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Missile Detection and Auto Destroying System using IoT

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ABSTRACT: This project is to design and construct automatic missile detection and destroying system. The system is designed to detect the target (missile) moving in multiple directions. The destroying system moves automatically in the direction of missile and fires it upon fixing the target. This system consists of a SONAR based object tracking system that continuously monitors the target. Upon detecting the target, it sends the target's location to a Central Control System. The Central Control System takes the action of moving the firing mechanism in the direction of target missile. Upon fixing the direction, it sends the control command to firing system to attack the target. This project is divided in three-part RF Transmitter, RF Receiver, and microcontroller.

I. INTRODUCTION

War is an organized armed conflict that is carried out by states, nations, national and social groups.This ultrasonic proximity detector comprising independent, ultrasonic is piezo ceramic transducers each operating at around 40 kHz.Target acquisition and tracking are frequent domains of active sensing methods such as RADAR, Ultrasound, or LASER scanning. The ability to track targets at manipulation range can significantly reduce the cost and complexity of manipulator control. Ultrasonic sensors, in particular, provide an ideal platform for experimental development in range detection. They are cheap, readily available, andincreasingly possessed of high-resolution sensors.

In this paper , an automatic missile detection and destroying system is made using IoT. An ultra sonic sensor is used for detesction of target missile object and calculating the distance between the targetting system (ultra sonic sensor) and target missile. We have used ESP32 advanced microcontroller for performing various tasks in our project. A servo motor is used to rotate the ultar sonic sensor in multiple directions. Here in this project we use laser to destroy the target missle in the detection range. When an ultra sonic sensor detects any objects in its detection range it seends a message to the ESP32 microcontroller and the microcontroller performs tasks like turing on the laser destroying system and alarming the buzzer.

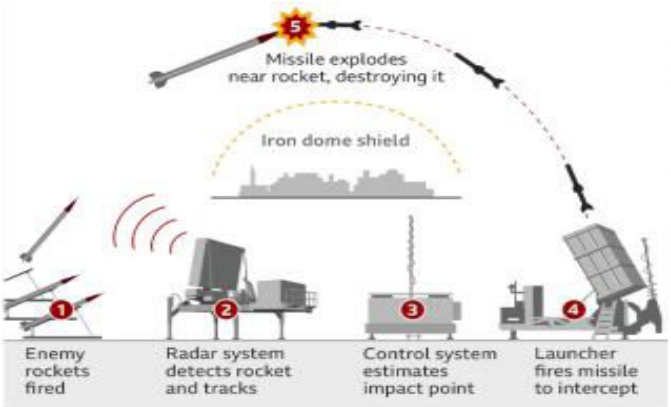

Fig 1:How our system works.

II. PROPOSED MODEL

The purpose of this project is to design and construct automatic missile detection and destroying system using IoT. The system is designed to detect the target (missile) moving in multiple directions. The destroying system moves automatically in the direction of missile and fires it upon fixing the target. This system consists of a SONAR based object tracking system that continuously monitors the target. Upon detecting the target, it sends the target's location to a

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Central Control System. The Central Control System takes the action of moving the firing mechanism in the direction of target missile. Upon fixing the direction, it sends the control command to firing system to attack the target. This project is divided in three-part RF Transmitter, RF Receiver, and microcontroller.

III. PROPOSED MODEL PROTOTYPE

This is the prototype of our proposed model. The ultra-sonic sensor is placed on top of the servo motor and a laser is placed in front the whole equipment to destroy the incoming missiles.

