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SPYING ROBOT WITH WIRELESS CAMERA USING ANDROID APPLICATION

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Abstract- The project is designed to develop a robotic vehicle using android application for remote operation attached with wireless camera for monitoring purpose. The robot along with camera can wirelessly transmit real time video. This kind of robot can be helpful for spying purpose in war fields. It has a feature of detecting landmines, detecting the harmful gases and a gun which is used to shoot the enemies. Microcontroller like Arduino is used for the desired operation.At the transmitting end using android application device, commands are sent to the receiver to control the movement of the robot either to move forward, backward and left or right etc. At the receiving end two motors are interfaced to the microcontroller where they are used for the movement of the vehicle. Remote operation is achieved by any smart- phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. The android application device transmitter acts as a remote control that has the advantage of adequate range, while the receiver end Bluetooth device fed to the microcontroller drives DC motors via motor driver IC for necessary work.

Index Terms-

I. INTRODUCTION

An Embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers.Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microprocessor not only accepts data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus data and thus finally gives the result.
This new Technology popularly known as Spying robot which will create wonders in saving many lives. The main aim of spying robot is to save lives of military people without keeping their lives into risk by going directly into the enemy land. Before, we have war field robot which are only used to see the enemy land but now we are having some added feature on to it. We have a land mine detector which is used to detect the landmines which are placed inside the land. We have gas sensor which is used to detect the type of gas in the war field if the enemy people release the harmful gas. Spy robot is not only used to monitor the enemy land we can also kill the enemy by operating it from base station.

The main objective behind developing this robot is for the surveillance of human activities in the war field or border regions in order to reduce infiltrations from the enemy side. The robot consists of wireless camera which can transmit videos of the war field in order to prevent any damage and loss to human life. Military people have a huge risk on their lives while entering an unknown territory. The robot will serve as an appropriate machine for the defense sector to reduce the loss of human life and will also prevent illegal activities. This robot has a feature of detecting the land mines along with detection of poisonous gas and a laser gun embedded on it. It will help all the military people and armed forces to know the condition of the territory before entering it.
An embedded system is a special purpose computer system designed to perform one or a few dedicated functions, sometimes with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use.
Since the embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale.
An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, and toys (as well as the more obvious cellular phone and PDA) are among the myriad possible hosts of an embedded system. Embedded systems that are programmable are provided with a programming interface, and embedded systems programming is a specialized occupation.

Certain operating systems or language platforms are tailored for the embedded market, such as Embedded Java and Windows XP Embedded. However, some low-end consumer products use very inexpensive microprocessors and limited storage, with the application and operating system both part of a single program.

Applications of Embedded System

In recent days, you are showered with variety of information about these embedded controllers in many places. The computer you use to compose your mails, or create a document or analyze the database is known as the standard desktop computer. These desktop computers are manufactured to serve many purposes and applications.

You need to install the relevant software to get the required processing facility. So, these desktop computers can do many things. In contrast, embedded controllers' carryout a specific work for which they are designed. Most of the time, engineers design these embedded controllers with a specific goal in mind. So these controllers cannot be used in any other place.

- Military and aerospace software applications: From in-orbit embedded systems to jumbo jets to vital battlefield networks, designers of mission-critical aerospace and defense systems requiring real-time performance, scalability, and high-availability facilities consistently turn to the Lynx OS® RTOS and the LynxOS-178 RTOS for software certification to DO-178B.

Rich in system resources and networking services, Lynx OS provides an off-the-shelf software platform with hard real-time response backed by powerful distributed computing (CORBA), high reliability, software certification, and long-term support options.

- Electronics applications and consumer devices: And as the wireless appliance revolution rolls on, web-enabled navigation systems, radios, personal communication devices, phones and PDAs all benefit from the cost-effective dependability, proven stability and full product life-cycle support opportunities associated with Blue Cat embedded Linux.

