Wireless Multifunctional Robot for Military Applications.

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Abstract - *There are various wireless modes like Bluetooth, Wi-Fi, Zig Bee, etc., but these wireless controls has limitations in its control distance. To overcome this limitation, Mobile Controlled Robot is designed to add long distant wireless controllability to your robot. Robots are specially design for human to make our life easier. Robots are design for various purposes like military purpose, industry, for home based application. At border different tanks, missile, guns etc. are used by enemy. This cause problem and harm our force or soldiers. For this a robot is design and developed for military purpose application to protect our army. 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.*

Key Words: **Wi-Fi-Module, RFID, IR Sensor, Temperature Sensor, Metal Detector, Gas Sensor.**

1. INTRODUCTION

The main principle of our robot is Principle of Humanity based on basic three laws of robotic system. This robot is electromechanical as well as artificial intelligent machine controlled by computer programming. it is designed to replace human beings in various hazardous areas. To overcome the complexity of wired communications, we are using advance wireless RF and Wi-Fi technology. The control signal from transmitter is sent to the receiver which is connected to an object or device or vehicle that is to be remotely controlled. Similarly, this project mentions about a wirelessly controlled commando robot controlled using radio frequency technology.

Military Robots are used to detect bombs, weapons, fire and gas etc. in the war fields. The advantage is that the cost per hour to operate a robot is a fraction of the cost of the human labor needed to perform the same function. Including this, they are reprogrammed and perform functions with a high accuracy. Human operators are far more versatile so they can switch to any pre-defined job tasks easily. Robots are built and programmed to be job specific. Robots are in the infancy stage of their evolution. As robots evolve, they will become more versatile, emulating the human capacity and ability to switch job tasks easily. While the personal computer has made an ineffaceable mark on society, the personal robot hasn't made an appearance. Robotics is element of science of automation which are operated under control of mini or micro-computer. Robots require a combination of elements to be effective: sophistication of intelligence, movement, mobility, navigation, and purpose. Without risking human life, robots can replace humans in some hazardous duty service. Robots can work in all types of polluted environments, chemical as well as nuclear. They can work in environments so hazardous that an unprotected human would quickly die.

1.1 PROPOSED CIRCUIT DESIGN OF ROBOTIC VEHICLE

A. Before Working Principle

The system we have proposed consist number of features like soldier identification, for monitoring various parameters in the environment, remote monitoring and controlling mechanism etc.

The system consist of Micro-controller, LCD display, RFID reader, IR sensor, Metal detector, LPG gas sensor, Temperature sensor, DC motor for assembly and Wi-Fi module for wireless communication between Microcontroller system and Android phone having Android web server which we have designed as per our application. This robot will continuously check for bomb detection with the help of Metal detector and send information to the Android application using Wi-Fi connectivity.

The robot will move by analyzing the obstacles in the path with the help of IR sensor. The hazardous gases are detected like LPG with the help of Gas sensor interfaced in the system for safety purpose. The RFID reader interfaced in system for identification of soldiers in order to differentiate between army of our country and enemies. We are able to control the movement of robot remotely using Android application.

B. Power Supply Module

The basic step in the designing of any system is to design the power supply required for that system. The steps involved in the designing of the power supply are as follows,

1) Determine the total current that the system sinks from the supply.

2) Determine the voltage rating required for the different components.

C. LPC2138(ARM 7) Microcontroller

The LPC2141/42/44/46/38/48 microcontrollers are based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/42/44/46/48 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems.

D. Wi-Fi Module

With the popularity of Wi-Fi IOT devices, there is an increasing demand for low-cost and easy-to-use Wi-Fi modules. ESP8266 is a new player in this field: it's tiny (25mm x 15mm), with simple pin connections (standard 2×4 pin headers), using serial TX/RX to send and receive Ethernet buffers, and similarly, using serial commands to query and change configurations of the Wi-Fi module. This is quite convenient as it only requires two wires (TX/RX) to communicate between a micro-controller and Wi-Fi, but more importantly, it offloads Wi-Fi-related tasks to the module, allowing the microcontroller code to be very light-weighted.

E. Sensor Module

The Sensor module consist of various sensors helps in the detection of metals, fire, harmful gases at remote areas.

- Metal detector used to detect metallic objects like weapons or bombs in war fields.
- Gas sensor used to detect harmful gases like LPG in its surroundings.
- Temperature sensor used to detect fire like hazardous environment when it exceeds its Thresholding level.
- IR sensor is also included for detection of obstacles in the workspace like war field for our military robot.

F. RFID Technology

- The RF ID Reader- EM-18 type of RFID reader.

- RF ID tag- The tag contains an Integrated circuit for memory and an Antenna coil.
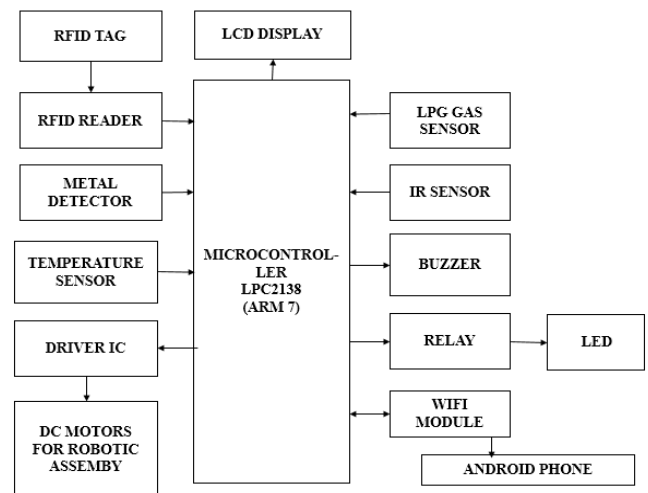
2. BLOCK DIAGRAM

Figure1- Block Diagram

3. CONCLUSIONS

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, compared to earlier robots work on local networks like Wi-Fi with constraints have limited operational range. This robotic vehicle with different sub modules can widely be used as surveillance robot for security purpose and emergency rescue operations.

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