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IOT based War Robot

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***Abstract*—This paper explains the latest approach of the current technologies in the field of robot, for military surveillance, using the concept of internet of things. Replacing humans in the places of combat or warfare, this robot detects the presence of humans, unusual objects, temperature and the presence of metals pieces in the field. The latest internet of things smart technology helps all connected devices to update themselves according to the changes in the surroundings and to be able to adapt in any environment, we can visualize the conditions of the field accurately. The movement of the robot can be controlled both manually and automated control.**

Keywords-Internet of Thing, sensors, RF,ARM LPC 2148

I. INTRODUCTION

A robot is nothing but an automatic electronic device that is capable of performing programmed activities, thus replacing human work, providing highly accurate results and easily overcoming the limitations of human beings.

In this project, we mainly focus on surveillance of war fields or places with no human reach.

In India, most of the cost/income is invested in military forces as there are many border threats in places like Kashmir, Ladakh and terrorism threats in places like Mumbai. It is a human threat to investigate these places during these havoc. The military uses Daksh military recently in combat fields.

One of the main advantage of this robot is it helps to keep the place under control by providing all time surveillance and also also overcomes the drawback of limited frequency range by using the concept of Internet of Things for receiving the data from the bot and also to control the movement of the bot.Also the second advantage being that the robot can be used in automatic mode where the bot changes its direction when an obstacle is detected in front of it with the help of ultrasonic sensors.

The night vision camera provides the live streaming of the metal detector sensor placed under the robot.It also sends the exact location of the robot with the help of GPS used on the bot and also helps us to find the exact location of land mines.

II. LITERATURE SURVEY

Ahsanul Hoquel et. al. first reported a design of a robot that provides the live streaming of the video with the help of a night vision camera.Later Jignesh Patoliya et. al. designed a war robot which had night vision camera and Bluetooth module to control the movement of the bot.It was controlled using a android device.The limitation of their work was the limited frequency range and the communication with the bot was over a short range.

Minal S.Ghute,Kanchan P.Kamble,Mridul Korde et. al. described a military robot which monitors the environment and provides live video feedback.This model used gyrosensors for the movement of the robot.It uses bluetooth connectivity for wireless communication with the help of mobile device which make it range limited.

Shudha Chowdhury et. al. designed a robot that was used to serve during the natural calamities like earthquake and cyclones etc.This robot uses a PIR sensors which helps in detecting human beings or animals being trapped inside a place or in a collapsed building.But the major drawback being that the location of the robot wasn't being able to detect.

Tarunpreet Kaur et. al. proposed a robot which uses solar panel to charge the batteries.This robot was also able to detect any obstacle placed in front of it and brought in the RF technology into robots for transmitting live video.

Dr.Shreedhar A Joshi et. al. developed a robot with speed varying facilities by giving different gears to the robot. This robot was also provided with a gas detection facility.The only drawback of this project was the use of arduino uno as their heart of the project.

Souvik Saha et. al. reported a robot that uses raspberry pi as the heart of the model.It was used for surveillance and the coding was done using python on linux operating system.

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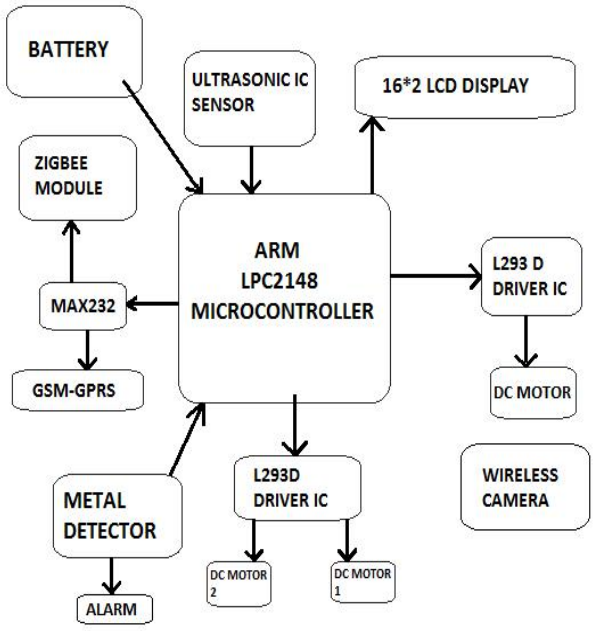
III. PROPOSED CIRCUIT DESIGN

