WIRELESS IMAGE TRANSMISSION SPY ROBOT FOR SURVEILLANCE SYSTEM

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ABSTRACT

The advent of new high-speed technology and the growing computer capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drives and advanced control algorithms. The objective of this paper is to provide an efficient and simple method for controlling the robot and detection of the mines. The main advantage of this technique is mines is identified with the exact location without sending any person and defuse the mines without losing of the human life.

Keywords: Automatic Robot, Image transmission robot, Mines Detector, Spy Robot

I INTRODUCTION

The advent of new high-speed technology and the growing computer capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drives and advanced control algorithms.The presented robot control system can be used for different sophisticated robot applications.

The system can be viewed as two different modules- transmitter and receiver sections. The transmitter module consists of PC or TV, 433 MHz RF transmitter with HT12E 4 bit encoder and camera receiver to receive the data from camera which is mounted on robot. We have to choose the direction of the remote by pressing respective switches which are connected to HT12E.The data presented on HT12 is being transmitted to RF receiver through RF transmitter. The receiver module receives the transmitted data and passes the data to the microcontroller. Thus, the microcontroller changes the direction of the robot according to the specified command. Since the microcontroller cannot drive the motors (used for robot) directly, L293D is used as a driver to provide the sufficient current required for the motors. The motors receive the input from the microcontroller and the required current from the power supply through L293D.

The robot will be equipped with camera and bomb detector. As it moves in the specified direction, if it encounters any person entering into the secured premises or if any bomb is found, the bomb detector immediately detects this and the microcontroller notices this and gives alert through buzzer. The output of the camera is given to the television where the entire view of the predefined location can be viewed all the time.

II METHODOLOGY FOR CONTROLLING ROBOT

The control system is described in two parts- Transmitter section and Receiver Section.

2.1 For Wireless Data Transmitter

Radio frequency (**RF**) is a frequency or rate of oscillation within the range of about 3 Hz to 300 GHz. This range corresponds to frequency of alternating current electrical signals used to produce and detect radio waves. Since most of this range is beyond the vibration rate that most mechanical systems can respond to, RF usually refers to oscillations in electrical circuits or electromagnetic radiation.

Radio frequency (abbreviated RF) is a term that refers to alternating current (AC) having characteristics such that, if the current is input to an antenna, an electromagnetic (EM) field is generated suitable for wireless broadcasting and/or communications. These frequencies cover a significant portion of the electromagnetic radiation spectrum, extending from nine kilohertz (9 kHz),the lowest allocated wireless communications frequency (it's within the range of human hearing), to thousands of gigahertz(GHz). To transmitting the data in radio freequency, a RF encoder is needed. We use a RF encoder IC which name is HT12E, is interfaced to the RF transmitter. The schematic block diagram is shown in the figure

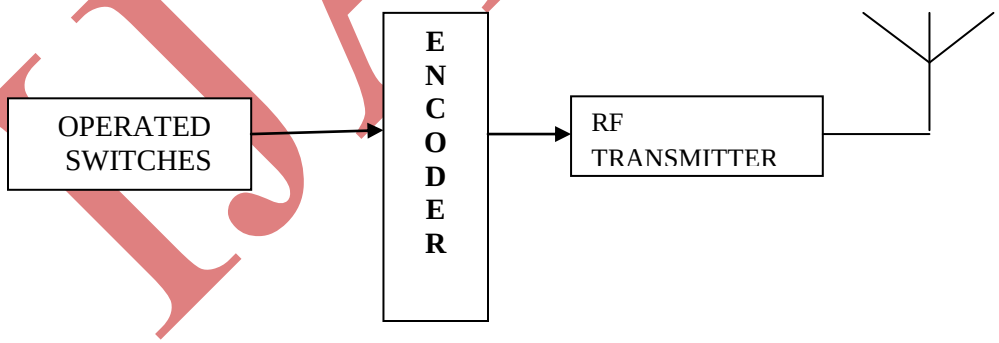
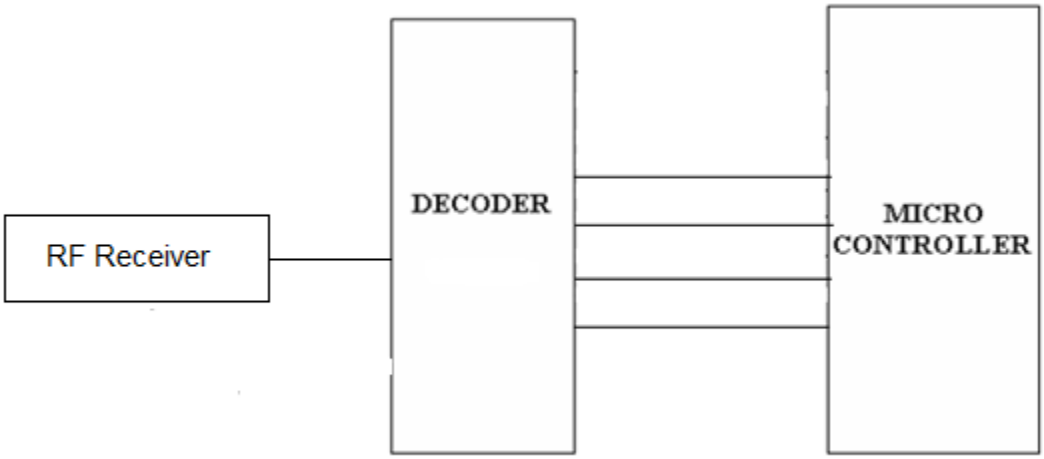


Fig: 1

The operated switch is a push button which is control the robot movements direction according to our desired direction. The data out pin is connected to the data terminal of the RF transmitter, which transmit the encoded data.

