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Remote Armoured Fighting Vehicle

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Abstract
The proposed Remote AFV uses an ultrasonic module which is linked with the 8051 family of microcontrollers, an ultrasonic transducer consisting of a transmitter and a receiver. The transmitted wave is re-imaged by the object and reconstructed by the transducer. The total time from sending a wave to receiving it is calculated taking into account the speed of sound. The distance is then calculated by a program running on the microcontroller and displayed on an LCD connected to the microcontroller. This circuit is used to receive the calculated signal with a frequency of 40 kHz from the missile object, feed it to a software microcontroller and replace it with an appropriate load while the system is running on the microcontroller. When the microcontroller receives a signal from the ultrasonic receiver, it runs a MOSFET gate using a transistor or a relay to turn on the door gun. The sensor is equipped with an antenna, rotates and is controlled by a servo motor on more than 180 levels. If the target is within detection range, the application will aim the laser beam at the target by turning and firing the launcher to the nearest detected target.

Keywords: *microcontroller, arduino, ultrasonic, servo motor.*

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I. INTRODUCTION

The proposed system uses an ultrasonic module connected to an Arduino family of microcontrollers to detect enemy AFV objects. Ultrasonic transducers consisting of transmitters and receivers are used in the same module. Ultrasonic transducers generate sound waves. The emitted sound waves are reflected by the object and received again by the transducer. The total time from sending a wave to receiving it is calculated with the speed of sound recorded. The distance is then measured and displayed on the LCD display connected to the microcontroller. When the microcontroller receives a signal from the ultrasonic receiver, it activates the door gun by triggering the gate of the MOSFET through a transistor or relay. The sensor is mounted on the antenna, rotates 180 degrees and is controlled by a stepper motor. If the target is within detection range, the projection will rotate the launcher to the closest detected target and fire it. The projection is rotated and controlled around one axis by a stepper motor, while simultaneously rotating up and down with another axis towards the missile object. The tanker is equipped with another microcontroller for moving the control actions of the vehicle. These actions are sent and received via the keypad via Zigbee wireless communication. Programs for the Arduino family of microcontrollers are written by embedded C programming using the Arduino IDE.

1.1 Proposed Approach

The main motive of our project was to bring about a technological advancement for the existing Armoured fighting vehicles (AFV) used at wars. We wanted to have it control, operate and fire remotely without a person inside the fighting vehicle so that there is no risk of a life involved. War being a major crisis it would be pretty hard to detect the opponents approaching simultaneously in various directions if it was to be dealt by the people manually, therefore using ultrasonic sensors we can find the opponents approaching towards the AFV and calculate the firing range and destroy it remotely.

1.2 Methodology

In this process, the requirement analysis is transformed to well-defined parts of the software. The goal of this step was to start the implementation of the system with all the all the resources needed for implementation. The products included a few different kinds of diagrams, like flowchart and components diagram. With the Components Diagrams the team could see the interrelations among all the components of our system: Bluetooth device, Arduino UNO, LED screen, Ultrasonic sensors, transmitter, servo motor and laser. We use Bluetooth

device to connect to the system. We have used Arduino UNO, ultrasonic sensors, servomotor, Laser, Buzzer, Battery supply, 16*2 Display, DC motors, transmitters and receiver in this remote armoured firing vehicle.

