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SMART SPY ROBOT

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ABSTRACT
This research paper is based on Spying Robot which is made by using different technologies and sources. This paper is basically based on a project which is made by us. The main purpose of this paper is to describe how this war spy robot is made, what are the sources or technologies used to make this robot and how this robot is helpful in so many ways. Basically the project is designed to develop a robotic vehicle [1] named Smart Spy Robot using RF technology for remote operation attached with webcam application for monitoring purpose. The robot along with wireless camera can wirelessly transmit real-time video and will give confidential information regarding opposite parties. An 8051 series [2] of microcontrollers used for the desired operation. The commands are sent to the receiver, at the transmitter side with pushbuttons, to control the movement of the Robot to move forward, backward and left or right.
Its application can be-
1.At the time of war where it can be used to collect information from the enemy terrain and monitor that information at a far secure area, and safely devise a plan for the counter attack.
2.Tracking locations of terrorist organizations and then plan attack at suitable time[2-5].
3.Making a surveillance of any disaster affected area where human beings can't go.

Keywords
Robot, Spy robot, RF Module, Wireless camera, Technologies used Different sources, Bluetooth HC-05 module.

1. INTRODUCTION
Now-a-days tracing and attacking enemies at different areas are very much difficult for the soldiers. There is always a chance for loss of lives of the soldiers during war and emergency situations. We are implemented a solution for the problem of replacing a soldier with a Robot Soldier completely controlled [6-8] with a wireless network. The paper mainly concentrates on human gestures to control the hardware device. The device i.e. the android mobile phone will recognize the gesture and pass on the information to the microcontroller which will make the device (robot) move accordingly

Moreover the camera will capture video all around. A number of techniques are available for robot control however they have difficult user interface and limited to certain environments [9]. However what is really lacking is a convincing way to interaction friendly to all. The robot motions left, right, forward, backward. Interfacing is being done between device and Bluetooth. Bluetooth device HC-05 module receives the command from smart phone via 8051 Microcontroller.

2. R F TECHNOLOGY
A radio frequency (RF) signal refers to a wireless electromagnetic signal used as a form of communication, if one is discussing wireless electronics. Radio waves are a form of electromagnetic radiation with identified radio frequencies that range from 3Hz to 300GHz. Frequency refers to the rate of oscillation (of the radio waves.) RF propagation occurs at the speed of light and does not need a medium like air in order to travel. RF waves occur naturally from sun flares, lightning, and from stars in space that radiate RF waves as they age. Humankind communicates with artificially created radio waves that oscillate at various chosen frequencies. RF communication is used in many industries including television broadcasting, radar systems, computer and mobile platform networks, remote control, remote metering/monitoring, and many more. While individual radio components such as mixers, filters, and power amplifiers can be classified according to operating frequency range, they cannot be strictly categorized by wireless standard (e.g.Wi -Fi , Bluetooth, etc.) because these devices only provide physical layer (PHY) support .In contrast, RF modules, transceivers, and So Cs often include data link layer support for one or more wireless communication protocols.

3. Radio Communication
To receive radio signals an antenna must be used. However, since the antenna will pick up thousands of radio signals at a time, a radio tuner is necessary to tune

into a particular frequency (or frequency range). This is typically done via a resonator –in its simplest form, a circuit with a capacitor and an inductor form a tuned circuit. The resonator amplifies oscillations within a particular frequency band, while reducing oscillations at other frequencies outside the band. Another method to isolate a particular radio frequency is by oversampling (which gets a wide range of frequencies) and picking out the frequencies of interest, as done in software defined radio. The distance over which radio communications is useful depends significantly on things other than wavelength, such as transmitter power, receiver quality, type, size, and height of antenna, mode of transmission, noise, and interfering signals. Ground waves, troposphere scatter and sky waves can all achieve greater ranges than line-of-sight propagation. The study of radio propagation allows estimates of useful range to be made.

4. RF SECTION BLOCK DIAGRAM

Let us take a RF transmitter wiggling an electron in one location. This wiggling will electron cause a ripple effect, somewhat same to dropping a pebble in a pond. The effect is an electromagnetic (EM) wave which travels out from the initial location those results in electrons to wiggle in remote locations. An RF receiver can detect the remote electron wiggling. The RF communication system then further utilizes this phenomenon by wiggling electrons in a specific pattern so as to represent information. The receiver can make the same information available at a remote location by establishing a communication with no wires. In most of the wireless systems a designer has two overriding constraints: it must operate over a certain distance (range) and transfer a certain amount of information within a time frame (data rate).

