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## Design of Nano Robotics for Defense

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**ABSTRACT:** Robotics is the science that makes the Robot as agent to move around, react to their environment in pursuit of our goals. Any electronic system that uses a computer chip, but that is not a general-purpose workstation, desktop or laptop computer is called an embedded system. Such systems use microcontrollers or microprocessors. In this paper we discussed about the implementation of embedded system based robot in security field. The robots are used in many real world applications such as in military sensing, rescuing operations during disaster management etc. We have analyzed and worked on this topic and came out with a project of MILITARY SECURITY APPLICATION. It holds the capability of detecting and conveying the information of presence of human being (including the image of the person) to the controller. The controller can decide whether the person is allowable inside our border or not. The detection is performed by Pyro electric Infra-red sensor and it was conveyed using wired network. The strange person can be allowed or shot by passing the respective command to the Robot which is placed along with the sensor in the border end.

**KEYWORDS:** Robotics, Pyro electric, sensor, Microcontroller, microprocessor, infrared sensor

### I. INTRODUCTION

#### Embedded System:

An embedded system is some combination of computer hardware and software that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, and toys are among the possible hosts of an embedded system.

### II. LITERATURE SURVEY

[1]JC ALEXANDER, JH MADDOCKS - THE INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH, 1989, this journal proposed a study of robots and its types and structures.

[2] NASA pocket robots for wireless communication, a design of project based a radio and wireless communications. (2007)

[3] Dhanalakshmi.V, Jyasri.D, Vishnupriya.R, Zigbee Based Wireless Intelligent security Robot for defense, has proposed a study a model of defense robots and its application oriented studies.(2014)

[4] Dr.S.Bargavi, Design of an intelligent combat Robots for war fields. As proposed minimize human in wars and increase in defense power (2011)

### III. TYPES OF ROBOTICS

#### Analog Robotics:

Analog robotics indulges the analog robots. Analog robot is a type of robot which uses analog circuitry to go toward a simple goal such as finding more light or responding to sound. The first real analog robot was invented in 1940.

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## Autonomous robotics:

A fully autonomous robot has the ability to gain information about the environment. Work for an extended period without human intervention. Move either all or part of itself throughout its operating environment without human assistance. Avoid situations that are harmful to people, property, or itself unless those are part of its design specifications.

## Nanorobotics:

Nanorobotics is the technology of creating machines or robots at or close to the microscopic scale of nanometers ( $10^{-9}$  meters). More specifically, Nanorobotics refers to the still largely hypothetical nanotechnology engineering discipline of designing and building Nanorobots. Nanorobots (nanobots, nanoids or nanites) would be typically devices ranging in size from 0.1-10 micrometers and constructed of Nano scale or molecular components. As no artificial non-biological Nano robots have yet been created, they remain a hypothetical concept.

## IV. PROPOSED SYSTEM

Our project titled “warrior Robot” is equipped with PIR sensor, which is capable of sensing live human being alone. Once live person is detected nearby, robot sends a logic 1 signal to Microcontroller which in turns activates the weapon. [1] Parallely the video camera fixed at head of robot captures the video information and transmits to remote controller.

### 1. Embedded System:

Embedded systems are the computing systems embedded within electronic devices.

### 2. Mission of This Project:

- To replace the armed men in the country border. So that, the precious human life may be prevented from death
- To withstand extreme climatic conditions or so intensive environment.
- Implementing the advanced technology for proper security purpose

### 3. Block Diagram Of Nano Robot:

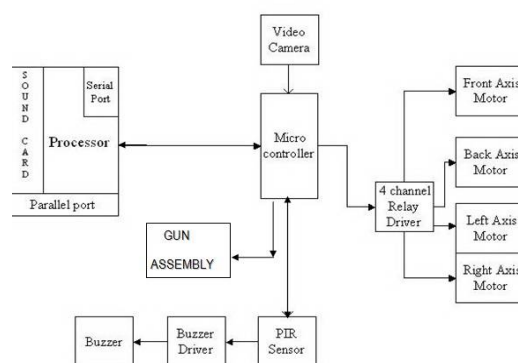


Fig (a) Block Diagram of the proposed system

## PIR Sensor:

Pyro electric infrared sensor to detect infrared energy radiation from human body it can detect the human presence (like security alarm) in the range up to 500cm.

## Theory of Operation:

Infrared radiation [2] exists in the electromagnetic spectrum at the wave length that is longer than visible light .objects that generate infrared radiation includes animals and the human body, the infrared radiation generated by human is strongest [3]

This PIR sensor is designed specifically to sense the infrared radiation emitted from human body.

