iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** IV **Month of publication:** April 2023

DOI: https://doi.org/10.22214/ijraset.2023.50390

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue IV Apr 2023- Available at www.ijraset.com

Military Support and Rescue Robot

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Abstract: ***Military support and rescue robots are becoming increasingly important in modern warfare and disaster response efforts. These robots can perform tasks that are too dangerous or difficult for human soldiers or first responders. They can also gather and transmit crucial information in real-time to help commanders make informed decisions. This abstract will discuss the key features and capabilities of military support and rescue robots, as well as their potential applications. One of the primary functions of military support and rescue robots is to assist soldiers and first responders in dangerous situations. These robots can be used to search for and extract wounded soldiers, identify and disarm explosive devices, and provide cover fire for advancing troops. They can also be equipped with sensors and cameras to gather intelligence and provide real-time situational awareness to commanders. In disaster response scenarios, these robots can assist in search and rescue efforts, locate and extract survivors from collapsed buildings, and provide aid and medical assistance to those in need. They can also be used to survey damaged infrastructure and assess the extent of the damage. Military support and rescue robots are typically equipped with advanced sensors and communication systems to enable them to operate in a variety of environments. They can be designed to operate on land, sea, or air, and can be adapted to handle different terrains and weather conditions. Some robots are also capable of autonomous operation, allowing them to navigate and complete tasks without human intervention. Overall, military support and rescue robots have the potential to greatly enhance the effectiveness of soldiers and first responders in dangerous and challenging environments.***

I. INTRODUCTION

In today's Robotic era we have different types of robots for performing various activities. The above idea gives the application to the one of the practical system which reaches out the person who is struck in hazardous situation and helps the military. Search and rescue is an application where robots used in the military can play a crucial role in saving lives.

The primary objectives for military support and rescue robots are to enhance the capabilities of military personnel and to improve the safety and effectiveness of military operations. Some specific objectives for these robots include:

1) *Reconnaissance:* Military support and rescue robots are often used for reconnaissance missions, allowing military personnel to gather information about enemy positions or other potentially hazardous environments without putting themselves at risk.
2) *Surveillance:* These robots can be equipped with cameras and other sensors to provide real-time surveillance of a particular area, allowing military personnel to monitor potential threats or activities.
3) *Search and Rescue:* Military support and rescue robots can be used in search and rescue operations to locate and assist in the extraction of injured or trapped individuals.

Overall, the objectives for military support and rescue robots are to provide enhanced capabilities and improved safety for military personnel, while also improving the efficiency and effectiveness of military operations.

II. PROPOSED METHODOLOGY

This robot will provide aid and support to the military by performing intelligence, surveillance and reconnaissance, search and rescue and removal of explosives. This robot is expected to reduce casualties and help the military work more efficiently. Here we are using INTERNET OF THING technology. The presence of different sensors connected to the Arduino uno. Here data transmission is taken place with the help of wifi. This idea of proposed system overcomes the weakness of the existing models and provides better support and military operations.

