IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 12, Issue 5, May 2025

DOI: 10.17148/IARJSET.2025.125324

Unmanned robot using IoT for military applications

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Abstract: Most military organization now takes the help of robots to carry out many risky jobs that cannot be done by the soldier. These robots used in the military are usually employed with an integrated system, including video screens, sensors, grippers, and cameras. The military robots also have different shapes according to the purposes of each robot. Here the new system is proposed with the help of low low-power IOT wireless sensor network to trace out the intruders (unknown persons) and the robot will take the necessary action automatically. Thus the proposed system, an Intelligent Unmanned Robot (IUR) using IOT saves human lives and reduces manual error on the defense side. This is a specially designed robotic system to save human life and protect the country from enemies. Robots are specially designed for humans to make our lives easier. Robots are designed for various purposes like military purposes, industry, for home home-based applications. At the border, different tanks, missiles, guns, etc. are used by the enemy. This causes problems and harms our forces or soldiers. For this, a robot is designed and developed for military purposes application to protect our army. robots are used to detect obstacles that are found in their path. If it finds any obstacle in its path, then using a gun mechanism it will able to shoot that obstacle. To make it a multifunctional robot all the actions performed by the user same actions performed by a robot using the stretch sensor. All these mechanisms are embedded in the propeller.

Keywords: ESP32, IR.

I. INTRODUCTION

The modern world and its researches has made a tremendous change in the field of computer science and engineering. Even hardware's and software's are built up in order to provide an ease for the humans work. The Kargil War also known as the Kargil conflict, that took place between May and July 1999. The conflict is also referred to as Operation Vijay which was the name of the Indian operation to clear the Kargil sector. The cause of the war was the infiltration of Pakistani soldiers and Kashmiri militants into positions on the Indian side of the LOC, which serves as the de facto border between the two states. During the initial stages of the war, Pakistan blamed the fighting entirely on independent Kashmiri insurgents, but documents left behind by and later statements by Pakistan showed involvement of Pakistani paramilitary forces, led by General, recaptured a majority of the positions on the Indian side of the LOC infiltrated by the Pakistani troops and militants. With international diplomatic opposition, the Pakistani forces withdrew from the remaining Indian positions along the LOC.

The war is one of the most recent examples of high altitude warfare in mountainous terrain, which posed significant logistical problems for the combating sides. Indian government had to face huge loss because of this war like human loss, machine loss, aircrafts, tankers. Indian economy decreased by 38%, cost of all commodities increased, taxes increased ; all together we had to face tremendous loss.

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II. BLOCK DIAGRAM AND METHODOLOGY

2.1 BLOCK DIAGRAM

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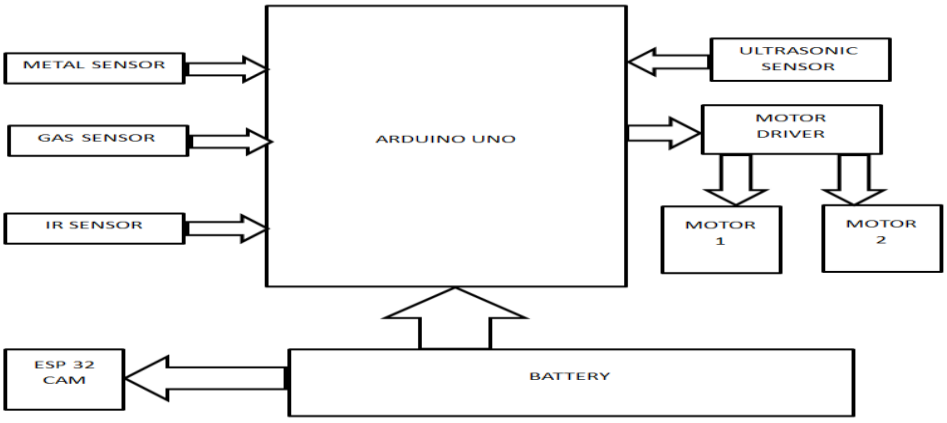

Fig1. Block diagram of Unmanned robot using IoT for military applications

2.1 WORKING METHODOLOGY

Implementing a comprehensive security and surveillance system can be achieved using a variety of advanced technologies. MQ series sensors (135, 37, 55) can provide effective protection from potential threats like surgical strikes by detecting specific gases or chemicals. A 360-degree motion sensor system ensures continuous, 24/7 surveillance, covering all angles and leaving no blind spots. To enhance defense capabilities, a merciless shooting facility utilizing LASER guns can be integrated, providing a precise and immediate response to intrusions. Additionally, metal detector sensors are crucial for identifying and neutralizing mines and bombs, offering protection against explosive threats. For live human detection, PIR sensors are employed to accurately sense movement and presence. An artificial intelligence photography system can be established using ESP32 cameras, which provide real-time image processing and analytics. Furthermore, an IoT-based notification system can be implemented using the IFTTT server, Jio Cloud, and BLYNK servers, ensuring timely alerts and updates. A 360-degree surveillance solution also plays a vital role in combating drug trafficking, helping to prevent the penetration of narcotics like cocaine and opium into the country. These integrated technologies work together to create a robust and multi-faceted security framework.

