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Ultrasonic servo motor control with Arduino micro-controller

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ABSTRACT

"Creativity is inventing, experimenting, growing, taking risks, breaking rules, making mistakes and having fun." Quoted by Mary Lou Cook, encouraged us to think on such a topic which can make our lives easier by overcoming the prominent problem faced around the globe. Sometimes we have to make our things automated and there is a need to make the world an easier place to live in. Arduino micro-controller has already made a huge impact on learning. The widespread acceptance gave the open source hardware a new life, potentially challenging many industrial products and new interests in hardware prototyping and electronics. The recent transition has been made from 8 bit to 32 bits and it is expected that in future Arduino may be seen in the form of a cheap practical computer. You can also presently make custom cell phones using open source boards like the Arduino. Looking at this actionable advancement towards Arduino, allured the ideology to make systematic and organized parking system for vehicles, using Arduino Uno. This project's main purpose is to produce a real-life solution to the car parking problem which the whole world is facing frequently. People usually roam around in the parking lots trying to find a suitable place to park in. To solve that problem we have created the automatic car parking system, using open source hardware, programmable sensors and the use of computers to provide an interface to understand the digital output produced.

Keywords— *Arduino, Servo motor, Automation micro-controller*

1. INTRODUCTION

Arduino is basically an open-source computer hardware/software platform for building digital devices and interactive objects that can sense and control the physical world around them. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. It comes with an open supply hardware feature that permits users to develop their own kit. The software of the Arduino is well-suited to all kinds of operation systems like Linux, Windows, and Macintosh, etc. It also comes with an open supply software system feature that permits tough software system developers to use the Arduino code to merge with the prevailing programing language libraries and may be extended and changed. For beginners, it is very simple to use and also cheap. It can be used to create such devices that can interact with the environment using sensors and actuators.

2. METHODOLOGY: EXPERIMENTAL/SIMULATION

2.1 Components Used

(a) Servo motor
(b) Ultrasonic Sensor
(c) Arduino Board
(d) Breadboard
(e) Buzzer
(f) Wires

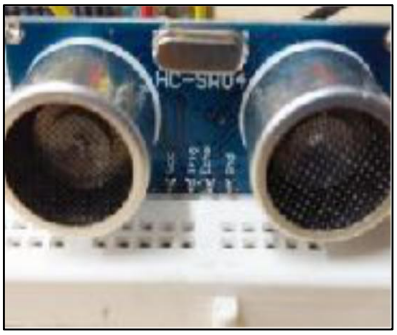

Fig. 1: Ultrasonic sensor

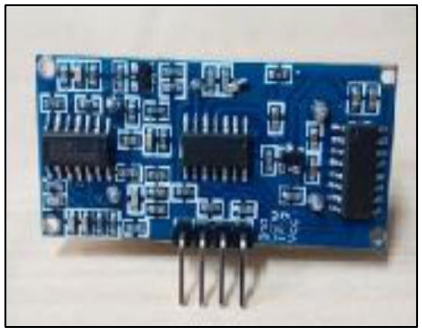

Fig. 2: Arduino Board

Fig. 3: Servo motor

Fig. 4: Buzzer

The circuit diagram for the Arduino and ultrasonic sensor is shown to measure the distance.

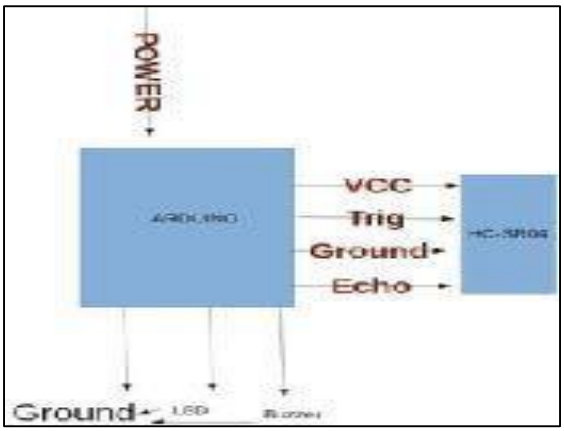

Fig. 3: Arduino circuit diagram

In circuit connections, the Ultrasonic sensor module's "trigger" and "echo" pins are directly connected to pin 18(A4) and 19(A5) of Arduino.

