

Multifunctional Robot for Military Surveillance

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Abstract. *The enemies used different types of tanks, missile, guns, etc at the border areas. This cause problem and harm to soldiers Many defence take the help of robots in hazardous condition to carry out risky job that cannot done by any soldier. The main principle of the robotic system is to monitor various conditions on-field. The robots used in defence are usually employed with sensors, cameras for live streaming, integrating circuits systems for tracing the unknown person. This multisensory robot used to detect human bombs, harmful gases and fire at remote and war field areas.*

These Robots are capable to function in hazardous environment where an unprotected human would quickly die.

Key words: *Sensors, live streaming, Zigbee, GPS*

I. Introduction

Replacing the human in hazardous work environment is nothing but automation enabling to create safe work environment. Robots requires a combination of elements of to be effective system and can work in polluted environment , chemical as well as nuclear. The robot has the ability to substitute the soldier at border areas. Robots should be task specific in order to achieve that robots are built and programmed The main principle the to control the robot wirelessly to as it reduces human risk and is of great use of soldiers Using Zigbee modules robots can be handled or controlled wirelessly through computer or laptop. For continuous motion detection and human presence it uses PIR sensors. Environment like temperature and humidity is monitored by using temperature sensor. This system uses camera for surveillance. Enemies can be targeted by using gun mechanism and this can be achieve correct aim it uses servo motors. Navigation is also possible with the help of Global Position System(GPS) as receiver is placed on robot. To get exact location of robot GPS is used. To detect poisonous gas or any hazardous gas a gas detector is used. To amplify the inputs and power Driver IC is used.

II. Literature Review

¹This paper describes the implementation of multifunctional robot for surveillance for remote area like warzone or border monitoring purposes. The system uses GPS and GPRS to determine the position of the system. The GPS receiver obtains the location coordinates which are decoded and sent to control station using GPRS. At the control station the GPS data is used to show the real time position of the robot using open source Google maps API, also the sensor data and images sent from the remote location can be seen on a webpage which can be accessible from anywhere.¹

In the paper, IoT Based Wireless multifunctional robot is implimented for military application with Raspberry pi 3 using MQTT protocol. Cameras, Grippers and actuators into web application using MQTT and HTTP protocol. To develop and design we are using Raspberry pi3 embedded board with python programming MQTT protocol. Using this system one can monitor and control the military robot from anywhere in the world. To develop and design the system Raspberry pi3 embedded board with python programming is done.²

This paper describes the robot with two legged biped walking robot using parallel leg mechanism i.e. PLM which includes different functions like capturing real world data using digital image processing used to detect its obstacle which is found in its path. If it found any obstacle in its path then using gun mechanism it will be able to shoot that obstacle. For making it multifunctional robot all the actions perform by user same actions

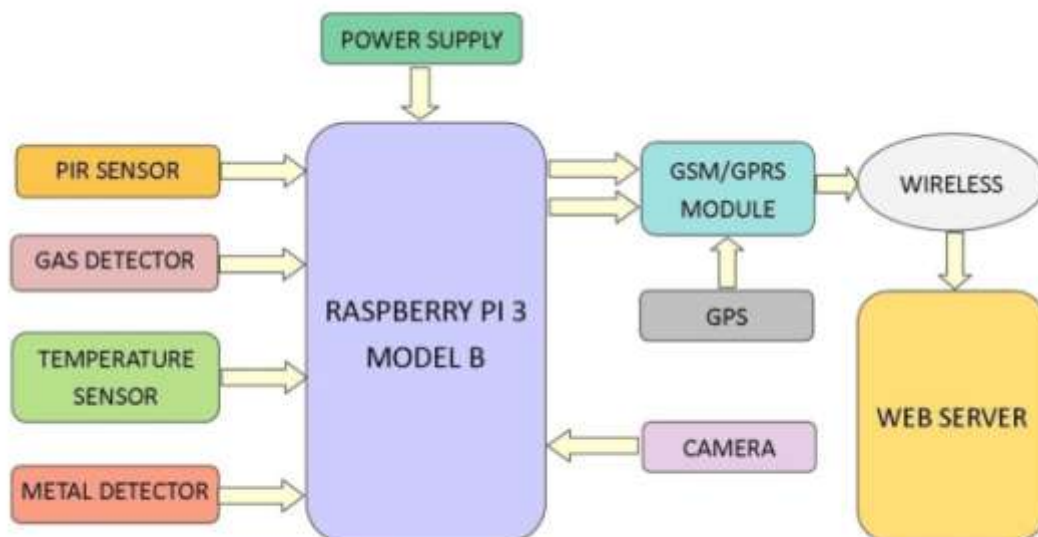
perform by robot using stretch sensor. This is a wireless robot communication takes place between server and client by using wifi through Winsock i.e., window socket³