For makers of low-cost consumer electronic devices who wish to integrate the Lynx OS real-time operating system into their products, we offer special MSRP-based pricing to reduce royal fees to a negligible portion of the device's MSRP.

II. PROPOSED WORK

Arduino UNO R3

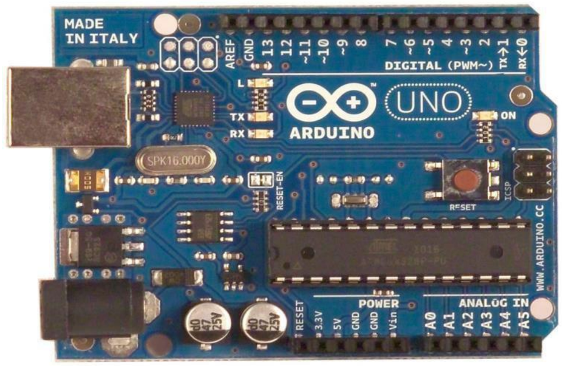


Fig 3.1: ARDUINO UNO

The Arduino Uno R3 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 crystal oscillator, 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.

The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

The power pins are as follows:

- VIN. The input voltage to the Arduino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- 5V. The regulated power supply used to power the microcontroller and other components on the board. This can come either from VIN via an on-board regulator, or be supplied by USB or another regulated 5V supply.
- 3V3. A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- GND. Ground pins.

Memory

The ATmega328 has 32 KB (with 0.5 KB used for the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

Input and Output pins

Each of the 14 digital pins on the Uno can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead()functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

.• Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.
- External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attachInterrupt() function for details.
- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analogWrite() function.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.
- LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the analogReference() function. Additionally, some pins have specialized functionality:

- TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

There are a couple of other pins on the board:

- AREF. Reference voltage for the analog inputs. Used with analogReference().
- Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The '16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1).
A Software Serial library allows for serial communication on any of the Uno's digital pins.

The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino software includes a Wire library to simplify use of the I2C bus; see the documentation for details. For SPI communication, use the SPI library.

Programming

The Arduino Uno can be programmed with the Arduino software (download). Select "Arduino Uno from the Tools > Board menu (according to the microcontroller on your board). For details, see the reference and tutorials.
The ATmega328 on the Arduino Uno comes preburned with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files).
You can also bypass the bootloader and program the microcontroller through the ICSP (In- Circuit Serial Programming) header; see these instructions for details.The ATmega16U2 (or 8U2 in the rev1 and rev2 boards) firmware source code is available . The ATmega16U2/8U2 is loaded with a DFU bootloader, which can be activated by

- OnRev1boards:connectingthesolderjumperonthebackoftheboard(nearthemapofItaly) and then resettingthe 8U2.
- OnRev2orlaterboards:thereisaresistorthatpullingthe8U2/16U2HWBlinetoground,makingit easierto put into DFU mode.

Smoke sensor (MQ2)

A smoke detector is a device that detects smoke, typically as an indicator of fire. Commercial, industrial, and mass residential devices issue a signal to a fire alarm system, while household detectors, known as smoke alarms, generally issue a local audible and/or visual alarm from the detector itself.Smoke detectors are typically housed in a disk-shaped plastic enclosure about 150 millimeters (6 in) in diameter and 25 millimeters (1 in) thick, but the shape can vary by manufacturer or product line. Most smoke detectors work either by optical detection (photoelectric) or by physical process (ionization), while others use both detection methods to increase sensitivity to smoke. Sensitive alarms can be used to detect, and thus deter, smoking in areas where it is banned such as toilets and schools. Smoke detectors in large commercial, industrial, and residential buildings are usually powered by a central fire alarm system, which is powered by the building power with a battery backup. However, in many single family detached and smaller multiple family housings, a smoke alarm is often powered only by a single disposable battery.