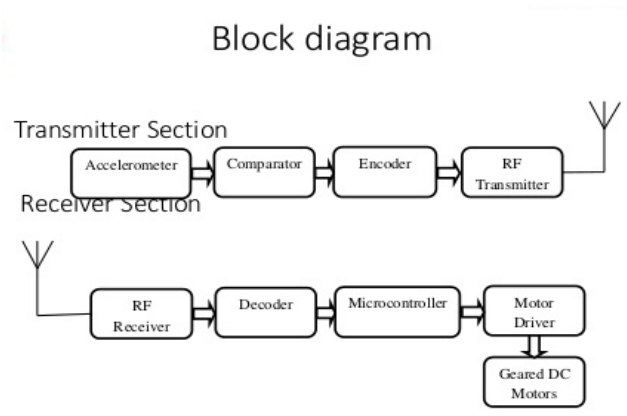

Fig.1. Block Diagram of Transmitter and Receiver Section

4. HARDWARE INSTALLATION

Wireless camera is used to send real time video and audio signals from the war field, which could be seen on a remote monitor at the base station, and action can be taken accordingly. Heart of this robot is Atmel's AT89S52. Microcontroller is the master controller that decodes all the commands received from the transmitter unit and give commands to slave microcontroller. It also acts as Slave microcontroller at the receiver unit which is responsible for executing all the commands received from the master and also generates PWM pulses for the speed control of the robot. Based on the input codes given by the user master will give command to slave microcontroller and robot will behave as follows.

- moves back and forth
- turns left or right while moving forward or backward
- Controls speed in both the direction.

Fig.2. Hardware part of project

Transmitting Unit

For modulating the frequency variable frequency oscillator1 is used i.e. to be transmitted and output is obtained a high frequency oscillator 2 for generating a carrier wave. Antenna radiates carrier wave into space.

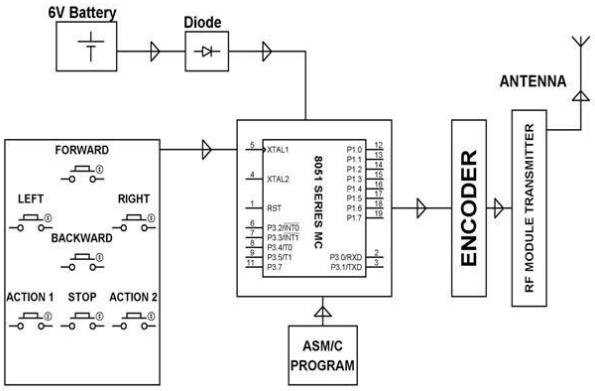

Fig.3. Circuit Diagram of Transmitter Unit

Receiving Unit

The receiving antenna for detecting the waves transmitted by transmitter antenna is connected to a tuned wave detecting circuit. The tuned wave detecting circuit's output is connected to amplifier which in turn has its output connected to the input of the low pass frequency as well as the filter to a high pass frequency filter.