The model is divided into two different stages -

1. Hardware connection of the components
2. Software coding to bind the components for particular task.

A. Hardware Design



1. ARM LPC2148 Micro-controller

It is the heart of the model.It is a standalone board which has 12Mhz crystal for for system clock and 32khz crystal for RTC.It has Multiple serial interface which includes two UART's where one is connected to the GSM module and the other to the RF module.This micro-controller provides power saving modes when in idle conditions.Since it is a 32-bit micro controller it integrate all the sensors and displays them on the LCD display which is connected across the LCD.Just like other micro controller it also supports coding which helps the bot to be used in both automatic mode and manual mode.

2. Obstacle Detection Sensor

Ultrasonic sensors are used to detect obstacles in the surroundings. The bot is able to find its own path with integration of the sensors. Ultrasonic sensors work by sending ultrasonic sound waves which are reflected after striking the obstacle. It also helps to determine the distance between the bot and obstacles. It also sends the signal for deviation whenever it encounters an object.

Ultrasonic waves travel faster than the audible sounds. Each module consists of an ultrasonic transmitter, receiver and contro c rcu t.

3. Power Supply

Two 12 volts 1.3 ampere batteries are been used.One of which is connected to the ARM LPC2148 micro-controller, zogbee module,16*2 LCD display and the ultrasonic sensor HCSR04.The other battery is given to the GSM module and for the motors which helps in the movement of the robot.Another two volts battery are been used to provide power supplies for the night vision camera and metal detector.

4. *Zigbee Module*

Zigbee modules are used to transmit the data that has been collected by different sensors to the receiver through RF module.Its a low power consumption which uses high level communication protocols.It overcomes the limitations of blue tooth technology by allowing the data to be transmitted over long distances.

5. GSM-GPRS Module

This module helps us to establish communication between the robot and the computer which is used to control the movement of the robot when used in manual mode.It helps us to sends the data a high transfer rate.The data collected by the ARM micro controller is sent to the GSM through UART.It uses HTTP protocol The modem comes with an interface which helps us to connect to the micro controller with MAX232.

6. Metal Detector

The operation of a metal detector is achieved upon the principle of electromagnetic induction. It consists one or more inductor coils that are used to interact with metallic elements on the ground.The metal detector is connected to a separate battery.Since its main aim is to detect any landmines planted the ground it is placed under the bot.

7. L293D Driver IC

This IC is responsible for the movement of the robot.To have a complete control over the robot,it combines two techniques namely PWM for controlling the speed and H-Bridge for controlling the rotation of the direction.It has two input pins one for the internal logic circuit and the other for the H-bridge which helps in driving the motor and has four output pins to which two Dc motors are connected.

8. Wireless Camera

A night vision audio-video camera is used for surveillance of the place all time.A seperate battery is used to provide poewr supply to the camera.It Uses IR (Infrared) light to illuminate images in the dark regions.It is placed at a high altitude in order to capture the image of the image of the surroundings.The AV camera transmits the data which will be received by the AV receiver on the receiver side.

