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360 DEGREE DESTROYER FOR MILITARY

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Abstract - The "360 Degree Destroyer for Military" model operates by automatically detecting various threats such as missiles, tankers, guns, humans, and drones using a laptop camera. Detection is accomplished through the implementation of CNN algorithms. Instead of firing upon detection, the system utilizes a laser to pinpoint detected object and LED is used to indicate the threat level of the detected object, and this system also detects the land mine using metal sensor. Messages indicating the presence of detected objects are promptly sent to Telegram for immediate action. Additionally, the movement of the robot can be controlled manually via Bluetooth by establishing a communication link between a Bluetooth-enabled device (such as a smartphone or a computer) and the robot's control system. This link allows commands to be sent wirelessly from the device to the robot, enabling control over its movement. This manual control via Bluetooth can include commands to move forward, backward, turn left or right, stop, or perform other predefined actions. This innovative approach to threat detection and communication provides a flexible and efficient solution for defense strategies, enhancing situational awareness and response capabilities.

Keywords--- Threat Detection, Land Mine, Missiles, Tankers, Guns, Humans, Drones, Laptop Camera, CNN, Laser, Led, Telegram, Bluetooth.

1. INTRODUCTION

In modern warfare, the need for advanced defense systems capable of swiftly detecting and neutralizing various threats has never been greater. The 360-degree Destroyer represents a groundbreaking solution to this pressing demand. This report delves into the intricate details of the innovative specifications and functionalities of this state-of-the-art military apparatus.

At the heart of the 360-degree Destroyer lies a sophisticated combination of cutting-edge technologies, including Convolutional Neural Network (CNN) algorithms and an array of Internet of Things (IoT) components. These components include Arduino Uno, H-bridge, metal sensor, temperature sensor, MEMS sensor, Bluetooth, ultrasonic sensor, battery, LED indicators, and a laser-equipped robot hand.

The primary objective of the 360-degree Destroyer is to autonomously detect and identify a diverse range of threats commonly encountered on the battlefield. This includes drones, landmines, human intruders, tanks, and incoming missiles. Leveraging the power of CNN algorithms, the system can rapidly analyze sensor data and distinguish between friend and foe with remarkable accuracy.

Upon detecting a threat, the 360-degree Destroyer employs a multifaceted approach to relay crucial information to military personnel in real-time. Utilizing Bluetooth connectivity, the system communicates with Telegram, a secure messaging platform, to deliver instant alerts and updates. This ensures that commanders are promptly informed of potential threats, enabling swift and decisive action.

Furthermore, the 360-degree Destroyer enhances situational awareness by employing LED indicators to represent detected objects. This visual feedback allows operators to quickly assess the nature and location of threats within their vicinity. Additionally, the system incorporates a laser-equipped robot hand, which illuminates detected objects with pinpoint accuracy. This not only assists in identifying targets but also provides a non-destructive method of interacting with potential threats.

2. LITERATURE SURVEY

1.“Missile Tracking and Auto Alert Over IOT”
Author: P. Bhuvana Sri, N. Kalpana.
Year of Publication: 2023
The "Missile tracking and auto Alert Over IOT " project was developed to create an automatic missile detection and destruction system. This system is engineered to detect targets (missiles) moving in various directions. The target destruction system automatically aligns itself with the direction of the missile and fires upon locking onto the target. The missile detection and auto-alert system utilize ultrasonic sensors, which rotate in both clockwise and counterclockwise directions continuously. If any object is detected in either direction, the buzzer activates automatically. Additionally, pressing a switch triggers the laser gun to fire at the detected object automatically. The range of the object is displayed on both an LCD screen and an IoT server for security purposes.

2. “Enhancing border security with IOT and Machine Learning”
Author: Mrs. S Jyothi, Manasa TK, Mahima Bhat, M Abhishek, Monika AS
Year of publication:2023.
The paper titled " Enhancing Border Security with IoT and Machine Learning " introduces the concept of a "Smart Border" as an alternative to traditional physical border systems. It

delves into the development of a sophisticated intruder detection system employing sensors, surveillance cameras, and machine learning algorithms to identify and categorize intruders along the border. The system's objective is to supplant physical and armed patrols with advanced surveillance technology, thereby minimizing human errors and environmental impact. By incorporating IoT principles and machine learning techniques, it seeks to bolster border security without resorting to physical barriers. To ensure future accessibility and mitigate security risks, the collected data is encrypted and stored in the cloud. Furthermore, the study examines existing literature in the field, highlights deficiencies in previous research, and elucidates the methodology and functioning of the proposed system.

3. "IoT based Border Security System using Machine Learning"
Author: Neda Fatima1, Salman Ahmad Siddiqui2, Dr. Anwar Ahmad3
Year of publication:2021
This paper addresses previous research limitations in intruder detection, such as errors, false positives, and inefficient machine learning models. It proposes an innovative solution: an IoT-based Border Surveillance system utilizing a Raspberry Pi Camera for continuous monitoring. The system sends alerts upon intruder detection and employs cloud memory for secure data storage, reducing memory redundancy common in IoT applications.

