

Defence Robot With Gun Assembly

^{#1}Aatish Bankar, ^{#2}Anuja Bhilare, ^{#3}Namrata Singh, ^{#4}Kunal Ranvir



¹aatish.bankar@gmail.com
²anuja.bhilare99@gmail.com
³singhnamrata668@gmail.com
⁴rkunalv@gmail.com

^{#1234}Department of Electronics Engineering, AISSMS IOIT, Pune 411001, Savitribai Phule University, Pune, Maharashtra, India

ABSTRACT

Now-a-days robots are used by military organization to carry out many risky jobs that cannot be done by the soldier. This paper presents defense robot with gun assembly for defense purpose that has IR and PIR sensor for human as well as edge detection and webcam has been installed on it so that it can monitor enemy whenever required. The military robots also have different shapes according to the purposes of each robot. Here the new system is proposed with the help of ZIGBEE wireless network to trace out the enemy and accordingly robot will be controlled manually from workstation. Thus the proposed system using ZIGBEE saves human life and reduces manual error in defense side. This defense robot used in war areas and this is the replacement of fighters against terrorist.

ARTICLE INFO

Article History

Received 21st March 2016
 Received in revised form :
 23rd March 2016
 Accepted : 25th March 2016
Published online :
28th March 2016

I. INTRODUCTION

The main aim of this project is to save the precious life of soldier in war field . As no one can forget the 9/11 when many people lost their lives. The risk of terrorist attack can perhaps never be eliminated ,but sensible steps can be taken to reduce the risk .This robot is Zigbee operated it has Gun assembly which moves up-down, horizontal-vertical in synchronization with webcam mounted over gun assembly.

The main objectives of using robot are

- A. Robots have traditionally put to use in environments that are too hazardous for man.
- B. We can make them go to war:

The main aim to develop a model which is efficiently used to minimize terrorist causality .Being able to achieve reliable long distance communication is an important open area of research to robotics as well as other technology areas .The faithful robots do not hesitate to tread even the dreaded terrain of battlefields. Military robot is a robot that can perform a task given such as locomotion, sensing, localization, and motion planning without a control from the humans during the task in progress. The military robot is an autonomous robot that consist of wireless camera that human able to monitor via computer as a spy. Today wireless system have been widely used by many company because it saves the cost of wiring ,easy to maintenance, more

reliable.Zigbee is chosen due to its large connectivity range and it is more reliable than other systems.

SYSTEM ANALYSIS

In this proposed system ,there are 2 sections transmitter as well as receiver and the communication used between transmitter as well as receiver is Zigbee. The basic block diagram of the defence robot is shown below. Along with Zigbee, web camera is also mounted over the receiver side which will capture the images at the war field and sent it to the workstation from where the operator can take right decision like whether to shoot the enemy and also in which direction robot is to be moved and accordingly zigbee transmitter will send command to the receiver section With the help of DC motor the Gun assembly and the camera will continuously move in horizontal, vertical, direction for continuous monitoring.The PIC microcontroller is the main part of this project.It is programmed to control motor driver and camera control motor.

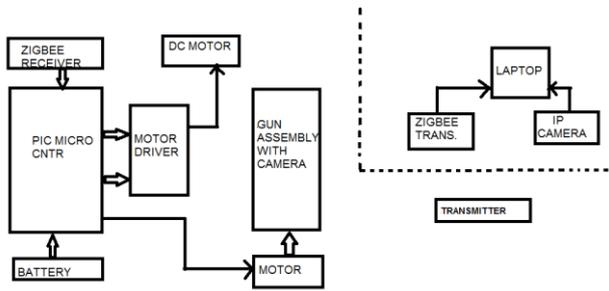


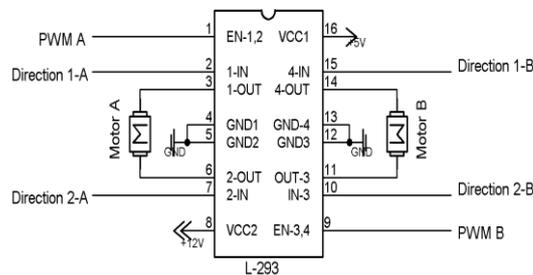
Figure1. Basic block diagram at transmitter and receiver end .

II.HARDWARE IMPLEMENTAION

Motor driver IC: L293D

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low current control signal and provide a higher current. This higher current signal is used to drive the motors. L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input. The current provided by the MCU is of the order of 5mA and that required by a motor is ~500mA. Hence, motor can't be controlled directly by MCU and we need an interface between the MCU and the motor.

