ACCIDENT AVOIDANCE ROBOTIC VEHICLE USING ULTRASONIC

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ABSTRACT

This is accident avoiding robotic vehicle using ultrasonic sensor. This kind of system is fastest growing safety feature in automotive industries. Such system enables vehicles to identify the change of collision and decrease the speed of vehicle.so it is automatically Avoid collision. This project idea is based robot is made using ultrasonic sensor and it is controlled by Arduino microcontroller and the whole system will give you very good understanding that how this system works. The main aim of the system to prevent accidents mainly due to the not knowing the following distance(i.e.10ms) between the one vehicle and other vehicle .The proposed system comprises an idea of having safety while reversing a vehicle ,detects any object within the following distance by ultrasonic sensor and decrease the speed of vehicle according to the corresponding distance

.INTRODUCTION

Nearly 12,50,000 peoples are died in road crashes every year and average 3,287 deaths a day similarly 20-50 milli are injured and disabled. Among different reasons for street mishaps ,diverted driving with the most well-known reasons for the street mishaps around the globe ,bringing about a bigger number of accidents consistently than speeding , alcoholic and driving ,and other significant mishaps causes .Some of the main sources occupied driving mishaps incorporate utilizing a phone or versatile ,changing the radio ,especially messaging while in the same time driving ,the greater part of perilous type of diverted driving .To decrease occupied driving mishaps structured a protected separation keeping up vehicle to maintain a strategic distance from mishap utilizing ARDUINO with ultrasonic sensor
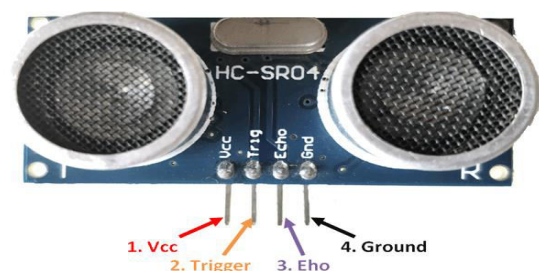
ARDUINO Board

ARDUINO Uno is a microcontroller board subject to the ATmega328P (datasheet). It has 14 computerized data/yield pins (of which 6 can be utilized as PWM yields), 6 clear wellsprings of information, a 16 MHz quartz important stone, a USB association, a force jack, an ICSP header and a reset button. It contains everything expected to help the microcontroller fundamentally interface it to a PC with a USB

association or force it with an AC-to-DC connector or battery to begin. You can dabble with your UNO without working a great deal about achieving something erroneously, most desperate result conceivable you can trade the chip for a few dollars and start again. "Uno" signifies one in Italian and was picked to stamp the presence of ARDUINO Software (IDE) 1.0. The Uno board and structure 1.0 of ARDUINO Software (IDE) were the reference translations of ARDUINO. directly created to additional cutting-edge releases. The Uno board is the first in a movement of USB ARDUINO sheets, and reference model for the ARDUINO stage; for a wide overview of current, past or out of date sheets see the ARDUINO rundown of board
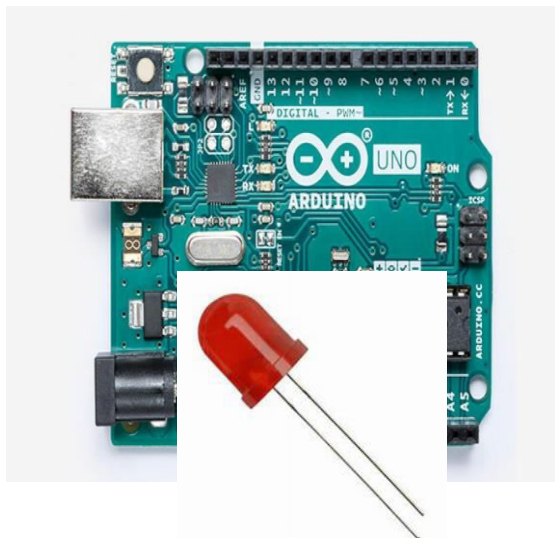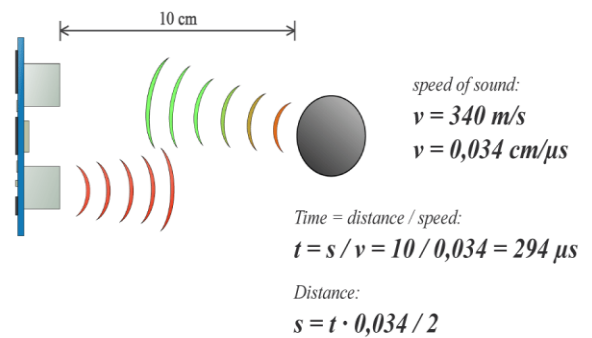
ULTRASONIC SENSOR:

Ultrasonic Sensor Pin Configuration

Pin Number	Pin Name	Description
1	Vcc	The Vcc pin powers the sensor, typically with +5V
2	Trigger	Trigger pin is an Input pin. This pin has to be kept high for 10us to initialize measurement by sending US wave.
3	Echo	Echo pin is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor.
4	Ground	This pin is connected to the Ground of the system.