2.2 WORKING FLOWCHART

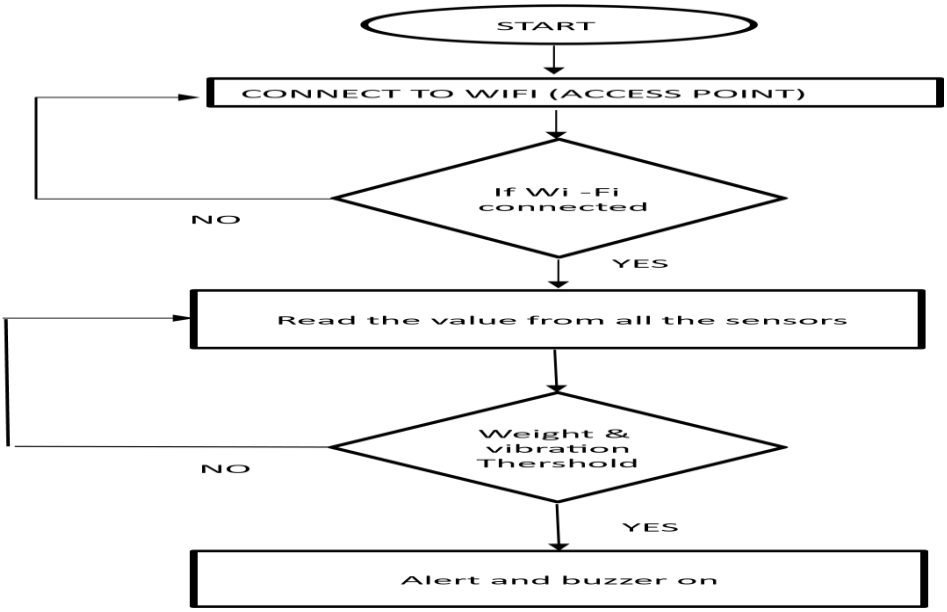

Fig2. Flowchart of the proposed system

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Figure 5.2, shows the data flow diagram for the proposed system. A DFD is a logical model of the system. The model does not depend on the hardware, software, and data structures of file organization. It tends to be easy for even non-technical users to understand and thus serves as an excellent communication tool. DFD can be used to suggest automatic boundaries for the proposed system at a very high level; the entire system is shown as a single logical process identifying the sources and destination of data.

III. COMPONENTS REQUIRED

3.1HARDWARE REQUIREMENTS

3.1.1 Micro controller ESP32

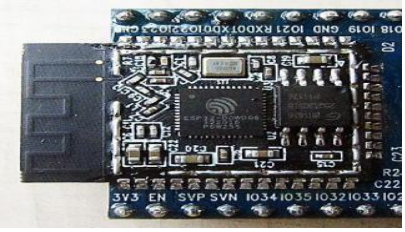

Fig3. ESP 32

The ESP32 series employs either a Ten silica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor, or a single-core RISC-V microprocessor and includes built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power-management modules. ESP32 was created and developed by Es Press if Systems, a Chinese company based in Shanghai, and is manufactured by TSMC using its 40 nm process. It is a successor to the ESP8266 microcontroller.

3.1.2 IR Sensor

Fig4. IR sensor

Infrared technology addresses a wide variety of wireless applications. The main areas are sensing and remote controls. In the electromagnetic spectrum, the infrared portion is divided into three regions: near-infrared region, mid-infrared region, and far infrared region.

3.1.3 Gas sensor

Fig5.Gas sensor

The Gas Sensor Module is a low-cost semiconductor sensor that can detect the presence of Ammonia (NH3), Mono nitrogen oxides (NOx), Alcohol, Benzene, Smoke, carbon dioxide (CO2), etc.

3.1.4 Metal sensor

Fig6. Metal sensor

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A metal sensor detects metallic objects by generating electromagnetic fields or using pulse induction technology, crucial for security screenings, archaeological digs, and industrial applications. Its ability to locate buried metals aids in various fields including security, construction, and resource exploration.

3.1.5 Ultrasonic sensor

Fig7. Ultrasonic sensor

The HC-SR04 ultrasonic sensor uses sonar to determine the distance to an object as bats do.

3.2 SOFTWARE REQUIREMENTS

3.2.1 ARDUINO IDE

The Arduino IDE provides a user-friendly interface for writing, compiling, and uploading code to Arduino boards. It supports a variety of programming languages, including C and C++, and comes with a range of built-in libraries for different functionalities. The IDE also includes features like syntax highlighting, automatic code indentation, and serial monitoring for debugging. Additionally, it offers extensive documentation and a large community of users who share projects, tutorials, and troubleshooting tips.