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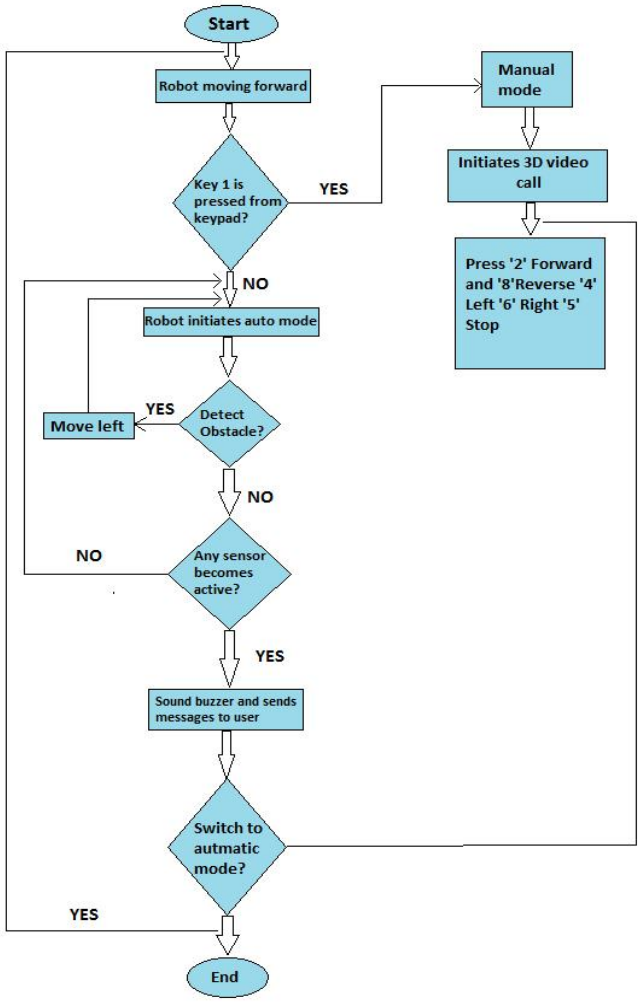
B. Software requirements

Keil software version 4 is used to code the robot when it is functioning in automatic mode as well as manual.Embedded C is the language used for coding the ARM micro controller.Flash Magic is used for dumping the code on the micro controller.The movement of the robot is controlled by pressing the keys on the keyboard on a hyper terminal which also tells the presence of any metal piece detected.

The working and the control flow of the model is represented using a flowchart shown below.



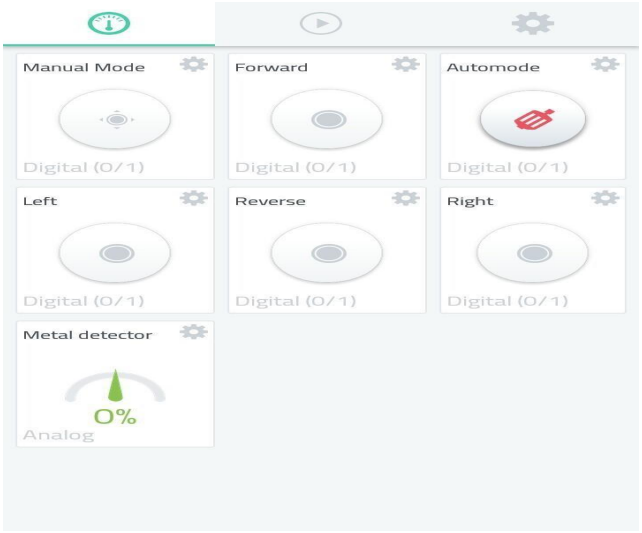
IV. APPLICATIONS OF WAR ROBOTS

War field robots gains its advantage due to its all time surveillance and also because of the different modes available to the user which makes the robot highly appropriate to be used at different places for security purpose.

- As the name suggests it is mainly used to in war fields in order to reduce the risk of the humans lives at the borders where the tension as always been high.
- It can be used in airports for detecting any metals placed and also act as a moving surveillance camera to enhance the security of the place.
- The robot can also be used to check the presence of any terrorist after the attack has been made which may also bring threat to human lives.

V. RESULTS

In this paper,the movement of the bot is been achieved by using the Keil software and L293D driver module.The robot can be used in both manual and automated mode by pressing on their appropriate buttons.By pressing the corresponding buttons the robot moves in forward, backward, left and right.The robot moves in automated mode once the auto mode button is clicked.



In this work,the robot is also streaming the live video of the surroundings both during day and night with the help of a night vision AV camera.It consumes low internet data and the videos are transmitted without any delay.

The model is able to detect the metals present on the surface and also able to detect any obstacle placed in front of it using metal detectors and ultrasonic sensors.