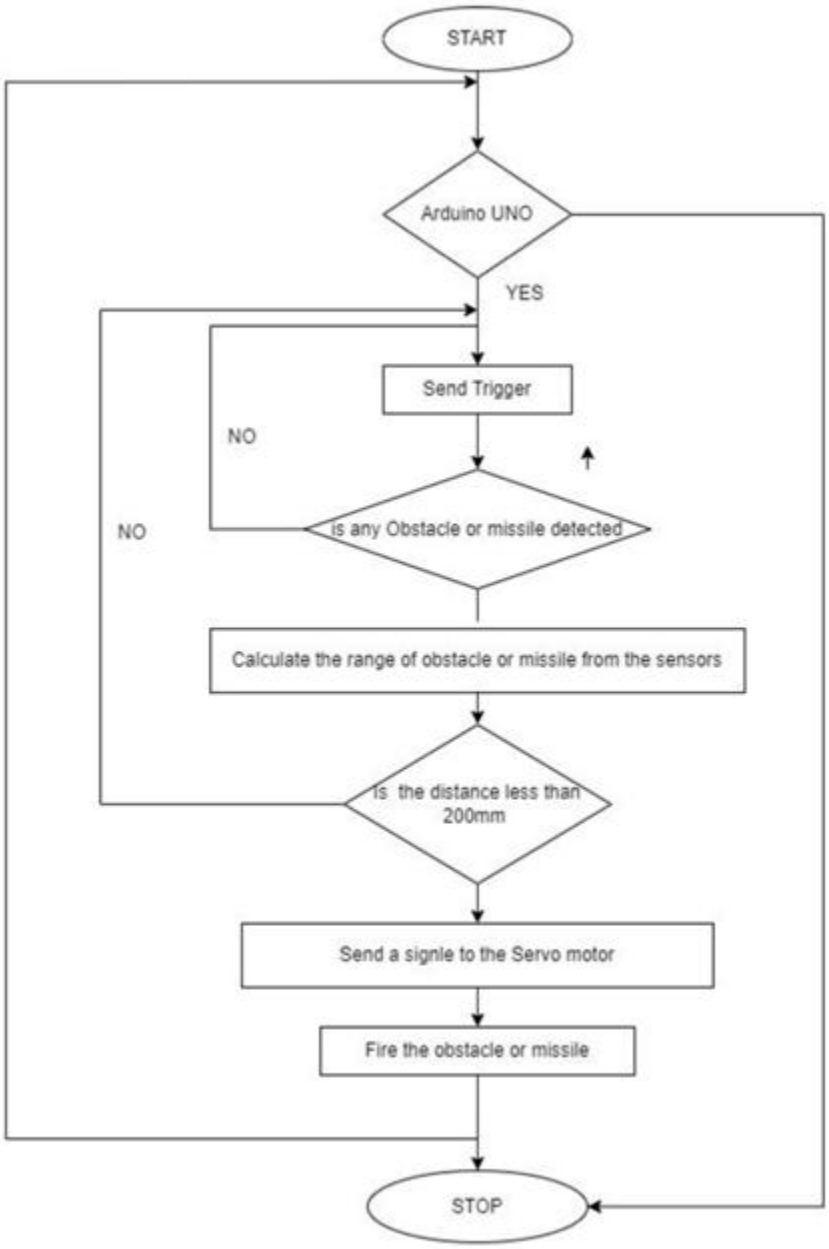

Figure 1: Flowchart of the proposed approach

1.3 Implementation

1.3.1 Hardware Implementation

The hardware components used for implementation are

- Arduino UNO
- Ultrasonic Sensor HC-SR04
- Buzzer
- 16*2 LCD
- SG90 Servo Motor
- Bluetooth Module HC-05