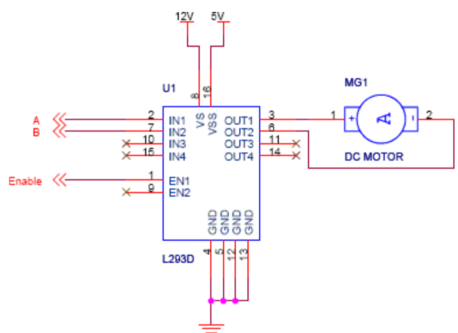
Fig 3.5 MQ2 Gas Sensor

Basic Smoke Detector Information:

What is the single most important thing you can do when it comes to fire safety in your home? All experts agree that without a doubt, the most important step to take is to make sure you haveworking smoke detectors installed. Smoke detectors have saved literally tens of thousands of lives, and prevented hundreds of thousands of injuries over the years. They're cheap, they're very easy to install, and there's absolutely no excuse for not using them. You can pick them up at discount stores, hardware stores, home improvement stores, and even more and more grocery stores carry them. How many do you need? At a bare minimum, you need at least one for every level of your house. If all bedrooms share a common hallway, then one detector in the hallway should do. But if the house is laid out with bedrooms separated in different areas, you'll need one for each separate area. In addition, any bedroom where people sleep with their door closed should have a detector inside the room. Smoke detectors over ten years old should be replaced, according to fire safety experts. They also recommend that you test your smoke detector on a regular basis – say every Friday night or Saturday morning, or whatever works for you, and is easy to remember. Testing them is very simple. Most smoke detectors have a button marked TEST, and you simply push it in. If the alarm sounds, it's fine. If it doesn't, either the detector has gone bad, or the battery is worn out. In either case, you'll need to fix it right away. Because it's easy to forget about batteries in smoke detectors, it's become something of a national institution in America to replace the batteries twice a year, when we switch to and from Daylight Savings Time. That's a good idea, and you should adopt the habit. Many people have been lulled into a false sense of safety because "I've got a smoke detector". But if the batteries are dead, it will do you no good. Fire experts estimate that about a third of all detectors in this country have dead batteries in them. Don't let this happen to you. One situation that needs to be addressed is what happens if the smoke detector keeps going off for no reason? Usually this happens because it's too close to a stove, and steam and light smoke are setting it off.

L293DDRIVERIC

L293D is a dual H-Bridge motor driver, So with one IC we can interface two DC motorswhich can be controlled in both clockwise and counter clockwise direction and if you have motorwith fix direction of motion the you can make use of all the four I/Os to connect up to four DCmotors. L293D has output current of 600mA and peak output current of 1.2A per channel.Moreover for protection of circuit from back EMF output diodes are included within the IC. Theoutput supply (VCC2) has a wide range from 4.5V to 36V, which has made L293D a best choice.Asimple schematic forinterfacing aDC motor using L293D is shownbelow.



Truth Table

A	B	Description
0	0	Motor stops or Breaks
0	1	Motor Runs Anti-Cloclwise
1	0	Motor Runs Clockwise
1	1	Motor Stops or Breaks

For above truth table, the Enable has to be Set (1). Motor Power is mentioned 12V, but you can connect power according to your motors.

Fig3.4.DriverIC connection

As youcanseein thecircuit,threepinsareneededforinterfacingaDCmotor(A,B,Enable). If youwanttheo/ptobeenabledcompletelythenyoucanconnectEnabletoVCCandonly2pinsneeded from controller to make the motor work. As per the truth mentioned in the image aboveits fairly simple to program the microcontroller. Its also clear from the truth table of BJT circuitand L293D the programming will be same for both of them, just keeping in mind the allowedcombinationsof Aand B.

