IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

LANDMINE DETECTION AND INTIMATION ROBOT USING GSM AND GPS TECHNOLOGY

Prof.Hariprasad T L[1], Anusha T Belamkar[2], Farheen Fathima A[3], Manoj G S[4] and Mahesh L[5]

[1]Associate Professor, Department of Electronics and Communication Engineering, Cambridge Institute of Technology (CITech), Bengaluru, India

[2,3,4,5]Student, Department of Electronics and Communication Engineering, CITech, Bengaluru, India

Abstract: The integration of GSM and GPS innovations permits for effective communication and exact area following, guaranteeing fast and precise reaction to recognized landmines. The real-time transmission of information empowers the base station to make educated choices and send assets successfully. Furthermore, the robot's capacity to check and cripple landmines remotely minimizes the hazard to human life included in manual demining operations. Furthermore, the Landmine Discovery and Insinuation Framework Robot's flexibility makes it appropriate for arrangement in different landscapes and situations. Its tough plan and all-terrain capabilities empower it to work in challenging conditions, counting unpleasant territory and unfavourable climate. This flexibility upgrades its viability in recognizing and neutralizing landmines in different geological areas, making it a profitable device for mine clearance operations around the world.

Keywords: Intimation system, Metal detectors, Base station, Versatility, All-terrain capabilities.

I. INTRODUCTION

A notable development in the notable development in the realm of landmine detection is the Landmine Detection and Intimation System, which makes use of GPS and GSM technologies. This system uses a robot vehicle fitted with a metal detector, GPS, GSM, and a microprocessor to find and identify landmines in real time. Because it can be operated from a distance via a smartphone app, the robot car is safe to use in dangerous environments. The robot vehicle's GPS and GSM capabilities enable it to communicate its location and discovered data to a control center, which facilitates operators' tracking and analysis of the data. Bluetooth is an open standard specification for a short-range, radio frequency (RF)-based connection technology that has the potential to revolutionize wireless communication and computing. Designed to be an affordable wireless networking system, it may be used with many kinds of portable devices, including mobile phones, PDAs (personal digital assistants), and laptops. The controller loads a program written in the Embedded "C" language to do the operation. L293D1 is the driver utilized with DC motors. The device is a monolithic integrated high voltage, high current, four channel driver that can control switching power transistors and inductive loads, including relays, solenoids, DC, and stepping motors, at normal DTL or TTL logic levels.

An embedded C instruction set is used to program a microcontroller used in this project. Input and output modules may communicate with this microcontroller. To control the robot's direction, dc motors that are attached to the robot are interfaced with the controller. The suggested method provides a dependable, effective, and safe way to find landmines in dangerous locations. This system offers a solution that blends cutting-edge technology with user-friendliness, making it an important addition to the field of landmine detection.Landmines posture a noteworthy risk to civilians and military work force around the world, with their nearness frequently driving to appalling results. To address this issue, the improvement of a vigorous and productive landmine location and insinuation framework is significant. Our venture centers on making a robot that can identify landmines utilizing GSM and GPS innovation, giving real-time data to administrators to securely explore through perilous zones. By leveraging these progressed innovations, we point to upgrade

the security and proficiency of mine clearance operations, eventually sparing lives and decreasing the effect of landmines on influenced communities Landmines posture a critical danger to civilian populaces and military staff around the world, with their covered up nearness causing endless casualties and preventing socio-economic advancement. In reaction to this squeezing issue, the improvement of a Landmine Location and Hint Framework Robot utilizing GSM and GPS innovation marks a vital step towards relieving the perils postured by these concealed explosives.

II. LITERATURE REVIEW

A. Kunaraj et.al, In this paper, an automated rover-robot with metal detection that may be controlled remotely to aid in the identification of landmines [1]. This metal detecting robot's goal is to locate landmines in rehabilitation areas devastated by war. This suggested solution requires less human work and poses no risk when it comes to landmine identification. Here, landmines are found by the integration of an ATUNO microcontroller, video camera, and inductive sensor. Radio frequency (RF) modules are used in the system to control devices, while Bluetooth modules facilitate communication between the operator and the robot. During testing, this robot demonstrates a high degree of metal detection proficiency, making it suitable for usage in landmine-affected areas.

