

Ultrasonic Braking Using Smart Sensoring System

A. Aravinth kumar¹ R.Kumar² Ajith Arul Daniel³ A.Parthiban⁴

^{1,2,3}Assistant Professor, Department of Mechanical Engineering, Vels Institute of Science, Technology & Advance Studies, Chennai, 600117, India

⁴Associate Professor, Department of Mechanical Engineering, Vels Institute of Science, Technology & Advance Studies, Chennai, 600117, India

Abstract

In the fast moving world, it is very difficult to keep distance between the vehicles especially in city signals, the vehicles are stopped nearer to each other. If the vehicle is going in the road, suddenly the driver loses the vehicle's control; then the driver dashes the vehicle to the tree. It will cause loss of lives and damage to the vehicle itself. If two vehicles are going successively in road or overtaking the another vehicle, suddenly the first vehicle applies brake and slows down the vehicle then the second vehicle dashes the first vehicle due to the improper distance between the vehicles. It will cause damage to the vehicle. Our aim is to reduce the above things by device to prevent the accidents and damages to the vehicles.

Keywords: *ATMEL microcontroller, Ultrasonic Transmitter and Receiver*

1. Introduction

While we have a tendency to square measure traveling within the vehicle we should always management the break if any objects forthcoming people. For that, we've got designed this project for automatic braking system. Whenever we have a tendency to management the break, at the time what happens within the system suggests that one amongst the coil winding is placed around it. It generates the emf and it's fitted with the appropriate mechanical set. After we unleash the break the force generation is stopped and also the coil winding releases from the mechanical set.

1.1 Description

When we are in travel the brakes must be in control with us, in order to avoid accidents. This system is activated on electromagnetic technique. That is when we are controlling the break; the relevant sensor signal produces from the object sensor. The controller controls the action goes under in peripherals. The microcontroller already programmed if the sensor signal comes means the vehicle speed reduced gradually and then stop the vehicle. The vehicle speed reduced with the help of electromagnetic force and rack pinion arrangement. In electromagnetic arrangement electromotive force created with the help of primary and secondary coils. So the controller output gives to the relay driver signal and finally it provides the relevant voltage to magnetic coil winding, the magnetic coil generates the electromotive force and it pulls the magnetic setups to attract it. Likewise when we release the break the force will be reduces and it releases from mechanical setups.

2. Literature review

The literature survey is carried out to understand the state of art behind sensor technology used in automotive engineering. Below are the following journals. Hemalatha B K, [1], Paper comprises the use of Infrared sensors for obstacle detection with help of PIC microcontroller. This supported microcontroller technology for aggregation information associated with speed and transmittal it through a transceiver to a base station that analyzes the transmitted information and takes applicable choices associated with regulation and management necessities[3], paper comprises of the use of ultrasonic sensors with help of PIC microcontroller, transducers and servo motor braking mechanism. It is supposed to use in vehicles wherever the drivers might not brake manually, however the speed of the vehicle is reduced mechanically thanks to the sensing of the obstacles.

