A Review on Warfield Spy Robot with Night Vision Wireless Camera

Suniksha B S[1], Shubhanchal Priya[2], Varshini M[3], Deepthi Raj[4]

[1,2,3]Department of Telecommunication Engg., Dayananda Sagar College of Engineering, Bangalore, India

[4]Assistant Professor, Department of Telecommunication Engg., Dayananda Sagar College of Engineering, Bangalore, India

Abstract—**This review paper deals with the assessment of research papers pertaining to project of war field spy robot using night vision camera. The objective behind the development of this robot is for the observation of human activities and the conditions in the war field or border regions in order to decrease intrusions from the opponents. The robot has the ability to transmit the videos even in dark environment since it contains night vision wireless camera so that any destruction and loss of human lives can be controlled. We are aware that the veteran's lives are endangered while setting foot in an unknown zone so the robot serves as an apt device for defense section for reducing the loss of human lives and it averts illicit operations. It transmits the information with the help of all the military people and armed forces to know the state of the warfield in prior to enter it. The robot has the capability of detecting the mines which are underground along with ability of letting the user direct it wirelessly in order to prevent human fatality. The robot also functions as a path guider since it consist of sensors as well as a fire extinguisher in crisis. The robot is so designed as it easily detects fire in advance to the condition where it cannot be handled, in upcoming days it can work with fire-fighters to reduce the risk of human casualty.**

Keywords— **Wireless camera, Arduino uno microcontroller, Fire sensor, Ultrasonic sensor, Metal detector**

I. INTRODUCTION

With the aim of the development of the advanced technology which offers high speed technology with improvised features for controlling the robots and to invent new methods of control theory. The above standard with some up gradations in technical accompanied by the need of efficient working robots is required for the creation of a faster, reliable, accurate and more intelligent robot which ought to be devised in an advanced control algorithm, robot control devices and new drivers. Earlier the robots were controlled by using wired networks but now to make robot much friendly to use, they are made in such a way so as to do user commanded work using wireless communication through android systems. Therefore, to achieve the necessities an android can be used as multimedia to govern the robot in user friendly manner. Generally, the arrival of technology has made a revolution in the field of robotics and automation that will vary in different sectors from the household works to defense sectors. Currently in the world markets the smart phones is bringing major change in the lifestyle of people as well as bring up a number of applications on different systems. One of the

system that is built on an open source is Android operating system. It has makes a big effect giving many applications for robotics to help people in daily life. The technologies which can be in use for serial communication by the robot is Wi-Fi technology, Bluetooth technology, Zigbee. These technologies can be useful in sharing information among these two devices also taking into consideration their range. The Wi-Fi module can be used for higher range when compared to Bluetooth module. The Wi-fi module ESP-8266 will be linked to the robot and the instructions to the robot shall be given over an android application. The robot consists of a board named Arduino uno which is a microcontroller. It has ICs of L293D motor driver along with an ESP-8266 Wi-Fi module. It also consists dual DC motors which to use for the movement of the robot. An android app- voice bot is used for controlling the robot using voice commands. A night vision wireless camera fitted to the robot is used to monitor the situation. Such cameras can have the ability to rotate by 360 degrees using the android app through motor. Mine sensor and fire sensor are used. Metal detector is in use for detection of large sized metal objects.

II. REVIEW OF PREVIOUS WORK

Literature on Warfield spy robot with wireless camera has been reviewed and discussed in this section based on technology used and its working research works.

Sreejith M A, Vivek S.K, Vimal Kumar.S.N [1] have developed a cost-effective three-wheeled robot using an arduino nano microcontroller which is used in surveillance. This also uses a smart phone which is running in android operating system. It uses android application commands given by the user to move in forward, backward, left side and right side directions. The vehicle has receiver device connected to Arduino nano, on receiving the commands from the receiver the Arduino nano now activates the motion of the motor using a driver. Since the robot can be operated by any android device at any place with ease therefore it gives quality interfacing with the user for conducting the robotic machine. Good range of Wi-Fi communication is an important factor to operate the robotic vehicle using the android app. The night vision camera placed on the robot permits to efficiently spy at dark environment with the help of infrared lighting.

