

Design Of Wireless Spy Robot For Video Surveillance Using Hybrid Technology

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Abstract - The Main aim of this paper is to design a spy robot which allow the Rescue team to go through the harsh conditions or may in disasters where it is very difficult to reach and help the banned people. This paper discusses the computer operated wireless robot which contains Wireless camera, motion sensor and temperature sensor. This robot will be operated through computer interface. As we are going forward wireless camera guide us in the direction, but if suppose there is something moving in the back word, then that can be detected by motion sensor i.e PIR sensor. On detection of human body, then by measuring its temperature, it can decide whether the person needs urgent help or not.

Keywords - Mechatronics;RF;Robot;Spy;Sensors;GUI

I. INTRODUCTION

A Robot is a mechatronics' device. It also includes resourcefulness or autonomy. The device with autonomy means does its thing "on its own" without a human directly guiding it moment-by-moment. The Robotics can be described as the current pinnacle of technical development. Robotics is a confluence science using the continuing advancements of mechanical engineering, material science, sensor fabrication, manufacturing techniques, and advanced algorithms. The study and practice of robotics will expose a dabbler or professional to hundreds of different avenues of study. For some, the romanticism of robotics brings forth an almost magical curiosity of the world leading to creation of amazing machines. A journey of a lifetime waits in robotics.

In practice, Robot is usually an electro-mechanical machine which is guided by computer or laptop, also mobile or electronic programming, and thus it is able to do tasks on its own. The Wireless controlled robots use RF circuits which have drawbacks of limited working range, frequency range and limited control. The Spy robot can capture audio and video information from the surroundings and can be sending to a remote station through RF(Redio Frequency) signal. The control of robot involves three distinct phases: perception, processing and action. Here, the preceptors are sensors mounted on the robot, processing is done by the on-board microcontroller or processor, and the task is performed using motors or with the help of some other actuators. In this paper when the user controls by remote controller, the spy robot will move to desired destination and spy images around the robot. In this paper the robot is not quite huge one and designed to be easy transportation.

II. LITERATURE SURVEY

In conventional robotics, the controlling and operation of robots is usually done by using RF (Radio Frequency) circuits. These circuits are widely used for control and working applications and are also reliable over a small range. The RF circuits consist of transmitter and receiver which are independent of each other. All the control signals and commands are sent through wireless medium in between transmitter and receiver. This RF circuits have drawbacks of limited working range, frequency range and limited control.

In this project, we are using CC2500 Radio Frequency wireless module. CC2500 is a transceiver module. This is suitable for transmitting and receiving data at multiple baud rates. In this project spy Robot can be commanded directly by laptop keyboard without using remote controller. Here spy Robot built with wireless visual system that the user can observe and control the situation through computer or laptop.

III. METHODOLOGY

To achieve the goal, the following additional technical arrangements are implemented in the system. Here Multiple devices are controlled and processed by Microcontroller.

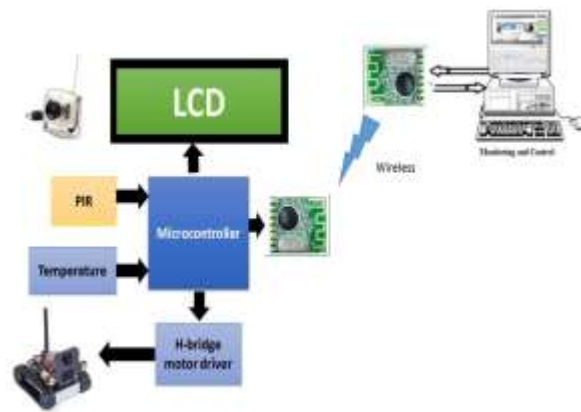


Figure 1. System Functional Diagram

A. Heart of System Microcontroller(AT89S52)

The AT89S52 is a low-power, high-performance 8-bit microcontroller which has 8K bytes of system programmable Flash memory. This device is manufactured using Atmel's high-density nonvolatile memory technology and this is compatible with the industry-standard 80C51 instruction set and pinout. The Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.



Figure 2. AT89S52 Microcontroller.

Speed Of AT89S52 Microcontroller

Total Machine Cycles = 12

Frequency=12MHz

to find out actual frequency(f)

f=?

f=12Mhz *1/12

f=1Mhz

we know the relation between time and frequency

$T=1/f=1/10^6=10^{-6}$

1 inst=1μsec

1 sec=1000000

i.e in 1 sec it execute 1000000 instructions.

