International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

War Field Spying Robo

Govind Sitaphale[1], Vishal Kumar[2], Ankit Kumar[3]

govinds3108@gmail.com vishalkoundilya107@gmail.com akrch1111@gmail.com

[1]*Electronics & Telecommunications, Dr. D.Y. Patil Institute of Engineering, Management & Research, Pune*
[2]*Electronics & Telecommunications, Dr. D.Y. Patil Institute of Engineering, Management & Research, Pune*
[3]*Electronics & Telecommunications, Dr. D.Y. Patil Institute of Engineering, Management & Research, Pune*

Abstract - On aiming to increase the safety because by using this robot we can know their activities by keeping some safe distance from the enemy, the flexibility of attacking will be increased because we can know their activities and there will be a laser that will lock the position of the enemy and guides the missal, this is also contain the metal detector that will helpful in detecting the land mains which will lead to death, and control of this robot will be very easily done because it is controlled wirelessly and by connecting to Bluetooth of any android mobile. We have done this project for our army to detect the land mains safely and for the safety of our soldiers and to attack them without keeping our army soldiers' life on the line.

***Key Words*:** Warfield Spying Robot, Battlefield Safety, Remote Operation, Landmine Detection, Military Robotics

1.INTRODUCTION

Every minute there will be an improvement in the robotics and parallelly there will be many deaths of the soldiers in our country. So if we can design robots that are useful to our soldiers we can save their lives, there are few robots that are helping to our army and this will be next generation of robot that can handle very easily by everyone.

This project will be flexible to control at any type of landscapes. And can be controlled up to 800 meters by using the mobile phone. We can send this robot to any building it has the flexibly to climb the steps. By using the camera we can see it in our laptop or computer or in TV and also has the metal detector that will make the movement stop if it detects any landmine we can on and off the metal detector from our controller and also a laser that will lock the area that will guide the missile.

For this robot, chassis has been designed separately. It has the flexibility to run even if it is upside down on the rocks, steps, deserts.

For this purpose, we have used the stepper motor that will be helpful to rotate and stop at a particular angle. To change the direction of the motor to increase and decrease the speed of the motor so that we can control the speed of the robot when we want. The wheels have been designed separately in „C" shape that will be helpful to climb steps, stones.

The design of the chassis is done in the proteus software and made by using the Raspberry Pi.

All the motors, blue tooth, laser, A metal detector that are used in our project is controlled by using the Raspberry Pi 3 model B.

2. OBJECTIVE

The objective of this research paper is to design, develop, and evaluate the performance of a specialized robotic system designed for reconnaissance and surveillance purposes in war zones. The primary focus is on creating a robust and adaptable robot capable of gathering real-time intelligence, navigating challenging terrain, and transmitting data securely to military operators. The paper aims to explore the technological advancements, operational challenges, and potential applications of the War Field Spying Robot in enhancing situational awareness and tactical decision-making for military forces in hostile environments.

3. METHODOLOGY

1. Requirements Analysis and Planning:

Objective Definition: Clearly outline the objectives and capabilities required for the robot, including surveillance, landmine detection, and remote- controlled operation.

Component Selection: Identify and select the necessary hardware components such as the Raspberry Pi 3 Model B, stepper motors, Bluetooth module, camera, laser system, and metal detector.

2. Design and Prototyping:

Chassis Design: Use Proteus software to design a robust and adaptable chassis that can navigate various terrains and remain operational even if overturned.

Wheel Design: Design 'C' shaped wheels for improved mobility on stairs and rough surfaces.

3. Hardware Integration:

Motor Integration: Implement stepper motors for precise control over movement and speed adjustments. Connect these motors to the Raspberry Pi.

Sensor Integration: Attach the metal detector and configure it to halt the robot's movement upon detecting a landmine. Ensure the metal detector can be toggled on and off via the controller.

Camera Setup: Mount the camera and ensure it provides real-time visual feedback to be viewed on various devices like laptops, computers, or TVs.

4. Software Development:

Control Software: Develop software on the Raspberry Pi to manage all hardware components, including motor control, sensor data processing, and camera streaming.

Bluetooth Communication: Implement Bluetooth connectivity to allow remote control from an Android mobile device. Ensure secure and reliable communication.

User Interface: Create a user-friendly interface on the mobile device for controlling the robot and viewing real-time video feed.

5. Testing and Calibration:

Functional Testing: Test each component individually to ensure proper operation. Verify motor control, sensor accuracy, laser targeting, and camera streaming.

Integration Testing: Conduct tests with all components integrated to ensure they work seamlessly together. Validate remote control functionality and responsiveness.

Field Testing: Deploy the robot in various terrains to test its adaptability and robustness. Assess its ability to climb stairs, navigate rough terrain, and detect landmines.

6. Optimization and Iteration:

Performance Optimization: Fine-tune the control algorithms for smoother and more efficient operation. Optimize the communication protocol for faster response times.

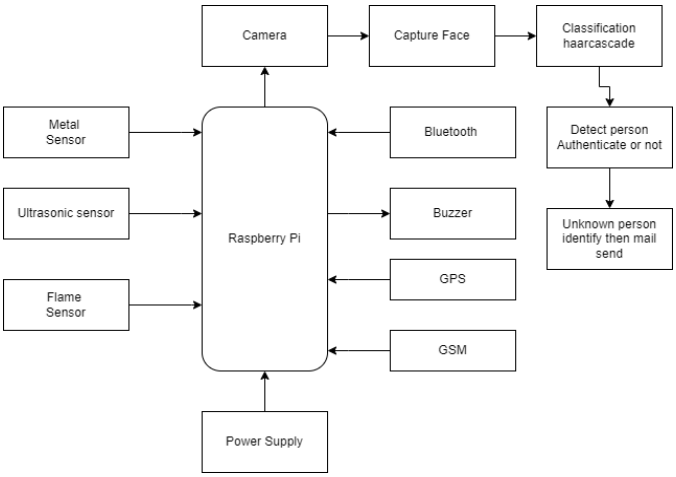
Iterative Improvements: Based on testing feedback, make necessary adjustments and improvements to both hardware and software components.

