Human Presence Threat Identification Using Robot Through Video Capturing

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Abstract

The purpose of this project is to design and construct a robot system which uses pir sensor for human presence detection and gun shooting mechanism. This system provides an automatic monitoring system for controlling the camera direction intellectually using wireless Zigbee through gui matlab. This shooting is done to destroy the enemies in war fields as this proposal is implemented in wars. The selected fields are continuously monitored by the robot from the pc section which is integrated with matlab software. The monitoring is done by the av transmitter and receivers provided at both robot and pc sections. It is a very low cost survey line system used to monitor a larger area. We can change the camera direction using control buttons. We are using ZigBee technology through gui mat lab, so we can increase the range of communication between robot (receiver) and transmitter. The robot system uses pir sensor for human presence detection and gun shooting mechanism control using dc motors on which it has been mounted.

Keywords

Robot, PIR sensor, Gui Matlab, Zigbee, PIC microcontroller.

I. Inroduction

An embedded system is a computer system designed to perform one or a few dedicated functions often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. By contrast, a generalpurpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today.

The microcontroller will act as the mediator between the transmitter and receiver. The Microcontroller is programmed using Embedded C language.PIC stands for Peripheral Interface Controller given by Microchip Technology .These devices have been very successful in 8-bit microcontrollers. A single microcontroller which is very easy to be assembled, program .One unit of PIC16F877A microcontroller can be programmed and erased so many times. Some said about 10 000 times. There are 5 input/output ports on PIC microcontroller namely port A, port B, port C, port D and port E. Each port has different function. Most of them can be used as I/O port. The erasing time is almost unnoticeable because once new program are loaded into the PIC, the old program will automatically be erased immediately.

The crystal oscillator speed that can be connected to the PIC microcontroller range from DC to 20Mhz

MATLAB (matrix laboratory) is a computing numerical environment and fourth generation programming language, Developed by Math works, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and FORTRAN.

Zigbee is a WPAN technology based on the IEEE 802.15.4 standard. Unlike Bluetooth or wireless USB devices, ZigBee devices have the ability to form a mesh network between nodes. Meshing is a type of daisy chaining from one device to another. This technique allows the short range of an individual node to be expanded and multiplied, covering much larger area.

The PIR Sensor detects motion up to 20 feet away by using a Fresnel lens and infrared-sensitive element to detect changing patterns of passive infrared emitted by objects in its vicinity. Inexpensive and easy to use, it's ideal for alarm systems, motion-

activated lighting, and holiday props. PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are often referred to as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors. PIRs are basically made of a pyroelectric sensor (which you can see above as the round metal can with a rectangular crystal in the center), which can detect levels of infrared radiation. Everything emits some low level radiation, and the hotter something is, the more radiation is emitted. The sensor in a motion detector is actually split in two halves. The two halves are wired up so that they cancel each other out. If one half sees more or less IR radiation than the other, the output will swing high or low.

Express PCB is a software tool to design PCBs specifically for manufacture by the company Express PCB (no other PCB maker accepts Express PCB files). It is very easy to use

PIC compiler is software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. PIC compiler also supports C language code.

Proteus is software which accepts only hex files. Once the machine code is converted into hex code, that hex code has to be dumped into the microcontroller and this is done by the Proteus. Proteus is a programmer which itself contains a microcontroller in it other than the one which is to be programmed. This microcontroller has a program in it written in such a way that it accepts the hex file from the pic compiler and dumps this hex file into the microcontroller which is to be programmed. The program which is to be dumped in to the microcontroller is edited in proteus and is compiled and executed to check any errors and hence after the successful compilation of the program the program is dumped in to the microcontroller using a dumper.

WAR FIELD ROBOT using 16F877A Microcontroller is used to move the robot according to the instructions given by Computer and also alerts through buzzer when any person is being detected by it. It also alerts when any human beings are near by using PIR sensor.

II. Existing System

The existing project represents a Pick and place robot controlled

by an Android application.

From Mohamed Naufal bin Omar("Pick and place robotic arm controlled by Computer"). We know that the whole the digital devices in the world are transformed in to Android OS based systems ,as it is more versatile ,flexible and easy to control and it is an open source software. Here The Pick and place robot is controlled wirelessly by an Android

application called Blue control through a blue tooth module. The Android OS as well as Arduino software are open source software.

The main feature of this pick and place robot is the soft catching arm or soft catching Gripper. We know that when handling the explosive items like bomb it should be handled carefully. Excessive pressure will cause explosion. So it is very essential to have a soft catching arm .This robot has microcontroller based electrical pressure sensor which has higher sensitivity than mechanical pressure sensors.

The hardware model functioned as desired and is shown in Figure below . This is designed to handle a maximum weight of 2 kg. The weight handling capacity of Pick and Place Robot is determined by the capacity of DC motors used. Very useful and interesting can be made by interfacing the "Pick and Place Robot with explosive detectors, metal detectors, wireless cameras

III. Proposed System

The main aim of this project is video coverage at required places. This system provides an automatic monitoring system for controlling the camera direction intellectually using wireless Zigbee through GUI MATLAB. The video will be transmitted to the receiver using AV transmitter. At PC section, end, this can be seen on pc through GUI MATLAB. It is a very low cost survey line system used to monitor a larger area. We can change the camera direction using control buttons. We are using ZigBee technology through GUI MAT LAB, so we can increase the range of communication between robot (receiver) and transmitter. The robot system also uses PIR sensor for human presence detection and gun shooting mechanism control using DC motors on which it has been mounted.

This project finds its major applications while we are monitoring larger areas like political canvassing, cricket stadiums, international conferences, worship places, banking, Bomb blasting places, Earthquakes etc. This project assures us with more reliable and highly secured system. Whenever the user presses a button in the PC of the MATLAB application, the data related to that button is sent through Zigbee module interfaced to PC. Whenever the appropriate keys are pressed in the keyboard of computer, the data related to those keys will be transmitted over Zigbee module.



Receiver



This data will be received by Zigbee module at robot section and this data is fed as input to the controller. The Microcontroller checks the data with the program embedded in it and performs appropriate actions on the robot and also gun mounted arm. This data will be received by the Zigbee module in the robot system and feds this to Microcontroller which judges the relevant task to the information received and acts accordingly.

Working

This project works on two phases receiver and transmitter. The robot section is the receiver which has the pir sensor and camera which detects the thefts and also audio and transmits the information to the transmitter part which is pc section through the help of av transmitter and receiver. By knowing the indication of enemies from alarm of buzzer, the thefts can be shooted with the help of a gun mounted at the robot section using dc motors and drivers. The transmission and receivering is done with the help of zigbee technology which has the capacity of wide range of wireless communication.

This project has the advantages of Capable of detecting live human beings using PIR sensor, Live Audio and video can be seen on TV, Fast response, Efficient and low cost design, Low power consumption. This project assures us with more reliable and highly secured system.



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IV. Results

The project was designed such that the robot can be operated using PC MATLAB based on GUI which is capable of detecting human beings in its path and which is wirelessly controlled through PC using Zigbee technology and the live images of the war field can be seen on the TV. We are using ZigBee technology through GUI MATLAB, so we can increase the range of communication between robot (receiver) and transmitter. The robot system also uses PIR sensor for human presence detection and gun shooting mechanism control using DC motors on which it has been mounted.

V. Conclusion

Our project is mainly intended to operate a robot using PC MATLAB based on GUI. The system uses PIR sensor detects any human presence in its way and if any human presence is being detected it stops and buzzers an alarm system. We can extend this to implement this project using Ultrasonic module. In future, there is a scope to extend this project with temperature and smoke sensors. Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit.

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