

Camouflage Technique Based Multifunctional Army Robot

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Abstract— Nowadays, many expenses are made in the field of defense in adopting primitive security measures to protect the border from the trespassers. Some military organizations take the help of robot in the risk prone areas which are not that effective when done by army men. These Army robots are confining with the camera, sensors, metal detector and video screen. The main objective of our system is to get camouflaged including some additional parameters like blue-tooth module for real time data processed by the camera at the video screen and PIR sensor to trace the intruders.. Thus the proposed system using blue-tooth reduces errors at defense and keeps the nation secure from the foe.

Keywords – Blue-tooth Module, Army robot, PIR sensor, Wireless Camera and Color Sensor.

I. INTRODUCTION

A robot is an automatic mechanical device often resembling a human or animal. Modern robots are usually an guided by a computer program or electronic circuitry. Robots have replaced humans in performing repetitive and dangerous tasks. The use of robots in military combat raises ethical concerns. The possibilities of robot autonomy and potential repercussions have been addressed in fiction and may be a realistic concern in the upcoming days.

Basically Army Robot is capable of performing tasks such as locomotion, sensing the harmful gas, sensing the humans beneath the surface, metal detection. Army Robot is an autonomous robot comprising of wireless camera which can be used as a spy and Blue-tooth used to control it wireless.

This Army robot is more efficient compared to the soldiers. Excellency of this robot is in being operated wireless from remote which offers no risk to the soldier lives. Robots are enhanced to be robust and sturdier giving the guarantee of success in the risk prone environment. The main aim of the paper is to implement a Camouflaged technology based Wireless multifunctional Army Robot which can be controlled through smart phone using Blue-tooth Module having locomotion and navigates around the risk prone areas and tries to identify the intruders,. In addition to this Army Robot is built with some artificial intelligence for its safety.

It has built in with Proximity metal sensor for detecting metal and MQ6 gas sensor for harmful gas detection.

II. BLOCK DIAGRAM

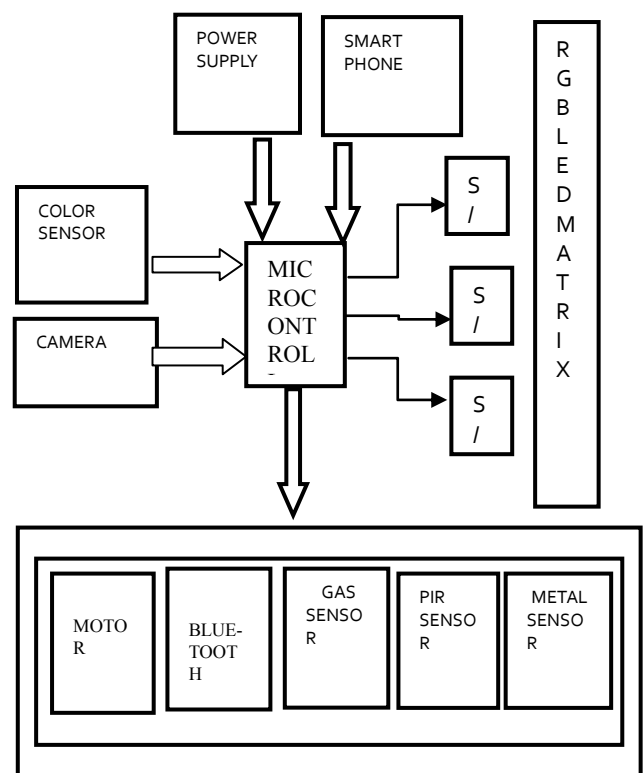


Fig.1 Block Diagram of Multifunctional Robot

III. HARDWARE SPECIFICATIONS

A. Micro-controller

Heart of the robot is a micro-controller. Micro-controller is used for controlling all the operation done by the devices which are interfaced to it. Micro-controller helps in transmission and reception of signals to be controlled. AT89c52 IC is used in this micro-controller for driving the robot. The IC used in this is AT89c52 has 40 pins. This IC is a low power consumption IC having 8K byte of Flash memory and programmable memory. It also has an on chip Flash memory used for reprogramming. Micro controller is provided with the power supply of 5V through the power supply circuit. It has an additional crystal oscillator with

clock frequency of 11.59Mhz. This IC can be easily interfaced.

B. Power supply circuit

The power supply circuit is the important part of any electronic system. Power supply circuit is used to provide power to the micro controller, LED Matrix, Blue-tooth Module, sensors and DC Motor. Regulated output of +5V & of +12V is provided by the power supply circuit. The three terminal of the IC 7805 provides 5V. The voltage from transformer is rectified and the filtered by the capacitor. Regulated IC has three terminals those are input pin, output pin and ground. The unregulated DC voltage that is obtained from the capacitor is given to the input pin of the regulated IC.