4. "Ultrasonic Radars based Military Security System for Identification of Trespassers"
Author: Pagidipalli Krishnaiah, Dathrak Rakesh, Banavathu Jyothi.
Year of Publication: 2020.
The goal of this project is to develop an automatic missile detection and destruction system capable of tracking targets moving in various directions. The system comprises an intelligent sonar-based object tracking system that continuously monitors potential targets. Upon target detection, the system relays the target's location to a Central Control System. This Central Control System then orchestrates the movement of the firing mechanism towards the target's direction. Once the direction is fixed, it triggers the firing system to attack the target.
To implement this, we utilize an ultrasonic radar system alongside a DC geared motor-driven firing unit, both of which are interfaced with a Microcontroller-based control unit. The movement of the ultrasonic sensor is facilitated by a servo motor embedded within it. The servo motor rotates through predefined angles, and upon detecting an object, the angle position is relayed as input to the launcher's servo motor. Consequently, the launcher releases the missile contained within it.
This setup is advantageous due to the ultrasonic sensor's ability to cover a large sensing distance, enabling target detection in various lighting conditions, including day and night. The Microcontroller's programming is achieved using Embedded 'C' language, providing the necessary intelligence and control for the system's operation.

5. "Missile Directed by Maneuverable Actuators" Author: Dr. M. Sureshkumar, R. Vignesh, S. Vinotha, S. Priyadarshini
Year of Publication: 2017
This survey will depict the different idea to automate the missile. The architecture is given with the proposed idea of existing system. The main reason for this paper is to automate the vehicle and reduce the manpower then to increase the efficiency of the system. It provides the user-friendly environment to access the system.

6. "Missile Detection and Automatic Destroy System"
Author: A.M. Anushree Kirthika.
Year of Publication: 2014
The Ultrasonic transceiver, comprising a transmitter and receiver, is employed to detect missile objects, with the distance displayed on an LCD screen via Zigbee wireless communication standard and a microcontroller. Mounted on an antenna, the sensor is maneuvered through 360 degrees and can also be adjusted vertically by a stepper motor. Upon detecting a target within its range, the system automatically redirects the launcher towards the nearest detected target and initiates firing. Additionally, the tank vehicle incorporates another microcontroller, facilitating control actions via Zigbee communication through a key panel. The launching mechanism can be adjusted to target missile objects with three-axis rotation based on data received from the Ultrasonic transceiver.

7. "Design and Implementation of e-Surveillance Robot for Video Monitoring and Living Body Detection"
Author: Dr. Shantanu K. Dixit, Mr. S. B. Dhayagonde
Year of publication:2014
Using this proposed technology, it gives a helping hand to our security forces in detection of intruders. This robotic system can also be used in high altitude areas where it is difficult for humans to survive as some of our border areas fall into high altitude areas. The proposed robotic system can also be used in finding the injured persons during disasters such as earthquakes, collapsing of building and also in the mining fields and it can be used as a spy robot.

8. "Surveillance Robot For Tracking Multiple Moving Targets"
Author: S. Pratheepa, Dr. Purushothaman Srinivasan
Year of publication:2011
Video tracking plays a crucial role in object monitoring, employing diverse image processing techniques. In this study, the captured video is divided into individual frames and segmented using a contextual clustering approach. The characteristics of the segmented images are then analyzed using MATLAB's imfeature properties, which offers 24 distinct properties. Among these properties, two key ones are utilized to enhance the features of the segmented image, specifically emphasizing the presence of humans.

3. METHODOLOGY

This section outlines the methodology adopted for the development and implementation of the 360 Degree Destroyer for Military, and including the hardware and software components utilized.

3.1 System Design

1. Laser Module

Upon detecting a threatening object through the camera, the Arduino board activates the motor and triggers a laser to engage with the unauthorized target. In the circuit design, the firing mechanism control for the gun is replaced with a laser. If the laser remains unlit, this indicates that no object has been detected by the sensor, thereby preventing the laser from firing. When the threatening object is detected(signaled by a high output on the port), the Arduino board initiates the firing of the laser. This laser serves as a device that emits light and it is used to engage with and neutralize the detected object.

2. Rover Movement

The Arduino Uno serves dual purposes, operating in both Remote-Control mode and Autonomous mode. In Remote-Control mode, the rover is manually controlled via Bluetooth, while in Autonomous mode, programming via the Arduino Uno enables the rover to operate independently. During Autonomous mode, the ultrasonic sensor detects obstacles, prompting the rover to adjust its direction accordingly.
Direct current (DC) motors are prevalent and feature just two leads: positive and negative. Connecting these leads directly to a battery initiates motor rotation, with a reversal of leads resulting in the motor rotating in the opposite direction. An H-Bridge circuit facilitates the control of a DC motor's spin direction without altering lead connections.
An H-bridge is an electronic setup capable of driving a motor in both forward and reverse directions, commonly utilized in various applications, notably motor control in robots. This configuration employs four transistors arranged to resemble an "H" in the schematic diagram.
While discrete transistors can construct this circuit, this tutorial advocates for employing the L298 H-Bridge IC. The L298 enables control over the speed and direction of DC motors and stepper motors, facilitating simultaneous control of two motors. However, when operating at higher currents, heat sinks are necessary to manage heat dissipation effectively.