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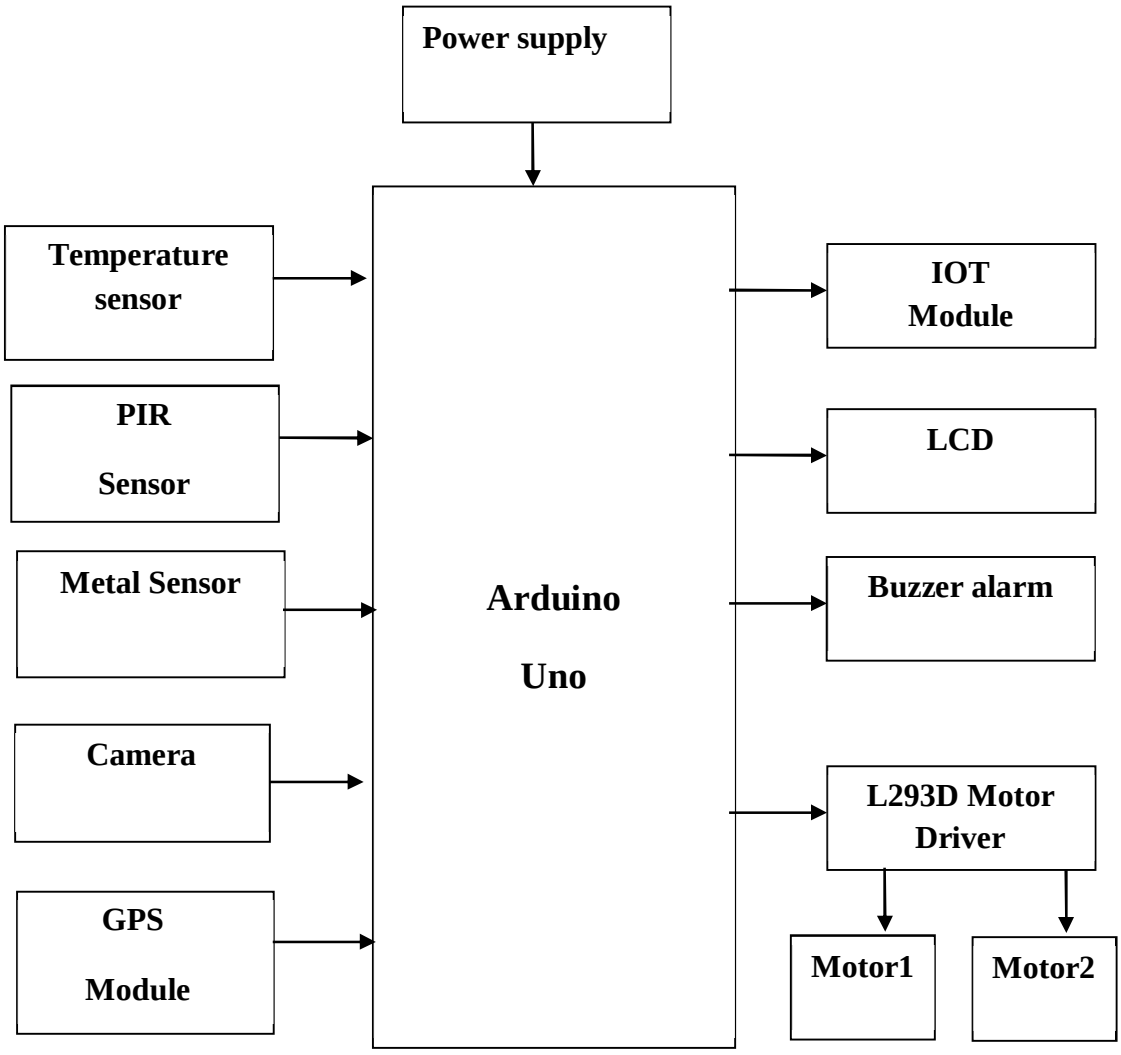


Fig: Block Diagram

1) *Liquid Crystal Display:* A 16x2 LCD can display 16 characters for line. There are 2 such lines.
2) *Power Supply:* Power Supply consists of a step-down transformer which operates on 230 V which is further connected to a Bridge Rectifier, following with two capacitive filters associated with IC Regulator and a load resistor.

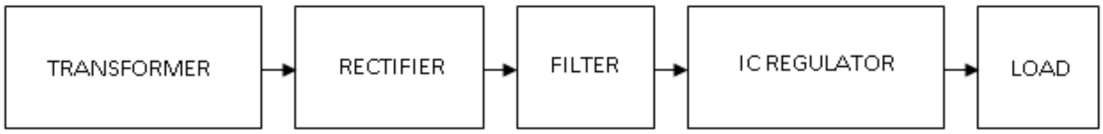


Fig: Block Diagram of Power Supply

3) *Arduino Uno:* Arduino uno is a microcontroller board based on the atmega328p. It has digital and analog pins that are connected for different modules. The code is written in Embedded C which dumped into it to activate the system.
4) *Temperature Sensor:* Here LM35 Temperature Sensor is used to detect the environment conditions of the surroundings.
5) *PIR Sensor:* Passive Infrared Sensor is a pyroelectric device that detects motion by measuring changes in the infrared (heat) levels emitted by surrounding objects.
6) *Metal Sensor:* A Metal Sensor is used to detect the metals which are included in the landmines. Thus it supports detection of explosives.