The system can be made into two parts firstly the user

interface and secondly the wireless surveillance robot. User interface is the one accountable for receiving allowance and the instructions from the user that will be associated to the robot via Wi-Fi module to complete the commands and get the expected output of surveillance. The performance parameters are speed, image resolution, noise, connectivity range, sensor range, compact design, camera angle and the response time. Therefore the results show that the robot can cover large areas since it consists of movable wheels so it is better than the closed circuit televison (CCTV), where it covers small areas whereas in this system we can stream live video and can capture images from any place at any instant of time with the help of an android device that is mobile phone.

Dilliraj.E, Rekha.S, Sindu Priya.N.R, and Vedhavalli.A [2] have used ZigBee technology in the robot for serial communication. Keeping the range into among the devices into consideration the data can be shared in ZigBee technology. The ZigBee module is connecting the robot and any instructions will be given by it. The war field robot consists of Raspberry pi board as a microcontroller board and it also has L293D motor driver IC's along with ZigBee module. There are two DC motors present which are also used for the motion of the robot. We are using a night wireless camera which is placed on top of the robot for the main purpose of spying which will use infrared lighting to capture the environment even in complete darkness. Using buttons, commands, are sent from the transmitter end to the receiving device to regulate the robot motion that is to move in all directions.

The receiver end consists of two motors interfaced to the microcontroller for vehicle motion. At the RF transmitter acts as a RF remote control that has the advantage of adequate range up to few meters. The receiver decod ebefore they are fed it to microcontroller for driving DC motors using L293D (device driving circuit). The surveillance system using spying robot can be customized for various fields like industries, banks and shopping malls. In forthcoming, the robot can be enhanced to comprise of a bomb disposal kit so as to diffuse bombs in the war field. Face recognition technology shall also be used in future. The surveillance task at the intercontinental border region is quite tough. At the border the defending forces are seriously guarding, but it is not possible to keep a watch every other moment. Therefore, a robot is an important requirement for this situation which can inevitably detect intruder in the border which will thereby report immediately to the board security control unit. Robot play vital role in helping humans, some of robots will replace the human in their work and some robots will act as assistive devices.

Therefore the results show that this robot will act as an assistive device to report the activities of the enemy terrain and as an effective surveillance device even during the time of the war.

Snehal Subhash Bhosale, Vidya Tukaram Shejwal,

S.M.Lambe [3] have worked on a RF based night vision spy robot using PIC controller. This robotic system can accomplish a lot of security and surveillance functions much efficiently than human beings without causing danger to human life. This robotic vehicle consists of two PIC microcontrollers namely PIC16f877a where one of the microcontroller is used at the receiver circuit and the other is used at the transmitter end. By using the transmitter the commands are transmitted to the robotic vehicle and according to the commands given by the user the vehicle goes in that direction such as frontward, backward, right side and left side directions and dc motors are made use in this robot for the movement of the vehicle. The images are captured and these images are sent to the IR receiving device which in turn is connected to the television or the laptop.

The RF based night vision camera is placed on the top of the robotic vehicle. Therefore, it can used for visualization even during night times. The driver IC used is L293D and the camera used is Mach smart wireless camera. Therefore the results show that the system could successfully capture real time motion picture with the night image and when the obstacle was detected through the IR rays of the camera the robot stops moving and waits for the user command and acts accordingly. So this robot is helpful in the border regions and to observe the wild animals where human beings cannot possibly reach.

Some of the interesting facts that have been explained by Qureshi Afaan, Sunsara Hanan, Ansari Sajid, Ansari Ejaz and Khan Amir [4] about the spy robot with long range obstacle detection.

The robot works with a feature of DTMF- Dual Tone Multiple Frequency which lets transferring data instructions through call. The long range spying robot with obstacle detection not only allows to regulate the robot movement but also stops the robot immediately when it encounter obstacle is detected. In this case the user need not to concern about the distance to make the robot move. The DTMF technology used just allows the user to operate the robot by calling on the mobile phone linked to the robot. The receiver phone will have to receive the command so that the data commands are communicated well to the robot for the necessary robot movements.

