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# Design of Fabrication of Automatic Braking System

**Ashish Deshmukh**
UG Student,
Department of Mechanical Engineering,
VIT Kamshet, Pune.

**Suraj Singh**
UG Student,
Department of Mechanical Engineering,
VIT Kamshet, Pune.

**Shreesh Shukla**
UG Student,
Department of Mechanical Engineering,
VIT Kamshet, Pune.

**Vivek Bachhav**
UG Student,
Department of Mechanical Engineering,
VIT Kamshet, Pune.

***Abstract:***
***An ultrasonic car braking system includes; an ultrasonic wave emitter provided in a front or portion of an automatic braking car producing and emitting ultrasonic waves frontward in a predetermined distance in front of the car. Ultrasonic receiver also formed in a front portion of the car operatively receiving a reflective ultrasonic wave signal as reflected by obstacles positioned within the pre-determined distance in front of the automatic braking car.***

***Keywords:*** ***Reverse braking, 8051 microcontroller, Ultrasonic sensor etc.***

## INTRODUCTION:

A large Driving is a compulsory activity for most people. People use their car to move from one place to other place. The number of vehicle is increasing day by day. It is produced tacked tightly and risk to accident. Nowadays, the numbers of accident is so high and uncertainly. Accident will occurs every time and everywhere and cause worst damage, serious injury and dead. These accidents are mostly cause by delay of the driver to hit the brake.This project is designed to develop a new system that can solve this problem where drivers may not brake manually but the vehicles can stop automatically due to obstacles. This project is about a system that can control braking system for safety. Using ultrasonic as a ranging sensor, its function based on ultrasonic wave. After transmit by transmitter, the wave can reflect when obstacle detected and receive by receiver. The main target for this project is, car cans automatically braking due to obstacles when the sensor senses the obstacles.

The braking circuit function is to brake the car automatically after received signal from the sensor.

The traffic accident is increasing as automobile production is increasing. It is important to prevent accidents so as to protect the driver, pedestrians, and valuable properties when accidents are occurred. Many technologies have been developed for vehicles to avoid accidents while moving in forward direction. But when vehicles moves in direction, loads of problems are faced by drivers. Researches have been made on automatic braking systems, but we are introducing automatic brakes in path. Generally a driver faces a difficulty in recognition of objects on path, keeping this fact in mind here we are introducing a system. The system includes controller logic and the obstacle sensor to detect the objects.Therefore, in this project we propose an "Automatic Braking system" to prevent collision by using sensors to detect obstacles.

The "Automatic Braking system" will process the sensor data and control the vehicle to prevent accidents caused by careless driving or difficulty in detecting objects in path. In this, we designed the auto-braking system which keeps a distance between the object and vehicle to prevent accident using sensors and is fabricated using 8051 as a control unit and ultrasonic sensor.

The system includes a novel technology to make vehicles safer and more efficient. The system is probably the most reliable means of detecting human beings and objects and, therefore, invaluable in the prevention of injury or fatal accidents. The aim of this paper is to develop an automatic braking system when the vehicle detects an obstacle in its path.

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## LITERATURE REVIEW:

Eung Soo Kim says in the paper "FABRICATION OF AUTO-BRAKING SYSTEM FOR PRE-CRASH SAFETY USING SENSOR" that the auto-braking system was designed by VHDL and fabricated to keep a distance between two cars. It provides pre-crash safety system for intelligent car. This module can detect the distance between front vehicle and driver's vehicle to keep a constant distance using a sensor and operate the brake system forcibly if the driver does not decrease the speed of car. The system displays the distance between the two vehicles and the speed of your vehicle. The performance of the system was good.

Design and Implementation: The fabricated auto-braking system has the sensor part and signal processing part to prevent an accident. It performed monitoring the environment and sensor signal processing. The sensor embedded in vehicle will detect the road environment, such as self-velocity, distance from front vehicle, and surroundings vehicles, using infrared sensor and ultrasonic sensor. These sensors were operated all the time during driving. The processing part accepted the signal from sensors and processed the signals and generated the instructions and transferred the generated instruction to control unit of transmission and brake of vehicle. There are three cases occurred in real situations. One case is that the distance between the front car and driver's car is far enough to defend crashing and self-velocity is the same velocity of front car or slower than that of front car. In this case, the driver's car is continuously running without changing its velocity. Another case is that the distance between the front car and driver's car is near and self-velocity is slower than that of front car. In this case, the driver's car is also continuously running without changing its velocity.

Another case is that the distance between the front car and driver's car is near and self-velocity is faster than that of front car. In this case, the driver's car is continuously running only when the driver reduce speed. But if the driver does not reduce speed, the auto-braking system may forcibly reduce the speed of driver's car to protect an accident.