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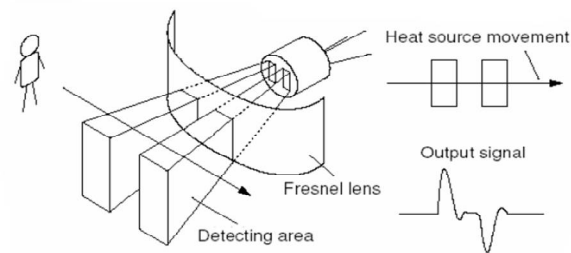


Fig (b) Working of Sensor

#### 4. Features of PIR Sensor:

- Human infrared radiation detection
- Human presence detection up to 5 meters
- Human motion direction up to 1.5 meters

#### 5. Applications of PIR Sensor:

- Human moving direction measurement
- Human-following device
- Human avoidance and security robot

#### 6. Microcontroller:



Fig (c) Microcontroller Circuit

#### 7. Controller Features:

- 4K Bytes of In-System Reprogrammable Flash Memory-
- Endurance: 1,000 Write/Erase Cycles
- Fully Static Operation: 0 Hz to 24 MHz
- Three-Level Program Memory Lock
- 128 x 8-Bit Internal RAM
- 32 Programmable I/O Lines
- Two 16-Bit Timer/Counters
- Six Interrupt Sources
- Programmable Serial Channel

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- Low Power Idle and Power Down Modes

### 8. Motor Drivers:

The dc motors are used for the wheel movement. Four relay circuits drive the motor. The relay circuits are activated with respect to the command from the controller.

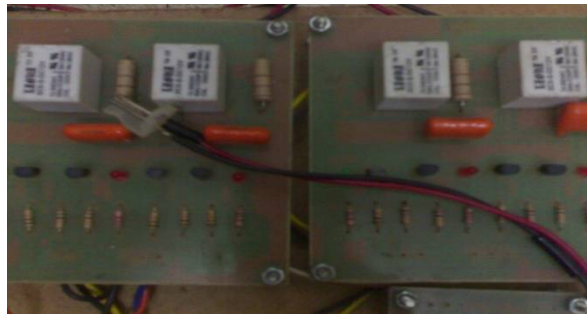


Fig (d) Circuit of Wheel Control

### 9. Robot Movement:

To move the robot left, the left motor is not powered and the right motor is made to rotate. To move the robot right the right motor is not powered and the left motor is made to rotate.

The motor rotation is governed by the control from the processor (computer) through the controller and the relay circuit.

### 10. Weapon Driver:

The firing gun is fixed at the robot terminal.[4] The control to the weapon is given from the processor through the separate relay circuit

Relay Circuit:



Fig (e) Relay Circuit

### 11. Control to Weapon Driver:

At the robot terminal a camera is fixed, which sends the image of the surrounding environment. The visuals from the camera are directly sent to the processor (computer). If any person is identified, the weapon is fired depending on the respective command from the processor through the controller and the relay circuit.

### 12. Hardware Requirement:

#### 12.1. Robot Chassis

- AT89s8252 – 8 bit Microcontroller
- Stepper motor driver

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- Video Transmitter
- Computer with windows 8(x) OS

### 13. Software Requirement:

#### Visual basic 6.0

#### Working:

The PIR sensors detect the human being and send the signal to the controller. The controller transmits the signal to the computer. The computer also receives the video signal from camera. By using the computer we can make the firing equipment to fire or to move front, back, to the left or right through relay circuit.

### 14. Advantages of This Robot:

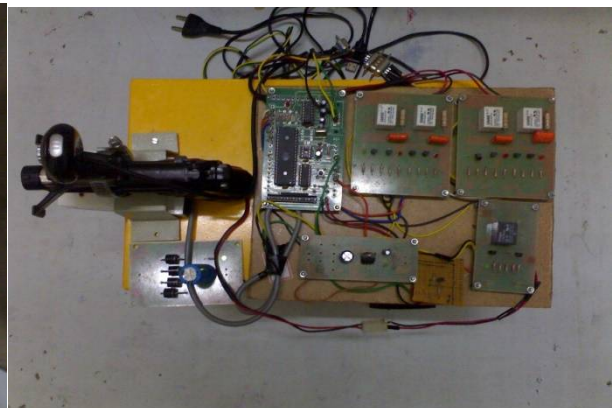
- It fulfills the necessity of presence of human warrior (the human can't be alert for all 24 hours)
- It can be implemented at low cost
- It is smaller in size.

Photo Flips of Our Project Embedded Robot:

Visual Equipment (camera)



Fig(f) Front View



Fig(g) Top View

## V. CONCLUSION

The same project can be implemented with the help of wireless communication technologies so that it may enable the control from distant place. Thus the embedded robotics represents a practical application of physics, computer science, engineering, and mathematics, and provides a very effective and flexible approach to demonstrate a range of engineering concepts. As a result, robotic technology and robots are being used by a growing number of educators at the college level to reinforce computer science and engineering theory, and to teach basic software and mechanical engineering at high school levels.

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