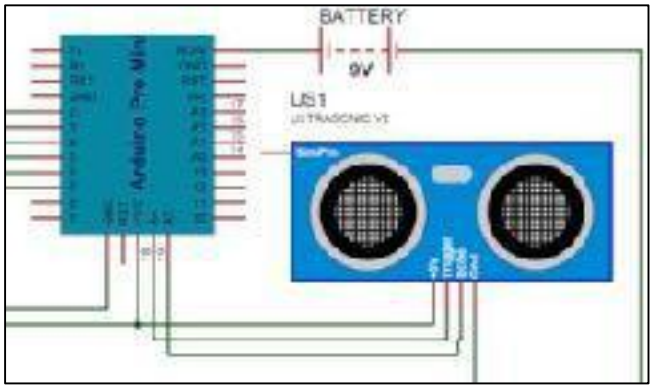

Fig. 4: Ultrasonic sensor circuit diagram

Control pin RS, RW and En are directly connected to Arduino pin 2, GND and 3. And data pin D4-D7 is connected to 4, 5, 6 and 7 of Arduino.

2.1.1 Servo motor: A minimum threshold distance for the servomotor and as the object moves closer, the program results in the display of the distance between the object and the setup. If the object happens to be under the threshold value, the buzzer connected to the setup turns on and the motor moves to the specified direction as programmed.

3. OTHER POSSIBLE USES OF THIS SETUP

(a) Revolving Doors: once the person who wants to enter a zone, the sensor will measure the distance between the person and the door and will automatically open the door.

(b) Curtain Control: once the person approaches the window, the curtain motor rotates resulting in the opening or closing of the curtains.

(c) General Protection: if the setup is put around something that is In the need of protective care, the minimum distance can be set so as to make the buzzer go off if anything approaches the object.

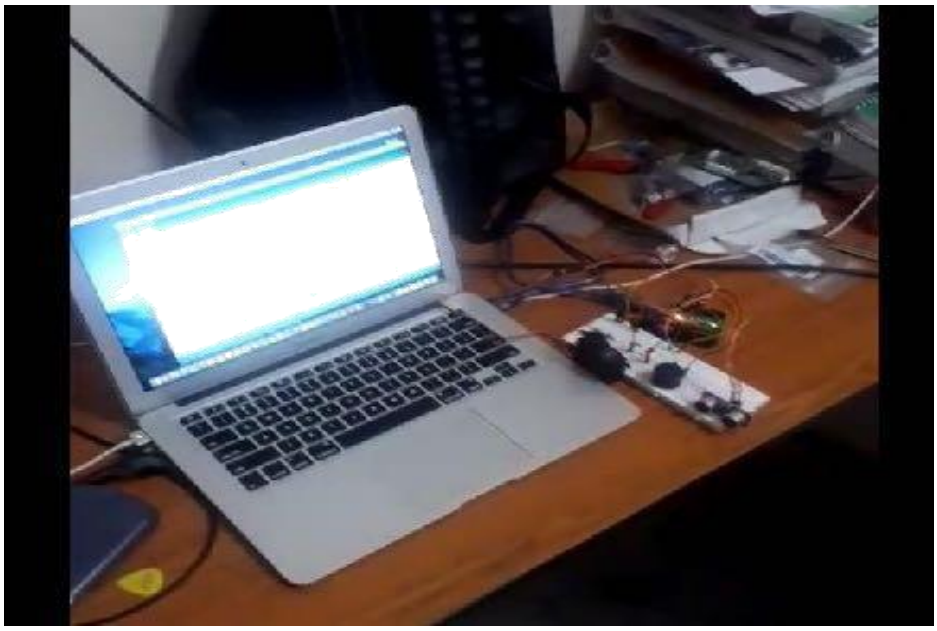

Fig. 5: Final Hardware connections with the software

4. EXECUTION PLAN

Step 1: Step 1: Connections hardwiring the devices on Breadboard which includes the sensor and the Arduino Board.

Step 2: Step 2: Software Programming the sensor and the Arduino to function the way desired and then assigning values to the outlets of the Arduino and the sensor i.e. Vcc, ground, trigger, echo, etc.

Step 3: Step 3: Set up the threshold distance of the sensor

Step 4: Step 4: Make the servo motor connections

Step 5: Step 5: Final assembly of the design required for functioning.

Step 6: Step 6: Test and execute.

5. CONCLUSION

The project crux is pushing the world to a more automated version of itself. The project has the above-listed uses and as the project uses the latest technological components, it can be designed to make any desired changes, various parameters can be changed and made to suit any requirement.

6. REFERENCES

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