

Border Guard Spy Robot

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Abstract

What is a Robot? It is a multifunctional, reprogrammable device which is principally designed to work like humans. It is expected to interpret the works such as surveillance, aerospace, loading and unloading, industrial, health care, pick & place of goods. Spy Robots can perform the most hazardous activities and with more accuracy to increase the productivity as it can work for 24 by 7 without rest. This paper explains the architectural design and controlling of automated vehicle kind robot which can move in desired track, capturing pictures and videos of required locations and immediate transmission of data. The main controlling device of the intact system is Arduino micro-controller. When the user turns on the robot, the robot moves within predefined path. SR04 and 5 laser guns are interfaced to the Arduino micro-controller. In this paper we present an android application developed by use of MIT App inventor and Wi-Fi communication is established which interfaces with micro-controller to control its direction and speed. Major work in this paper is to design a motion controlled robot using Wi-Fi of an Android device.

Keywords: Android OS, Microcontroller, laser, Wi-Fi module

1. Introduction

The major controlling device in the entire system is Arduino micro-controller. When the user turns on the robot, it moves on predefined path. 5 laser guns and SR04 are connected to the Arduino microcontroller. When motion is detected by SR04 sensor this data is fed to the Arduino. The Arduino gets on the laser guns for shooting automatically. We can check the IP camera video in mobile phone. To complete this immediate task, a program is written in embedded-C language and loaded in microcontroller. These robots consist of ultrasonic sensor to detect the motion and 5 laser guns represent shooting indication. The advent of latest high-speed machinery provides realistic prospect for robot controls and recognition of innovative methods for controlling it. This scheme describes a new economical solution of robot control systems. The robot control system presented in this paper can be used for different and

complicated robotic applications. In current applications the International border area surveillance is a critical task. The most important work is done by border guarding forces that continuously do patrolling of border but to survey the border at each and every instance is difficult. An essential requirement for this duty can be done by evolving a robot which automatically detects gatecrasher in the border without human intervention and report it to nearby border security. Now a day many of the military departments utilize the robots to carry out unsafe jobs that cannot be done by the soldiers which keeps their lives in danger. In this work spy robot based on Arduino system, which will save human lives, and also reduces manual fault and protect the nation from enemies. Surveillance system using spy robot described in this paper can also be modified as per the application for various fields.

2. System Architecture:

2.1 Arduino Uno-Board

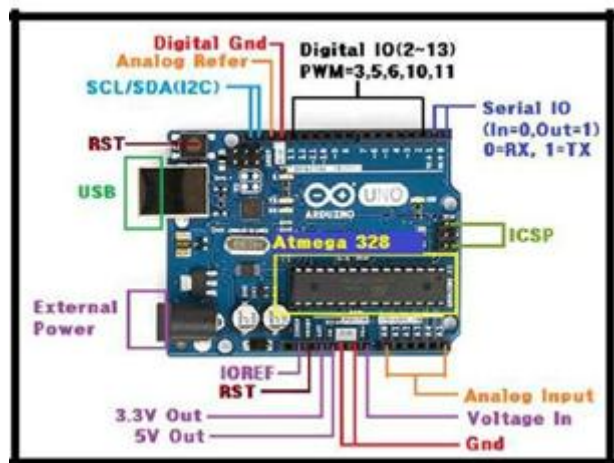


Fig.-1: Board Design of Arduino Uno R3

The Arduino Board is as shown in fig 1. This is the brain of Wi-Fi interfaced Spy robot loaded with a program written in embedded C language specifying various operations to do the necessary functioning. Here the motor drivers are used to make the system work as necessary. The Arduino is an open source electronics platform which gives easy-to-use embedded hardware-software. Arduino uses a range of microcontrollers equipped with set of digital and analog input/output (I/O) pins that possibly be interfaced to various expansion boards or breadboards and other circuits.

