

AUTOMATIC BOMB DETECTION AND SAFETY RESCUE SYSTEM

¹K.Sugunesh, ²T.Vinothkumar, ³P.Mahalakshmi, ⁴M.Sudhakaran,
^{1,2}Student, Dept of EEE, GTEC Engineering college, vellore,
³Asst prof, Dept of EEE, GTEC Engineering college, vellore.
⁴Asso prof, Dept of EEE, GTEC Engineering college, vellore.

Abstract:

Structural collapse disasters routinely inspire sympathy not only for victims and their families, but also for heroic personnel who are faced with a tremendously complex, hazardous and often frustrating task environment. Military operations and rescue activities in the aftermath of recent earthquakes and bombings indicate a tremendous need for greater access. Recent developments in the remote inspection industry show great potential for employment of small robotic micro- rover systems in expanded roles for urban search and rescue. This paper discusses key issues in the application of robotic systems to search and rescue activities and discusses ongoing development of a knowledge-based for efficient management of automated search assets. It is designed to provide a robotic system that can combat in wars and other military purposes. In this paper, we propose a vision based technique that can be employed in case of hazardous condition where human beings cannot be employed. The main aim is to operate the robot which can work automatically on an object with a mechanical linkage. It identifies the intruders by using facial recognition technique. First using the technique of artificial intelligence the changes in the environment like fire, pit, obstacles, bomb and human live body are recognized. The robot is controlled from a remote location in addition to remote monitoring.

Keywords: Robot, Zigbee, Microcontroller, Sensor.

1. INTRODUCTION

In its most basic sense, we define “robot” as an engineered machine that senses, thinks, and acts. Thus a robot must have sensors, processing ability that emulates some aspects of cognition, and actuators. Sensors are needed to obtain information from the environment. Reactive behaviours (like the stretch reflex in humans) do not require any deep cognitive ability, but on-board intelligence is necessary if the robot is to perform significant tasks autonomously, and actuation is needed to enable the robot to exert forces upon the environment[1]. Generally, these forces will result in motion of the entire robot or one of its elements (such as an arm, a leg, or a wheel) [2].This definition does not imply that a robot must be electromechanical; it leaves open the possibility of biological robots, as well as virtual or software ones. But it does rule out as robots any fully remote-controlled machines, since those devices do not “think”, e.g., many animatronics and children’s toys. That is, most of these toys do not make decisions for themselves; they depend on human input or an outside actor. Rather, the generally accepted idea of a robot depends critically on the notion that it exhibits some degree of autonomy or can “think” for itself, making its own decisions to act upon the environment. Thus, the US Air Force’s Predator unmanned aerial vehicle (UAV), though mostly tele-operated by humans, makes some navigational decisions on its own and therefore would count as a robot. By the same definition, the following things are not robots: conventional landmines, toasters, adding machines, coffee makers, and other ordinary devices. As should be clear by now, the definition of “robot” also trades on the notion of “think”, another source of

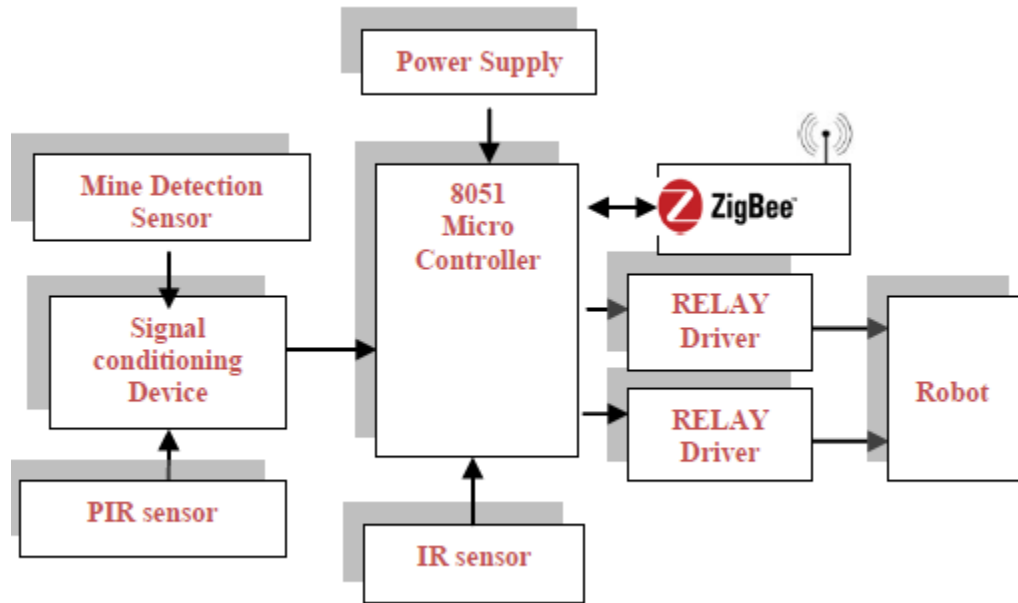


Fig.2. Block diagram of robot section

contention which we cannot fully engage here. By “think”, what we mean is that the machine is able to process information from sensors and other sources, such as an internal set of rules either programmed or learned, and to make some decisions autonomously.

