

Camouflage Robot

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Abstract – Camouflage robot is solution for reducing human losses in military operations or terrorist attacks. They play major role in saving human lives. The proposed system consists of a vehicle mounted with two cameras, one camera which captures the images and detects color accordingly as part of camouflaging feature and other camera for surveillance purpose. As a new trend we have used wireless transceiver ZigBee to increase the range of communication between transmitter and receiver. The robot can quietly enter into enemy area and send information via camera. On the other hand one more feature is added to the robot that is camouflaging. Camera will capture the image and color of the surrounding will be detected at the backend and according to that robot will change its color. Because of this feature the robot cannot be easily detected by enemies. The movement of the robot is wirelessly controlled via PC. Since human life is always valuable, this robot can be the substitution of soldiers in war areas. The Camouflage robot can also be used in star hotels, shopping malls, jewelry showrooms, etc. where there can be threat from intruders or terrorists.

Keywords - Camouflage, Surveillance, ZigBee.

INTRODUCTION

With the development of technology, scientists and researchers has now come up with the invention of robots. These robots help to make human life much easier especially in dangerous area. One of the concern areas of today is the military. Military robots are used to take the risky job which is difficult to be handled manually by human. These robots take the job as the assistant of a soldier. Today, many military organizations take the help of military robots to perform risky jobs. These robots used in military are usually employed with

the integrated system, including video screens, sensors, gripper and cameras. The motive behind Camouflage Robot is to reduce human losses in military operations or terrorist attacks. Camouflage Robot acts as a virtual spy and can be sent into the strategic locations of military importance for observation and warfare purpose. Since it's very hard to detect it by a naked human eye, the Camouflage robot can be also used to test the various security systems developed in the market and act as a measure to evaluate its efficiency. The main objective of the Camouflage Robot is to enhance the machinery of the defense system. Secondary objective is to work in the field of Zoology for wildlife photography. The idea of the Camouflage Robot is based on the chameleon's camouflage techniques. The aim of the project is to design, manufacture and operate a robot via PC, used as remote control device, a small mobile robot which can duplicate the colors where it moves on, hence being camouflaged to the outside world. To achieve these goals, we used a LED matrix (RGB) which can diffuse uniform colors. Initially, the robot can camouflage itself in red, green and blue color. The main application of our robot is to camouflage and pilot from afar an object, no matter what its size is. So, in the Defense sector, such a system would allow large sized vehicles (e.g. armored vehicles) to be much more camouflaged: indeed, the camouflage in the army has become necessary to army missions, to move into an enemy land without being seen and protect soldiers since they can act from afar. Besides, in the Intelligence sector, we could use spying robots like drones. As a last example, in the area of wildlife Photography, hidden picture or video systems would allow totally new shots with the principle of our robot. Finally, one of the main advantages of the Chameleon Robot is that it is not only resistant to mild weather but also will not harm the environment.

LITERATURE SURVEY

Complete autonomous robot which can perform varieties of tasks is still under development. Therefore researches all over the world work towards the design and development of such robot, so as to simplify our work in various fields. A Robot based on RF technology used for spying in war field is developed. The new innovation added here that is color sensor. The color sensor senses the color according to surrounding environment and changes its color. So the robot easily changes its color and because of this feature the enemy can't easily predict the robot. Principle of Color Sensor: The color sensor has three primary colors i.e. RED, GREEN and BLUE. It senses the surface color and according to this changes its color that produces shade with combination of three primary colors RGB. The color sensor checks the reflection of color and produces that much intensity. Then reflected intensity is converted into 8-bit value. So by using color sensor surface color observed and change its color with help of combination of three primary color i.e. RED, GREEN and BLUE etc. so robot having new added property of changing color [4]. The author Dr. Shantanu K. Dixit [2] implemented a paper that controlled robot remotely by using internet. A real time video can be captured by using camera built on the robot. So this type of robot is mainly applicable in surveillance. Camera movement can be easily directed in vertical and horizontal direction. The robot can be easily moved anywhere by DC motor and camera can be directed at vertical and horizontal direction via stepper motor. PIR sensor is used to detect living bodies. The video is processed by RASBERRY PI. The shoot processed video is send by internet so we can control robot wherever we are. But the condition is that we should have internet access. If internet access is active then there is no any limitation on range of communication to the user pc with the help of internet. Dr. S. Bhargavi [1] research of an intelligent combat robot is designed specifically for war field. A protection is provided from enemies. Whenever enemies come in front of robot he will shoot by using laser gun. This remote operation is provided by user sitting at one place. A wireless camera is mounted on the robot. A real time video is transferred to the user pc and whenever enemies are coming in front of robot then user can

shoot enemy by laser gun which is operated remotely.