3.2.3 Blynk IoT app

When a user opens a mobile app, the app communicates with the device's operating system and other built-in software components to access the device's hardware which can control the various operations

IV. RESULT AND CONCLUSION

4.1. Result

- The working of a robot with sensors, where all three sensors of live human detection, Metal, and Gas sense the object in front of it within 10cm and gives us a sensed notification on the App called BLYNK.
- The movement of a robot can be controlled and operated by a mobile phone by a user like the front, back, left, and right. Along with the sensing, the gun turns in the direction of detection and also shoots the object on the spot with a laser gun.

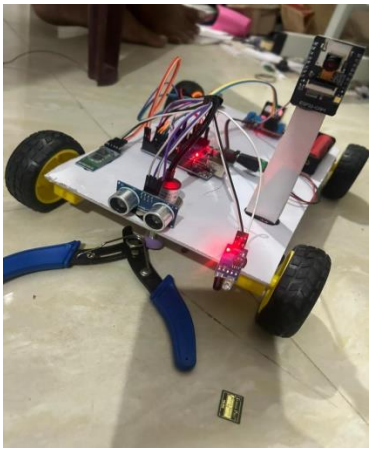

Fig.8 Demo model

- The emergence of intelligent unmanned robots leveraging IoT for military applications signifies a transformative leap in modern warfare capabilities. These robots, equipped with advanced sensors, communication systems, and autonomous decision-making capabilities, offer a multitude of strategic advantages and operational opportunities on the battlefield.

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- One of the key strengths of intelligent unmanned robots in military applications is their ability to operate autonomously or semi-autonomously, reducing the need for human intervention in hazardous or high-risk environments.

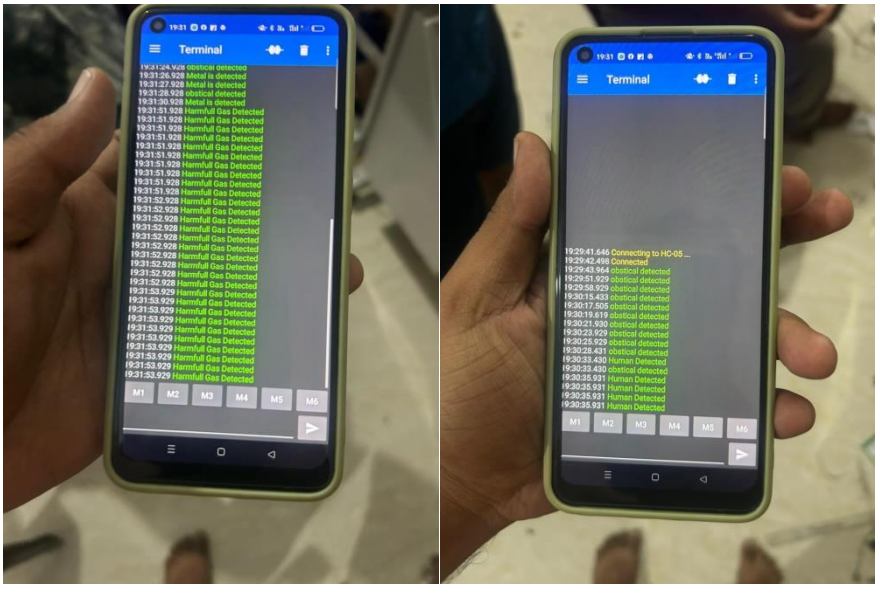

Fig9. Results after simulation

V. CONCLUSION

Merciless bsf is the current area of research where lots of scope exists. Currently this particular security technique is required by several countries .one such enhancement we are trying to do. The type of communication technique enhance operation, where the user can control the m from any part of world by getting live video feedback, compared to earlier robots work like wifi with constraints have limited, iot and s video camera makes it cost effectives combat robot. This robotic vehicle with different widely be used as surveillance robot for se c emergency rescue operations where human and user will be able to alert prior to intruder The proposed system gives an exposure to design a multifunctional defence robot. This robot has a widespread industrial, defense applications. The laser gun attached to the robot is an excellent substitute for the weapons carried by the soldiers

REFERENCES

[1] Bhawana D. Parate and Jagruti J. Shah, “Design and Development of Multifunctional Robot for Military Purpose Application”, International Journal of Engineering Research and Applications IJERA ISSN: 2248-9622 International Conference on Industrial Automation and Computing ICIAC- 12-13th April 2014.

[2] Sharath Sethu Raghavan, Jasim M,[2], “Hazardous Gas & Mine Detecting Robot”, International Journal of Computer Trends and Technology (IJCTT) – volume 28 Number 1 – JUNE 2020.

[3] Sweeta Deshmukh, Priyadarshini, Mamta Madhura Deshmukh, Dr.Md.Bakhar, “IOT Based Surveillance Robot”,2nd National Conference on recent Advances in Engineering and Technology, 2019.

[4] Vishal L. Mate, Mayuri B.Borse,KomalPatalpure, BhagyashreePawar,”IOT Based Wireless Multifunctional Robot for Military Applications” IJARIIE-ISSN(O)-2395-4396-4295”, Vol-3 Issue-2 2017.