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7) *Buzzer:* A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, house hold appliances such as a microwave oven, or game shows.
8) *Camera:* V380pro is a wifi camera with hd wireless ip camera operated by a mobile application. It is used for Surveillance.
9) *GPS Module:* Global Positioning System Module is connected with antenna which gives the latitude and longitude of the location.
10) *IOT Module:* Internet Of Things Module is used operated with the help of wifi controlled by the Mobile application.
11) *Motors:* L293D IC motor is used. It contains two small motors in forward , reverse and moves right and left.

III. LITERATURE REVIEW

Military support and rescue robots have been the focus of much research and development in recent years, as they provide valuable assistance to military personnel and emergency responders in high-risk situations. In this literature review, we will examine some of the key findings and advancements in the field of military support and rescue robots. One of the most significant areas of research in this field is the development of autonomous robots that can operate without human intervention. For example, in a study published in the Journal of Field Robotics, researchers developed a system that allowed a team of robots to collaborate and perform search and rescue operations in a disaster zone without human control. The robots were equipped with sensors and algorithms that enabled them to navigate the environment and communicate with one another, resulting in efficient and effective search and rescue operations. Another important area of research is the use of robots in bomb disposal operations. In a study published in the Journal of Explosives Engineering, researchers examined the effectiveness of a robotic system designed for explosive ordnance disposal. The robot was equipped with specialized tools and sensors that enabled it to locate, identify, and dispose of explosive devices. The results of the study showed that the robot was able to perform the task safely and effectively, reducing the risk of injury or death for human bomb disposal technicians.

Furthermore, some research has focused on the design of robots that can adapt to different environments and terrains. For instance, in a study published in the Journal of Field Robotics, researchers developed a robot capable of climbing over obstacles and traversing rough terrain. The robot was equipped with a suspension system and advanced sensing capabilities that allowed it to navigate challenging environments, making it suitable for use in search and rescue missions. Finally, research has also examined the ethical implications of using military support and rescue robots. In a paper published in the Journal of Military Ethics, researchers explored the ethical considerations surrounding the use of autonomous robots in warfare. They concluded that while robots have the potential to reduce the risk of harm to human personnel, there are also concerns about accountability and the potential for unintended consequences. In conclusion, the research on military support and rescue robots has demonstrated their potential to revolutionize the way military operations and rescue missions are conducted. However, further research is needed to address the technical and ethical challenges associated with their use, ensuring that they are deployed in a safe and responsible manner.

IV. IMPLEMENTATION

The implementation of military support and rescue robots involves several steps, including design, development, testing, and deployment. The following is a brief overview of these steps:

1) *Design:* The first step in implementing a military support and rescue robot is to design it to meet specific operational requirements. This involves identifying the tasks the robot will perform, selecting the appropriate sensors and technologies, and designing the robot's physical structure.
2) *Development:* Once the design is complete, the robot is built and programmed. This involves integrating the selected sensors and technologies into the robot, programming its algorithms, and testing its functionality.
3) *Testing:* Before the robot can be deployed, it must be thoroughly tested to ensure that it can operate safely and effectively in its intended environment. This involves testing the robot's sensors, navigation systems, and communication capabilities, among other things.
4) *Deployment:* Once the robot has been designed, developed, and tested, it can be deployed in its intended environment. This involves transporting the robot to the deployment site, integrating it into the overall mission plan, and ensuring that it is operated safely and effectively.
5) *Maintenance and Support:* After deployment, the robot requires ongoing maintenance and support to ensure that it continues to operate effectively. This involves regular maintenance checks, software updates, and technical support.