Niveditha.P. et.al says in the paper "COLLISION WARNING SYSTEM USING ULTRASONIC SENSORS AND AUTOMATIC BRAKE SYSTEM" that vehicle technology has increased rapidly in recent years, particularly in relation to braking system and sensing system. In parallel to the development of braking technologies, sensors have been developed that are capable of detecting physical obstacles, other vehicles or pedestrians around the vehicle. This development prevents accidents of vehicles using Stereo Multi-Purpose cameras, Automated Emergency Braking Systems and Ultrasonic Sensors. The stereo multi-purpose camera provides spatial intelligence of up to 50 metres in front of the vehicle and there is environment recognition of 500 metres. Cars can automatically brake due to obstacles or any hindrance when the sensor senses the obstacles. The braking circuit function is to brake the car automatically after receiving signal from the sensors. All cars are competent in applying brakes automatically to a maximum extent of deceleration of 0.4g. Integrated safety systems are based on three principles. They are: collision avoidance, collision mitigation braking systems and forward collision warning.The framework of the proposed system is developed for a safety car braking system using ultrasonic sensor and to design a vehicle with less human attention to the driving. This technology could be further enhanced.The same can be implemented in aircrafts, submarines. But automatic brakes cannot be used always. So it can be replaced by action of automatic diversion with the help of various sensors such as radar sensors, distance sensors, etc. The stereo multiple camera has a kind of approach which also enables an assist to further develop the system to be able to detect slowly moving object in a very disturbed environment. There are experiments which are being conducted with challenging on-road datasets. The results displayed are that of a combined approach which outperforms than a feature-based approach in a disturbed environment.This exploration endeavors to propose a more proficient Information

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Communication Technology (ICT) based process. The proposed outline makes utilization of radio recurrence (RF) as a method for correspondence between the Attendant Management Data Server (AMDS).

classrooms or address corridors. The Student Attendant Management Information System (SAMIS) was planned and tried. The SAMIS gathers and oversees understudies participation records from RFID gadgets introduced in the address lobbies. Aamir Nizam Ansari et.al. [4] Explains the reason for this paper is to build up a remote framework to identify and keep up the participation of an understudy and find an understudy. For, this the understudies ID (recognizable proof) card is labeled with a Radio-recurrence ID (RFID) inactive label which is coordinated against the database and just finished once his unique mark is checked utilizing the biometric finger impression scanner. A man should be found should be possible by two implies that is by means of the site or by sending the move number of the understudy as a sms to the GSM modem which will answer by taking the last area put away of the understudy in the database.

Srivignessh Pss et.al. [5] Says the minimized and solid classroom participation framework utilizing RFID and face confirmation is displayed in this paper. The RFID framework distinguishes the understudy utilizing the RFID card and further character check of the understudy is done utilizing face acknowledgment method. RFID particularly recognizes the understudy in view of the card number, then an individual (Fast Adaptive Neural Network Classifier – FANNC) classifier is utilized to check the substance of every understudy solely. The framework is prepared and tried by leading examinations on FEI confront database. Every classifier is prepared utilizing face pictures of every understudy in seven distinctive head postures and it is tried against six unique stances. The execution of the framework is tried for frontal face confirmation, head posture fluctuated confront check and recognition of intermediary participation is completed.

## PROBLEM STATEMENT:

The number of vehicles is increasing day by day and proportionally the numbers of accidents are also increasing. These accidents are mostly caused by the delay of the driver to hit the brake. To prevent the accidents caused by this delay, ultrasonic braking system is used in automobiles.

The main target of the ultrasonic braking system is that, cars should automatically brake when the sensors sense the obstacle. This is a technology for automobiles to sense an imminent forward collision with another vehicle or an obstacle, and to brake the car accordingly, which is done by the braking circuit. This system includes two ultrasonic sensors viz. ultrasonic wave emitter and ultrasonic wave receiver. The ultrasonic wave emitter provided in front portion of an automatic braking car, producing and emitting ultrasonic waves in a predetermined distance in front of the car. Ultrasonic wave receiver is also provided in front portion of the car, receiving the reflected ultrasonic wave signal from the obstacle. The reflected wave (detection pulse) is measured to get the distance between vehicle and the obstacle. Then 8051 microcontroller is used to control the DC motor based on detection pulse information and the servo motor in turn automatically controls the braking of the car. Thus, this new system is designed to solve the problem where drivers may not be able to brake manually exactly at the required time, but the vehicle can still stop automatically by sensing the obstacles to avoid an accident.

## OBJECTIVES :

The objectives of this project are:

1. To develop a safety car braking system using ultrasonic sensor
2. To design a vehicle with less human attention to the driving
3. To develop a model showing working of ultrasonic sensor based braking system.
4. To propose a low cost automation system which can be implemented easily in today's cars to provide safety and accuracy while driving and parking.

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## METHODOLOGY :

This project consists of a handheld range finding device using ultrasonic transducer and an 8051 microcontroller. A two-line LCD display is used to display the measurements. There is a 40 kHz transmitter and receiver. The 40 kHz-transmission signal is generated via a square wave outputted from the 8051.

