

Wireless Military Defense Robot

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Abstract - Generally many risky, unmanageable and various tasks are difficult to handle by human. Thus there is need for something, which can be physically present and handle the task. So, robot can be much effective and useful option for such risky tasks. Nowadays in industries, medical, colleges, home appliances, restaurants, military and defense, robot plays very important role and make the task easier and efficient. The proposed work is to design and develop for military application.

In this paper we are focusing on the use of battery life and also it will not always remain in surveillance mode although whenever user wants to control robot, they can do it on their choice otherwise it will always remain in automatic mode.

This paper also presents a Defense robot which uses different technologies like Infrared sensor, PIR sensor Ultrasonic sensor, Bluetooth module and Wi-Fi Technology etc.

Keywords: Zig bee, Bluetooth, RFID, Wi-Fi, Wireless Sensor Network, Camera, Defense Robot.

1. INTRODUCTION

Nowadays the technology is enhanced day by day with the real time projects and efficient work towards by developing of robots. This paper presents multipurpose functionalities of wireless robots. This robotic vehicle has ability to substitute the soldier at border area to provide surveillance. Nowadays for controlling and development of robots various technologies are used such as Zig bee protocols, RF modules, Touch screen, Wi-Fi modules and other technologies. The implementation of this project to resolve the problem of replacing human to surveillance robot, because of this we reduce harm of human resource. Surveillance Robots are the robot which monitor the thing continuously. Nowadays, the robots which are based on the mobile with camera are more popular. Using this camera robot can observe the surrounding. Usually the size of the robot is capable enough to enter in tunnels, mines and small areas. In this paper we discussed through various researches what development has been done in robotics in field surveillance and Defense Robots and our proposed work regarding the following paper. There are various defense robot based on the different communication technology:

a) Zig bee based robots

Zig bee is based on the IEEE standard 802.15.4 which is low cost, low power & highly secure and suitable for wireless personal area network. Using CMOS/USB/TTL source, zig bee can be used to transmit and receive data at 9600/4800 baud rate. The transmission distance range is 10 to 100 meter. For establishing the communication between devices, Zig bee uses digital radios.

Zig bee network consist network coordinator device which is used to set up the network and manages the information about each node in the network and information that is being transmitted and received in the network. So basically in Zig bee based robot, Zig bee is used for the communication between the pc and robot, which handles the low data rate.

b) RFID Based Robots

RFID is usual term for technologies that use radio waves to automatically identify person or object. RFID includes digital tag, reader and antenna. There are three types of classes of RFID active type, passive form and half active form. RFID mainly used for tracking or monitoring system.

Table.1- Comparison of Different Communication Technologies.

Parameter	Zig bee	Wi-Fi	Bluetooth
Range	10-100 meter	50-100meter	10 meter
Frequency band	2.4GHz	2.4GHz	2.4GHz
Application	Monitoring & control	Internet	Cable Replacement
Battery Life	Very Low	High	Medium
Data rate	50-60 Kbyte	>1000 Mbyte	250 Kbyte
Complexity	Low	High	Medium

2. LITERATURE SURVEY

2.1 Surveillance Robot for Military Application.

S. A Joshi, Aparna Tondarkar, explain that in [1] the modern approach for surveillance at remote and border areas using multifunctional robot based on current IOT used in defense and military applications. Due to this robotic vehicle we can replace the soldier at border area to provide surveillance. Using Internet communication this robotic vehicle can operate on both automatic and manual mode. This multisensory robot used to detect presence of enemy capture it in camera and give the live streaming to the authorized person Surveillance is major role while we working on border area for this there is robot for surveillance purpose. This paper presents a smart surveillance robot for military application by using Raspberry Pi for security purpose. An field Raspberry pi sends a wireless command which is received by Authorized person on web Page and accordingly robot moves. In this system Raspberry pi camera is used for video streaming. The Raspberry pi programming is done in python language. The experimental result shows that the video streamed up to 15 frames per second.