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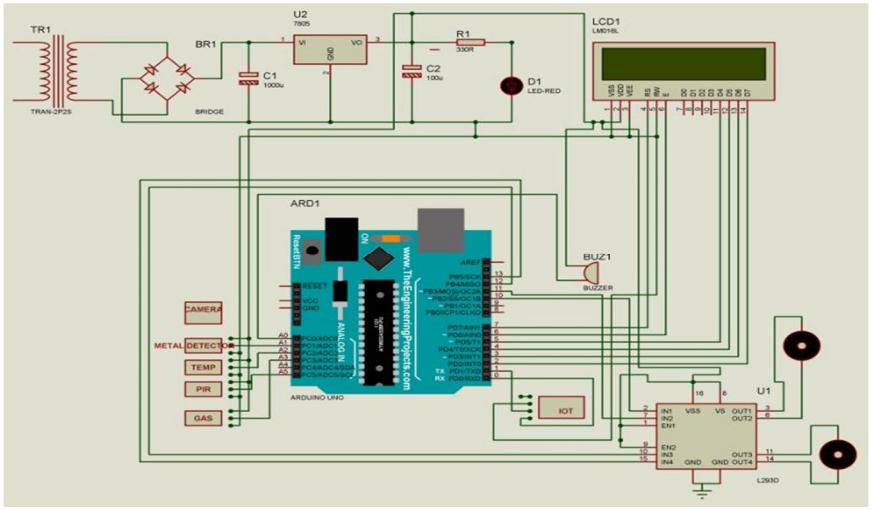