V. Abilash et.al, In this paper, when deploying armed vehicles into enemy territory, land mine detection is especially important. In order to prevent damage or distraction [2] to the battle tank and defence crew casualties, these armed vehicles, also known as main battle tanks, are utilized to follow the pilot tank's path while being manually operated. Furthermore, a mine detecting robot can be employed to identify and disperse mines laid during hostilities, sparing civilian lives and preventing human casualties. The goal of this research project was to create a prototype land-mine detection robot (LDR) that could be controlled remotely over WiFi. Human safety was taken into consideration when designing the robot, which uses unique range sensors to avoid obstructions. This project prototype's lightweight, temperature-resistant aluminium was fabricated. The robot is equipped with a Global Positioning System (GPS) sensor that determines and transmits its current location. Algorithms for path planning, obstacle avoidance, and detection were employed to precisely navigate the suggested path while avoiding obstacles. In this robot, an Arduino microcontroller is utilized.

R. K. Megalingam, et al. In this paper, the project is to develop a basic robot that can use autonomous navigation to locate landmines and mark their positions using a basic Zumo32U4 robot [3]. In many nations that have been plagued by landmine problems for many years, landmine detection is a crucial yet difficult task. It is not only a military issue; humanitarian issues are also involved. Therefore, in order to solve this problem, we developed a straightforward, lightweight, autonomous, wirelessly driven robot that can identify landmines at a depth of 5 to 9 cm underground. The design and development of the landmine detecting method are described in the study.

R. K. Megalingam, et al. In this paper, It was recently discovered that landmines are present in at least 60 nations worldwide[4]. Because these landmines pose a hazard to human and livestock life, there is rising worry about them. Over 50–100 million landmines remain unexploded in over 50 nations, including Egypt, Angola, Iran, Afghanistan, Cambodia, and so on. Even though a number of nations have begun to take significant action, such as providing financing for demining programs and training personnel in demining techniques, landmines have grown to represent a serious hazard to human life. Numerous methods exist for detection, but the most of them need human interaction, posing a serious risk to their lives and limbs. The study presents a proposal for autonomous swarm-based landmine detection robots that can locate landmines on their own and communicate that information to the control station. A functional model is formed by combining the theoretical ideas with the algorithm. The reader can clearly see from this study how these robots aid in demining.

V. Prakash, et al. In this paper, Landmine identification and inspection have played a significant role in human aid response due to the extent of the harm done to human lives, both financially and physically [5]. As a result of this approach, several safe and efficient techniques for landmine identification, marking, and clean-up have been developed. However, the majority of the time, the instruments are pricy, difficult to use, and require knowledgeable specialists. A significant portion of this procedure was handled by humans for a very long period. These are extremely traditional procedures that endanger human life. Using such traditional approaches calls for careful planning and a great deal of training. Mobile robots are used in recent technologies to locate hidden landmines in order to reduce human engagement.

J. Florez-Lozano, et al. In this paper, several information sources are needed for real-world issues like landmine detection in order to lower decision-making uncertainty [6]. Distributed systems, as described in this study and based on hardware and software multi-agent systems, offer a unique way to address these issues. We assess a trained system's performance throughout the distribution of data across training and validation sets in order to get a high rate of landmine identification. A summary of the data set is also given, along with samples collected by a cooperative multi-agent system designed to identify improvised explosive devices.

Subramanian, et al. Landmines are still a never-ending issue [7]. Due to the clashes and war in the past centuries, a part of landmines has been buried which are dynamic still nowadays and de-mining them is a troublesome, unsafe and time expending assignment. As in the standard way if the arrangement is anticipated it includes misfortune of human life which is not worthy. Innovation clears way to illuminate this issue in a logical way utilizing robots which can fathom the issue without misfortune of human lives. A robot has been created to identify these landmines and discover their areas with the offer assistance of Worldwide Situating Framework (GPS) innovation. Assist the criticism is sent almost the discoveries of the scope and longitude area to the server through Worldwide Framework for Versatile communication (GSM) innovation to offer assistance target the correct position of the landmines. The input can be gotten on versatile phones utilizing the same GSM innovation so to alarm the bomb squad part.

