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RFbased Military Surveillance Robot

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ABSTRACT -The expectation of this undertaking is to decrease human casualties in fear monger assault like 26/11. So, this issue is often overwhelmed by planning the RF based covert operative robot which includes remote camera, so as that from this it'll be not difficult to analyse rivals when it required. This robot can discreetly enter adversary zone and sends us the data through remote camera. the event of this robot is remotely constrained by a handheld RF transmitter to send orders to the RF beneficiary mounted on the moving robot. Since human existence is consistently important, these robots are the replacement of troopers in war zones. This government operative robot can likewise be utilized in star inns, shopping centres, adornments show rooms, then on where there are often danger from gate crashers or fearbased oppressors. At the hour of war where it alright could even be utilized to gather data from the adversary landscape and screen that data at a far secure territory, and securely devise a meeting for the counter assault, tracking areas of fearbased oppressor associations and afterward plan assault at appropriate time. Making a reconnaissance of any fiasco influenced territory where people can't go.

KEYWORDS: RF Transmitter, Receiver, Robot, WarfieldRemote, Raspberry Pi, Arduino, Camera

I. INTRODUCTION

India is emerging as a significant producer of hightech defence and technologies [1]. Project is supposed to grow a automatic vehicle using RF technology for local operation affixed with beamed camera for observing cause. The robot in conjunction with camera can wirelessly transmit real time video with nightsight capabilities. This is kind of robot can be cooperative for sighting causes in war zones. An ATmega16 microcontroller is used for the required operation. At the transmitting end using remote control, commands are sent to the receiver to manage the movement of the robot either to maneuver forward, backward and left or right, ARM up and down etc. At the receiving end two motors are interfaced to the microcontroller where they're used for the movement of the vehicle. The RF transmitter acts as a RF remote that has the advantage of adequate range (up to 200 meters) with proper antenna, while the receiver decodes before feeding it to a special microcontroller to drive DC motors via motor driver IC for necessary work. A beamed camera is organized on the robot framework for sighting cause even in complete gloom by using infrared lighting [2]. At the transmitting end using remote control, commands are sent to the receiver to manage the movement of the robot either to maneuver forward, backward and left or right, ARM up and down etc. At the receiving end two motors are interfaced to the microcontroller where they're used for the movement of the vehicle. After receiving the command robot will stop. then the robot will move within an equivalent direction during which previously the robot is moving.

II. RELATED WORKS

A. I. Bugaje, A. Z. Loko [3] had designed and implemented an unmanned ground Vehicle (UGV) for fumigation purposes. The UGV entails of the supervisory board, sprayer, DC based servo motor, and Bluetooth element. Bluetooth communication modules helps to work out a radio communication governor for the robotic vehicle, the sprayer, and sprayer container spin. The performance of the unmanned ground vehicle for fumigation purpose hardware prototype was tested during the realtime test. it had been found that the system was perfectly working on both smooth and rough surfaces [4]. the stableness of the fourwheel robot that contained the fumigating tank was maintained. The system could receive command remotely via Bluetooth from up to a radius of 8 meters' coverage. The sprayer features a capacity to

spray the chemicals up to 2 meters' radius. The battery system within the prototype can work for 4 hours without recharging. the entire body of the system can enable the system to enter almost every corner with none obstruction. This prototype is developed to reduce human exposure to pesticides during spraying. within the longer term, ZigBee module are often used for wireless communication which may have a extended range.

Wai Mo MoKhaing, Kyaw Thiha [5] had developed a spy robot system that's used to capture the photographs around the area with the help of transmitting and receiving antenna. The remoteoperated robot is consisting of a wireless camera, an antenna, batteries, and 4 movable wheels. The spy robotic is managed through employing a foreign which could move to the required location and capture the photos around the region. This robot isn't relevant for an thorough kind of operations. The robot captures audio and video information from the encircling environment and may send it to the linkattached terminal via RF signals. The robot makes use of RF circuits for transmissions of captured images which features a drawback of theconstrained working range, frequency range, and confined control. The wireless camera has audio and video systems. This camera can move the left and right direction to determine the survey around the robot. there is no USBport during this camera so as that the saving and records process of the paper need a capture card. Similarly, the wireless camera could even be upgraded with the 360-degree left and proper guidelines so as that the functionality features a movement at many sides.