B. Digital Temperature Sensor(LM75)

- LM75 temperature sensor includes a delta-sigma analog-to-digital converter, and a digital overtemperature detector.
- The host can query the LM75 through its I2C interface to read temperature at any time.
- The open-drain overtemperature output (OS) sinks current when the programmable temperature limit is exceeded.
- The OS output operates in two modes, either comparator or interrupt.
- The LM75 temperature sensor measures temperature and it converts the data into digital form by using a bandgap type temperature sensor and a 9-bit delta-sigma ADC. In Digital Temperature Sensor an I2C-compatible 2-wire serial interface allows access to conversion results.
- The LM75 temperature sensor accepts standard I2C commands to read the data, and set the overtemperature alarm (OS) trip thresholds, and configure other characteristics.
- While reading the Temperature register, any changes in temperature are ignored until the read is completed. In this the Temperature register is updated for the new temperature measurement upon completion of the read operation.

C. Motor Driver IC (L293D)

- In this project we are using L293 and L293D two motor drivers.

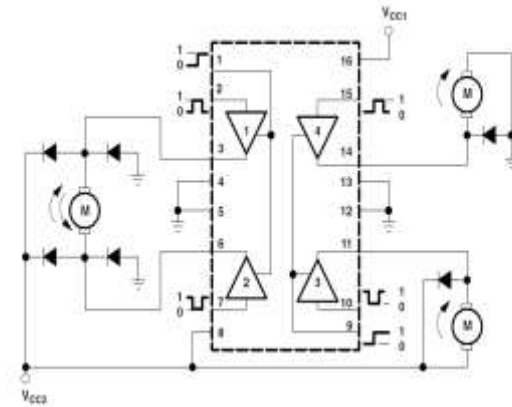


Figure 3. L293, L293D quadruple half-h drivers

- The L293 and L293D are quadruple high-current half-H drivers. The L293 motor driver is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V.
- The L293D motor driver is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. i.e Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications.

D. PIR Sensor

- The PIR sensors are used to sense motion, almost always allow you to detect whether a human has moved in or out of the sensors range.
- They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses.
- They are referred as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors.

The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. If a warm body like a human or animal passes by, then it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves.

If the warm body leaves the sensing area, the reverse happens, where the sensor generates a negative differential change. These change pulses are what is detected.

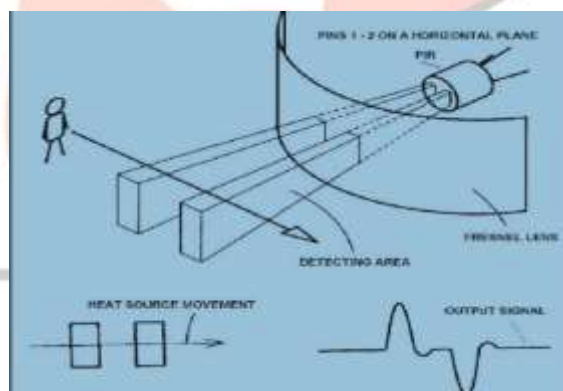


Figure 4. PIR Sensor.

E. RF CC2500(Wireless Module)

- CC2500 is a wireless module based on RF transceiver i.e CC2500 is a transceiver module.
- CC2500 is a small size and low power consumption module.
- It is a low-cost 2.4 GHz transceiver designed for very low power wireless applications.
- The circuit is intended for the 2400-2483.5 MHz ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency band. The MAX RF output power can be set as high as +1dBm, with data rate as high as 500Kbps.
- The CC2500 module integrated many RF functions thus you can use it conveniently and reducing your development time.
- It provides hardware support for packet handling , data buffering and for burst transmissions.
- It support multiple frequencies within same baud rate that helps in avoiding data collision with no requirement of complex wireless connection software for connecting two serial devices.
- CC2500 module is suitable for transmitting and receiving data at multiple baud rates.

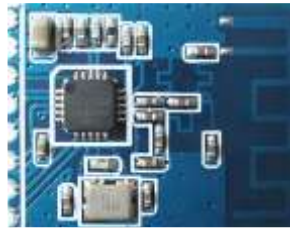


Figure 5. CC2500 Wireless Module.

IV. CONCLUSION

In this project the Robot can perform difficult and repetitive works for humans. It can have a very risky job and such dangerous job could be done by using small spy robot. But it is also useful to check and look out the places where dangerous poison gases have. Spy robot can also be used in searching people who are in building destroyed by the earthquake. Because of the wireless camera is installed in spy robots, it can be used remotely to enter and exit dangerous place that human cannot. If the user controls by remote controller, the spy robot will move to desired destination and spy images around the robot. The user can check and recommend from computer with the wireless remote controller.

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