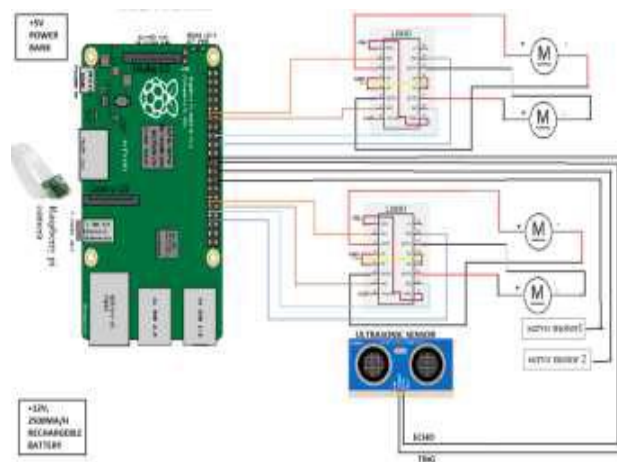


Figure 1.Controller section of S.A Joshi paper

2.2 Review on Rough Terrain and Defense Robot.

Sahil Bhatnagar Shivam Kumar Gola explains that In [2] they uses rough terrain robots instead of using other simple robots. This paper also presents an Defense robot which uses different technologies like Infrared sensor, PIR sensor Ultrasonic sensor, Bluetooth module and Wifi Technology etc. and this paper proposed a low voltage power supply, low cost and wireless robot which is controlled using microcontroller and Android Application. This paper presents multipurpose functionalities of wireless robots. Nowadays for controlling and development of robots various technologies are used such as Zigbee protocols, RF modules, Touchscreen, Wi-Fi modules and other technologies. In this paper they discussed through various researches what development has been done in robotics in field of Rough terrain and Defense Robots and there proposed work.

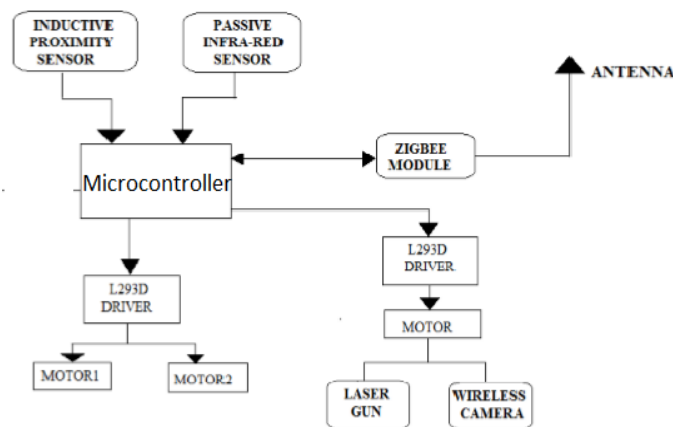


Figure 2.Controller section of Sahil Bhatnagar paper

2.3 Wireless Multifunctional Robot for Military Application

Tarunpreet Kaur explains that In [3] a modern approach for surveillance at remote and border areas using multifunctional robot based on current 3G technology used in defense and military applications. This robotic vehicle has ability to substitute the soldier at border areas to provide surveillance. The robotic vehicle works both as autonomous and manually controlled vehicle using internet as communication medium. This multisensory robot used to detect human, bombs, harmful gases and fire at remote and war field areas. Conventionally, wireless security robot obsolesces due to limited frequency range and limited manual control. These limitations are surmounted by using 3G technology which has limitless range. This system also enhances the use of renewable resource energy by equipping with solar panel. An autonomous operation is controlled by Ultrasonic sensor and infrared sensors. Manual operation is controlled by DTMF decoder and cell phones used as video camera by initializing 3G video call and change the path of robot according to real time information of surrounding. This paper also illustrates the experimental results of tilt angle selection of solar panel and power consumption in automatic and manual mode. This robotic vehicle is designed for reconnaissance as well as surveillance under certain circumstances.