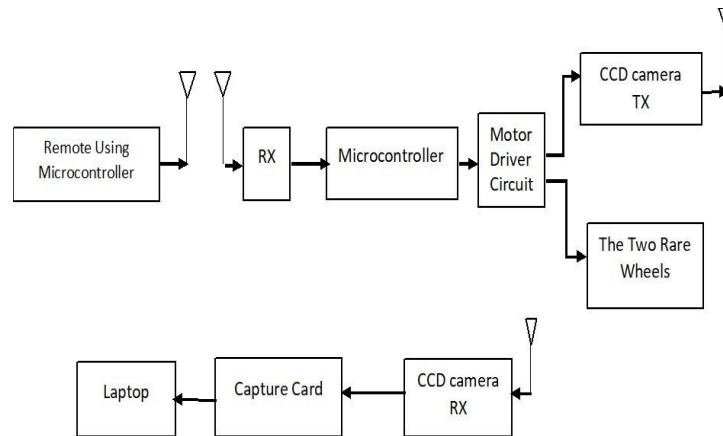


Fig.1. Remoted Operated Spy Robot System

Sung-Soo Kiml, Heechan Kang [6] developed a military robot of remote operation for the indoor environment. Fig.1 shows the detailed information related to remoted operated Spy robot system. Displayed virtual reality environment is captured by means of the camera device with a stabilizer and the digital camera is transferred into the operator's console [7]. It is anticipated that the distinct forms of the unmanned robot automobiles with a digital camera device can be effectively tested if the actual-time models are replaced. so as to acquire more stable pictures, the image processing method has to be included with the hardware stabilization. RevatiPote [8] had developed a spy robot which includes fire detection and water sprinkling mechanism. The robot vehicle may be competently operated from any other android device. It gives a very good user interface for observing with respect to the car. The android system has been used to control the wireless bot in a decent Bluetooth overage range. The Bluetooth receiver placed on the vehicle is mainly used to transmit control signal from developed mobile application to vehicle. We additionally offer a temperature sensor to sense actual time temperature and provide output in the application. Such kinds of applications normally utilized in the navy system or any excessive temperature device to discover their situation. The robot makes use of an ultrasonic sensor to detect an obstacle and to find distance among the robot and obstacle. The sensor located on the robot initially senses the signal and compares with the threshold value. Finally, the detected signal is passed to the controller. The robot and the android application are related to the usage of Bluetooth [9]. In order to prevent the human lives, the developed robot includes a wireless camera which is used to transmit videos and images from the war area. Military persons have an enormous chance to loss their lives while entering into unknown territory. Spy robot mainly helps the armed peoples to known about the surrounding before entering into the area. The captured videos or pictures are sent through Bluetooth which has a confined range of operation. The above technologies are used only for

short range of operation, not suited for far range of communication. So, in this paper RF is used as communication module which is safe and can operate for long distance.

III. OVERVIEW OF EXISTING SYSTEM

In the current framework, robot needs to control distantly where the individual needs to screen the zone utilizing far off however physically controlling and the more Human more is needed to execute this framework.

IV. PROPOSED METHODOLOGY

This task configuration can be isolated into two segments; equipment and programming executions. The equipment execution comprises of the advancement of the Remote Control, RF and Camera and likewise utilize wise robot while the product execution centres around programming of raspberry pi utilizing python program. Camera is utilized for distinguishing adversary presence in fight or line region by perceiving people through profound learning calculation. This way robot is capable group objects in a casing into people, creatures and lifeless things and settle on choices all alone.