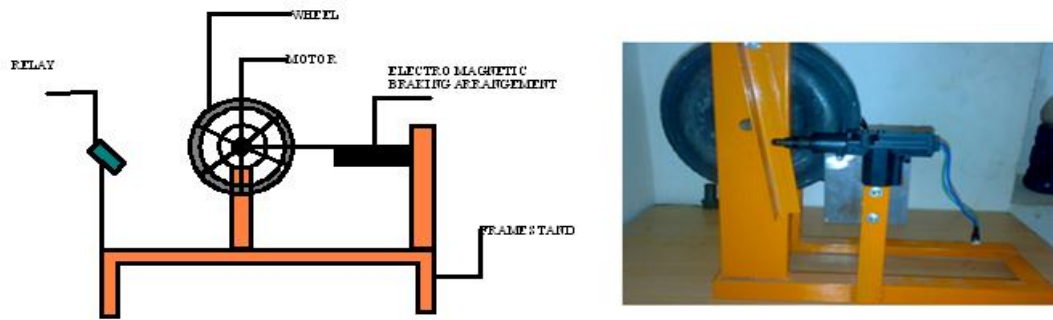


Fig. 1. Braking Unit

3. Block Diagram

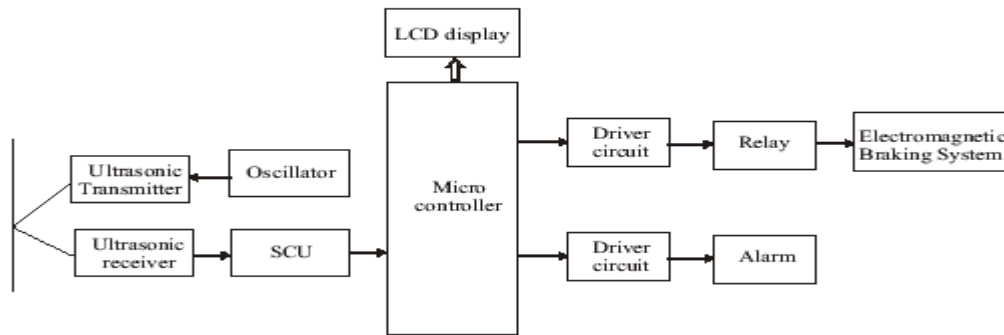


Fig. 1.1 Block Diagram Of Ultrasonic Sensor Distance Controller

3.1 Circuit Layout

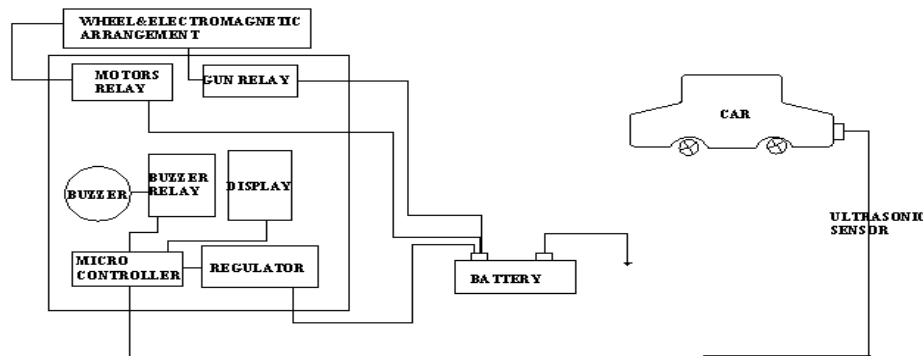


Fig. 1.2 Circuit Diagram

In this circuit diagram the ultrasonic sensor is placed in the front of the vehicle. The ultrasonic sensor emits and receives waves. The ultrasonic sensor is connected to microcontroller. The microcontroller output signals are connected to buzzer, display, gun relay. Since the buzzer, display, microcontroller requires only 5 volts we use the voltage regulator. Motor relay and gun relay requires 12 volts so we give a direct connection from the battery. Motor relay runs the motor and gun relay actuates the electromagnetic gun.

3.2 Ultrasonic Distance Meter

A method and system is disclosed for crucial the situation of a member of a category of individual transmitter-receiver units distributed throughout an outlined facility. A central station establishes a double-way line with one or additional booster stations and sends a coded message distinguishing a selected individual part over the line. The booster stations answer the message by causation out wake-up signals and energy inquiry signals.

3.3 Ultrasonic Transmitter and Receiver

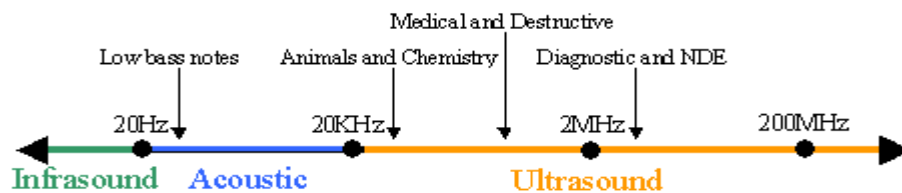


Fig. 2 Ultrasonic Wave Length

Ultrasonic refers to any study or application of sound waves that are higher frequency than the human hearable vary. Music and customary sounds that we tend to contemplate pleasant are usually twelve kilocycles per second or less, whereas some humans will hear frequencies up to twenty kilocycles per second. Inaudible waves incorporate frequencies larger than twenty kilocycle per second and exist in far more than twenty five Mc. Inaudible waves are employed in several applications together with plastic fastening, medicine, jewellery cleansing, and nondestructive check. At intervals nondestructive check, inaudible waves offer North American country the power to “see through” solid/opaque material. Associate in Nursing find surface or internal flaws while not touching the fabric in an adverse manner.

