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ADVANCED WIRELESS ROBOT WITH LIVE VIDEO TRANSMISSION

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ABSTRACT:

In our technical world invention of new technology is increase day by day. The robotics is top most important technology which is used to live video purpose of detecting the occurrence relevant obstacles. As we know that Robot perform surveillance task quite well with integrating action by using surveillance system. This project is to design and build manually controlled live video transmission robot with the help of low power RF wireless sensor network to track out the intruders. This robot is capable of performing multiple functions such as live video transmission with all around directions and also in detecting the obstacles there by raising a buzzer.

1. INTRODUCTION

Presently the surveillance of International border areas is very daunting task. The security forces are patrolling the border in hostile conditions. They are getting help from surveillance cameras already mounted but they cover very limited areas. The cameras already mounted at a fixed position, is not of much use as we cannot change the camera view in real time. Also it is not possible to mount the cameras in the forest areas as the trees obstruct the view of the camera. This paper explains how to design and implement wireless robot which will enable us to control the robot with the help of internet and it will be to able live video Transmission. It will help in rescue operation and user can access the video transmitted from the remote area such as the sensitive areas or areas which are beyond our reach. The total system contains mobile robot, controlled with the RFID, which has camera mounted on it. User will be able to control the robot through RF, thus, providing user with wireless control of robot. The camera mounted on the robot is able to move horizontally around its vertical axis and vertically along its vertical axis. Camera movement is controlled through Application at the user interface, thus, providing user with enhanced view of the surroundings. Robots are being used in variety of industrial applications for various activities like pick and place, painting, assembling of subsystems and in hazardous places for material handling etc. Robots are becoming more and more intelligent as technology advances in the areas of CPU speed, sensors, memories etc. And there is ever demanding applications even in defence. With the rapid growth of the Internet, more and more intelligent devices or systems have been embedded into it for service, security and entertainment, including distributed computer systems, surveillance cameras, telescopes, manipulators and mobile robots. Although the notion of Internet robotics or web-based robotics is relatively new and still in its infancy, it has captured the huge interest of many researchers worldwide. Except for operating in hazardous environments that are traditional telerobotic areas, Internet robotics has opened up a completely new range of real-world applications, namely tele-manufacturing, tele-training, tele-surgery, museum guide, traffic control, space exploration, disaster rescue, house cleaning, and health care. Automated video surveillance is an important research area in the commercial sector as well.

Technology has reached a stage where mounting cameras to capture video imagery is cheap, but finding available human resources to sit and watch that imagery is expensive. Surveillance cameras are already prevalent in commercial establishments, with camera output being recorded to tapes that are either rewritten periodically or stored in video archives.

2. LITERATURE REVIEW

Earlier the robots were controlled through wired networks but now to make robot more users friendly, they are framed to make user commanded work. There are no distance limitation issues in this project. The robot is capable to work everywhere where there is a wireless connection. This project can be used for security purposes where we need to get information about some suspicious area/people. We can do this by sitting at a far secure place and safely devise a plan to tackle their activities It acquires image from cameras through a web browser. The robot contains a PC with a web server. It receives real-time uploaded image from cameras. As the internet of things is the concept, newly introduced in the field of electronics. The concept is about handling the things with the use of internet and the best model for these applications. When the surveillance is considered, serve his purpose as it is good connectivity simply plugging Wi-Fi dongle into one of its port On the other hand it can also be very helpful in explorers and animal psychologists need to observe closely the life style of various dangerous animals like lions, snakes and small insects so they use such kind of robots because human life is at risk or their presence can disturb animal patterns of livings. Similarly it can be used in laboratories where dangerous chemicals and gases are tested. It can go to places where chemists can't go, check the leakage and also can perform other tasks.

In this section, we summarize the previous work in the literature for enhancing video streaming over wireless networks. Detti et al. [1] evaluated and demonstrated a technique for streaming H.264 SVC video over a DDS middleware. The structure of the DDS data unit designed by them was able to carry H.264 SVC [4] video-units. Also they designed a receiver-driven rate-control mechanism based on the DDS data unit, which exploited specific DDS functionality. Finally, they implemented and showed the effectiveness of their mechanism in an 802.11 wireless scenario, comparing their proposal with other solutions. Clavijo et al. proposed that a CORBA middleware implementation can be used to offer real-time video streaming [5]. Furthermore, in [6], Kaff et al. introduced a CORBA based platform to respond to changing resource requirements in video applications using video streaming service.

CORBA is a very complete technology that introduces a big number of interfaces for almost any type of required middleware functionality; however, it is a complex architecture that introduces implementation overheads, particularly when compared with other lighter weight technologies such as ICE (Internet Communications Engine) [7], DDS (Data Distribution Service for real-time systems) [2], or some specific real-time Java based solutions [8].Therefore, existing approaches can be improved to facilitate real-time video transmission with guaranteed QoS. In addition, using new standard middleware introduces flexibility for video transmission in two ways. First, compared to direct implementation over the network level, the utilization of a middleware is already more flexible. Second, utilizing middleware solutions provides QoS management to appropriately initiate real-time and QoS-aware support for video transmission.