A Motor Driver IC like L293D or L298 is used for this purpose which has two H-bridge drivers. Hence, each IC can drive two motors. Note that a motor driver does not amplify the current; it only acts as a switch.



It is a specification for a suite of high-level communication protocols used to create personal area networks built from small, low-power digital radios. ZigBee is based on an IEEE 802.15 standard. Though its low power consumption limits transmission distances to 10–100 meters line-of-sight, depending on power output and environmental characteristics, ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. ZigBee is typically used in low data rate applications that require long battery life and secure networking (ZigBee networks are secured by 128 bit symmetric encryption keys.) ZigBee has a defined rate of 250 Kbit/s, best suited for intermittent data transmissions from a sensor or input device. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer. The technology defined by the ZigBee specification is intended to be simpler and less

expensive than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi **PIC16F877A (Microcontroller)**

:Microprocessors and microcontrollers are widely used in embedded systems products. Microcontroller is a programmable device. A microcontroller has a CPU in addition to a fixed amount of RAM, ROM, I/O ports and a timer embedded all on a single chip. The fixed amount of on-chip ROM, RAM and number of I/O ports in microcontrollers makes them ideal for many applications in which cost and space are critical. As per the specification requirement of the project and the market availability of the specified components, market survey is performed. PIC16F877 and PIC18F4550 are easily available and cost effective as compared to ARM processors. One of the main requirement is 1UART for serial communication with GSM module both P16F877 and 18F4550 have one UART but cost of P16F877A is half as that of P18F4550.

DC motor

A **DC motor** is any of a class of electrical machines that converts direct current electrical power into mechanical power. DC motors are used in our project for locomotive motion of the robot and for gun assembly. 10 rpm and 60 rpm dc motor are used for movement of gun and for motion of the robot. This DC or **direct current motor** works on the principal, when a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move. If the direction of current in the wire is reversed, the direction of rotation also reverses.

Wireless camera:

A camera is a device that records images, either as a still photograph or as moving images known as videos. This is used in the robot to take the video surveillance of the area. And it is transmitted using a carrier signal. On the receiving end it is converted to video signal. It has a range of 70-100fts with no line of sight.

PIR sensor :

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 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 often referred to as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors. The role of using PIR sensor is to grab the attention of soldier at workstation if in case his mind is diverted.

IR sensors:

The sensor used is the TSOP1738. It only senses the signal of frequency 38kHz. This sensor is used to avoid the reception of signal from other sources. The 38kHz signal is only used by TSOP1738, it is horizontally mounted. It senses the reflected IR rays from 38kHz IR source to detect any obstacle on its way. IR sensor is used to detect edge. In case of depression the robot will not move further and hence it will prevent the robot from damage.

The introduction of IR and PIR sensor will make the robot intelligent..

III.SOFTWARE SPECIFICATION

MikroC is a Platform and Development Environment for a Visual Programming Language. It is used for c language programming using which we are communicating zigbee. The Programming Language used in MikroC, is a Dataflow Programming Language.

We are using MATLAB for image processing. The Latest Version of MATLAB is Version MATLAB13, Released in March, 2013.

PROTEUS 7.0 FOR CIRCUIT SIMULATION:

Proteus 7.0 is a virtual system modelling that combines circuit simulation, animation components and microcontroller model to co-simulate the complete microcontroller based designs. In this project, virtual simulation circuit is designed with help of proteus for testing

IV.CONCLUSION:

This proposed system gives an exposure to design a robot that can do multifunction in defence. Manual control is employed so that it can be controlled from workstation which is located far from War field .The system uses Zigbee standard for wireless communication which is more reliable and cost efficient and easy to use. The use of Zigbee made the control of system easy.

Our system is aimed towards the Zigbee technology up to 30 meters distance. In future we can increase the distance up to 100 m. The proposed system is focusing on the welfare infantry to minimize the casualties to a great extent.

V. REFERENCES

[1]Continued testing of the Cannon Caliber electromagnetic Gun System (CCEMG) By: M.D. Werstc.E. Penneyt.J. Hotzj.R. Kitzmiller, 9th EML Symposium, Edinburgh, Scotland, May 1998.

[2] IEEE Transactions on Magnetics, Vol 35, No. 1, January 1999, and Pp. 388-393.

[3] Analysis And Design of Human-Robot Swarm Interaction in Firefighting By Amir M.Naghsh., Jeremi Gancet., Andry Tanoto., Chris Roast Proceedings of the 17th IEEE International Symposium on Robot and Human Interactive Communication, Technische Universität München, Munich, Germany August 1- 3,2008.

[4] International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 5, May 2014.