III. METHODOLOGY

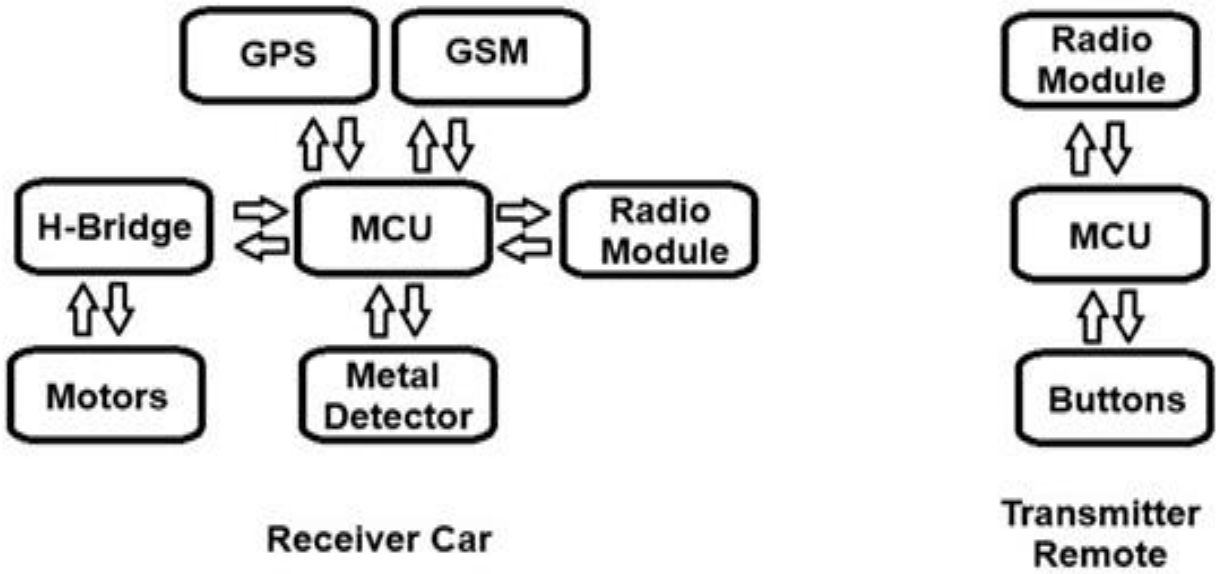

fig 1: Block diagram receiver car and transmitter remote

1.Research and Planning:

- Gain an understanding of the fundamentals of landmine detection, including how GPS and GSM technology may be incorporated into a robot to accomplish this task.
- Organize the necessary parts and their features.

2. Component Selection:

- Select an Arduino or Raspberry Pi microcontroller, or any other compatible microcontroller, for the robot.
- Choose sensors, such as ground-penetrating radar (GPR) or metal detectors, to identify landmines.
- Select a GPS module to track location and a GSM module for communication.

3. Hardware Assembly:

- Assemble the sensors, GPS module, and GSM module in accordance with the specifications that correspond to each module.
- Ensure proper power supply and wiring.

4. Programming:

- Create code to direct the robot's motion and interpret sensor data.
- Use sensor data to implement algorithms for landmine detection.
- Integrate GPS to track the robot's location and GSM to deliver warnings and messages.

5. Testing:

- To make sure the sensors are correctly identifying landmines, test the robot in a controlled setting
- Verify that the GSM module is successfully transmitting messages and warnings.
- Check the GPS module to ensure precise monitoring of location.

6. Integration and Deployment:

- Integrate all components into the robot chassis.
- Conduct field tests to ensure the robot functions correctly in real-world scenarios.

7. Documentation and Presentation:

- Document the project, including the methodology, circuit diagrams, code, and test results.
- Prepare a presentation to showcase the project's features and capabilities.