Ultrasonic Sensor- Working:

It creates ultrasound at the 40 000 Hz which experiences the air and if there is an article or hindrance on its way It will avoid back to the module. the speed of the sound you can ascertain the division. The HC-SR04 Ultrasonic Module has 4 pins, Ground, VCC, Trig and Echo. The Ground and the VCC pins of the module should be connected with the Ground and the 5 volts nails to the ARDUINO Board autonomously and the trig and resounding pins to any Digital I/O nail to the ARDUINO Board. In requesting to make the ultrasound you have to set the Trig on a High State for 10 µs. That will pass on a 8 cycle sonic burst which will go at the speed sound and it will be gotten in the Echo pin. The

Echo pin will yield the time in microseconds the sound wave voyaged. For instance, if the article is 10 cm away from the sensor, and the speed of the sound is 340 m/s or 0.034 cm/µs the sound wave should dodge 294 u seconds. Regardless, what you will get from the Echo pin will be twofold that number considering the way that the sound wave needs to feel free to sway backward. To get the detachment in cm we need to copy the got travel time an impetus from the resonation pin by 0.034 and separate it by 2.
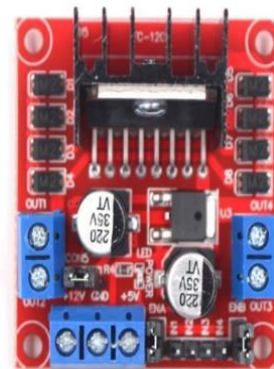

speed of sound:
$$v = 340 \ m/s$$
$$v = 0{,}034 \ cm/µs$$

Time = distance / speed:
$$t = s / v = 10 / 0{,}034 = 294 \ µs$$

Distance:
$$s = t \cdot 0{,}034 / 2$$

L298n MOTOR DRIVER CIRCUIT WITH IC:

Description: The L298N is a coordinated solid circuit in a 15-lead Multi watt and PowerSO20 bundles. It is a high voltage, high momentum double full-connect driver de-marked to acknowledge standard TTL rationale level sand drive inductive loads, for example, transfers, solenoids, DC and venturing engines.

L298N Driver: The L298N is a double H-Bridge engine driver which permits speed and heading control of two DC engines simultaneously. The module has two screw terminal squares for the engine An and B, and another screw terminal square for the Ground pin, the VCC for engine and a 5V pin which can either be an information or yield.

DC MOTOR:

A motor is an electrical machine which changes over electrical imperativeness into mechanical essentialness. The standard of working of a DC motor is that "at whatever point a present passing on conductor is placed in an alluring field it experiences a mechanical force"
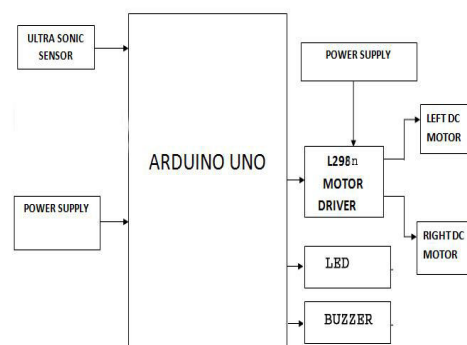
LED & BUZZER:

The LED is an exceptional sort of diode and they have comparable electrical attributes of a PN intersection diode. Henceforth the LED permits the progression of current the forward way and hinders the current in the converse bearing. Bell gives the BEEP sound as indicated by the given time. A ringer or beeper is a flagging gadget, generally electronic, regularly utilized in cars, family machines, for example, a microwave, or game shows.
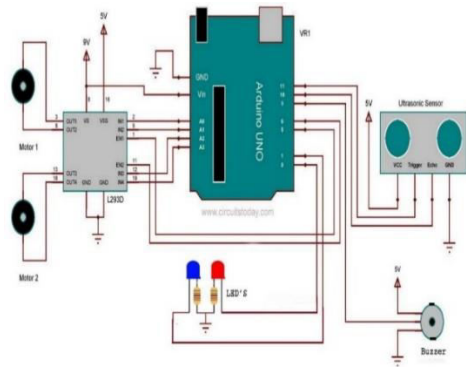
ARDUINO SOFTWARE

Arduino is an open source PC gear and programming association, undertaking, and customer arrange that plans and makes single board microcontrollers and microcontroller packs for building propelled contraptions and instinctive things that can distinguish and control inquiries in the physical and electronic world.

