



IOT BASED AUTONOMOUS ROBOT FOR SAFETY ENHANCEMENT

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ABSTRACT: Robot automation technology is evolving at a rapid pace to meet the world's growing demand for disaster management, rescue operations, and human risk reduction. These tasks necessitate use of multipurpose Robot with IOT. It is necessary to have a user-friendly robot that can be accurately controlled from anywhere by mobile app. The project presented here focuses on the design and development of a new product. Development of a multipurpose Robot which is used in different aspects like bomb-detection Robot and fire-fighting Robot, that can be operated from anywhere. To keep costs down, use locally accessible hardware. This is capable of carrying any complex object (up to 3kg) in a highly efficient manner which is helpful in defence for bringing medicines. The robot had gas, fire, and obstacle detection capabilities.

Keywords: [Robot, ESP32, Motor Driver, Submersible pump.]

1. INTRODUCTION

According to National Crime Records Bureau (NCRB), it is estimated that more than 1.2 lakh deaths have been caused because of fire accidents in India from 2019-2021. Even though there are a lot of precautions taken for Fire accidents, man-made disasters do occur now and then. In the event of a fire breakout, to rescue people and to put out the fire we are forced to use human resource which are not safe. With the advancement of technology especially in Robotics it is very much possible to replace humans with robots for Bomb Detection and fighting the fire. This would improve the efficiency of firefighters and would also prevent them from risking human lives. This is about a IOT Based Autonomous Robot for Safety Enhancement, which will automatically sense the fire and start the water pump.

Robot is defined as a mechanical design that is capable of performing human tasks or behaving in a human-like manner. Building a robot requires expertise and complex programming. It's about building systems and putting together motors, solenoids, and wires, among other important components. A multipurpose robot is one that has a small metal detector and fire extinguisher are added to it. By attaching a small fire extinguisher to the robot, the automation put out the fires it detects via Temperature Sensor module and also attaching small bomb to the Robot, it detects the harmful metal with help of metal detector by human controlling it from anywhere. A primary purpose of

this undertaking is to provide an incentive for the robotics community to develop what will be a practical application for a real-world robot. Although it is merely a simulation of a real-world scenario, it requires the designers to use practical techniques to create useful designs.

Multipurpose Robots are autonomous robots or remote-controlled mobile robots designed for military, industrial, domestic applications, from search and rescue to attack. Some such systems are currently in use, and many are under development. Broadly defined military robots date back to World War II and the cold War in the form of the German Goliath tracked mines and the Soviet Tele tanks. The MQB-1 Predator drone was when "CIA officers began to see the first practical returns on their decade-old fantasy of using aerial robots to collect intelligence.

2. LITERATURE SURVEY

E Amareswar, G Shiva Sai Kumar Goud, KR Maheswari, E Akhil, S Aashraya, T Naveen

They proposed a robot that can be control using an application running on an android phone. Android phone sends control command via Bluetooth which is interfaced to the controller. The Controller interfaced to the Bluetooth module through UART protocol. According to commands received from the robot motion can be control. This robot is used for detecting bombs.

A Kuna raj, J Joy Mathavan, M Mathushan, G M Kamalesan
 They proposed a robot which can be controlled from a limited distance by applications in android phone for landmine detection.

In this proposed system we are going to develop a multipurpose Robber. This robber had gas, fire, and obstacle detection capabilities. We also insert camera for live view and this robber is capable of picking up and carrying any complex object (up to 2kg) in a highly efficient manner which is helpful in defence for bringing medicines.