IV. RESULTS AND DISCUSSION

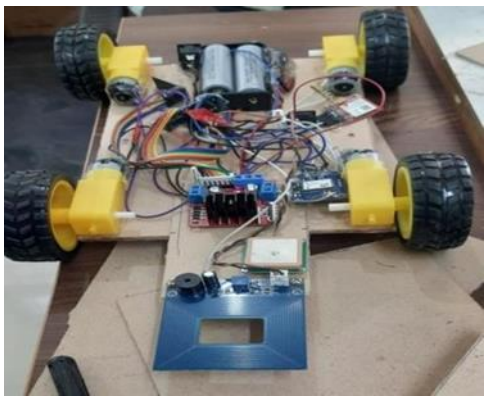

fig 2 model picture

The Robot will be able to moves in all four bearings: ie. Right, Left, Front, back
• The Robot will be able to distinguish mine ahead of it.
• This demonstrate robot gives less complex structure and decreases the fetched to construct a landmine location robot.

• Since it gives the scope and longitude situating utilizing the GPS module, it is simple to point out the correct position of the landmine in the frame of co-ordinates.

The robot demonstrated notable advantages in terms of accuracy, speed, and safety when compared to conventional landmine identification techniques like hand demining or the use of animals. While human demining techniques frequently result in poorer accuracy rates and present serious threats to workers, the automated approach used by the robot improves efficiency and safety. Reducing false positives and false negatives from the robot's detecting algorithms was one of the primary obstacles encountered during the project. Future generations of the robot might concentrate on enhancing the detection range and accuracy with sophisticated sensor technologies and machine learning algorithms in order to further improve its performance. The landmine detecting robot can be used in military operations, infrastructure development in conflict-affected areas, and humanitarian demining activities, among other real-world uses. Global landmine clearance operations may be made safer and more effective by the robot by automating the identification process and lowering the dangers involved in manual demining.

V. CONCLUSION

In conclusion, the landmine discovery and hint framework robot utilizing GSM and GPS innovation presents a critical headway in the field of mechanical autonomy for compassionate and military purposes. By combining the capabilities of GSM and GPS, the robot is able to distinguish landmines with tall exactness and send real-time area data to a farther client. This framework not as it were diminishing the hazard to human life amid mine clearance operations but moreover gives a cost-effective and effective arrangement. Future improvements might incorporate the integration of machine learning calculations for progressed discovery precision and the advancement of a more vigorous and dexterous robot stage. In general, this extend illustrates the potential of innovation to address complex challenges and move forward security in perilous situations.

REFERENCE

1. A.Kunaraj, M. Mathushan, J. J. Mathavan and G. M. Kamalesan, "Sensor Controlled Defense Purpose Robot for Land Mine Detection," 2020 International Conference on Smart Electronics and Communication (ICOSEC), Trichy, India, 2020, pp. 42-47, doi: 10.1109/ICOSEC49089.2020.9215338.
2. V. Abilash and J. P. C. Kumar, "Ardunio controlled landmine detection robot," 2017 Third International Conference on Science Technology Engineering & Management (ICONSTEM), Chennai, India, 2017, pp. 1077-1082, doi: 10.1109/ICONSTEM.2017.8261366.
3. R. K. Megalingam, V. Gontu, R. Chanda, P. K. Yadav and A. P. Kumar, "Landmine detection and reporting using light weight zumo bot," 2017 International Conference on Inventive Computing and Informatics (ICICI), Coimbatore, India, 2017, pp. 618-622, doi: 10.1109/ICICI.2017.8365207.
4. R. K. Megalingam, D. Nagalla, P. R. Kiran, R. Geesala and K. Nigam, "Swarm based autonomous landmine detecting robots," 2017 International Conference on Inventive Computing and Informatics (ICICI), Coimbatore, India, 2017, pp. 608-612, doi: 10.1109/ICICI.2017.8365205.
5. V. Prakash and P. Sreedharan, "Landmine Detection Using A Mobile Robot," 2021 IEEE 9th Region 10 Humanitarian Technology Conference (R10-HTC), Bangalore, India, 2021, pp. 01-05, doi: 10.1109/R10-HTC53172.2021.9641540.
6. J. Florez-Lozano, F. Caraffini, C. Parra and M. Gongora, "Training Data Set Assessment for Decision-Making in a Multiagent Landmine Detection Platform," 2020 IEEE Congress on Evolutionary Computation (CEC), Glasgow, UK, 2020, pp. 1-8, doi: 10.1109/CEC48606.2020.9185686.
7. Subramanian, Lakshmi Sankar, et al. "Development of landmine detection robot." AIP Conference Proceedings. Vol. 2311. No. 1. AIP Publishing, 2020.