Vora and Brown [9] studied DDS deployment for the newer 802.11n standard. Their performance metrics were throughput, delay, and jitter when video streaming is brought in a network carrying merely data traffic. They also studied the approximate number of users streaming high rate videos that can be supported over various network configurations. In [10], the authors analyzed and evaluated the performance of H.264-based video streaming over multihop wireless local area networks (WLANs). Guidance was provided on how to achieve the optimal balance for a given scenario, which is important when deploying end-to-end video streaming services with quality of service guarantees. For WLANs, we have conducted a previous study to examine DDS over WLANs [11], but the video that we used was very low motion video and the codec

bit-rate was 128 kbps which is much less than what is used in this paper. That adjustment was done to meet the limited WLAN bandwidth; the results showed that consumed bandwidth was nearly twice less than that in the proposed work.

3. DESIGN OF HARDWARE

This chapter briefly explains about the Hardware implementation of authentication of Advanced Wireless Robot with Live Transmission. It discusses the circuit diagram of each module in detail.

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Arduino board has the following new features:

- 1.0 pin out: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin, that is reserved for future purposes.
- Stronger RESET circuit.
- Atmega 16U2 replace the 8U2.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

Fig1: ARDUINO UNO

POWER SUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".

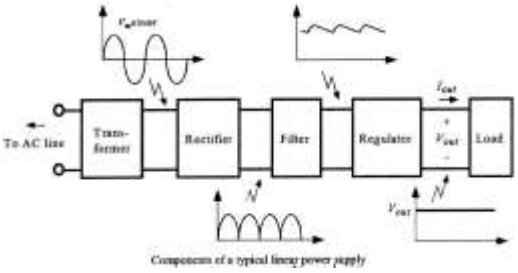


Fig:2. Block Diagram of Power Supply

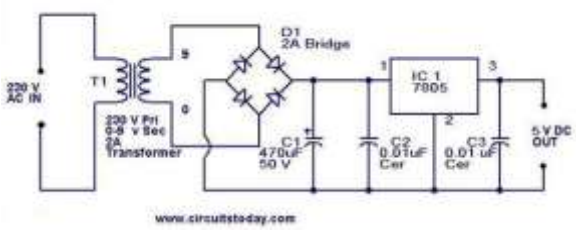


Fig3. Schematic Diagram of Power Supply

4.4. IR SENSOR:

Infrared is a energy radiation with a frequency below our eyes sensitivity, so we cannot see it Even that we cannot "see" sound frequencies, we know that it exist, we can listen them.
Even that we cannot see or hear infrared, we can feel it at our skin temperature sensors. When you approach your hand to fire or warm element, you will "feel" the heat, but you can't see it. You can see the fire because it emits other types of radiation, visible to your eyes, but it also emits lots of infrared that you can only feel in your skin.

Infra-Red is interesting, because it is easily generated and doesn't suffer electromagnetic interference, so it is nicely used to communication and control, but it is not perfect, some other light emissions could contains infrared as well, and that can interfere in this communication. The sun is an example, since it emits a wide spectrum or radiation.

IR GENERATION

To generate a 36kHz pulsating infrared is quite easy, more difficult is to receive and identify this frequency. This is why some companies produce infrared receives, that contains the filters, decoding circuits and the output shaper, that delivers a square wave, meaning the existence or not of the 36kHz incoming pulsating infrared.

It means that those 3 dollars small units, have an output pin that goes high (+5V) when there is a pulsating 36kHz infrared in front of it, and zero volts when there is not this radiation.

RC-5

Various remote control systems are used in electronic equipment today. The RC5 control protocol is one of the most popular and is widely used to control numerous home appliances, entertainment systems and some industrial applications including utility consumption remote meter reading, contact-less apparatus control, telemetry data transmission, and car security systems. Philips originally invented this protocol and virtually all Philips' remotes use this protocol. Following is a description of the RC5. When the user pushes a button on the hand-held remote, the device is activated and sends modulated infrared light to transmit the command. The remote separates command data into packets. Each data packet consists of a 14-bit data word, which is repeated if the user continues to push the remote button.

LCD:

A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc.

