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# Reverse Parking Sensor

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**Abstract:** In this paper, we will discuss about the notion of reverse parking sensors. Advancements in the field of automobile industry, prompted to produce numerous private cars. Correspondingly, a plenty of novice drivers are increasing. For an inexperienced driver backing up a car is considerably a difficult job. Moreover, it is easy to damage the car due to obstacles that are hardly seen on the rear-view mirror. To overcome this, we will design a reverse parking sensor using ultra sonic sensor and Arduino which will assist the driver while reversing the car. In this project, Ultrasonic sensor detects the object and sends signals to microcontroller, if the distance is less it alerts the driver with help of the buzzer.

**Keywords:** Arduino Uno, Ultrasonic sensor, Buzzer, Microcontroller, Components, Parking sensor.

## I. INTRODUCTION

In the present scenario, vehicle parking is considered as dominant skill for a driver, as it is tedious and tough job to judge the space around the vehicle. Parking a car parallelly and while reversing the car in parking lots often requires expertise, so to make it easier parking sensor is developed. These are proximity sensors which helps the driver to know the distance between the car and the obstacle while parking. In this project we utilized Ultrasonic sensor and Arduino to detect and park the car cautiously without getting into trouble. Ultrasonic sensor sends acoustic pulses and the Arduino measures the interval of each reflected signal, based on this time interval, Arduino then calculates the distance and activates the Buzzer if the distance between the sensor and object is less than certain range. Buzzer is connected to Arduino, which will be activated to warn the driver when distance is less. Parking sensor is activated when driver engages into reverse gear, sensor operates continuously until the reverse gear is disengaged.

## II. LITERATURE SURVEY

- Smart Parking Systems and Sensors: A Survey G. Revathi, V. R. Sarma Dhulipala, Conference Paper · February 2012, DOI:10.1109/ICCCA.2012.6179195

The survey explores, the concept of smart parking system and their categories.

- Car Parking Distance Controller Using Ultrasonic Sensors Based On Arduino Uno, Volume 2, Issue 5, September 2021 ISSN: 2715-5072 DOI: 10.18196/jrc.25106.

It is project developed for parking management companies and parking users, which helps in managing the spaces for the car and easy usage of parking lots.

## III. HARDWARE COMPONENTS

**1.Ultrasonic sensor:** An ultrasonic sensor is an electronic device that measures the distance of an object by emitting ultrasonic sound waves and converts the reflected sound into an electrical signal. Ultrasonic sensors primarily contain two elements: the transmitter and the receiver. transmitter sends ultrasound frequency that reflects from the objects and the receiver receives it with an echo. Further this echo is processed to calculate difference in time, depending on the computed time the distance between object and sensor is calculated.

**2.Arduino Uno:** It is a microcontroller board based on microchip ATmega328P microcontroller and developed by Arduino. Arduino Uno includes 6pin analog, 14pin digital inputs, USB port, socket and a ICSP header. It is programmed using Arduino IDE and powered with a USB cable.

**3.BC548 NPN Transistor:** It has three terminals, emitter, base and collector. Transistor is used for amplification and switching purpose.

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**4. 1N4007 PN Junction Diode:** It is constructed with P and N-type materials. It works as one-way switch, which allows the current to flow in one direction. It is a rectifying diode that helps in converting alternating current signals (AC) to direct current signals (DC).

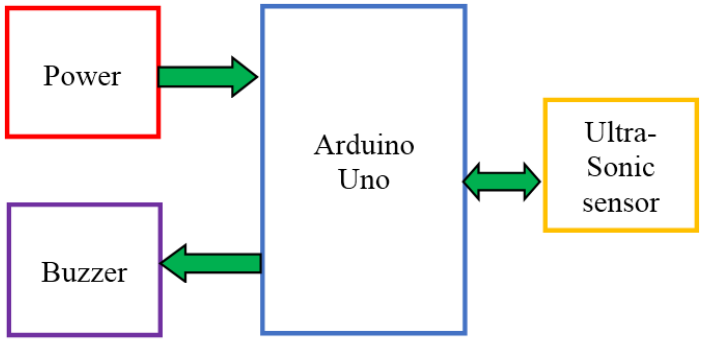
**5. 1KΩ Resistor:** it is two terminal device of 1kiloOhm resistance used to resist flow of current.

## IV. SOFTWARE SPECIFICATION

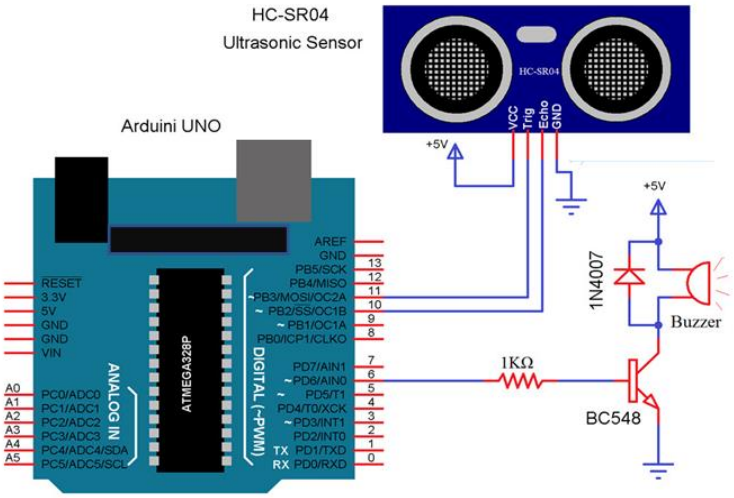
Arduino is programmed using Arduino IDE software. It a commonly used programming software which is easy to understand. Program code is developed to detect the distance between obstacle and the sensor. For Ultrasonic sensor, the TRIG Pin should be high for a minimum of 10µS.After this, the Ultrasonic Sensor automatically sends acoustic pulses. The time between transmitted and the reflected signal is calculated by reading the HIGH on the ECHO pin. The distance is calculated using the code: distance = 0.034*(duration/2). The code is constructed to increase the buzzing of the buzzer as the distance decreases.

## V. DESIGN AND WORKING

The ultrasonic sensor consists of 4 pins: VCC, TRIG, ECHO and GND. VCC, GND are in connection with +5V and GND of the power supply while the TRIG and ECHO are connected to Digital I/O pins 11 and 10 of Arduino respectively. Buzzer of 5V with a driver circuit using BC548 along with a 1KΩ resistor.




The above diagram represents the working flow of the Reverse parking sensor.
In the working, Ultrasonic sensor is used to measure the distance and Arduino Uno acts as control unit which controls sensor calculates the distance and activates the buzzer. Initially, ultrasonic sensor transmits acoustic pulses and receives the reflected pulses, Arduino makes use of the time interval of the reflected pulses and calculates the distance between the object and sensors, microcontroller will activate the buzzer and if the distance is less than 100cms the intensity of the buzzer increases. We can modify the code to increase the intensity of buzzer with decrease in the distance.



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## VI. RESULT AND CONCLUSION

The main aim of this project it to design an effectively working parking sensor which will assist the driver to make parking effortless.

In this project we can detect an object within a range of 2cm to 400cm. When the circuit is powered, the Arduino will start measuring the distance of the objects in front of the Ultrasonic Sensor. If the computed distance is under 100cm, then Arduino activates the buzzer. We can modify the code to beep the buzzer so that the intensity of the beeps increases with a decrease in the distance. This can be done in several stages for example, if distance measured is from 41 to 60cms,21 to 40cms and 0 to 20cms respectively the buzzer frequency can be set to different frequencies 50hz,100hz and 250hz. In this case the buzzer intensity will increases as the distance decreases.

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