VI. CONCLUSION

The robot model can be controlled from a far distance and overcomes the limitations of the other robots that uses blue tooth technology.The wireless night sensor camera is used to live stream the video and can be viewed on the hyper terminal on our devices.The metal detector sensor used in the robot senses the metal components and mines present in the fields.

The robot proposed can reduce the loss of the lives on the

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border areas and also helps in performing patrolling duty and recce any unexplored areas.The GPS trackers equipped on the model helps us locate the landmines by providing the co ordinates where the mine was planted.

Further research can be carried out on the proposed robot to overcome the limitation like the inability of the robot to rove in the water.Also the size and wight of the robot can be minimised by using advance materials and innovative techniques.

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REFERENCES

[1] T asha,Nischitha B R,Lavanya K N, Ramya Shree D, and C Gururaj "Vision Interfaced War Field Robot With Wireless Video Transmission" Proceedings of the 2nd International Conference on Trends in Electronics and Informatics (ICOEI 2018) IEEE Conference Record: # 42666; IEEE Xplore ISBN:978-1-5386-3570-4.

[2] G. Anandravisekar et.al "IOT Based Surveillance Robot" International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Vol. 7 Issue 03, March-2018.

[3] Md. Baijid Hasan Shorif Shekh Nuruzzaman ,Ahsanul Hoque,Md.Eftekhar Alam, "Arduino based Battlefield assistive Robot" 2017 IEEE Region 10 Humanitarian Technology Conference (R10-HTC) 21 - 23Dec 2017, Dhaka, Bangladesh. J. Paul Chandra Kumar and V. Abilash," Arduino controlled landmine detection robot"2017 Third International Conference On Science Technology Engineering and Management (ICONSTEM).

[4] Borole. P.B. and Mohammad Shoeb Shah "Surveillance And Rescue Robot Using Android Smart Phone And Internet". International Conference on Communication And Signal Processing, India. (2016).

[5] Dilip Kumar,Tarunpreet Kaur "Wireless Multifunctional Robot for Military Applications" Proceedings of 2015 RAECS UIET Punjab University Chandigarh 21-22nd December 2015. 978-1-4673-8253-3/15 ©2015 IEEE.

[6] Mahind V.A,Pavan kumar M.V.N.R , Sawant J. P,Jedhe N.K," R-HEX ZIGBEE Defense Robot For Parameter Monitoring", "International Journal of Research in Advent Technology, Vol.3, No.5, May 2015 E- ISSN: 2321-9637, pp.88-92.

[7] Dipak Patil ,Abhijeet Patil , Himali Patil , Sunil Kalal," Camouflage Technique Based Multifunctional Army Robot", International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) Volume 4, Issue 2, February 2015. pp.259-261.

[8] Dheeraj Mishra, Dhiraj Singh Patel, Devendra Pandey, Ankit Sumele ,Prof. Ishwar Rathod," Mobile Operated Spy Robot", International Journal of Emerging Technology and Advanced Engineering, ISSN 2250-2459 (Online), ISO 9001:2008, Vol. 3, Special Issue 2, January 2013.

[9] Dr. M. Meenakshi,Sandeep Bhat," The Role of Wireless Communication for Autonomous Military Robot", Int'l Journal of Computing, Communications & Instrumentation Engg. (IJCCIE) Vol. 4, Issue 1 (2017) ISSN 2349-1469 EISSN 2349-1477.pp.64-66.

[10] J.G. Rana,R.A. Kadu, Prof. V.A. More, P.P. Chitte, M.R. Bendre. "Wireless Control & Monitoring of Robotic Arm (SWORDS)", International Journal of Computer Technology and Electronics Engineering (IJCTEE), Volume 2, Issue 1, ISSN 2249-6343,pp.28-38.

[11] Jayasri.D,Dhanalakshmi.V, vishnupriya.R, "Zigbee Based Wireless Intelligent Security Robot For Defence Camp", ISSN No: 2309-4893 International Journal of Advanced Engineering and Global Technology Vol-2, Issue-4, April 2014, pp.576-583.