V. STEPS FOR VEHICLE OPERATION

STEP 1: Connect the Laptop and Raspberry Pi module with the same Wi-Fi connection.

STEP 2: Once both are connected in the same network, open VNC viewer and enter the IP address of the Raspbian module.

STEP 3: Run the program. The application consists of “forward”, “backward”, “right”, “left” for vehicle control. The controller can guide the vehicle by using these buttons.

STEP 4: Then connect the wireless smart night vision camera and the PC/Mobile with the same connectivity.

STEP 5: Connect the Ultrasonic sensor with ARDUINO and dump the respective instruction codes into ARDUINO

STEP 6: Since the ultrasonic sensor is interfaced with the ARDUINO module to continuously monitor the surrounding environment. It can rotate up to 270 degrees. The values are continuously transferred to the application through RF connection.

STEP 7: The entire set is monitored with the help of RF connection in order to have a high range of security.

VI. BLOCK DIAGRAM

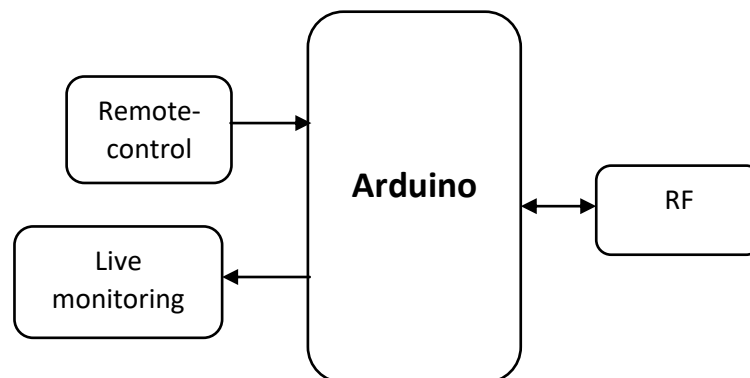


Fig.2. Transmitter Section

Fig. 2 represents the transmitter part of the module where the hardware components like Remote Control, Live monitoring LCD display and RF Transmitting antenna are connected to the ARDUINO module. Remote control is used to control the direction of the module. Live monitoring LCD display is used to get information from the robot and display the information in LCD display. RF antenna is used to send instruction to the robot through radio frequency as transporting medium.