C. PIR sensor

The PIR (Passive Infra-Red) Sensor is used to detect the changes made in the surrounding object by measuring the infrared levels made by the movement of object. The high signal of the motion of object is detected on the I/O pin. PIR sensor is a pyroelectric device. The PIR sensor is a device which generates electric charge when exposed to infrared radiation and is made of a crystalline material. An on-board amplifier is used to measure the changes in voltage generated that is obtained by the infrared on striking the object. Fresnel Lens is a special kind of filter used in this sensor which is used to focus the infrared signal onto the object. The motion of the object is indicated by on board amplifier on rapid change of the ambient infrared signal. This PIR sensor has a single bit output having small size that makes it compatible to all micro-controllers of 3V & 5V operation with <100uA current draw.

D. Color sensor

To analyze the color of its environment, color sensor is used. The color sensor used provides small size, low cost, easily compatible. This color sensor is small in size and integrated on a small module making wiring easy and also emits precise information of the neutral color lighting of pure white. The operating principle of color sensor is simple. Photo diode is used to generates signal after reacting with the color filter on receiving light reflected by ground. The generated signal is analyzed in terms of frequencies and then gives ground color.

E. LED MATRIX

To display ground colors, 8x8 RGB LED matrix's is being used. We used one matrix with one color sensor which allows it to create a uniform color zone.

Besides, these LED matrix's have many benefits such as pins in 2*16 sets make it easier for wiring, their lightening quality (the robot is used for the purpose of reproducing a color rather than lightning up the environment), and a low power consumption.

F. Blue-tooth Module

Blue-tooth module is driven by the signal given by the smart phone using an Android Application. This Blue-tooth Module consists of master and slave. There is one master and many slaves.

G. Gas Sensor

To analyze the toxic gases present in the environment this sensor has been used. High sensitivity to LPG, propane, sensitivity to smoke, Fast response and long life. It is a Simple drive circuit.

H. Metal detector

To detect the metal objects, Metal proximity sensor has been used. It will detect the object between 1cm to 7cm. On detection of any metal object, the Led will blink and the buzzer will be initialized. The Principle of this metal sensor is the inductive oscillator circuit. The inductive oscillator circuit is used to monitor the current losses in coil occurred due to the high frequency. The metal sensor is designed for detecting the metal objects by detection of the Eddy current losses produced by high frequency. On detecting the metal object, the level of the output signal changes. The level of the change in supply current indicates the Output signal. Output current depends on the distance of the metal object. The flow of current will be maximum when the object is near to the coil or when the object is far the current will flow less through the searching coil. The detector is beneficial in many ways like the detection range is up to 7cm, Range of operation varies according to the size of object, Power consumption is of 5V DC and 50mA, digital output having Active with logic "0" and full SMD design.

I. DC Motor

DC motor is used to provide locomotion to the robot. It is driven by the power supply circuit with 12V. DC motor used is compatible with the micro-controller. Force = (current) x (wire-length) x (magnetic field)

J. Camera

Camera in this project is being used for the real time data interpretation which is wireless done using RF trans receiver. It is inbuilt with the RF Module trans receiver.

IV IMPLEMENTATION

The idea of the Army Robot is based on the camouflage techniques [2]. The aim of the project is to design, manufacture and operate via a Smart phone, used as remote control device can reproduce the color accordingly with the ground surface where it will be moving on, hence being camouflaged to the outside world. On the one hand, in order to achieve these goals, we used a LED matrix (RGB) which can diffuse uniform colors, coupled to sensors that can precisely identify ground colors. This robot is designed in such a way that it can reproduce the color independently at various areas each area being able to reproduce color with specific spots of the ground surface . which allow the robot

to mock up as a checkerboard of multiple colors – the various colors it drives over[2]. On the other hand, we also created a system which can receive and decipher information received from the Smart phone using Blue-tooth to further pilot motors which in turn drive the robot in any required direction. Furthermore, Camera is attached to show the real time data wireless through RF, Gas sensor to detect toxic gas, Metal sensor to detect metal arm and weapons if any, PIR sensor to detect human intruders or soldiers beneath the earth[3], LCD display to display the detected parameter. The robot is being camouflaged and is controlled from afar an object. So, in the Defense sector, such a Robot would allow the vehicles having large size to be camouflaged in fact, Camouflage is essential in the army missions. Besides, in the Intelligence sector, we could use spying robots like drones.

V.CONCLUSION

The main objective of our project is for Border security by using camouflage technology[2] and has been successfully accomplished wireless using Blue-tooth module driven by an Android App. We used PIR sensor principle to detect men direction and distance of obstacle. By using PIR Sensor transmitter receiver we can detect the obstacle coming in path. Gas sensor and metal detector are also being used for sensing the toxic gases and the metal weapons if any. In this system we used camera to transmit the data from border to the official area or headquarters. In the scanning path if any obstacle or enemy is detected then firing starts and control action take place. Thus in defense application it is possible to provide 24 hour security.

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