via an ultrasonic transmitter. The ultrasonic receiver is used to receive the pre-displayed wavelength of the vehicle. Then the reflected waves are fed tothe generator unit of the ultrasonic wave, where the incomingwave is amplified and compared to the reference signals to maintain a constant rate. This signal is supplied to a microcontroller, and when operating a DC gear motor and Servomotor may be present, leading to the use of brakes. Themodel was designed to demonstrate expertise and was testedaccording to the simulated scenarios. In the future, a real model can be built depending on its availability.

***Key Words*: Emergency braking system, ABS**

1. INTRODUCTION

These days the number of accidents is very high and uncertain. An accident can happen anytime and anywhere and can cause serious damage, serious injury, and even death. These accidents are mainly caused by the driver's delay in hitting the brakes. This project solves the problem of manual brake delays. Using ultrasonic waves as various sensory vehicles can stop automatically. The Arduino board is used to build and dispose of the required C Program, which contains the PIC microcontroller. Therefore, by using this car, the technology can automatically stop by hearing obstacles.

1.1 BACKGROUND

Driving is common for most people. The number of vehicles is increasing day by day. Nowadays, technology has undergone major changes leading to increased speed. Speed plays a vital role in keeping track of long distances. But this speed is also a major problem for road accidents. Normal braking is not enough to avoid accidents when the driver is not working. Further improvement should be made to the brake system to brake the car where the driver is not able to brake the brakes, which may require an automatic braking system. This automated braking system allows the vehicle to brake without the help of the driver.

The main implication of the ultrasonic braking system is that the vehicles must be braked automatically when the sensors feel an obstacle. This is an automotive technology that detects an impending collision with another vehicle or obstacle and removes the vehicle properly, which is made by the brake circuit. This system includes two ultrasonic viz sensors. Ultrasonic wave emitter viz. the ultrasonic wave emitter and the ultrasonic wave receiver extend the ideas in detail and act differently as if the automatic system of brakes could complement the techniques of increasing the presence of technology

1.2 OBJECTIVES

The aim of this project is to build an automated brakes system to avoid accidents. Performing a car brake safety system using ultrasonic sensors and designing a car that is less sensitive to driving.

This project is required to be attached to the entire vehicle, mainly used when driving cars at night. Most accidents occur at night due to long-distance distances the driver may be tired. Therefore, the driver may hit a car on the sidewalk or trees on the sidewalk. Through this project, the car is stopped by an automatic braking system. Therefore, we can avoid the danger

2. LITERATURE REVIEW

2.1 Eung Soo Kim "FABRICATION OF AUTO-BRAKING SYSTEM FOR PRE-CRASH SAFETY USING SENSOR**."**

The auto-braking system is developed by VHDL and is designed to maintain the distance between the two vehicles. It offers a pre-crash safety system for smart cars.

2.2 Implementation of Automatic Reverse Braking System, FPGA Divya Thakur Prof. A. P. Thakare

The Auto-Braking System uses a raised Sensor to prevent front, rear end, right turn, and left-turn traffic accidents. This module can detect the distance between the front car and the driver's vehicle to maintain a continuous distance using a sensor and using the brake system. Therefore, in this paper, we propose an "Automatic Reverse Braking system" to prevent collisions using the sensors to detect obstacles

"Automatic Reverse Braking system" processes sensor data and controls the vehicle to prevent accidents.

2.3 Niveditha.P. et al. "COLLISION WARNING SYSTEM USING ULTRASONIC SENSORS AND AUTOMATIC BRAKE SYSTEM."

He says automotive technology has grown rapidly in recent years, especially with regard to brakes and hearing systems. Similar to the technology used by brakes, sensors are built with the ability to detect body obstacles, other vehicles, or pedestrians around the vehicle. These improvements prevent car accidents using Stereo Multi- Purpose cameras, Automated Emergency Braking Systems, and Ultrasonic Sensors. The multi-purpose camera offers area sensitivity of up to 50 meters in front of the car, and there is a natural observation of 500 meters.

2.4 Review of Speed Control and Automatic Braking System Gopal P. Gawande, Shruti V. Gavhale, Irshad A. Zariye, Sagar P. Ritpurkar EXTC Department, AVBIT, Pawnar (WARDHA), Maharashtra (INDIA)

The proposed operation is likely to control the speed of the vehicle and the automatic braking system. It is divided into three main stages; 1. Find the object (Obstacle) in the car. 2. Control the speed of the car. 3. by default, you apply the brakes.

3. METHODOLOGY

3.1 COMPONENTS

3.1.1 ULTRASONIC SENSOR

Ultrasonic devices that chase and detect waves using high-frequency frequencies called ultrasonic waves to detect the presence of an object and its range.

Test distance =

(high-level time × velocity of sound (340M/S) / 2 Specifications:
Working Voltage - DC 5 V Working Current -15mA Working Frequency - 40Hz
Max Range - 4m
Min Range - 2cm
Measuring Angle - 15 degree

Trigger Input - Signal 10uS TTL pulse

Echo Output - Signal Input TTL lever signal and the range in proportion

Dimension - 45*20*15mm

3.1.2 ULTRASONIC TRANSDUCER:

The ultrasonic transducer is one type of sound-related sensor. Here we use the ultrasonic transducer HC-SR04

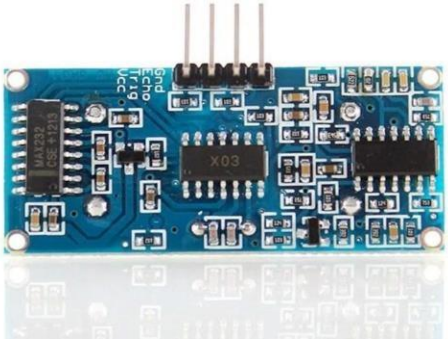

Fig-1: Ultrasonic Transducer

3.1.3 OPERATIONAL AMPLIFIERS:

Also known as Op-amps, it is a power amplifier designed for use with objects such as capacitors and resistors, among its internal/external terminals. They are a major component of analog devices.

