

# Intelligent Braking System

R.M Choudhari<sup>1</sup>, Arshad M. Shah<sup>2</sup>,

<sup>1</sup>student, Department of Mechanical Engineering, Padmashri Dr. V.B. Kolte College Of Engineering, Malkapur, Buldhana Dist, Maharashtra, India

<sup>2</sup>assistant Professor, Department of Mechanical Engineering, Padmashri Dr. V.B. Kolte College Of Engineering, Malkapur, Buldhana Dist, Maharashtra, India

## ABSTRACT

Now days the no. of accident are so high and uncertainly. Accident occurs frequently and causes worse damage, serious injury and even death. Most accident takes place due to driver error in recognition, judgments or vehicle operation. Not so long ago, it would have seemed incredible that your car would be able to “see” other vehicles or pedestrians, anticipate collisions, and automatically apply the brakes or take corrective steering actions. But more and more cars can do that to some degree, thanks to a growing list of collision avoidance systems. This project is about a system known as 'Intelligent braking system' (IBS) which employ several sensors to respond when emergency conditions occur. The system includes an ultrasonic sensor wave emitter provided on the front portion of the vehicle. An ultrasonic receiver is also fitted to receive the signal. The reflected wave gives the distance between the obstacle and the vehicle. Then a microcontroller is used to detect the pulses and apply brakes to the vehicle without driver's input and hence it can increase safety

**Keyword:** - Ultrasonic Sensor, Intelligent Mechatronic system, RPM counter, Microcontroller. The extremely rapid response time provided by the electronic control can be used for crucially shortening the braking distance by introducing advanced control of braking system operation Adriano Mega 1280/2560.

## 1. INTRODUCTION

Road accident is most unwanted thing that happens to road user. Sometimes this accident proves to be fatal. The major source of car accident is human error. These accidents are mostly caused by delay of the driver to press the brakes. The basic approach of this paper is to design a system which will prevent such accidents by continuously keeping the record of the distance between two vehicles. In IBS, ultrasonic sensor senses imminent collision with another vehicle, person or obstacle and the microcontroller in the system activate the brakes and it will slow down the vehicle or bring it to stop if needed. This IBS has to be work with ABS (antilock braking system) equipped in vehicle in order to increase control over vehicle while emergency braking. The primary objective of this system is to develop a safety car braking system using ultrasonic sensor and to design a vehicle with less human attention to the driving.

When the driver comes to know that the vehicle is going to collide, they become nervous and they don't apply the brakes or apply brakes with insufficient braking force than that of required by the vehicle to slow down and come to rest and hence get collide with the obstacle. Majority of accident occurs this way. IBS eliminates such types of problems like semi applied brakes, reaction time, stopping distance and distance between two vehicles to avoid such accident.

## 2. CIRCUIT DIAGRAM

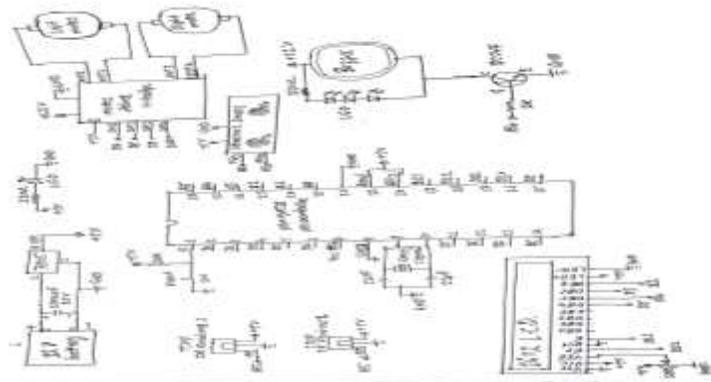


Fig. circuit diagram of Intelligent Braking System

### 3. WORKING

In this system we have used Microcontroller Atmega328P for controlling the whole system. Working of this project is depends on Ultrasonic Sensor Module. In this system Ultrasonic Sensor Module is used for detecting the obstacle in front of vehicle. Ultrasonic sensor help us to detect at which distance the obstacle is present. This module senses the obstacle in the range 4 meter accurately.

Ultrasonic sensor module is fixed at front side of vehicle. This module consist of ultrasonic transmitter and ultrasonic receiver. This module has 4 pins in which two pins for vcc and ground. This module required 5 volt dc supply. Another two pins as trigger and echo pin. When microcontroller applied trigger signal to trig pin of ultrasonic module for 10 micro second then transmitter generates sound signal of 40 KHz. This sound signal is reflected back from obstacle surface within range 4 meter. This reflected sound signal captured by the ultrasonic receiver and generate electrical signal at echo pin. Microcontroller calculates the time period of trigger and echo signal. After placing time period in mathematical formula the distance of obstacle is calculated. In this system trig pin of ultrasonic sensor is connected to A0 pin of microcontroller and echo pin is connected to A1 pin of microcontroller.

The TSOP IR receiver is connected to A5 pin of microcontroller. Which is to receive the signals from IR remote. We are using IR remote to control the vehicle forward, backward and stop wirelessly.

The H-Bridge motor driver circuit is used in this system to drive the 12 volt dc geared motors. The input 1, input 2, input 3 and input 4 of motor driver circuit is connected to D, D8, D9 and D10 pins of microcontroller respectively. Output of motor driver is connected to left motor and right motor.