BLOCK DIAGRAM:

In our venture the yield from the ultrasonic sensor is given to the ARDUINO UNO controller as a contribution to process them as indicated by codes which are really implanted into the controller to give the ideal yield. **4.1**

CIRCUIT DIAGRAM

ARDUINO UNO is an open source microcontroller input/yield sticks in which 6 PWM yields are available and it has 6 information sources. Ultrasonic sensor is given as contribution to the Arduino uno, it has 4 pins trigger, reverberation, Vcc and ground pins. trigger is an info pin. Reverberation is a yield pin. Ground pin is given to the ground of the framework. Vcc pin is given to flexibly to the framework, around +5v.Motors are given to the Arduino uno through L298n engine driver.

5.1 WORKING PROCESS:

The hindrance evasion automated vehicle utilizes ultrasonic sensors for its developments. An Arduino uno is utilized to accomplish the ideal activity. The engines are associated through engine driver IC to microcontroller. The ultrasonic sensor is appended before the robot. At whatever point the robot is going on the ideal way the ultrasonic sensor transmits the ultrasonic waves persistently from its sensor head. At whatever point an obstruction comes in front of it the ultrasonic waves are reflected back from an item and that data is passed to the microcontroller. The microcontroller controls the engines left, right, back, front, in view of ultrasonic signs. So as to control the speed of each engine beat width balance is utilized (PWM). A programmed deceleration framework, the separation between your vehicle and the vehicle before you reduce your vehicle speed will naturally lessen to keep up the sheltered separation.

The underlying stage starts from ultrasonic sensor that recognizes the separation of vehicle in the frontIf the vehicle arrives at nearer to front vehicle, red shading light will shine that will show warning.
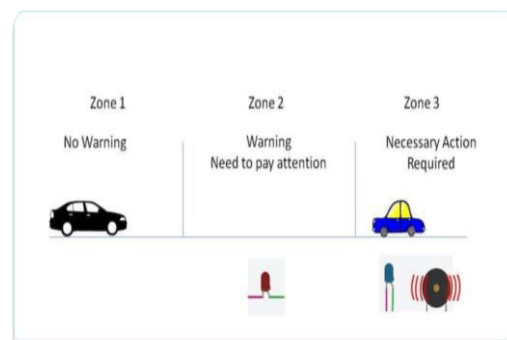
When vehicle reaches extreme near to front vehicle, it automatically stops.
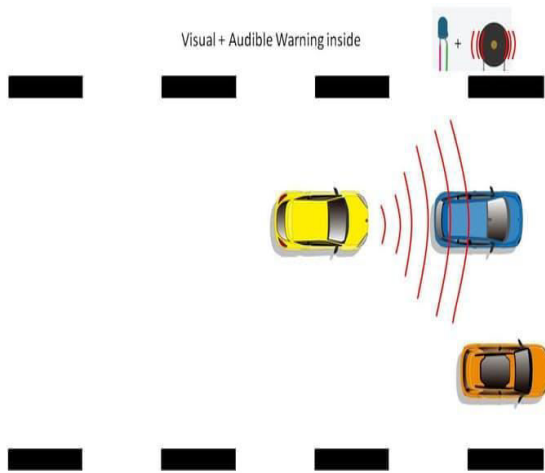
Zone 1: No warning

Zone 2: visual warning and maintaining speed according to distance

(in this zone, driver has to pay attention)

Zone 3: visual, audio warning and stops the vehicle automatically

The initial stage begins from ultrasonic sensor that identifies the distance of vehicle in the front. If the vehicle reaches closer to front vehicle, red colour light will glow that will show notification. when vehicle reaches extreme near to front vehicle, it automatically stops.

Visual + Audible Warning inside

ADVANTAGES:

- To avoid accidents and better for environment.
- Low cost and Easy to implement compered to smart driverless cars.
- Reduces speeding, drunk driving accidents, and other major accidents causes
- To avoid distracted driving accidents

LIMITATIONS: It isn't Prescribe to keep the range long in light of the fact that this would case the robot to continue moving FORWORD and BACKWORD as it detects any obstruction, even distant from it. A drawback with hindrance shirking dependent nervous identifying is the need of the robot to stop before an obstruction so as to consider an increasingly exact estimation. ... In this paper the dynamic directing calculation guarantees that the robot doesn't need to stop before an impediment during its route.

APPLICATIONS:

- Especially military applications
- It can be used for city wars Smart Driving System.
- Automatic Speed Controlling.
- Smart Alerting to Driver.

7.1 CONCLUSION:
The above Arduino controller and ultrasonic sensor were considered and the HcSR-04 ultrasonic sensor was chosen, as the controlling outcome are fulfilling for its utilization in the vehicle model framework bring created. It was utilized to detect the deterrent and evasion them. On effective usage of impediment shirking calculation was effectively completed too with insignificant blunders, by coding the calculation in python. Deterrent shirking is an excellent application to be utilized in vehicle forestalling numerous mishaps and death   t

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