3. IMPLEMENTATION

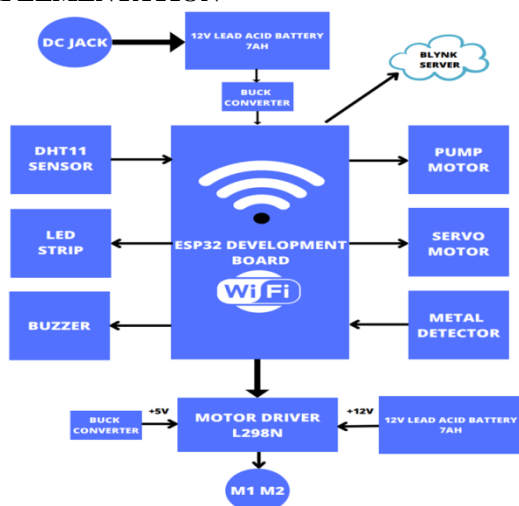


Figure 1: Block Diagram

The main branch this project is ESP32. All the components are connected to ESP32 module. This project used for multipurpose and also implemented number of features in which live tracking this is the main advantage in the project and also this robot operating from anywhere through blink server and mobile phone. Metal detector use to detect the conductive metals up to a range of 50cm. Whenever it detects the metal then buzzer is activated and also robot. DHT11 temperature sensor sense the surroundings temperature, if the temperature increases due to fire by observed fire on the live tracking, then by the mechanism of submersible pump the fire is stopped. This can operate in dark areas with the help of LED strips which gives light to the path.

All the Motors used are connected to motor driver. With the help of gear motors robot can rotate 360 degrees. Gun used for self-defence for robot rotates 180 degrees with help of servomotor. By using another servo meter fire gun can be fired. Power supply for this robot is provided by lead acid battery. ESP32 WIFI module is directly connected to blynk server. By monitoring options in blynk application which is already installed in mobile.

4. RESULT



Figure 2: Front view of the designed model

CONCLUSION AND FUTURE SCOPE

Conclusion

This project describes about the real time metal detection and firefighting robot which moves in constant speed (5kmph). In metal detection it identifies the metal and sent notification along with buzzer and in fire-fighting it identify the fire then extinguish it with help of pumping mechanism. The detection and extinguish was done with the help of ESP32 for which the gearmotor, temperature sensor and its driver etc, are interfaced. The robot is connected with the mobile phone through IOT module both hardware and software has been realized successfully in this project. The "IOT Based Autonomous Robot For Safety Enhancement" can be used in everyday life.

Future Scope

By using lithium-ion Battery, the travelling speed and performance of the robot can be increased and also dispose the bomb by using picking up robotic arm. Instead of water fire can be controlled by using carbon dioxide, dry chemical and foam water.

REFERENCES

- [1]. A Kuna raj, "Sensor Controlled Defence Purpose Robot for Land Mine Detection", international conference on Smart Electronics and Communication, ICOSEC-2020.
- [2]. Anjir Ahmed Chowdhury, "Implementation of Cost-Effective Bomb Defusing Robot with Live Streaming Dual Camera Interface", International Conference on Robotics, Electronics and Signal Processing Techniques, ICERST-2021.
- [3]. Rhaman, Md Khalilur, Sabbir Ahmed Khan, and Shifur Rahman Shakil. "State of Art in Robotics and Embedded Systems: Bangladesh Perspective." Journal of Automation and Control Engineering Vol 4.1, 2016.
- [4]. Bunkum, Manao, et al. "Tele-Operation of Robotic Arm." 2019 12th Biomedical Engineering International Conference (BMEICON). IEEE, 2019.
- [5]. Lanjewar, Rushikesh. "Coffee Maker Robotic Arm". International Journal for Research in Applied Science and Engineering Technology. Volume 8. Issue II. Feb 2020. [5] Kumar, Arcot. "Review on Multipurpose Agriculture Robot". International Journal for Research in Applied Science and Engineering Technology. Volume 8, Issue V. May 2020.
- [6]. Mohd Annuar, Khalil & Zin, M.H.M. & Harun, Mohamad Haniff & Mohd Ab Halim, Mohd Firdaus & Azahar, Arman. "Design and development of search and rescue robot". International Journal of Mechanical & Mechatronics Engineering, Volume 16, Issue 2, pp 36-41, 2016.
- [7]. A. K. Bin Motaleb, M. B. Hoque and M. A. Hoque. "Bomb disposal robot," 2016 International Conference on Innovations in Science, Engineering and Technology (ICISSET), Dhaka, 2016, pp. 1-5, DOI: 10.1109/ICISSET.2016.7856510.
- [8]. A. Ravendran, P. Ponpai, P. Yodvanich, W. Faichokchai, and C.Hsu, "Design and Development of a Low-Cost Rescue Robot With Environmental Adaptability." 2019 International Conference on System Science and Engineering (ICSSE), Dong Hoi, Vietnam, 2019, pp. 57-61, DOI: 10.1109/ICSSE.2019.8823116.