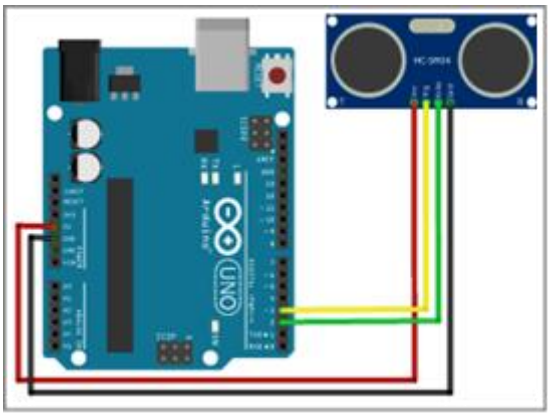

Figure 2: Arduino UNO connection with Ultrasonic Sensor HC-SR04

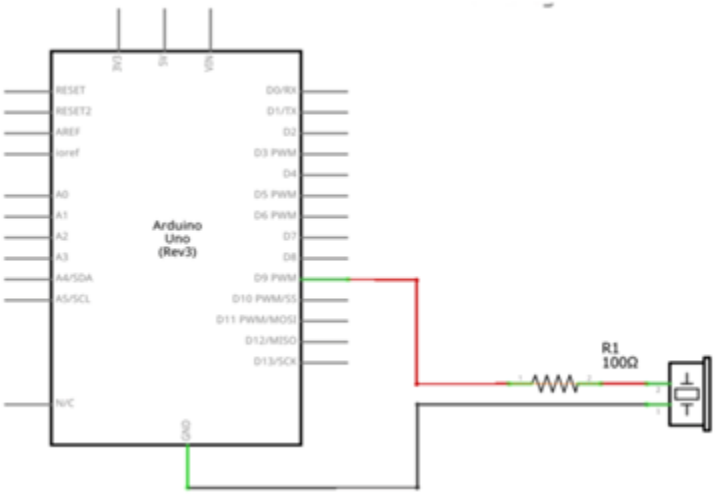

Figure 3: Arduino UNO connection with the Buzzer

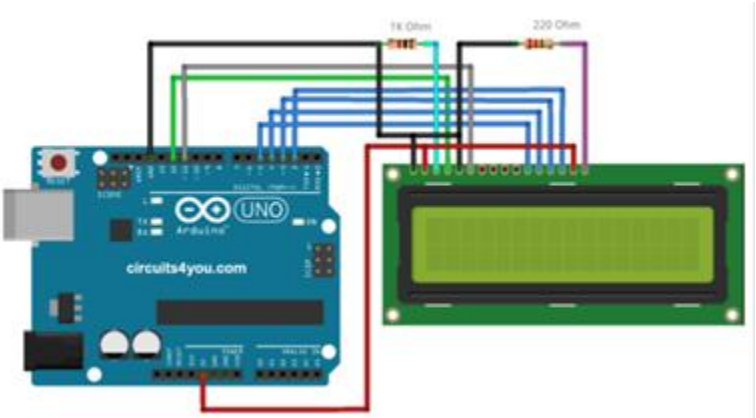

Figure 4: Arduino UNO connection with the LCD

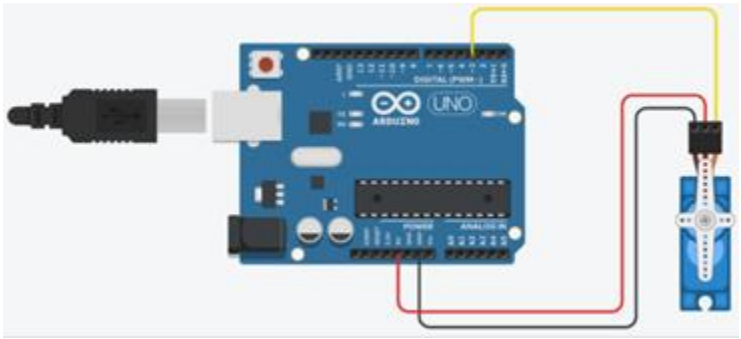

Figure 5: Arduino UNO connection with the LCD

1.3.2 Software Implementation

We have used embedded C programming language to code in Arduino IDE and have exported the code to the Arduino UNO from the Arduino IDE environment.

We have coded the implementation of all the delays to happen, the display to be shown on the LCD, the distance calculation using the ultrasonic sensor, and the input from the bluetooth to the arduino using the embedded C language at the Arduino IDE environment.

II. RESULT AND DISCUSSION

On sensing the opponent using the ultrasonic sensor, the distance is calculated and if the opponent is within the firing range then the opponent is destroyed (demonstrated with laser).