3.1.4 BRAKING CIRCUIT:

After the magnified ADC signal was sent to the braking circuit. Here we use a PIC microcontroller (PIC 16F84 8-bit).

3.1.5 ARDUINO UNO R3:

The Arduino Uno R3 is a microcontroller board based on a removable, dual-inline-package (DIP) ATmega328 AVR microcontroller. It has 20 digital input/output pins.

Specifications:

Microcontroller - ATmega328 Operating Voltage - 5V
Input Voltage - (recommended) 7-12V Input Voltage - (limits) 6-20V
Digital I/O Pins - 20 (of which 6 provide PWM output) Analog Input Pins - 6
DC Current per I/O Pin - 40 Ma DC Current for 3.3V Pin - 50 mA

Flash Memory - 32 KB (ATmega328) of which 0.5 KB used by boot loader
SRAM - 2 KB (ATmega328) EEPROM - 1 KB (ATmega328)
Clock Speed -16 MHz Length - 68.6 mm
Width - 53.4 mm
Weight - 25gm

Fig-2: Arduino Uno R3

3.1.6 SERVO MOTOR:

The Servo car is made up of a DC car controlled by a flexible resistor (potentiometer) and other gears.

3.1.7 DC GEAR MOTOR:

A DC motor is a rotating electrical device that converts the direct current of electrical energy into mechanical energy.

Specifications: Voltage: 12V DC Stroke length: 2inch Duty cycle: 25%

Max load current: 3 Amp No load current < 1 Amp

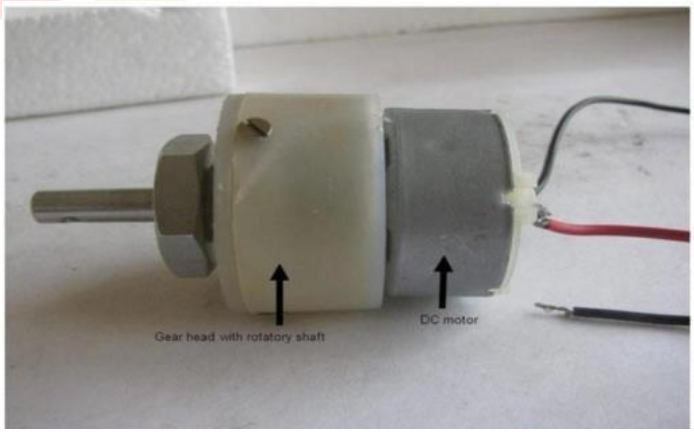

Fig-3: DC motor

3.2 WORKING

1. Ultrasonic sensor consists of transmitters and receiver units. As the ultrasonic transmitter detects an obstacle by transmitting signals to the ultrasonic receiver unit.

2. Ultrasonic sensor insertion is used to determine if there is anything wrong with the vehicle.

3. When an object is found, the system will then determine that the vehicle's speed is greater than the speed of the object in front of it.

4. With the help of the abandoned Arduino C Program, the calculations will be done with the PIC microcontroller according to the given distance and the distance between the default system and the obstacle.

5. The DC gear motor rotates uniformly at a given rpm and slightly reduces the speed while automatically braking the system through Servomotor braking events.

6. Significant speed differences may indicate a potential collision, in which case the system will automatically apply the brakes.

5.CONCLUSION

We have completed the development of an automated braking system model, and this project introduces the implementation of the Self-Continuous Crash Transmission System, which is intended to be used in vehicles where drivers cannot brake by hand, but the speed of the vehicle can be automatically reduced due to obstruction. It reduces risk levels and tends to save many lives. By doing this project, we have probably gained information on the functionality of the automatic braking system, and for future research and research, we hope to develop the system into a more advanced speed control system for motor vehicle safety, while recognizing that this requires a lot of work and learning, such as microcontroller design and vehicle design. Therefore, we believe that the integration of all components into the Automatic Braking System will increase security and provide such a system with a bigger market space and a competitive edge in the market.

REFERENCES

1. http://members.rennlist.com/pbanders/ecu.htm. This link refers to a technical document that contains information about the electronic control unit.
2. http://www.aa1car.com/ This website contains technical articles, books, and manuals that help us find what's wrong with our vehicle and what needed to fix it.
3. David Epsilon, An embedded software premier, Pearson education, 1999.
4. Joshua Pérez, Fernando Saco, Vicente MI lanes, Antonio Jiménez, Julio C. Diaz and Teresa de Pedro, an RFID based Intelligent Vehicle speed controller using active traffic signals, SENSORS 2010, 15872 5888; doi: 10.3390/s100605872.
5. Van NE's. N; Houtenbos. M; van SC Hagen. I: Improving Speed behaviour: The Potential of In-Car Speed Assistance and Speed Limit Credibility. IET Intel. Transp. Syst. 2008, 2,323-330.
6. MI lanes, V. Onieva, E. Perez, J. De Pedro, T. Gonzalez, C. Control of Velocidad Adaptativo para Entornos Urbanos Congestionados. Rev. Iberoam, automat. Informat. Ind.2009,66-73.