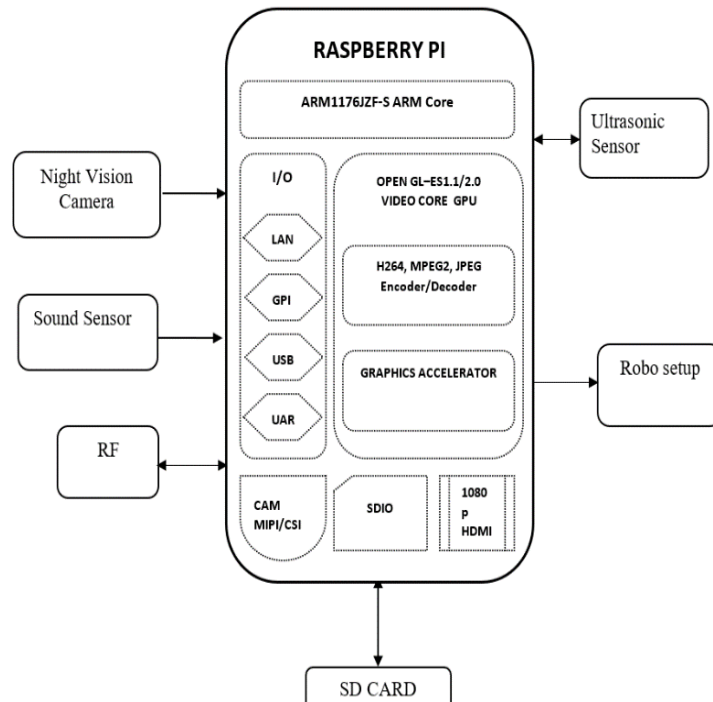


Fig.3. Receiver Section

Fig.3 shows the receiver part of the module where the hardware components like Ultrasonic sensor, Sound sensor, Night vision camera, Driver IC and RF receiving antenna are connected to the raspberry module. Ultrasonic sensor is used to detect any obstacle present in the path. Sound sensor is used to detect the environment sound intensity and the night vision camera is used to get livestreaming of the environment both day and night. Driver IC helps the locomotion of the module and the RF antenna is used to receive instruction from the operator.

VII. DEVELOPED PROTOTYPE

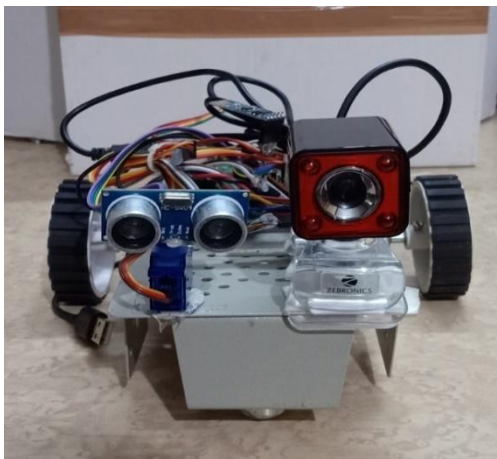


Fig.4. Transmitter Part of the Prototype

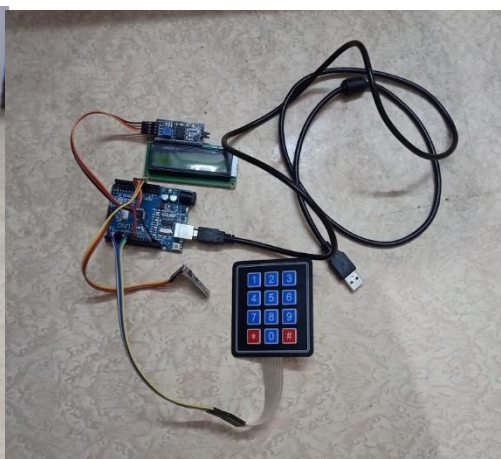


Fig.5. Receiver Part of the Prototype

The transmitter part of the prototype Fig.4 shows the camera on the top of the vehicle continuously sends the videos of surrounding to the respective authorities. The presence of ultrasonic sensor measures targeted object by emitting ultrasonic sound waves, and converts the sound waves into a sign. For ultrasonic sensing, the foremost widely used range is 40 to 70 kHz.

The receiver part of the prototype Fig.5 shows the remote control helps to navigate the robot to the desired place. The LCD displays the popup information of the robot's current status with the help of RF antenna connected to ARDUINO.

VIII. RESULT AND DISCUSSION

In this paper, a lowcost autonomous pcontrolled surveillance robot has been implemented as depicted in Fig.5 where search and operation are often made much effective and easier. the facility supply of the Raspberry module was switched on to see for detection of human. The RF receiver details were checked. Sensors like ultrasonic sensor and Sound sensor are often implemented to form this robot simpler to detect the presence of citizenry and ready to characteristics the identified object into different categories