A robot operated by mobile [3]: It has a camera that spy's every movement of enemy and is controlled by mobile. So it is mainly applicable in military field and also preferable for police. The DTMF (Dual Tone Multi Frequency) technology is used. Because of this technology robot is control by using mobile and range of communication is unlimited. But the mobile network should be efficient. In this, the mobile is attached with the robot and another mobile having user trainer. The robot is completely handled or controlled by mobile. For processing, initially mobile user makes a call to another mobile which is attached with robot. Due to calling if a key is pressed a tone corresponding to the key pressed is heard at the other end known as DUAL TONE MULTIPLE FREQUENCY (DTMF). Then the robot will receive tone with the help of phone stacked in the robot. At the other end the tone is processed by microcontroller by using DTMF decoder. This sends command to the motor driver IC which drives robot forward, reverse, left and right.

NEED OF PROPOSED SYSTEM

Nowadays, many expenses are made in the field of defense in adopting primitive security measures to protect the human life. Some military organizations take the help of robot in the risk prone operations which are very risky to the humans or cannot be done efficiently by humans. Therefore there was need for a human operated machine to replace humans in some fields. Likewise, in the area of wild life photography, hidden picture or video system would be also captured with the help of the Camouflage robot.

PROPOSED SYSTEM

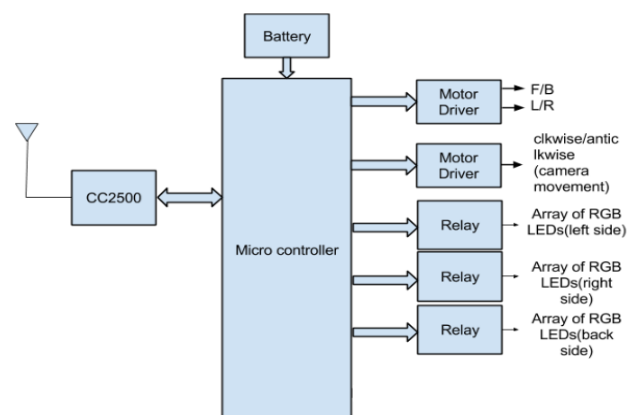


Figure 1: Robot side Block Diagram

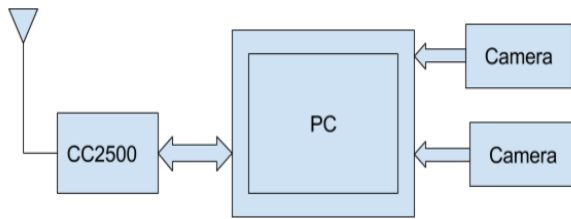


Figure 2: PC side Block Diagram

Camera:

Robot is in the form of a vehicle mounted with a webcam which acquires color by capturing the images. Camera is used to detect the surrounding color presence and will give input to the MATLAB, image processing. Microcontroller code is used to ON particular led depending on camera input sensed and the image processed by the MATLAB. Camera is also used to monitor surrounding activities that will display on PC side. Camera movements are controlled using PC GUI.

LED's:

In our project we are using RGB LEDs for output. Depending on camera input sensed and the image processed by the MATLAB it will check the color and send signal to switch on the particular LED relays.

ZigBee Module (CC2500):

Motion of a robot (i.e. Forward/Backward/Left/Right) is controlled via PC using CC2500. CC2500 acts as half duplex communication module. We are using two CC2500. One is attached to the PC side and another attached to the Robot. PC side CC2500 acts as transmitter and Microcontroller side CC2500 acts as a receiver. MATLAB software is used to create PC side GUI coding. We will give input with the help of PC side GUI through PC side CC2500. Microcontroller side CC2500 will receive the signal from the PC side CC2500 and according to that it will ON particular motor for a particular time.

Motor Driver:

Since DC motors require more current than the microcontroller pin can typically generate, we need some type of switch which can accept a small current, amplify it and generate a larger current, which further drives the motor. This entire process is done by Motor Drive. In our project, two

motor drives will be used. One for movement of robot i.e. left, right, front, back and other for movement of camera i.e. clockwise or anticlockwise.

Relay:

It is an electrical switch that uses an electromagnet to move the switch from OFF to ON position instead of a person moving the switch. Relatively small amount of power is required to turn ON relay.

CONCLUSION

The proposed system provides a helping hand to our security forces in detection of intruders. The robot can also be used in high altitude areas where human cannot survive. Moreover, the camouflaging feature makes it difficult to detect the robot by naked human eye. There is scope to improve the system by configuring it with multicolor camouflaging.

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