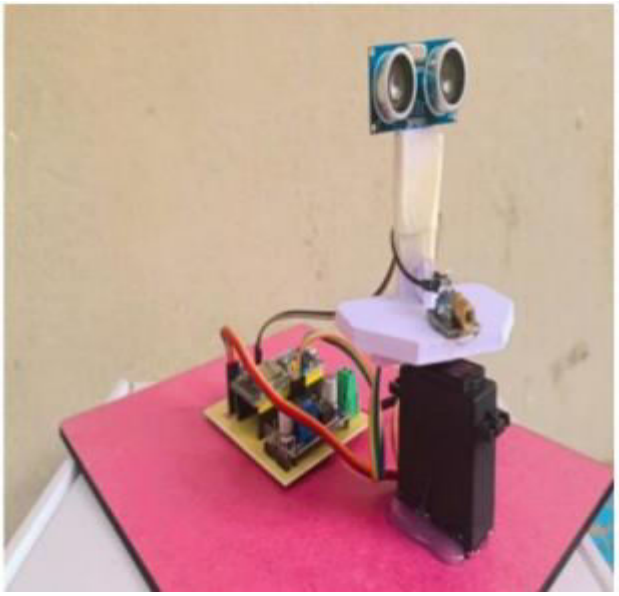

Fig.2:Proposed model prototype

IV. BLOCK DIAGRAM

The block diagram of proposed system consists of ESP32, Motor driver L298N, Laser Diode, Power Supply, Ultra Sonic

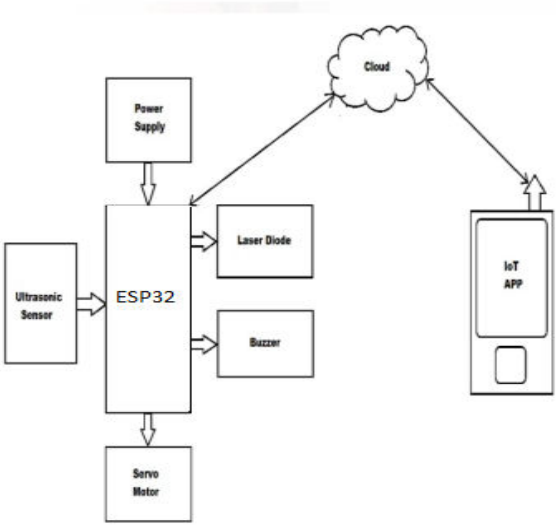

Fig.3:Block diagram.

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Sensor and Buzzer.Blynk-App is used to control the movement of theultrasonic sensor and even the output parameters are displayed using the Blynk App Platform. Ultra- Sonic Sensor will detect the obstacles in the surroundings and generated output can be seen as message in blink app. Motor Driver is used to run the servo motor to move the laser diode in any direction. When the obstacle comes nearer to the ultrasonic sensor it detects the object and it gives the message to ESP32. ESP32 processor gives the message to the Buzzer and Laser diode. Laser diode destroys the object within seconds. When laser diode destroys the object, it notification to the mobile throughBlynk App.

ESP32

ESP32 is a low-cost System on Chip (SoC) Microcontroller from Espressif Systems, the developers of the famous ESP8266 SoC. It is a successor to ESP8266 SoC and comes in both single-core and dual-core variations of the Tensilica's 32-bit Xtensa LX6 Microprocessor with integrated Wi-Fi and Bluetooth. The good thing about ESP32, like ESP8266 is its integrated RF components like Power Amplifier, Low-Noise Receive Amplifier, Antenna Switch, Filters and RF Balun. This makes designing hardware around ESP32 very easy as you require very few external components.

SPECIFICATIONS OF ESP32

ESP32 has a lot more features than ESP8266 and it is difficult to include all the specifications in this Getting Started with ESP32 guide. So, I made a list of some of the important specifications of ESP32 here.

- Single or Dual-Core 32-bit LX6 Microprocessor with clock frequency up to 240 MHz. • 520 KB of SRAM, 448 KB of ROM and 16 KB of RTC SRAM.
- Supports 802.11 b/g/n Wi-Fi connectivity with speeds up to 150 Mbps.
- Support for both Classic Bluetooth v4.2 and BLE specifications. • 34 Programmable GPIOs. • Up to 18 channels of 12-bit SAR ADC and 2 channels of 8-bit DAC.
- Serial Connectivity include 4 x SPI, 2 x I2C, 2 x I2S, 3 x UART.
- Ethernet MAC for physical LAN Communication (requires external PHY).

RELAY

A Relay is a simple electromechanical switch. While we use normal switches to close or open a circuit manually, a Relay is also a switch that connects or disconnects two circuits. But instead of a manual operation, a relay uses an electrical signal to control an electromagnet, which in turn connects or disconnects another circuit. Relays can be of different types like electromechanical, solid state. But their working is same.

SERVO MOTOR

A servo motor is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor which runs through a servo mechanism. If motor is powered by a DC power supply, then it is called DC servo motor, and if it is AC-powered motor then it is called AC servo motor. Apart from these major classifications, there are many other types of servo motors based on the type of gear arrangement and operating characteristics. A servo motor usually comes with a gear arrangement that allows us to get a very high torque servo motor in small and lightweight packages. Due to these features, they are being used in many applications like toy car, RC helicopters and planes, Robotics, etc.