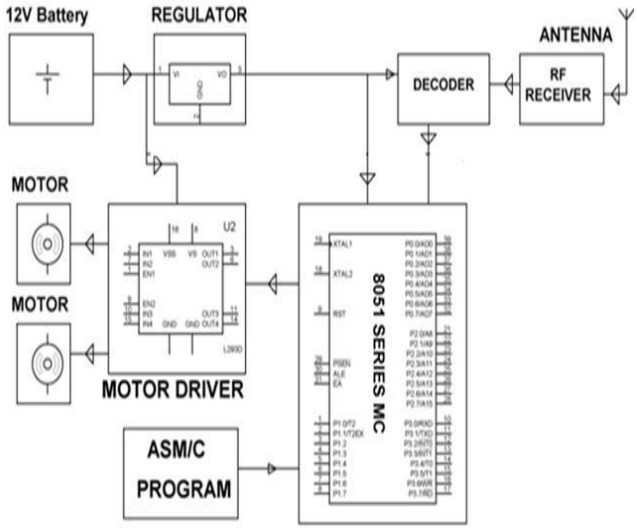

Fig.4. Circuit Diagram of Receiver Unit

5. MICROCONTROLLER CIRCUIT (AT89S52)

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

7. WIRELESS CAMERA

The camera system consists of a transmitter, a receiver and PC with a control program and a user interface. As the receiver existing equipment is used, the transmitter is designed and manufactured during this work so as the software for all components. The created camera system is used for a remote acquisition of images. It can by used, for example, in these applications: • Security systems – scanning when a door is opened, motion in the monitored area or periodical check of an area. • Monitoring - checking the condition of a monitored area or object, for example control of fuel level. • Remote reading - periodical readings of the inaccessible meters (water meters, gas or electricity).

8. INTERFACING

The android code is written in java and the microcontroller code is written in embedded c. This is possible with the help of android NDK. The NDK allows us to program the hardware in our known language. Hence the linking of codes is done via the NDK.

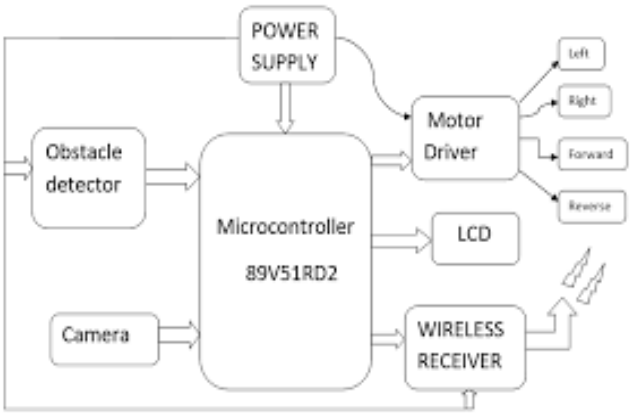

Fig.5. Circuit connection with microcontroller

9. BLUETOOTH HC-05 MODULE

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle.

Hardware Features

- Typical -80dBm sensitivity
- Up to +4dBm RF transmit power
- Low Power 1.8V Operation ,1.8 to 3.6V I/O
- PIO control
- UART interface with programmable baud rate
- With integrated antenna
- With edge connector

Software Features

- Default Baud rate: 38400, Data bits:8, Stop bit:1,Parity:No parity, Data control: has. Supported baud rate: 9600,19200,38400,57600,115200,230400,46080
- Given a rising pulse in PIO0, device will be disconnected.
- Status instruction port PIO1: low-disconnected, high-connected; PIO10 and PIO11 can be connected to red and blue led separately. When master and slave are paired, red and blue led blinks 1time/2s in interval, while disconnected only blue led blinks 2times/s.
- Auto-connect to the last device on power as default.
- Permit pairing device to connect as default.
- Auto-pairing PINCODE:"0000" as default Auto-reconnect in 30 min when disconnected as a result of beyond the range of connection.

10. FUTURE SCOPE

1. It can be built further to work as a HUMANOID

.2. It can have many uses in practical fields from teenager's robots to robots working in industries.

3. It is helpful in wars as a part of spying.

4. The proposed robot can be further improved in terms of decision taking capabilities by employing varied types of sensors and thus could be used in big industries for different applications.

11. CONCLUSION

The primary need for our paper would be accuracy. We have been able to view the things accurately that are currently happening in the surrounding area. Our design has not caused any sort of disturbances. The robot will

move depending on the motor direction based upon the input we give through command by remote section unit. It display the current operation is going on as example left robot, near to object, clear up. With the help of the camera we are able to view the things that are happening in the surrounding area where the robot is hidden. By keeping the circuit easy and simple, most users will be able to use it easily. Thus we should be able to manipulate its path when necessary, to create the robot safely. To all that, a control unit is needed, where control units RF signal is used. By using these signals encoding is done signal is sent through the transmitter. At the receiver end these decoded signal are given as input to drive the motor. Not for long range applications it can be used as a spy robot within short distances.

12. FUTURE ENHANCEMENT

We can connect this system directly to internet by using zigbee with Wi-Fi. By using internet we can control the system via remote location. We do not require any simulation tool by using GUI software. Halogen light can be used for the vision of the robot. We can also control the device by giving it voice command thereby making it a voice recognition system.

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