

Spy Robot for Military Purpose

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Abstract

To study and development of the spy robot. The robot is in form of a vehicle mounted with a camera, which acquires and sends picture to the P. C. This robot is solution for reducing human losses in military operations or terrorist attacks. It plays important role in saving human lives. The proposed system consists of colour sensor as part of camouflaging feature it means to acquired the surrounding colour wireless camera for surveillance purpose as spying enemies is very difficult for the soldiers because it is a dangerous and risky process. Humans should move out from direct exposure to dangerous situations, so for that we have to use the present technology. The main aim of the project is to design robot which has good range and camouflaging feature to deal with the surrounding surface.

Key Words: Spy robot, camouflaging feature, sensor, RF transmitter and receiver.

INTRODUCTION

Spy means getting information of enemies without knowing them and as technology is growing tremendously the act of spying is becoming more challengeable. While getting information there is always a chance for loss of lives of the soldiers during. The situation such as 26 /11 where people including foreigners & policemen have lost their lives while about 300 people were injured in the terrorist attack in country. [4]

Our idea is to make a robot to tackle the hostage situation & the worst conditions which cannot be handled by human being .We are implementing a solution for this problem with replacing a human soldier by a Robot which is completely controlled with a wireless network. A Robot is a virtual artificial agent [5]. Robot is a Electro-mechanical machine which is controlled by computer, or remote control.

The control of robot involves two distinct phases: transmitting, receiving the signal around 200 meters of area. Generally, sensors are mounted on the robot, and processing is done by the microcontroller or processor and the task is performed using motors. [5]. When the user controls the spy robot by remote controller, it will move to desired destination and spy images around the robot. In the project "Smart Spy robot" they used Bluetooth technology for communication which has the disadvantage of very small range of communication. [7] The block diagram of remote operated spy robot is shown in figure 1;

1. BLOCK DIAGRAM:

The proposed spy robot system consists of colour sensor, Micro-controller (AVR), camera, RF transmitter module, LEDs, four movable wheels, four DC motors, and a computer. It also has driving circuitry to drive the DC motors according to the

commands. The source of power to the system is a battery of 6V which provides the power to all circuitry present on the board. LPT port is used for connecting transmitting section to the computer to control the movement of robot by using the specific keys. Power supply for transmitting section is provided by the computer. The block diagram of 'Spy Robot for Military Purpose' is shown in the following figure (fig. 1).

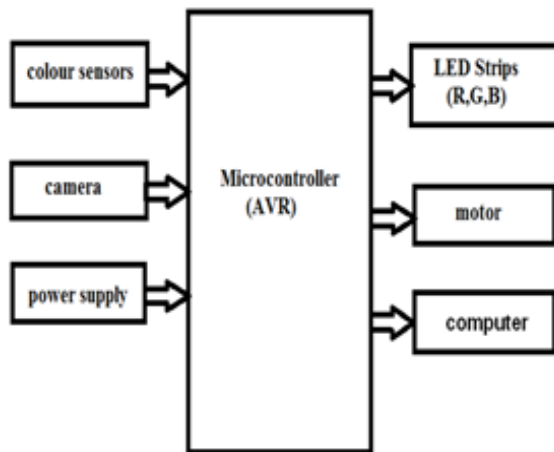


Figure 1: Block Diagram of Spy Robot

A. AVR Microcontroller

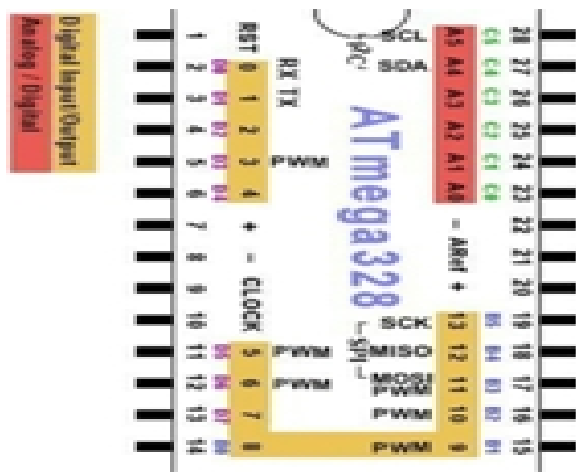


Figure 2: Pin diagram of atmega 328

This is the CPU of our project. The spy robot is based on the AVR microcontroller (ATMEGA 328P-PU). AVR is widely used in robotics and has many advantages over other microcontrollers. So we used ATMEGA 328 microcontroller in our project.

The device have integrated features to reduce external components, thus reducing system cost, enhancing system reliability and reducing power consumption[10].

1. 28 pin narrow DIP package.

2. 8 bit RISC
3. 32 general purpose working registers
4. EEPROM 4K Bytes
5. Operating frequency 20MHz.