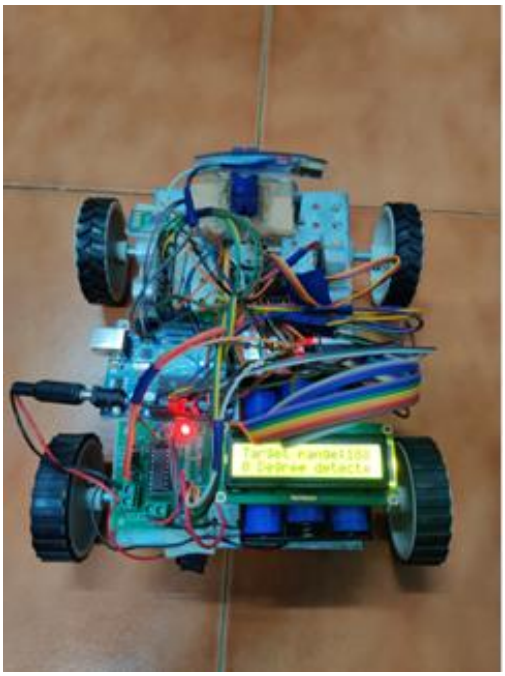

Figure 6: Remote AFV's projection at 0 degree on detecting an opponent to its right

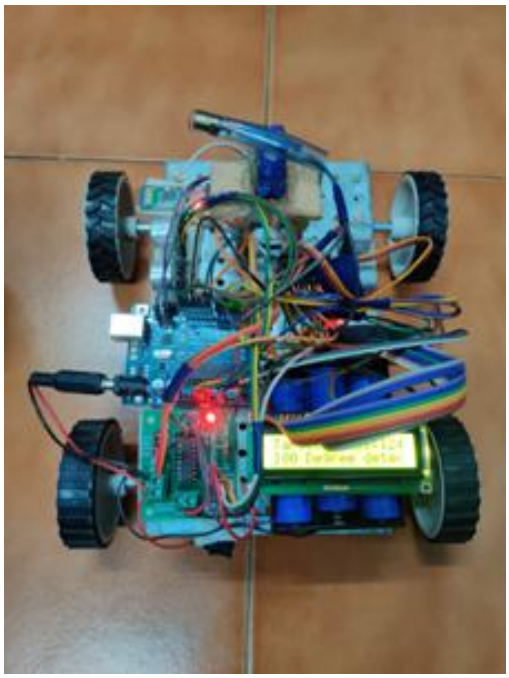

Figure 7: Remote AFV's projection at 180 degree on detecting an opponent to its left

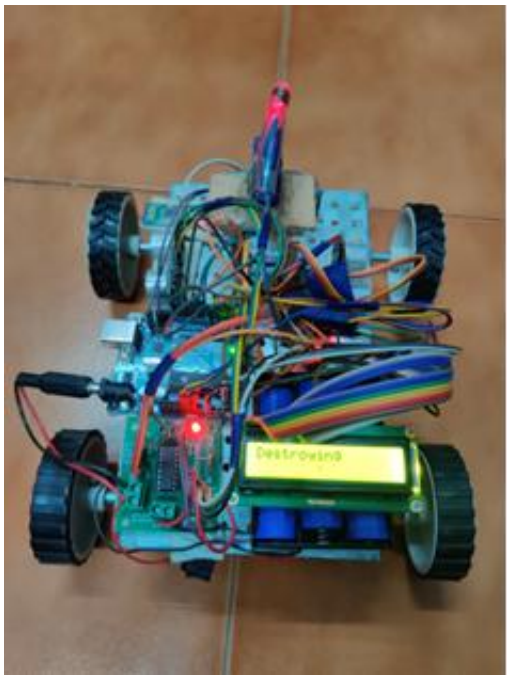

Figure 8: Remote AFV's projection at 90 degree on detecting an opponent in the front and then destroying it

III. CONCLUSION

This proposed system uses an ultrasonic module connected to a family microcontroller 8051 an ultrasonic transducer that connects the transmitter and receiver using the transmitted waves reflected back to the object and received by the transducer and the total time taken to send the wave to the receiver is calculated by considering the sound speed and the distance is calculated by a microcontroller operating system and displayed on a liquid crystal display screen connected to a small control circuit used to receive signals from 40 khz from the missile. the feeder in the small control system and open the appropriate load while the system is used in the small controller when the microcontroller receives a signal from the ultrasonic receiver opens the door gun by activating the mosfet gate through a transistor or transmitting sensor plugged into an antenna and rotated and servo controlled. engine up to 180 degrees if there is a target within the acquisition distance the application will turn the launcher to the nearest target and the laser burner is used on that target.

IV. **REFERENCES**

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