The system consists of Arduino board which is interfaced with the ultrasonic sensor which helps in the detection of the obstacle in its way of propagation. In case of any obstacle found on its way the robot will stop and wait for the user's command for its next movement. The robot is interfaced with a night vision spy camera which allows it to capture the data around it. So that the near view can be easily detected and operations can be made accordingly. The robot has a remote section which basically works on the DTMF technology the received tone is converted to the digital signal of 4 bits. The driver section of the robot consists of DC Motor which is utilised for the motion of the robot.

This robot has a special feature wherein it can be used irrespective of the frequency as there is so such frequency limit and can avoid obstacle in its way.

Jignesh Patoliya, Haard Mehta, and Hitesh Patel [5] have discussed about arduino controlled war field spy robot which uses night vision wireless camera and android application to control the robot. The robotic vehicle is equipped with the wireless camera which will have a night vision capability for surveillance purpose. The night vision camera used permits for the transmission of real time night video even in the dark conditions. The data which is recorded by the camera can be observed on a desktop or a television (TV) for reference. The important technology which is made use of here, for serial communication with the device is Bluetooth technology. The purpose of this is for transferring the data betwixt the devices. The Bluetooth module HC-05 is attached with the robot and the instructions are given to the device using the android application using the MIT app inventor platform. The warfield spy robot consists of arduino which is a microcontroller board. It consists of L293D as a motor driver IC's including a HC-05 bluetooth module. The purpose of using two DC motors are for the movement of the robot.

The night vision wireless camera is mounted on the device which is used to observe the conditions in the area and thus the camera will be able to rotate 360 degrees through an application along with the motor and the device can be advanced by including more characteristics like the gas detectors and comb defuse kits. In this paper they have described about the course of action and steps for android application. This application consists of two sections that is designer and block. The camera also consists of the unique feature such as motion detection. Few applications of this system are in veteran operations, monitoring in the border regions, search and save operations and activities in the dangerous areas.

Capability of controlling this device with gestures adds a unique feature which is beautifully defined in the paper by Lavanya KN, Ramyashree D, Nischitha BR and T Asha [6]. This paper discusses how the robot works with the vision interfaced camera capability with the gesture handling feature which is governed by programming encapsulated with the Arduino board. Along with certain sensors which have the ability to detect all the obstructions in the way of the robot which includes fire sensor which will help in case of fire, avoidance from explosive since it has an inbuilt mine detector. In context to certain papers it is noted that various technologies such as threshold technology which has the ability of recognition of gesture is studied and worked upon. Use of Gyroscope have been done for the hand movement in the designation of 3 wheel car robot. Likewise, RDB-D camera has been used has made it convincible to interact with human signals.

The main characteristics of this paper is based on gesture recognition which is processed through the use of Matlab Code. Webcam of the laptop or desktop is used for detection of the gesture while the matlab performs the inner operation by recognizing the gesture through code. The serial port is setup to transmit the command generated by gesture recognition for any action. The primary colors are used in order to give gesture movement as these are worn in the finger and accordingly image is recognized by the web cam. Accordingly with the recognition of gesture the matlab performs the coding functionality at the backend. For the wireless movement bluetooth and wifi modules have been used which is in turn attached to the driver which receives data from the HC12. L293D is in charge for the motion of the device according to the commands given. Different sensors like metal, fire, ultrasonic helps in adding better features to the robot and making its movement smooth in any direction and in any situation.

Thus this robot can be used easily as it is quite easy to give commands which makes it user friendly.