2.2. Architecture of Proposed systems

This robot consists of ultrasonic sensor SR04 and 5 laser guns to detect the motion and represent the indication of execution. The main controlling device of the entire system is Arduino microcontroller. When the user turns on the robot, the robot moves on predefined path. 5 laser guns are interfaced to the Arduino microcontroller, when the motion is detected by SR04 sensor, this data is fed to the Arduino. The Arduino gets on the laser guns for shooting automatically. We can check the IP camera video in mobile phone. The Block Diagram shown in fig 2 provides information about proposed system architecture.

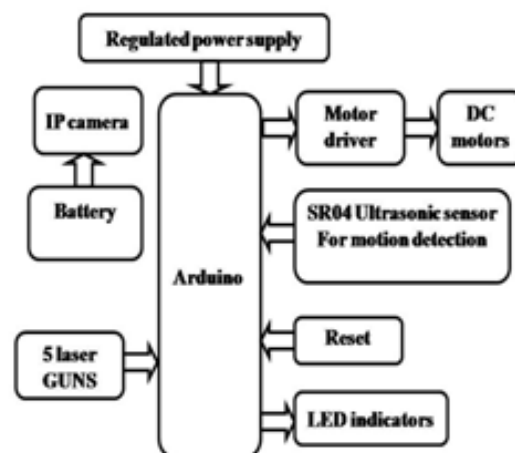


Fig.2 Block Diagram

DC Motor:

Any electric motor operates based on concept of electromagnetism. A current carrying conductor generates a magnetic field and when this conductor is placed in an external magnetic field, it will experience a force proportional to the current in the conductor. The external magnetic field is produced by using High-strength permanent magnet.

D.C. motor is an electrical component controlled by DC voltage. It can move in left and right, forward and backward directions according to the polarity of applied voltage. Every DC motor has six major parts - axle, rotor (armature), field magnets, commutator, stator and brushes. All typically mechanical movements which robots need to perform are accomplished by the use of electric motor, which are means of converting electrical energy into mechanical energy and are best suited as power device.

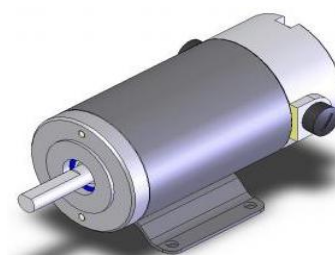


Fig: 3 DC motor

Ultrasonic sensor:

It is also known as Transceiver when it sends signals as well as receives. It works on a correlated principle to radar or sonar by estimating attributes of an object by taking the echoes from sound or radio waves correspondingly. It can be used to generate high frequency sound waves. Mainly sensors compute the time interval between transporting the signal and getting the echo back to determine the distance of an object. This technology can be used for measuring: direction and speed.

IP or Web Camera:

A webcam is a camera that can feed its captured image in real time to a computer or computer network. IP camera is shown in fig 4. A webcam is not like an IP camera which uses a direct

connection using Ethernet or Wi-Fi, it is generally connected by a FireWire cable, USB cable, or similar cable.