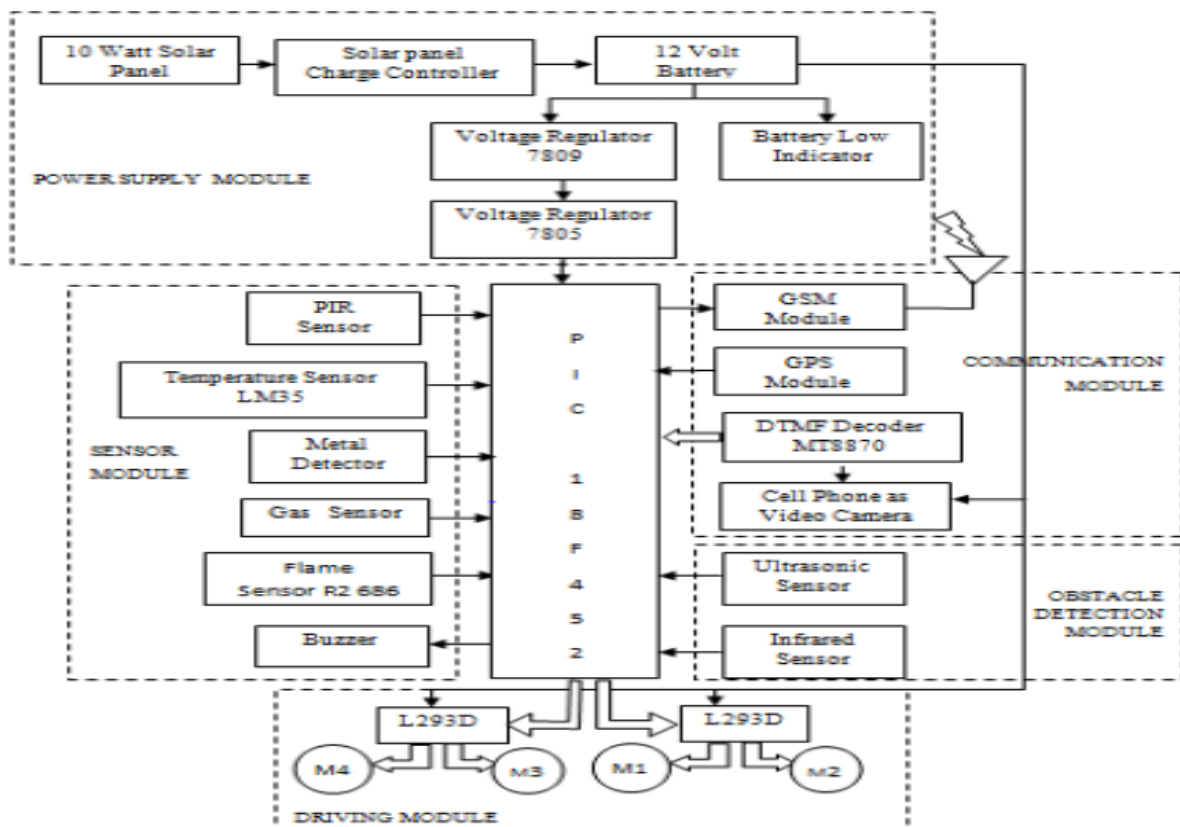


Figure 3.Controller section of Tarunpreet Kaur paper

2.4 Unmanned Multifunctional Robot Using Zig bee Adopter Network for Defense Application.

Pream kumar Manoharan explains that In [4] the system is proposed with the help of low power Zig bee wireless sensor network to trace out the intruders (unknown persons) and the robot will take the necessary action automatically. Thus the proposed system, an Intelligent Unmanned Robot (IUR) using Zig bee saves human live and reduces manual error in defense side. This is specially designed robotic system to save human life and protect the country from enemies. In proposed system, the communication is carried by the Zig bee wireless communication network. With the help of CMOS camera the robot is monitor in this system.

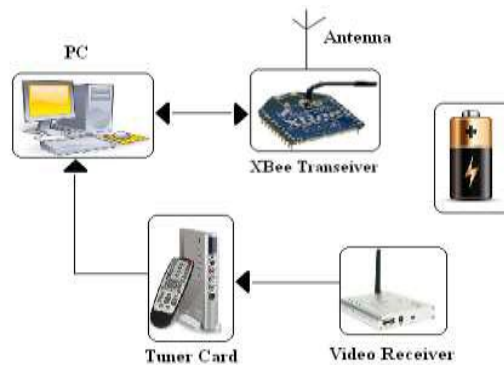


Figure 4. Controller section of Premkumar paper

2.5 Utilization of Mobile Technology for Mobile Robot Controller.

Saliyah Kahar. explains that in [5] the utilization of different mobile technology for mobile robot controller such as Bluetooth, Wi-Fi or Wireless LAN and 3G. Comparison of the frequency, data rate and range for each mobile technology used in this application are discussed. The field of robotics includes various sectors such as factory sector, manufacturing and security. For future work, author states that the development of mobile robot controller via mobile technology, which is 3G technology. The results of this research are expected to provide benefits to consumers and mobile device manufacturers to optimize the usability of mobile devices.