2.2 For Wireless Data Transmitter

The data is received by the RF receiver from the antenna pin and this data is available on the data pins. Two Data pins are provided in the receiver module. Thus, this data can be used for further applications. The data transmitted into the air is received by the receiver. The received data is taken from the data line of the receiver and is fed to the decoder .The output of decoder is given to microcontroller and then data is processed according to the application. For interfacing the receiver with the microcontroller a decoder IC is used which name is HT12D. It is a 4 bit RF decoder IC which is connected to the microcontroller. The schematic block diagram of of RF receiver to the decoder IC is given below-



The received data at the transmitter receiver is decoded by the decoder IC (HT12D). The decoded data is used by the microcontroller for the further function.

III IMAGE TRANSMISSION SYSTEM

The image is transferred by the wireless camera which is mounted on the robot. Camera capture the image from robot location and transfer it in to the air. The image transferred in the air is received by the TV tuner or a wireless camera receiver and image is shown by the TV or on the Laptop or Monitor screen.

IV PRINCIPLE OF METAL DETECTION

The operation of metal detectors is based upon the principles of electromagnetic induction. Metal detectors contain one or more inductor coils that are used to interact with metallic elements on the ground .The single-coil detector illustrated below is a simplified version of one used in a real metal detector.

A pulsing current is applied to the coil, which then induces a magnetic field shown in blue. When the magnetic field of the coil moves across metal, such as the coin in this illustration, the field induces electric currents (called eddy

currents) in the coin. The eddy currents induce their own magnetic field, shown in red, which generates an opposite current in the coil, which induces a signal indicating the presence of metal. A metal detector is a portable electronic device which penetrates the ground magnetically in order to find traces of metal. This metal could either be discarded pieces of aluminum or valuable coins, jewelry and other buried treasures.

V ALGORITHM

Step 1: START

Step 2: Get i/p from the user

Step 3: Data is modulated & transmitted

Step 4: Demodulates the data

Step 5: Input to microcontroller

Step 6: If mine is detected then it is stopped &buzzer is ON

If not Moves in Commanded direction

Step 7: Forward if data=254 then go to step 13 else step 8

Step 8: Reverse if data=253 then go to step 14 else step 9

Step 9: Left if data=251 then go to step 15 else step 10

Step 10: Right if data=247 then go to step 16 else step 11

Step 11: Stop if data=255 then go to step 17 else step 12

Step 12: Follow previous conditions

Step 13: lef_P=0, lef_n=1, rht_P=0, rht_n=1;

Step 14: lef_P=1, lef_n=0, rht_P=1, rht_n=0;

Step 15: lef_P=1, lef_n=1, rht_P=0, rht_n=1;

Step 16: lef_P=0, lef_n=1, rht_P=1, rht_n=1;

Step 17: lef_P=1, lef_n=1, rht_P=1, rht_n=1;

Step 18: Capture the image from the Camera

Step 19: Send to TV using AV RX

Step 20: Display the images on TV

Step 21: END

VI ADVANTAGE AND LIMITATIONS

It is useful in airport security, building security or event security. It is useful in detects the metallic composition of soil or rock formations. Some advantage is pointed below

- No line of sight is needed.
- Not blocked by common materials: It can penetrate most solids and pass through walls.
- Longer range.
- It is not sensitive to the light;.
- It is not much sensitive to the environmental changes and weather conditions.

There are some disadvantage of this technology, which is describe below

- Interference: communication devices using similar frequencies - wireless phones, scanners, wrist radios and personal locators can interfere with transmission.
- Lack of security: easier to "eavesdrop" on transmissions since signals are spread out in space rather than confined to a wire.
- Higher cost than infrared.
- Federal Communications Commission (FCC) licenses required for some products.
- Lower speed: data rate transmission is lower than wired and infrared transmission.

VII CONCLUSION

The implementation of RF based spy robot is done successfully. The communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements. Software tools like Keil Uvision Simulator, Proload to dump the source code into the microcontroller, Orcad Lite for the schematic diagram have been used to develop the software code before realizing the hardware.

Continuously reading the commands from the transmitter and change the direction of the Robot accordingly and also monitor the output wireless. The mechanism is controlled by the microcontroller. Circuit is implemented in Orcad and implemented on the microcontroller board. The performance has been verified both in software simulator and hardware design. The total circuit is completely verified functionally and is following the application software.

It can be concluded that the design implemented in the present work provide portability, flexibility and the data transmission is also done with low power consumption.

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