

Automatic Braking System

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Abstract— An automatic Braking system is an intelligent mechatronic system includes an Ultrasonic wave emitter provided on the front portion of a car producing and emitting Ultrasonic waves. An Ultrasonic receiver is also placed on the front portion of the car operatively receiving a reflective Ultrasonic wave signal.

Indexed Terms— Aurdino Board, Solar Panal, Ultrasonic Sensor, Braking System, D. C. Motor

I. INTRODUCTION

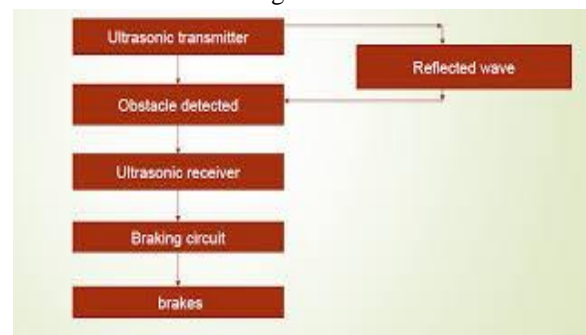
Nowadays, the number of accidents is so high and uncertain. Accident will occur every time and everywhere and cause worst damage. Serious injury and dead. These accidents are caused by mostly delay of the driver to hit the break.

The project is designed to develop a system that can solve this problem where drivers may not brake manually but the vehicles can stop automatically due to obstacles. Using ultrasonic as a ranging sensor, its function based on ultrasonic sensor. After transmission by transmitter, the wave can reflect when obstacle detected and received by the receiver The Arduino board is used by creating and dumping the required c program, which consists the PIC microcontroller in it. Then PIC (programable Interface Controller) microcontroller is used to control the servo motor based on detection pulse information and the servo meter 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.

Figure A:



II. PROPOSED SYSTEM

In this project we are using ultrasonic sensor & solar system. The ultrasonic sensor is used to detect the obstacle and sends it to aurdino board receives the signals and controls the braking system.

The vehicle we solar energy for the working of the vehicle where the solar panel is placed at the top of the vehicle. And also total functioning of the braking system is controlled by the aurdino board which receives the signal from the sensor

III. WORKING PRINCIPLE

- Each car manufacturer has it's own automatic braking system technolog, but they all rely on some type of sensor input .
- Ultrasonic sensor contains transmitter and receiver units, and as ultrasonic transmitter detects the obstacle by transmitting the signals and reflects back to ultrasonic receiver unit.

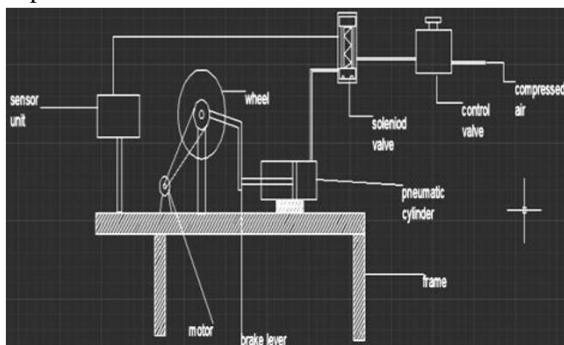
- Ultrasonic sensor input is then used to determine if there are any objects present in the path of vehicle.
- If an object is detected, the system can then determine if the speed of the vehicle is greater than the speed of the object in front of it.
- By which through Arduino dumped C Program the calculations will takes place through PIC microcontroller according to given maximum distance, and distance between automatic system and obstacle.
- The DC gear motor rotates uniformly at a given rpm and gradually reduces speed while automatically braking the system through servomotor braking mechanism phenomena
- A significant speed differential may indicate that a collision is likely to occur, in such case the system is capable of automatically activating the brakes.

IV. HARDWARE REQUIREMENTS

- Aurdino Board

Arduino Uno is a microcontroller board developed by Arduino.cc which is an opensource electronics platform mainly based on AVR microcontroller Atmega328.

The current version of Arduino Uno comes with USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output.



- Solar Panel

Solar panels are those devices which are used to absorb the sun's rays and convert them into electricity or the heat energy.

C. Ultrasonic sensor:

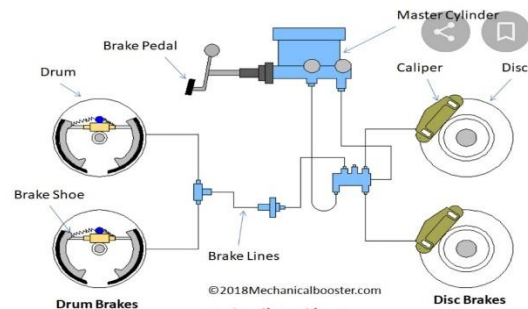
- An ultrasonic sensor transmit ultrasonic waves into the air and detects reflected waves from an object. There are many applications for ultrasonic sensors, such as in intrusion alarm systems, automatic door openers and backup sensors for automobiles.
- An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves.
- An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.
- High-frequency sound waves reflect from boundaries to produce distinct echo patterns

- D.C. Motor

DC Injection braking is a method of braking in which direct current is applied to the stationary windings of an AC motor after the AC voltage is removed.

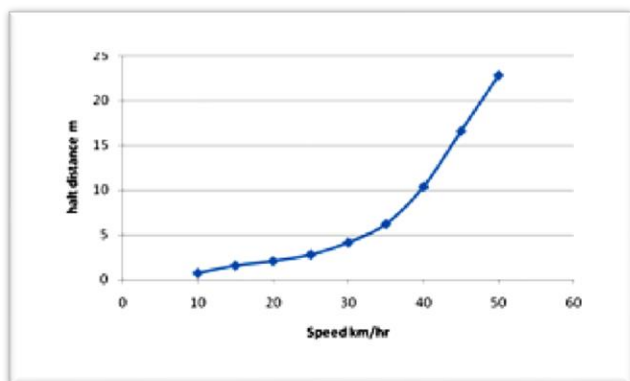
- Braking System

Braking system is the arrangement of various linkages and components (brake lines , brake drum or brake disc , master cylinder or fulcrums etc) that are arranged in such a fashion that it converts the vehicle's kinetic energy into the heat energy which in turn stops ...



- Result

As a result of this automatic braking system, the function of each part is working well and the whole system is successfully accomplished. The safety distance is determined then the vehicle system is braked when the obstacle is detected.



The ranging of the ultrasonic sensor in this prototype is about 2 cm to 1cm and works efficiently within the prescribed limit.

V. PROTOTYPE DEVELOPED



VI. CONCLUSION

This study suggests that there may be safety benefits from using this technology, such as reduction in stress, decreased lane changes and longer following distances for younger drivers. However, many drivers are not aware of the limitations of their systems, which raise safety concerns. The misunderstandings evidenced in the study, such as the false assumption that systems will help avoid a collision with a stopped vehicle. Drivers need to be better informed about situations in which their system is unlikely to react. Based on the potential safety benefits and problems more research is

needed to determine the overall safety impact of these systems. The future scope of the system is implementation on hardware. We can also include buzzers, indication lights and can set speed by using keyboard and keyboard encoder IC in this system.

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