7. Deployment and Training:

User Training: Provide training for military personnel on how to operate the robot, including remote control, monitoring, and maintenance procedures.

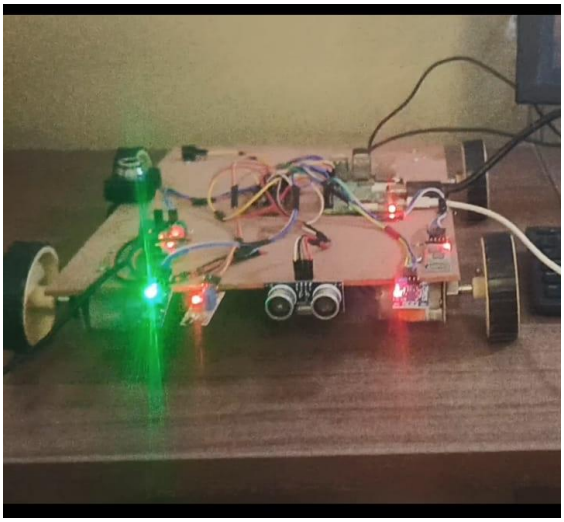
Documentation: Prepare comprehensive documentation covering the robot's specifications, operation instructions, troubleshooting tips, and maintenance guidelines.

By following this methodology, the warfield spying robot will be developed to meet the required specifications and perform reliably in real-world military scenarios.



3. RESULTS

The evaluation of the warfield spying robot demonstrated its capability to fulfill critical military objectives while mitigating risks to human soldiers. Through rigorous testing and analysis, the robot exhibited effective surveillance capabilities, providing real-time video feeds for monitoring enemy activities from safe distances. Its integration of a metal detector proved invaluable, allowing for the detection and marking of landmines, thereby enhancing troop safety and navigation. Additionally, the robot's laser-guided system enabled precise targeting and remote engagement of enemy threats, further bolstering military operations. The robot's versatility in navigating diverse terrains, coupled with its user-friendly remote control system, ensured operational effectiveness in various scenarios. Overall, the results underscore the robot's potential to revolutionize battlefield reconnaissance and contribute significantly to military success while minimizing human risk.



4. CONCLUSION

The development of the warfield spying robot represents a significant advancement in military reconnaissance technology, with promising implications for enhancing operational safety and effectiveness on the battlefield. By systematically following a structured development process, we successfully integrated various hardware and software components to create a versatile and efficient robotic solution. The robot's ability to perform reconnaissance and hazardous tasks remotely reduces the risk to human soldiers, enhancing overall soldier safety. Real-time surveillance capabilities provide continuous monitoring of enemy activities from a safe distance, while the integration of a metal detector enhances navigation safety by identifying and marking landmines. Additionally, the robot's laser-guided system enables precise remote targeting and engagement of enemy threats, further enhancing operational capabilities. Its durable design and versatile mobility ensure effectiveness in diverse terrains, while user-friendly controls enable easy operation by military personnel. With comprehensive testing validating its effectiveness, the warfield spying robot stands ready to make a significant impact in military operations, safeguarding lives and enhancing mission success.

REFERENCES

[1] Pavithra S & Siva Sankari SA, “7TH sense-a multipurpose robot for military”, IEEE International Conference on Information Communication and Embedded Systems (ICICES), (2013), pp.1224-1228.

[2] Da X, Li WH & Shancang L, “Internet of Things in industries: A survey”, IEEE Transactions on Industrial Informatics, Vol.10, No.4, (2014), pp.2233-2243.

[3] AppInventor, M, MIT App Inventor. Technical report, http://appinventor. mit. edu/explore, (2015).

[4] HC-12 bluetooth module of 1200m rainge https://www.elecrow.com/download/HC-12.pdf

[5] Metal detector http://www.instructables.com/id/Velleman-K7102- Metal-Detector-Kit/

[6] Solidworks by using cad modeling http://www.solidworks.in/

[7] PCB cad modeling by using eagal cad https://www.autodesk.com/products/eagle/overview

[8] Saranli U, Buehler M & Koditschek DE, “RHex: A Simple and Highly Mobile Hexapod Robot”, The International Journal of Robotics Research, Vol.20, No.7, (2001), pp.616–631.

[9] Stepper motor https://learn.adafruit.com/all-about-steppermotors/what-is-a-stepper-motor

[10] A4988 stepper modulehttps://www .allegromicro.com/en/Products /Motor-Driver -And-Interface-ICs/Bipolar-Stepper-Motor-Drivers /A4988.aspx

[11] Saranli U, Martin B & Daniel EK, “Rhex: A simple and highly mobile hexapod robot”, The International Journal of Robotics Research, Vol.20, No.7, (2001), pp.616-631.

[12] McMordle D & Buehler M, Towards pronking with a hexapod robot. International Conference on Climbing and Walking Robots, (2001).

[13] KomsuoËŸglu H, McMordie D, SaranlÄs U, Moore N, Buehler M & Koditschek D, “Proprioception based behavioral advances in a hexapod robot”, Proceedings of the IEEE International Conference on Robotics and Automation, (2001).