Fig: Schematic Diagram

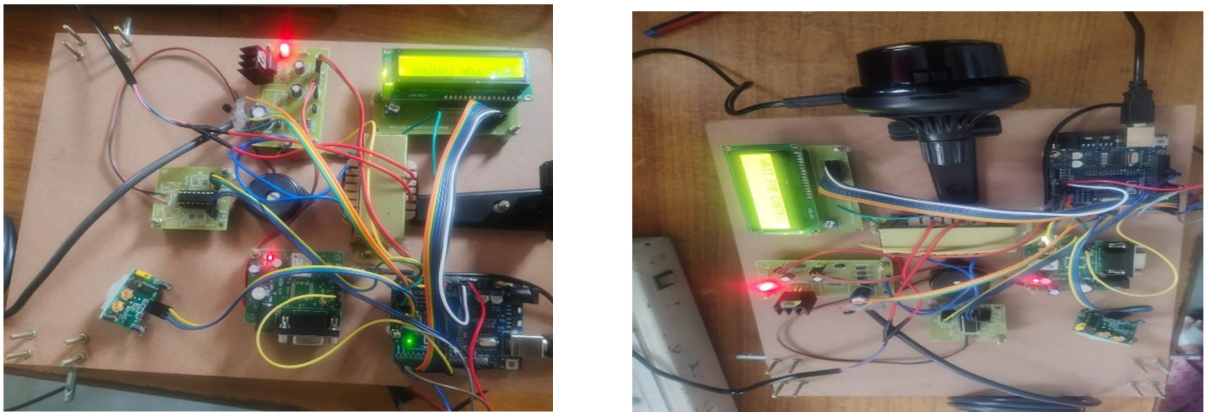


Fig: Circuit and connections

V. CONCLUSIONS

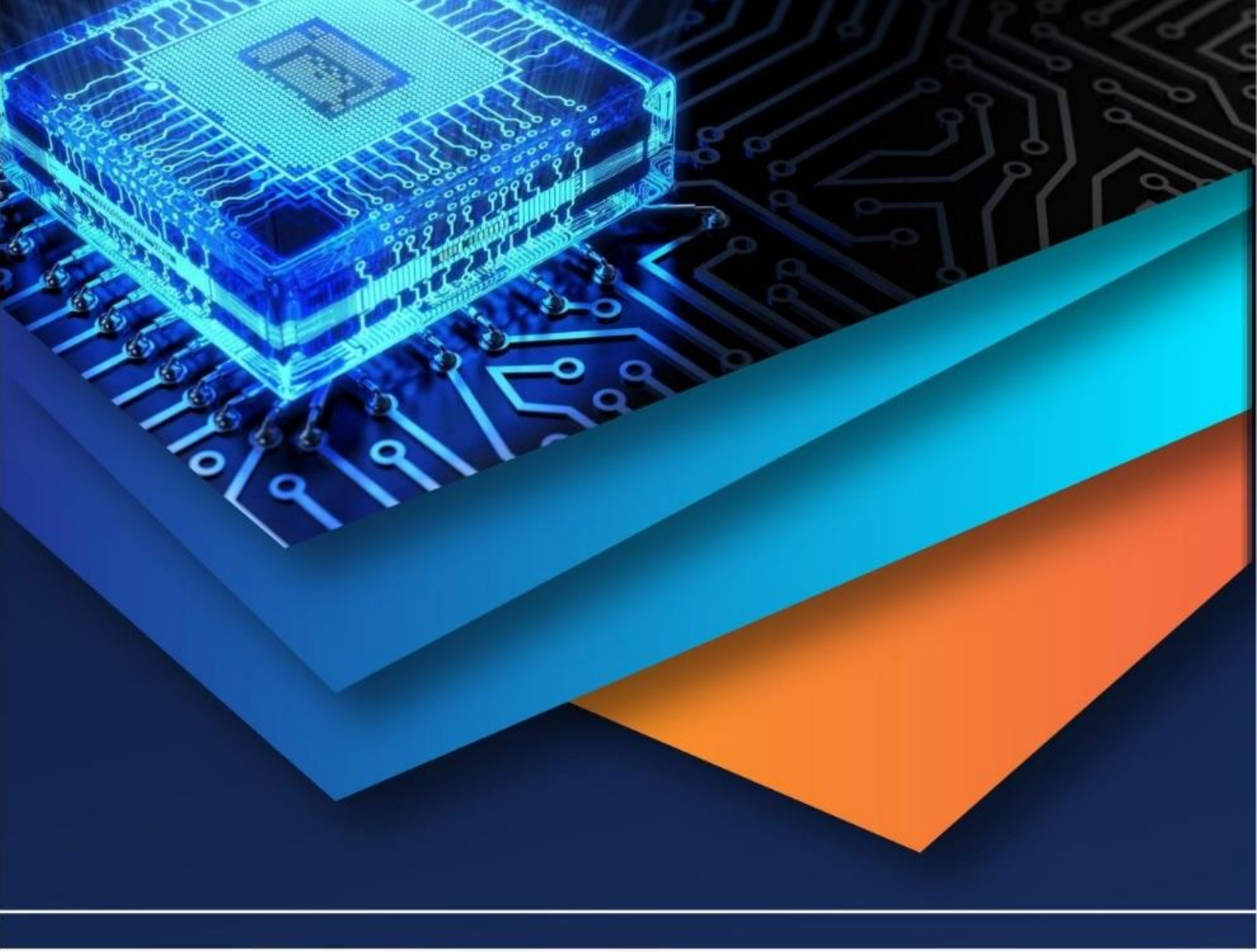
The prototype is a semi-autonomous, battery-operated military support and rescue robot, developed to eliminate all the key weaknesses in the existing models and to build an all-in-one robot developed to work with maximum efficiency. From the results and discussion, the proposed system overcomes the weakness of the existing systems and proves to aid better in military operations. Military support and rescue robots have become increasingly important in modern military operations and disaster response. They are capable of performing a variety of tasks that are too dangerous or difficult for humans to undertake. These robots can assist in search and rescue missions, deliver supplies to inaccessible areas, provide medical assistance, and even detect and dispose of explosives. As technology continues to advance, the future of military support and rescue robots is likely to see even greater improvements in their capabilities. These improvements may include enhanced mobility, sensing capabilities, autonomy, versatility, and integration with other technologies. This will make robots even more effective in a variety of situations, including combat zones, disaster areas, and other hazardous environments. However, it's important to note that military support and rescue robots are not without their limitations. They may not be able to fully replace human operators, particularly in situations where human judgment is required. Additionally, they may be vulnerable to hacking or other cyber threats, which could compromise their effectiveness and put human lives at risk. The development of military support and rescue robots is an exciting area of innovation that has the potential to improve the safety and effectiveness of military operations and disaster response efforts.

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