The 8051 is then used to calculate the time of flight (TOF) for the sound wave that is bounced off of distant objects.

The return signal is amplified using two op-amp amplifiers. There are three potentiometers that need to be calibrated for correct operation. One controls the contrast of the LCD display. Another controls the amplification of the third stage of the amplifier system. The third controls the voltage offset that connects to the base of a NPN switching transistor. The measurement range of the device is one to ten feet. Further distances can be measured, but due to circuit noise erroneous measurements can be obtained for longer distances. The absolute maximum range that can be measured is about twenty feet. In this research, an adaptive cruise control system is developed and implemented on an AIT intelligent vehicle.

1. To develop the adaptive cruise control system, the original throttle system and braking system of the vehicle have to be modified.
2. The original throttle valve which is controlled by a cable from the accelerator pedal is modified to the drive-by-wire system by using a dc motor with a position control algorithm.

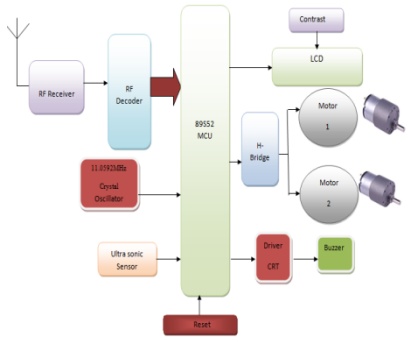


Figure: 5.1 Block Diagram of the System

## WORKING OF THE SYSTEM:

1. Power on the system.
2. Transmitter side there is switches to operate remote area vehicle. Each switch has its specific task, move vehicle left, right, forward, Reverse, stop etc.
3. If any obstacle come in front of vehicle then vehicle stop automatically.

## SYSTEM DESIGN :

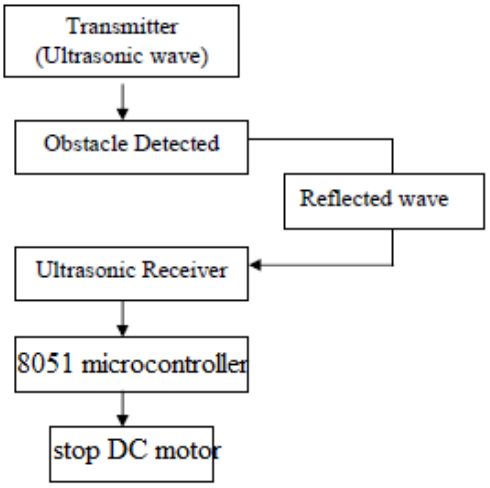


Figure: 6.1 Flow algorithm of the System

Hardware Required

1. LCD
2. At89s52
3. Ultrasonic sensor
4. Power Supply
5. Dc motors

## ADVANTAGES:

1. Quick and accurate.
2. Use of Mechatronics system makes safe and reliable.
3. Can be used for both obstacle detection and distance calculation which is needed while parking and driving.
4. User can check the results on LCD so no need to turn back.

## APPLICATIONS:

1. Intelligent parking or brake system
2. Industrial applications

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3. In automatic system
4. Audio can be propagated by modulated ultrasound.
5. In Marine Applications (sonar etc.).

## FUTURE SCOPE:

The introduced braking system in this project is very cheap and is affordable for anybody. But the actual importance for the safety increases the value of this system. Due to this the various changes, modifications, new ideas are introduced. These changes are observed and analyzed the importance of this system. So these automobile industries are about to launching the various intelligent systems to increase safety of customers. National and international organizations evaluate Motorcycle ABS as an important factor to increase safety and reduce motorcycle accident numbers. The European Commission passed legislation in 2012 that made the fitment with ABS for all new motorcycles above 125cc to be mandatory from 1 January 2016. A new technology from Volvo may launch which allow cars to park automatically. Recently, Volvo has announced its working automatic parking system dubbed Autonomous Parking. It uses sensor system to park the vehicle without driver. This feature will include in next XC90. Volvo Autonomous Parking can find spots and park.

## CONCLUSION:

This project presents the implementation of an Ultrasonic Automatic Braking System for Collision Avoidance, intended to use in vehicles where the drivers may not brake manually, but the speed of the vehicle can be reduced automatically due to the sensing of the obstacles. The relative speed of the vehicle with respect to the obstacle is estimated using consecutive samples of the distance calculated. It is used by the control system to calculate the action on the brakes, to adjust the speed in order to maintain a safe distance to prevent accidents. This factor, coupled with the fact of lower cost and power consumption of ultrasonic sensors, could facilitate the application and mounting of the system in many low-end vehicles, thus helping to improve safety and offer a hassle free driving experience at a reduced cost. With this future study and research, we hope to develop the system into an even more advanced speed control system for automobile safety, while realizing that this certainly requires tons of work and learning, like the programming and operation of microcontrollers and the automobile structure.

We believe that the incorporation of the accelerator pedal disengagement mechanism will maximize safety and also give such system a bigger market space and a competitive edge in the market.

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