B. Colour Sensor

We are going to use colour sensor for detecting colour of the surface and its output is feed to microcontroller. It can identify colour shades giving RGB value for the detected colour. RGB colours provide the respective unique value to the microcontroller. When the single red or green or blue colour is detected only the respective value of that colour and the remaining two values of remaining two colours are becomes zero. The value of surrounding surface colour is highest from among three colours that respective led are glow. The detected colour is identified as amount of three primary colour values namely Red, Green & Blue with 8 bit accuracy for each primary colour [9]. Any colour can be separated or combined into three primary colours Red, Green and Blue using the. Microcontroller is going to on the corresponding LED strips (RGB)

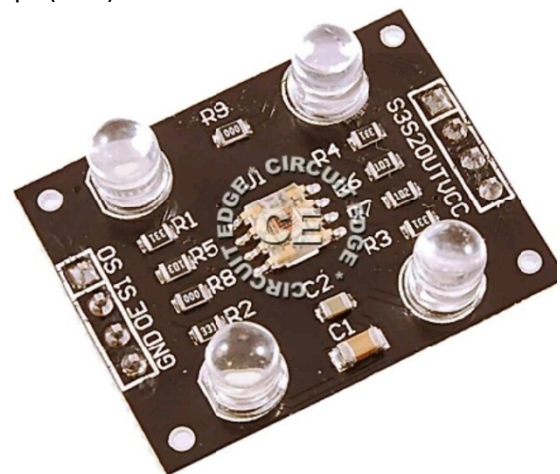


Figure 3: Colour Sensor

C. Camera

Camera will collect information of enemies and send it wirelessly to the user. A camera is a device that record images, either as still photograph or moving images known as videos. This is used in spy robot to take the video of surveillance of the area and transmitted using a carrier signal [7]. They had used CCD camera which has disadvantage that it can't send images at night to overcome this problem we have to use a night vision camera. We are using a mountable VJA camera of JMK Company.



Figure 4: Wireless Camera

D. RF Transmitter

RF modules have the two phases RF Transmitter and RF Receiver. The work system was come out with the operation of receiver and transmitter circuit. The RF technology is used for long distance communication. The range for RF technology is about 200 meters. RF transmitting also provides the facilities of switches for the movements of robot. RF receiving section is mounted at the motor side of the robot. RF transmitting part is connected to the LPT port of the CPU. Power supply to the RF transmitter section is provided through the CPU. Power supply to the RF receiver section is provided by the 6v battery.

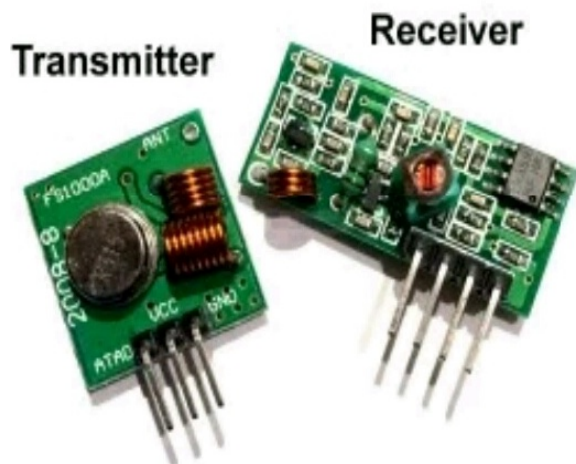


Figure 5: RF Transmitter and receiver module

E. Motors

For the proper movement of the system four dc motors of 300 rpm, 6V helical gear motors has been used in the circuit and a four castor wheels are attached in the both front and back end of robot vehicle. Caster wheel enable the movement of the robot is easy in every direction. Motors of each end

are controlled with help of driving circuit so can move simultaneously. For controlling the complete system a microcontroller is used and this complete system need a power supply of 6V, which provided form a battery.



Figure 6: Motor

F. Power Supply

Here to meet all requirements we are using a 6V battery. Specifications of battery are

1. output voltage :- 6V
2. current rating :- 4.5Ah
3. max charging , current :- 1.35A

2. WORKING

Basically a system acts as spy to catch and view the enemy's activity. Microcontroller reading input signals from the colour sensor which is in the form of integer value. The highest value of the respective colour same as the surrounding colour. So the robot will capture the surrounding colour .The sensor switches each primary colour RGB, one by one and checks what intensity of colour is reflected by the surface of detection This reflected intensity is converted to 8 bit value. Camera which is mounted on vehicle catches images and sends it to remote user by using RF transmitter which operates at specific frequency. Movement of the robot are controlled by user by allocating specific keys of the computer which has the different hex values for the different keys for the movement of robot like left rotate or right rotate, and forward or backward. Driving circuitry drives the motors based on the input from microcontroller. Driving circuitry consist of transistors and relays. Transistors used are BC547 and relays are 5 pin relays. To accomplish camouflaging

feature LEDs or strips of LEDs are used. Which are connected to the microcontroller via transistors. It will glow the respective LEDs as signal from microcontroller.

3. RESULT

It will collect information with the help of colourless camera. This robot acquires surrounding colour it means red or green or blue colour LED's are glowing.

4. CONCLUSION

This paper presents the design, development and construction of a spy robot, which has camouflaging feature and send information wirelessly. Spy robot is designed using AVR micro controller. We can also use these in jails, Search and rescue operation Wireless security surveillance in hot spots. As per need features can be changed. For example extra features such as gas detector, obstacle detector can also be added. The system is working with open loop. A better resolution can be achieved if closed loop control is incorporated. The system responses are a little bit slower than expected. RF transmitter module has the limited range of operating so for further enhancement we can use zigbee module or incorporate it with Wi-Fi i.e. Zigbee + Wi-Fi.

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