III. RESULTS AND DISCUSSION(IF ANY)

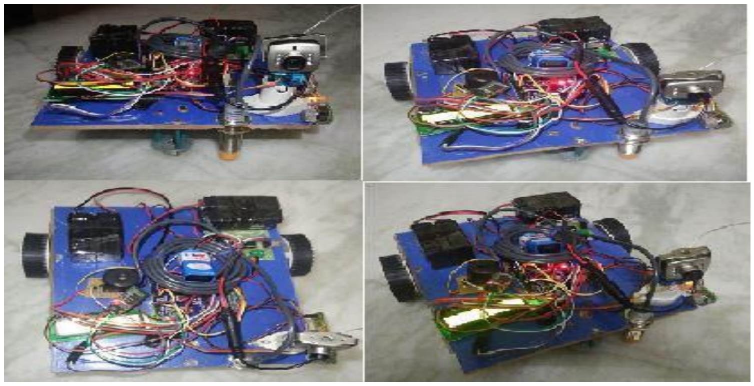


Fig7.1:ProjectKit

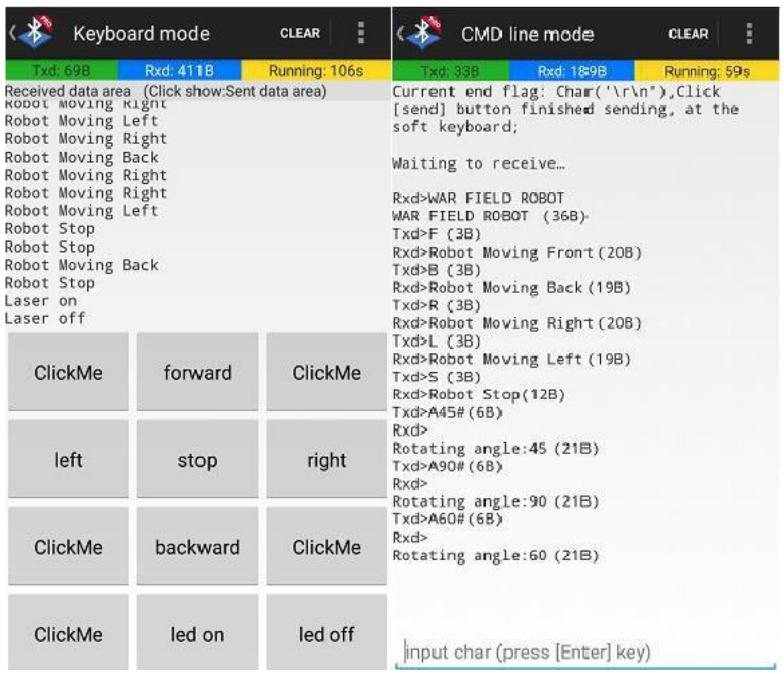
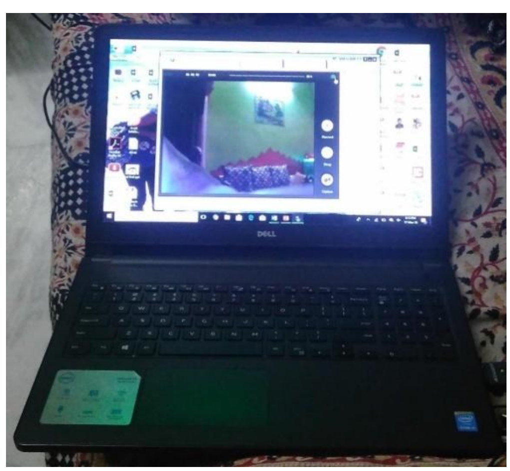


Fig3.2Android Application



Monitor to see output

IV. CONCLUSION

As we all know that India is sick off massive terror attacks, bomb explosions. To avoid such disasters technological power must exceed human. “Human life and time are priceless”So we took an initiative to design a model of a spy robot that can be widely used to avoid terror attacks, to ensure more security at the border and high density areas.Every nation needs its own defense system for their integrity and security. In such a way construction of these robots will carry nation’s name and fame globally.

V. REFERENCES

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