Salunkhe Disha et al(2018) [4]: The proposed method implements a robotic system which is able to monitor various conditions on-field and is sent to the android application via Wi-Fi connectivity which ultimately provides a remote monitoring and controlling facility. The type of communication technique enhance its range of operation, where the user can control the movement of robot from any part of world by getting live video of surrounding as feedback.⁴

III. Proposed Methodology

A passive infrared sensor (PIR sensor) is an electronic sensor that is used to detect the unknown person . Liquefied Petroleum Gas sensor is used to detect LPG. MQ-6 is used for detecting gas concentrations anywhere from 200 to 10000ppm. The metal detection sensor used to find the metal object which buried underground. Metal detector sensor are used to find the bomb buried underground. Wireless Module -The RF module are small in size and it is small electronic circuit used to transmit, receive or transceiver radio waves. These RF module are used for Communication purpose. And the range of this module are 800 m in open ground. Driver IC- We use the L293D driver IC. It is a motor driver IC which is used to drive the DC motor in four direction left, right, forward, and reverse. Gun Mechanism-Gun is Mounted on robot to protect itself from enemies and target them. Correct aim is achieved by using servo motors which can rotate in 180 degrees. DHT11 is used to monitor temperature and humidity. It is low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to monitor the surrounding environment To achieve navigation a GPS System is used. with the help of Global positioning system we can track proposed system and can get exact position of robot. Main aim of the system is to operate the robot wirelessly using computer or laptop and this is possible by using Zigbee module. Zigbee module basically act as a communication module for entire system. ZigBee Technology transfers of simple data like that from sensors. It supports low data rate of about 250 kbps Technology is used where applications requiring low power, low cost, low data rate and long battery life.

Block Diagram



IV. Advantages

- The robot is a wireless system hence can be operated remotely.
- It is a well organized system, hence does not require special training to control the robot.
- The robot is specifically designed to reduce the human risk and to provide prior warning and information about war field.
- The main feature of the robot is advance gun mechanism which helps to target the enemy remotely.

- The Robotic system is a secured system and hence the information cannot be leaked.
- The system requires less memory as the robot needs to store only latest information for less period of time before being sent to the remote server.

V. Limitations

- The Robot has a limited range of surveillance, thus cannot be operated beyond particular region.
- The robot has gun mechanism to attack the enemy but is unable to defend itself.

VI. Applications

Following are the some of the advance uses and applications of military robot for surveillance

- The robot can be used for military surveillance to check the preconditions on the war field.
- Mining areas can be remotely observed to ensure the health of mine workers.
- The system can be designed for industrial processing areas to detect harmful gas leakage without endangering human risk
- Can be utilized in research work in forest regions.
- To find Information in remote areas where humans are unable to reach and monitor regions like volcanic regions.
- Keeping track on animals in wildlife century without disturbing or distracting the wildlife.
- Constructing structures like tunnels to create map and check underground conditions for workers.
- Keeping track of weather conditions in desert regions

VII. Conclusion

The proposed system is designed mainly for surveillance where humans are unable to reach or to reduce the human risk. Military surveillance robot will specifically provide information about the war condition on the war field without endangering soldiers' lives. The robot is provided with multifunctional services like human detection, gas detection, metal detection, information on temperature, GPS, live video and pictures. All these information are transferred wirelessly, hence the robot can be operated remotely. Thus the robot can help take precautionary measures to prevent one's life.

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