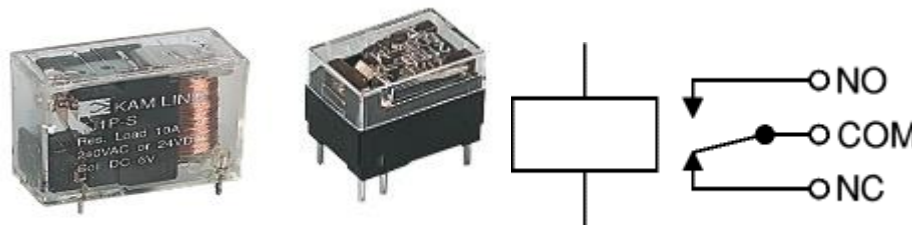


Fig. 2.1 Relay Unit

The relay's switch connections are usually labeled COM, NC and NO:

- COM = Common, always connect to this; it is the moving part of the switch.
- NC = Normally Closed, COM is connected to this when the relay coil is off.
- NO = Normally Open, COM is connected to this when the relay coil is on.

3.5 Atmel Microcontroller

Microcontrollers are designed to play an increasingly important role in revolutionizing various industries and influencing our day-to-day life more strongly than one can imagine. Since its emergence in the early 1980's the microcontroller has been recognized as a general-purpose building block for intelligent digital systems. It is finding using diverse area, starting from simple children's toys to highly complex spacecraft. Because of its versatility and many advantages, the application domain has spread in all conceivable directions, making it ubiquitous. As a consequence, it has generate a great deal of interest and enthusiasm among students, teachers and practicing engineers, creating an acute education need for imparting the knowledge of microcontroller based system design and development.

4. Micro Controller

A micro controller is a complete microprocessor system built on a single IC. Microcontrollers were developed to meet a need for microprocessors to be put into low cost products. But the typical 8-bit microprocessor based system, such as one using a Z80 and 8085 is expensive. Both 8085 and Z80 system need some additional circuits to make a microprocessor system.

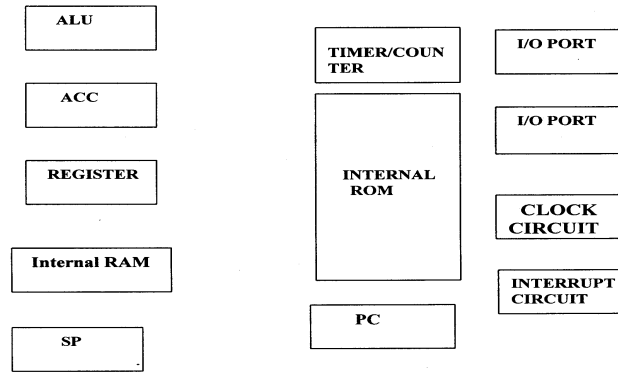


Fig 2.2 Block diagram of microcontroller

4.1 Atmel Microcontroller

- **SERIES:** 89C51 Family
- **TECHNOLOGY:** CMOS

4.1.1 Features of 8-bit Micro controller ATMEL 89C51:

- 8 Bit CPU optimized for control applications
- Extensive Boolean processing (Single - bit Logic) Capabilities.
- On - Chip Flash Program Memory
- On - Chip Data RAM

5. Buzzer

A buzzer or electronic device may be a device, sometimes electronic, generally employed in cars, manages appliances like a microwave, or game shows. It comprises of variety of switches or sensors connects to a sway unit that determines and if that button was pushed or a planned time has non church going, and typically illuminates a light-weight on the specified button or instrument panel, and sounds a warning within the style of endless or intermittent noisy or beeping sound. At the start this device was supported AN mechanical device system that was clone of an electrical bell while not the metal gong (which makes the ringing noise).

5.1 Features

- Detection in all direction without dead angle
- Totally built-in installation with no bad effect to the car application
- The sensor antenna is installed inside the bumper, no need for drill on their bumper

During approaching to an obstacle, the electronic unit activates the acoustic signaling with 3 types signals

- A continue sound of “beep” approximately between 0, 0.3m
- A short interval sound of “beep” approximately between 0.3-0.5m
- A1 long interval sound of “beep” approximately between 0.5-0.7m

6. Electromagnetic Gun

Propellant steam-powered Guns are usually restricted To Muzzle Velocities on the Order of 2000 Meters per Second. Barrels merely cannot face up to The Temperatures and Pressures needed For Higher enlargement Rates of the Propellant Combustion product (Normally CO₂ and Nox).