3.Capturing Image

The camera module specified for this military defense system is a laptop camera, likely integrated into the system for object detection and surveillance purposes. Laptop cameras, commonly found in commercial laptops, are typically compact and offer sufficient resolution for real-time image capture and processing. These cameras often have capabilities for capturing both still pictures and film footage, which would be essential for continuous monitoring and analysis in this application.. The camera's primary function within the system would be to capture visual data of the surrounding environment, including potential threats such as tanks, missiles, or drones. This captured data would then be processed by the integrated Convolutional Neural Network (CNN) algorithm to identify and classify objects of interest. Employing a laptop camera aligns with the system's overall design, leveraging existing technology for reliable and effective object detection and threat assessment.

4.Algorithm- CNN

A Convolutional Neural Network (CNN) is an artificial intelligence algorithm inspired by the human visual system, adept at identifying patterns within images. It works by passing the image through layers of filters, each layer focusing on different features like edges or shapes. As it goes through these layers, it gradually learns to identify more complex patterns, enabling it to make accurate predictions or classifications about what's in the image.

3.2 Hardware and Software Components

The system's hardware components comprise several essential elements. The Arduino UNO serves as the system's central processing unit, managing both input and output functions. An ultrasonic sensor facilitates distance measurement, while a temperature sensor monitors changes in temperature. Mechanical movement is enabled by a DC motor, while a MEMS sensor detects motion and orientation. A laser assists in directing towards detected objects. An IoT communicator allows the system to connect to the internet for remote monitoring. Consistent energy provision is ensured by a power supply, while an H-Bridge controls the DC motor. The presence of metal objects is detected by a metal sensor. Connectivity and IoT capabilities are enhanced by a Node MCU. A relay serves as an electromechanical switch for DC motor control, while a battery provides portable power. Wireless communication is enabled through Zigbee and Bluetooth modules, with LEDs serving as indicators. Additionally, a laptop camera can be utilized for image processing or computer vision tasks.
The software components include:
The Arduino IDE for working with Arduino boards, Embedded C is a programming language used for controlling small computing devices like microcontrollers. It allows developers to write code that directly interacts with hardware to perform specific tasks, Python is a versatile programming language, and IDLE as a user-friendly environment for Python programming.

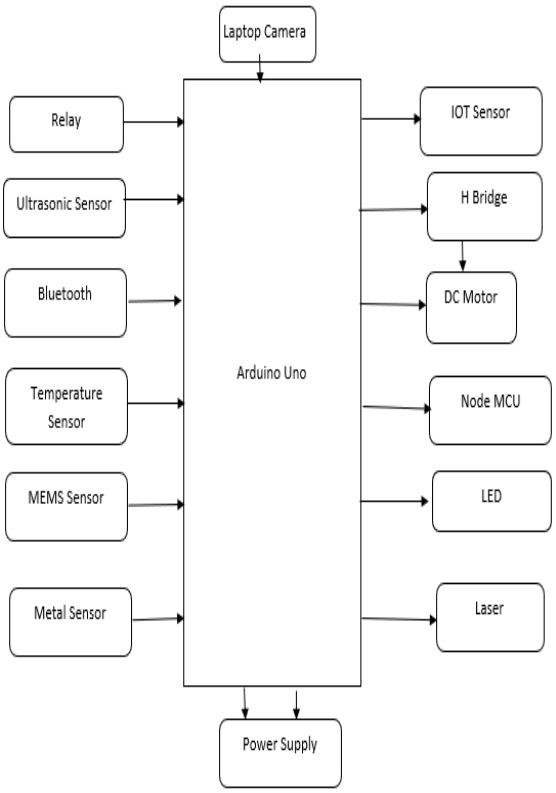

Figure 1: Block Diagram

4. CONCLUSION

The "360 Degree Destroyer for Military" model represents a significant advancement in threat detection and response systems. By leveraging CNN algorithms and a laptop camera, it autonomously identifies various threats such as missiles, tanks, humans, and drones. Instead of destroying the target, the system uses a laser to pinpoint the detected objects and LEDs to indicate threat levels, enhancing situational awareness for operators. Moreover, the integration of Telegram messaging ensures swift communication of detected threats for timely action. Furthermore, the inclusion of a metal sensor enables the detection of landmines, further enhancing the system's utility in diverse defense scenarios. Additionally, manual control via Bluetooth provides operators with flexibility in maneuvering the robot. Overall, this innovative approach offers a comprehensive and adaptable solution for bolstering defense strategies, empowering military personnel with enhanced situational awareness and response capabilities.

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