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V. RESULTS

The movement of the laser diode is controlled by using Blynk app. When any person enters the with in the region then a message will be generated and it is observed in the app. To obtain this process the ESP32 should be connected to the Wi-Fi or internet.

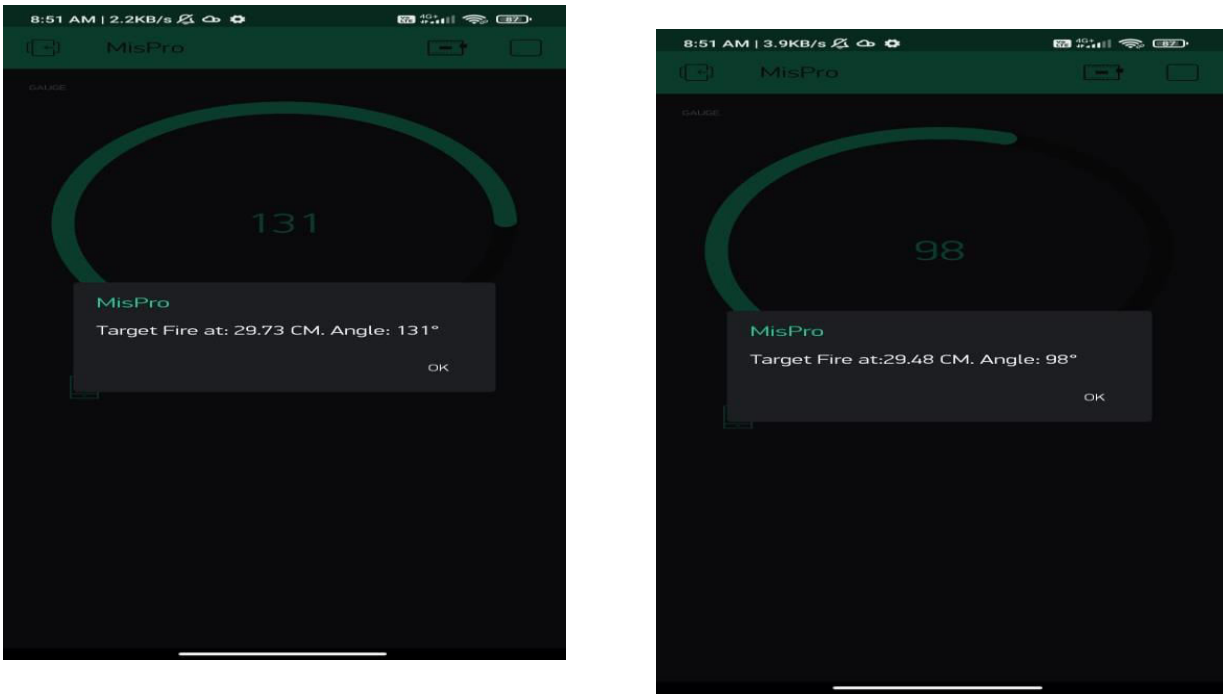

Fig.4a and 4b:Result.

VI .CONCLUSION

The Ultrasonic transceiver (Transmitter & Receiver) detects missile object and displays the missile direction through Microcontroller. If there is any target within the detection range, the application will turn ON the Laser gun to the nearest detected target and fires. A buzzer alarms when any of the ultrasonic sensor identifies the missile to alert the nearest people.

VII. FUTURE SCOPE

In Future it can be used as an advanced tracking system along with high intensity camera to track a real target (say a Missile or Tank). The advantage of this unit is that to run the system we can use video camera and other sensors to see the live moving target from anywhere in the world. Further developments could relax these restrictions by allowing range detection from the video image and implementing tracking and prediction of a moving target, but these features proved impossible to include within our timeframe. Target acquisition occurs via processing of an image stream from a single webcam, making use of foreground segmentation and SURF feature detection, together with a calibrated pinhole model to convert from pixel distances into real- world Cartesian coordinates. Because the missile launcher has no sensors to provide feedback on its pose, described in terms of the altitude and azimuth angles of its barrel, we also present results for a visual servicing system.

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