Fig 3 Electromagnetic Gun

One try At a Gun for Higher Velocities Used Differential Pistons Connected to attain low One for Compression of the Drive Gas) to supply A high of element Gas (Hydrogen is that the Lightest, and thus quickest increasing, Of All Gasses). Whereas Some Success Was Achieved, The equipment was Cumbersome and therefore the Velocities Were Still restricted. for a few Applications, notably Orbital Launching, this is often meager (Earth velocity Is eleven,200 M/S).

6.1 Types of Electromagnetic Gun

Two basic sorts of magnetic force gun area unit represented within the patent literature, the rail gun and therefore the coil gun. Each use keeps energy sources to provide an outsized force field and a high electrical phenomenon through a driving coil.

6.1.1 Rail Gun

The rail gun used here is very simple in conception. A conductive coil is found between two electrically conductive rails that area unit command stiffly parallel to at least one another by insulators. Connecting the rails to a supply of hold on power causes a current to flow down one rail, through the coil, and back to the supply through the opposite rail. Thus the rails generate force fields perpendicular to the rails. This supply of current through the coil inside this field, which then generates a force, may tends to propel the arm.

6.1.2 Coil Gun

The coil gun which can be operated as a linear type induction motor. A series of coil coils ar consecutive connected to sources of keep power (capacitors) generating a field that travels down the bore of the gun. The quickly dynamical field induces a current in an exceedingly ring formed coil, opposite in direction to this within the solenoids.

In order for a coil gun to operate at cheap potency, the coils should be energized even as the coil exits the solenoid. Varied temporal order and detection circuits are represented, counting on optical or inductive sensing of the coil position and quick semiconductor switches. These all become prohibitively big-ticket at the present levels required to accelerate a helpful payload.

7. Liquid Crystal Display

Liquid crystal displays (LCD's) have materials, that mix the properties of each liquids and crystals. instead of having a temperature, they need a temperature vary inside that the molecules area unit virtually as mobile as they'd be during a liquid, however area unit sorted along in associate ordered kind almost like a crystal. The recent advancements have resulted in more

legibility, a lot of data displaying ability and a wider temperature vary. These have resulted within the LCDs being extensively employed in telecommunications and amusement physics.

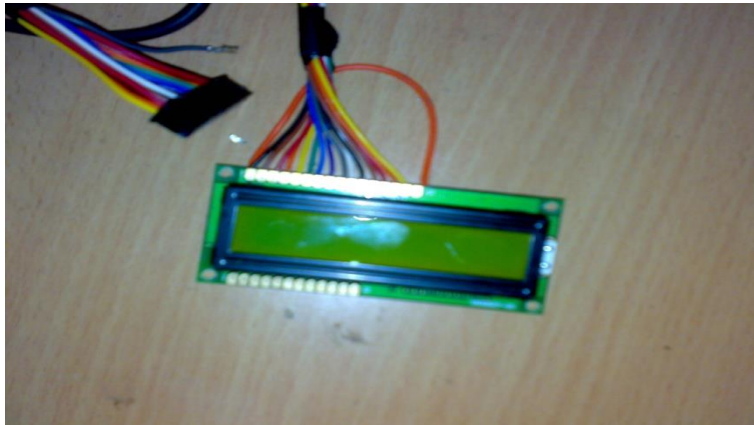


Fig 4 Lcd Display

8. Conclusion

The entire report offers a short discuss of “Ultrasonic sensing element Distance Controller”. several benefits square measure there in comparison to alternative automatic braking system. The planned system supported ATMEL microcontroller is found to be a lot of compact, user friendly and fewer advanced, which might promptly be employed in order to perform many complex tasks. Though it's designed keeping in mind regarding the necessity for business, it will extended for alternative functions like business applications. because of the chance of engineering (Atmel microcontroller) used this “Ultrasonic device Distance Controller” system is totally package controlled with less hardware circuit. This feature makes that this technique can be the platform for future systems.

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