In this system 16x2 LCD is used to show the distance of obstacle from the vehicle. 16x2 LCD's data pin DB4, DB5, DB6, DB7 are connected with pin D5, D4, D3, D2 of microcontroller. And command pin RS and EN is directly connected with pin D12, D11 of microcontroller. RW pin of LCD is directly connected with ground. Whenever the obstacle comes in range 2 meter the buzzer alarm starts beeping and range of obstacle displayed on LCD. After when the vehicle is at 1 meter range from obstacle then the microcontroller generates signals to stop both motors. In this way the vehicle will stop at 1 meter range and avoids accident. In this project we are using gear motors to stop the vehicle instead of brakes in real life we can use pneumatic brakes to stop the vehicle by using this system.

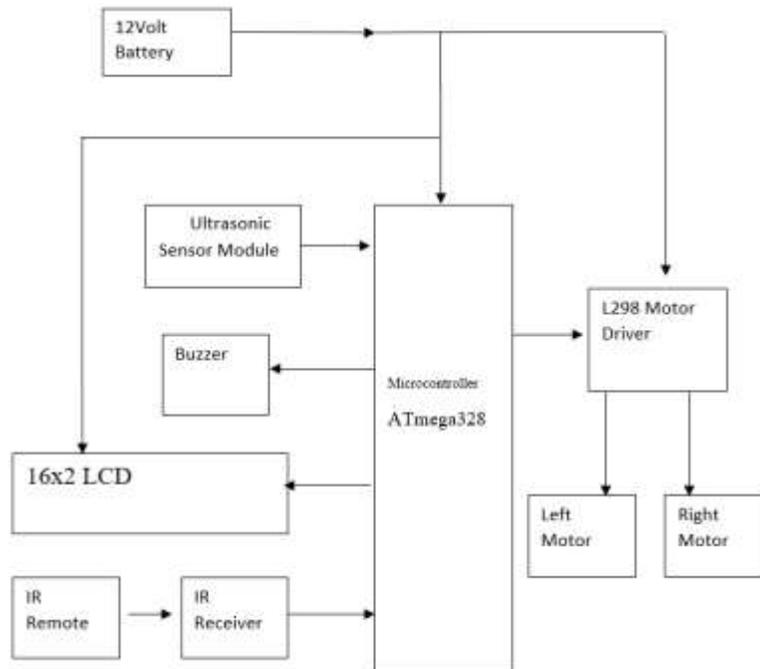


Fig. Block Diagram of Intelligent Braking System

#### 4. FINAL IMPLEMENTATION



#### 5. ADVANTAGES

Arduino Platform is allowed for easy and fast prototyping. Being able to just hook up LCD and be able to display messages on it in a matter of minutes. The Arduino hardware platform already has power and reset circuitry setup as well as circuitry to program and communicate with the microcontroller over USB.

#### 6. CONCLUSION

Intelligent Braking System has very large potential to eliminate accidents and reduce the severity of those that occur. Indeed it can be considered as one of the most powerful collision avoidance system in present. As ultrasonic sensor can detect any kind of obstacle hence this can also work with less human attention to driving. People have higher expectation of cars and need safer, smarter and more comfortable cars. Therefore, the safety system of cars will be better developed and also will have more demand in upcoming time. Implementation of such an advance system can be made compulsory as similar to wearing seat belt so that accident can be advert to some extent.

#### 7. REFERENCES

1. Collier W. J. and Wieland, RJ. "Smart Cars Smart Highways", *EEE Spectrum*, *April* 1994.
2. Ploannou P. and Xu Z., "Throttle and Brake Control Systems for Automatic Vehicle Following", *Path Research*
3. Raza H., Xu Z. and Ioannou P., "Experimental Evaluation of Cooperative Driving System", Report 97-7-01, July 1997. Report UCB-ITS-PRR-94-10.11-583
4. Solomon S, "*Sensors Handbook*", McGraw-Hill, New York, 1999.
5. Granet F. and Picado R, "Longitudinal Collision Avoidance", <http://www.path.berkeley.edu/~lea@AVCSS/LongCollAvoid/> February 2000
6. Unnamed Author, "Range Finding Devices", <http://www.geocities.com/SiliconValley/Ci81S/ali/device.htm>, 19 February 2000
7. Jhang K W., Hyun I.G. and Song K.I. et al, "A Novel Method for Distance and Relative Velocity Measurement in Rear-End Collision Warning System", *Society of Automotive Engineer, Inc.* 1996.
8. Beckwith T. G., "Mechanical Measurement", Addison Wesley, 1990
9. Raza H., Xu Z. and Ioannou P., "Modelling and Control Design for a Computer-Controlled Brake System", *IEEE Trans. Control System Technology*, Vol. 5, No. 5, *May* 1997.

10. *Sheikholeslam S. and Desoer C. A, Longitudinal Control of a Platoon of Vehicle 1: Lineat Model*", PATH
11. *Sheikholeslam S. ami Desoer C. A, "Longitudinal Control of a Platoon of Vehicle 2: First and Second Order Derivatives of Distance Deviations, PATH Research Report and soft Computing, Prentice Hall 1997.*
13. *Kosko B., "Fuzzy Engineering", Prentice Hall 1997*
14. *Wang L.W, " Adaptive Fuzzy Systems and Control: Design and Stability Analysis", Rentice Hall 1994.*
15. *T. L. Chin and George Lee C. S., "A Neuro-Fuzzy*