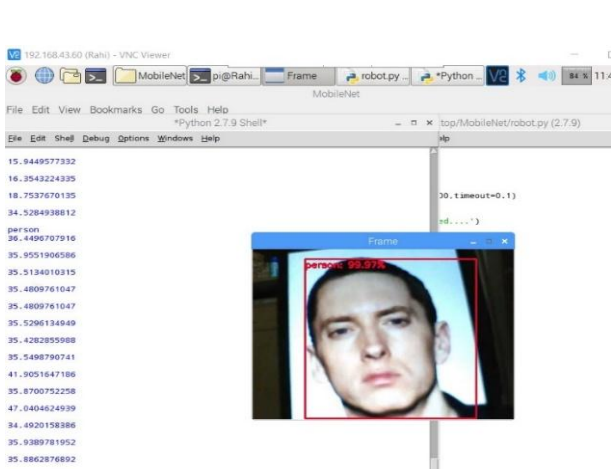


Fig.6. Screenshot of Real Time Object Detection

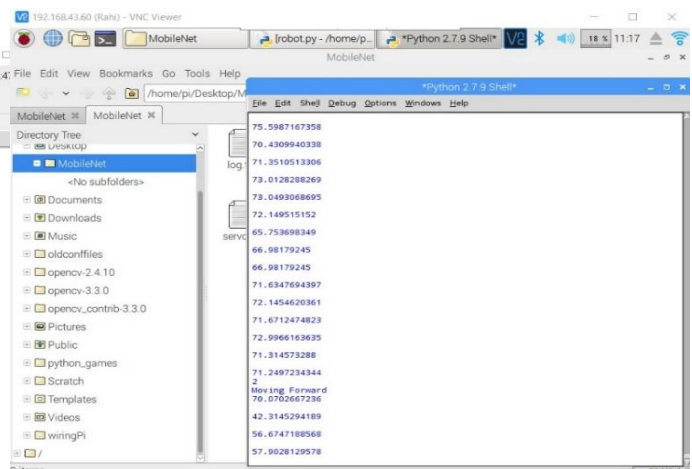


Fig.7. Screenshot of Direction Parameters

Fig.6 and Fig.7 shows the livestreaming of the robot and therefore the refore the confirmation of person present at that place and the direction of the robot heading towards to the destination and the current status of the output is shown in the LCD display Fig.8.

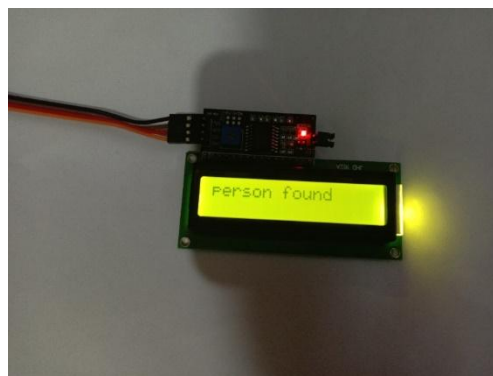


Fig.8. LCD Display Output

Table.1. Performance Comparative Analysis

Parameters	Existing Paper	Proposed Paper
Sensor	Yes	Yes
Human Detection Distance	5 Meters	12 Meters
Infrared	No	8 Meters
Camouflage	No	No
Audio/Visual Alert	Only Audio	Yes
Software	Embedded C	Raspbian

The performance analysis of the proposed module with the existing module is shown in Table.1.

A. Advantages and Disadvantages

- This system is effective for rescue operation, in war fields and earthquake affected location
- It eliminates human need to access hazardous regions.
- The cameras battery backup is weak and can be overcome by using solar panels.
- The usage of high range sensors increases the cost.

B. Applications

- In army forces to detect the alive human being.
- In rescue operation where human reach is not possible with tracking systems.
- In war fields, to control the unmanned aerial vehicle.

IX. CONCLUSION

The pace of technological advancement seen over the last three decades can be expected to be grow rapidly for the next following decades. The method for spying purpose based on night vision camera to capture the night activities at the war field or any outside field where human being cannot go. The paper comes out with the operations of Receiver and transmitter circuit. The functions and the operations of the circuits interrelated are very important to be analysed. With appropriate steps and methodology, any process of completing the project can be managed wisely and will be make a good result. Currently Wireless controlled Omni-directional monitoring robot with video support that can monitor using webcam. As per the present scenario, human dependencies on technology and future trends robots are going to be used as a perfect replacement for human being in all aspects of life.

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