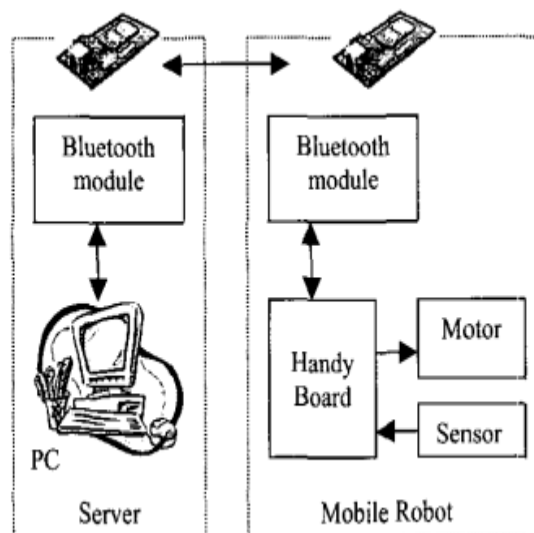


Figure 5. Hardware Architecture of Saliyah kahar paper

3. PROPOSED SYSTEM

In our proposed system controller used is Node MCU. It has a USB to 3.3V power supply on the board. The Node Mcu(ESP8266) which is integrated with Wi-Fi Module ha ability to is give any microcontroller access to your Wi-Fi network. The whole robot functionality is controlled by this controller. As the Flame sensor requires one analog input which is provided by analog pin A0

of NodeMCU hence additional multiplexer is not required for this purpose as Node MCU controller has only one analog input. It controls the vehicle in both automatic and manual mode effectively. Skype video calling is used to control the robot in manual mode. Whenever any sensor become active an alert message is sent to webservice. In order to change the path of robot during manual mode, the user initiates the Skype video call to the mobile phone equipped to robot. The smart phone is Placed on the robot to monitor the surrounding and kept on auto receive mode to provide live view of surrounding of robot in order to change its path.

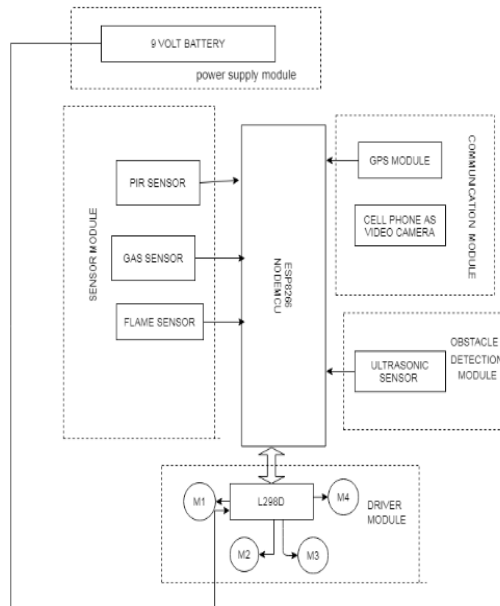


Figure 6. Design of proposed model.

4. CONCLUSION

We have concluded from existing robot system that, they have limited range as they are based on different communication technology used such as Zig bee, Bluetooth, RFID. Also they are costly due to Expensive camera is used for surveillance. Therefore to avoid such drawbacks we proposed a system to save the battery life that means robot will not always remain in surveillance mode although whenever user wants to control robot, they can do it on their choice otherwise it will always remain in automatic mode. Rather than using expensive camera, we prefer Skype video calling for live streaming.

5. ACKNOWLEDGEMENT

We are pleased to present “Military Defense Robot” as our project and take this opportunity to express our profound gratitude to all those people who helped us in completion of this paper.

We thank our college for providing us with excellent facilities that helped us to complete and present this paper. We would also like to thank the staff members and lab assistants for permitting us to use computers in the lab as and when required. We are very thankful to our project guide Prof. Yash Shah for the valuable and timely advice during the various phases in our project. We would like to thank Prof. Anuja Gote for providing guidance and support. We also like to thank them for providing us with all proper facilities and support. We would like to thank them for support, patience and faith in our capabilities and for giving us flexibility in terms of working and reporting schedules. We would like to thank everyone who has helped us directly or indirectly in our project.

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