Fig:4 IPCamera

3. SYSTEM ARCHITECTURE

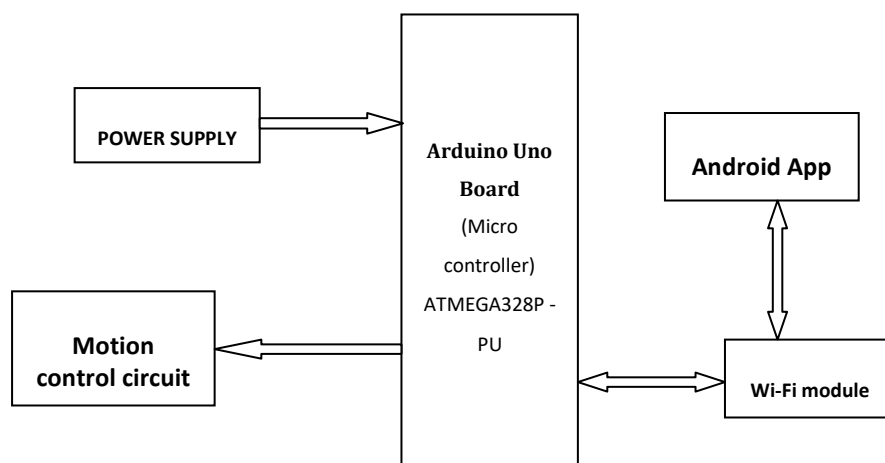


Fig. 5: System Architecture of proposed design

3.1 Border guard Detection system

The Arduino Atmega328 microcontroller is used in this project. In this Arduino controller, we use 4 digital pins 8, 9, 10, and 11. Pins 8 and 9 are used to move in forward directions, and pins 10 and 11 are used to move in backward directions. A motor driver is used to detect the path which mechanically moves in forward and backward directions. Here

ultrasonic sensor is used to intellect the obstacles. The complete live streaming is seen in IP camera which rotates 360 degrees. The use of DC motor is for the wheels rotation of spy robot.

4. Results

SpyRobot presented in this project is the android application based design, made through App Inventor. The major task of this application is to

control the robot. This robot has special buttons integrated to it with each button having different function. These robots consist of ultrasonic sensor to detect the motion and 5 laser guns represent shooting indication. Laser gun attached to it works when any undesirable condition happens or robot is being attacked by any person. Fig 6 and 7 shows outputs of the project.



Fig: 6 Spy Robot

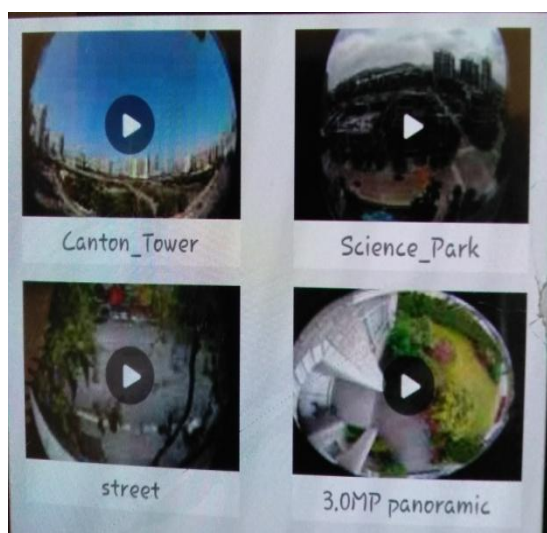


Fig:7 Live Streaming

5. Conclusion

The proposed Robot in this paper shows how it can be used for spy & rescuing purpose. Smartphone with latest Android version operating system, is used to develop effective remote controlling program which also uses Wi-Fi wireless network, making it simple and suitable to control the robot.

It establishes a two-way communication connection between the Android phone and robot which would allow a non-expert to interact with and fine-tune the functionality of a system. Atmega 328 controller is projected to make the purpose of interactive objects or environments more reliable. The border surveillance has always been a relatively sensitive task which includes countless risks. This robot can do this job instead of people, by controlling the robots efficiently. This can provide better results. This proposed system is a reliable solution for secure surveillance in military areas.

REFERENCES

- [1] "Wireless Indoor Surveillance Robot "Hou-Tsan Lee, Wei-Chuan Lin, Ching-Hsiang Huang, Yu-Jhih Huang, SICE Annual Conference 2011, Waseda University, Tokyo, Japan, September 13-18, 2011.
- [2] "Intelligent Surveillance & Security Robot Systems", Kyunghoon Kim, Soonil Bae, and Kwanghak Huh 978-1-4244-9123-0/1 ©2010 IEEE.
- [3] "Image-Based 3D Surveillance in Man-Robot-Cooperation", Jorg Krieger, Bertram Nickday, Oliver Schulz 0-7803-8513 6/4/2004 IEEE.