III. CONCLUSION

The warfield spy robot is developed so that the robot takes risk out of potentially deadly scenarios than on the immediate danger caused to life and limb and the robot also provides the live surveillance since it has wireless camera and provides safety and security from the risks that soldiers face in the war field. It also reduces the infiltrations from the opponent side. The wifi module can be used for serial communication since it has long range when compared with the bluetooth module and RF module. The robot also consists of many sensors like LDR, ultrasonic sensor, fire detector, gas sensor and pressure sensor which helps in detecting the conditions in the war field and can be used to take precautions. Since it has wireless communication it is human friendly and much reliable. So with the advancement in the technology the robot can be advanced by including more characteristics to it. The robot can be made much smaller in dimensions and it can be controlled through voice or actions which makes the controlling of robot much easier. The motors can be mounted on the robot which in turn is connected to the wireless camera so that it allows three hundred and sixty degree rotation and the robot can be used for efficient surveillance of the environment. Therefore it can be used to collect information of the environment and track location of the enemies. Other features like adding a robotic arm helps to pickup things which can be used for further investigation. Therefore this robot can reach where humans cannot possibly go and transfers the data of the environment. It also helps in taking images simultaneously while we are live streaming a video from the warfield.

REFERENCES

[1]. Sreejith.M.A, Vivek.S.K, VimalKumar.S.N, "Spy Robot Wireless Video Surveillance using Arduino", International Journal of Recent Trends in Engineering & Research (IJRTER) Conference

on Recent Trends in Electrical and Electronics Engineering (RTEEE '19) Special Issue; March- 2019 [ISSN: 2455-1457].

[2]. Dilliraj.E, Rekha.S, SindhuPriya.N.R, Vedhavalli. A, "R F Controlled Warfield Spy Robot Using Night Vision Wireless Camera", Volume 8, Issue 3 , March 2019

[3]. SnehalSubhashBhosale, VidyaTukaramShejwal, S.M.Lambe, "RF Based Night Vision Robot Using PIC Controller", IJARIIE-ISSN(O)-2395-4396, Vol-5 Issue-2 2019

[4]. Qureshi Afaan,SunsaraHanan,AnsariSajid,AnsariEjaz and Khan Amir, "Very Long Range Spy Robot With Obstacle Detection", International Journal Of Scientific & Engineering Research Volume 9, Issue-2, February 2018

[5]. JigneshPatoliya, Haard Mehta, Hitesh Patel. V T Patel, ChangaAnand, "Arduino Controlled Warfield Spy Robot Using Night Vision Wireless Camera and Android Application." Department of Electronics and Communication Engineering Charotar University of Science and Technology, Gujrat: 388421.

[6]. Lavanya KN, Ramyashree D, Nischitha B R, T Asha, C Gururaj, "Vision Interfaced Warfield Robot With Wireless Video Transmission", Proceedings of the 2nd International Conference on Trends in Electronics and Informatics (ICOEI 2018)

[7]. IEEE Conference Record: # 42666; IEEE Xplore ISBN: 978-1-5386-3570-4

[8]. Akhilesh J Akhil Krishnan G, Gokul R Sekhar, Sujith S, Jesna K A B.Tech, Department of Electronics and Communication Engineering, College of Engineering Perumon, Kerala, India. "Spy robot with wireless camera" International Journal of Innovative Research in Science, Engineering and Technology An ISO 3297: 2007 Certified Organization Volume 6, Special Issue 6, March 2017.

[9]. AaruniJha, Apoorva Singh, RavinderTurna, Sakshi Chauhan SRMSWCET, UPTU, India "War Field Spying Robot With Night Vision Camera", Journal of Network Communications and Emerging Technologies (JNCET) Volume 2, Issue 1, May (2015).

[10]. Neil, MacMillan, "Range –based navigation system for mobile robot." Computer and Robot vision - 2011 Canadian Conference on IEEE 2011.

[11]. International Journal for Modern Trends in Science and Technology Volume: 03, Special Issue No: 02, March 2017 ISSN: 2455-3778.

[12]. Rohan Gaikwad, Boarkar, Kunal, and Ajay R "Wireless Controlled Surveillance Robot" International Journal 2.2 (2014).

[13]. G.N Saridis, "Toward the realization of intelligent controls", Proceedings of the IEEE, vol. 67, no. 8, pp. 1115-1133, Aug. 1979.

[14]. KirtiBhagat, SayaleeDeshmukh, ShraddhaDhonde, SnehaGhag, "Obstacle Avoidance Robot", International Journal of Science, Engineering and Technology Research (IJSETR), Volume 5, Issue 2, February 2016