In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

Fig: 4. LCD

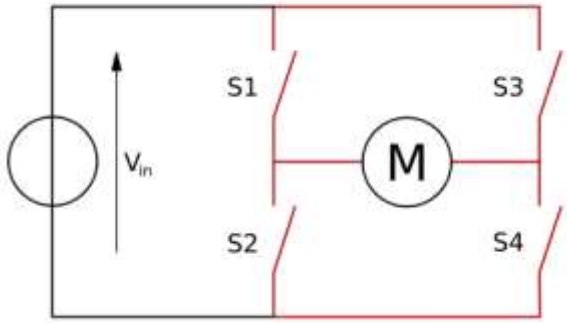
DC MOTOR:

The speed of a DC motor is directly proportional to the supply voltage, so if we reduce the supply voltage from 12 Volts to 6 Volts, the motor will run at half the speed. How can this be achieved when the battery is fixed at 12 Volts? The speed controller works by varying the average voltage sent to the motor. It could do this by simply adjusting the voltage sent to the motor, but this is quite inefficient to do. A better way is to switch the motor's supply on and off very quickly. If the switching is fast enough, the motor doesn't notice it, it only notices the average effect.

When you watch a film in the cinema, or the television, what you are actually seeing is a series of fixed pictures, which change rapidly enough that your eyes just see the average effect - movement. Your brain fills in the gaps to give an average effect.

Now imagine a light bulb with a switch. When you close the switch, the bulb goes on

H-BRIDGE:



An H-bridge is an electronic circuit which enables DC electric motors to be run forwards or backwards. These circuits are often used in robotics. H-bridges are available as integrated circuits, or can be built from discrete components.

The two basic states of a H-bridge.The term "H-bridge" is derived from the typical graphical representation of such a circuit. An H-bridge is built with four switches (solid-state or mechanical). When the switches S1 and S4 (according to the first figure) are closed (and S2 and S3 are open) a positive voltage will be applied across the motor. By opening S1 and S4 switches and closing S2 and S3 switches, this voltage is reversed, allowing reverse operation of the motor.

RF CONTROLLER

Radio Frequency (RF) and wireless have been around for over a century with Alexander Popov and Sir Oliver Lodge laying the groundwork for Guglielmo Marconi's wireless radio developments in the early 20th century. In December 1901, Marconi performed his most prominent experiment, where he successfully transmitted Morse code from Cornwall, England, to St John's, Canada.

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.

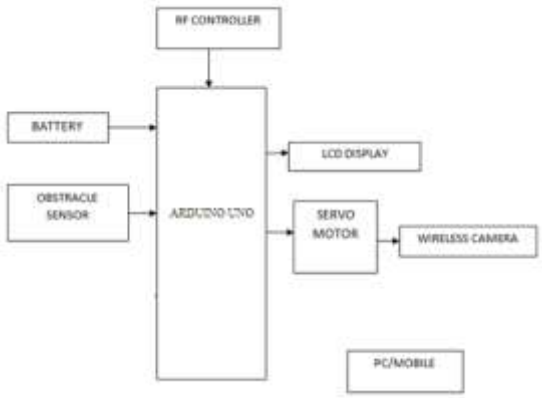
PROPERTIES OF RF:

Electrical currents that oscillate at RF have special properties not shared by direct current signals. One such property is the ease with which it can ionize air to create a conductive path through air. This property is exploited by 'high frequency' units used in electric arc welding. Another special property is an electromagnetic force that drives the RF current to the surface of conductors, known as the skin effect. Another property is the ability to appear to flow through paths that contain insulating material, like the dielectric insulator of a capacitor. The degree of effect of these properties depends on the frequency of the signals.

4. PROJECT DESCRIPTION

This chapter deals with working and circuits of Advanced Wireless Robot with Live Video Transmission. It can be simply understood by its block diagram &circuit diagram.

BLOCK DIAGRAM:



SOFTWARE REQUIREMENTS:

- Arduino IDE

HARDWARE REQUIREMENTS:

- Power supply
- Arduino UNO

- IR sensor
- LCD
- V380 wireless camera
- H-Bridge
- DC Motors
- Switches
- RF Controller

WORKING:

In our technical world invention of new technology is increase day by day. The robotics is top most important technology which is used to live video purpose of detecting the occurrence relevant obstacles. As we know that Robot perform surveillance task quite well with integrating action by using surveillance system. This project is to design and build manually controlled live video transmission robot with the help of low power RF wireless sensor network to track out the intruders. This robot is capable of performing multiple functions such as live video transmission with all around directions and also in detecting the obstacles there by raising a buzzer.

5. CONCLUSION

It is concluded that smart surveillance system using Arduino video and transmitting to a smart phone .Also this paper contains detailed information for controlling a robotic vehicle guided via RF Controller. All this techniques can be used in any conditions and areas where it is difficult for the security forces to reach. It can monitor the areas and secures a place from the adversaries which can be done by Wireless robot all the times with great accuracy and high precision. HD surveillance camera is set up in the Robot which we want to monitor the video containing which will be stored and live video can be accessed from anywhere just by entering static IP assigned to the system in the web browser.

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