2. ARCHITECTURE OF RESCUE ROBOT

A micro-controller is a low-cost processor. Its main attraction is that on the chip itself, there will be many other components such as memory, serial communication interface, analog-to-digital convertor etc. So, for small applications, a micro-controller is the best choice as the number of external components required will be very less. On the other hand, microprocessors are more powerful, but you need to use many external components with them. B.

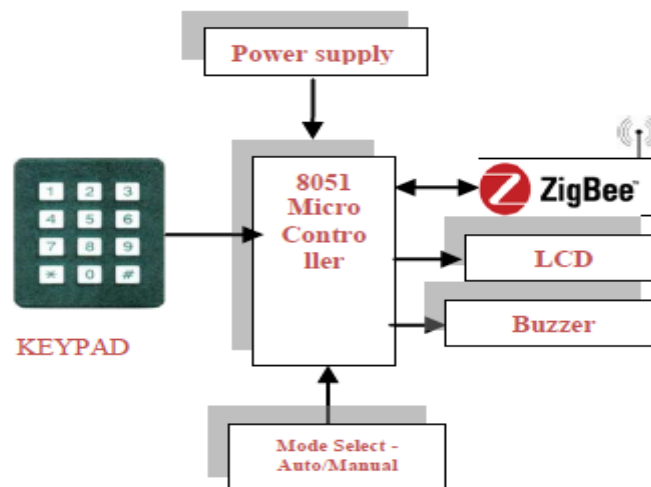


Fig.2. Block diagram of control section

Input Devices Unlike the desktops, the input devices to an embedded system have very limited capability. There will be no keyboard or a mouse and hence interacting with the embedded system is no easy task. Many embedded systems will have a small keyboard- you press one key to give a specific command. The output devices of the embedded systems also have very limited capability. Some embedded systems will have a few Light Emitting Diodes (LEDs) to indicate the health status of the system modules, or for visual indication of alarms. A small Liquid Crystal Display (LCD) may also be used to display some important parameters. In the present days Automated systems have less manual operations, flexibility, reliability and accurate. Zigbee is new wireless technology guided by IEEE 802.15.4 Personal Area Network standard. It is primarily designed for the wide ranging controlling applications and to replace the existing non-standard technologies. It currently operates in 868MHz band at a data rate of 20Kbps in Europe, 914MHz band at 40kbps in USA, and 2.4GHz ISM bands worldwide at a maximum data-rate of 250kbps. A sensor (also called detector) is a converter that measures a physical quantity and converts it into a signal which can be read by an observer or by an (today mostly electronic) instrument. For example, a mercury-in-glass thermometer converts the measured temperature into expansion and contraction of a liquid which can be read on a calibrated glass tube. A thermocouple converts temperature to an output voltage which can be read by a voltmeter. For accuracy, most sensors are calibrated against known standards. Sensors are used in everyday objects such as touch sensitive elevator buttons (tactile sensor) and lamps which dim or brighten by touching the base. There are also innumerable applications for sensors of which most people are never aware. Applications include cars, machines, aerospace, medicine, manufacturing and robotics. A sensor is a device which receives and responds to a signal when touched. A sensor's sensitivity indicates how much the sensor's output changes when the measured quantity changes.

3. HARDWARE IMPLEMENTATION

Heart of our robot is Atmel's AT89S51 [5]. Microcontroller acts as master controller, decodes all the commands received from the transmitter and give commands to slave microcontroller. It also acts as Slave microcontroller which is responsible for executing all the commands received from the master and also generating PWM pulses for the speed control. In this circuit 8051 microcontroller is used. It is divided into four ports, port 1, 2 are the general I/O ports for producing the input and output connection between the controller and I/O devices. Keypad is the input device for the controlling section in order to produce the input instruction to the controller. Here, in this mode, the user has the full control of the robot. The user can control the robot from the remote location by using this keypad. Port 2 (from 8-15) which is also an I/O port is interfaced with the LCD for getting the output. The inputs from the microcontroller are fed through the pin 7-14. MAX 232 is used to interface the Zigbee with the microcontroller and it helps to produce the serial communication between them. MAX232 is a dual driver/receiver and typically converts the received/transmitted signals and finally gives the information to the Zigbee. ZIGBEE is the transceiver (transmitter/ receiver). The information from the manual key is given to the microcontroller. The controller processes the received signal and is given to the Zigbee with the help of MAX232 which is transmitted to the robot section. It is the heart of the system which controls all the activities of transmitting and receiving. The IC used is AT89c51. The AT89c51 [6] is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with

in-system programmable Flash on a monolithic chip, the Atmel AT89c51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

4. RESULTS AND DISCUSSION

This paper consists of two sections. One is Robot section and the other is Control section. In robot section, the sensors regarding the respective parameters are made to available such as temperature sensor, IR sensor and PIR sensor etc. In the Control section, the parameters are displayed on PC. In Robot and control sections, microcontroller forms the control unit.

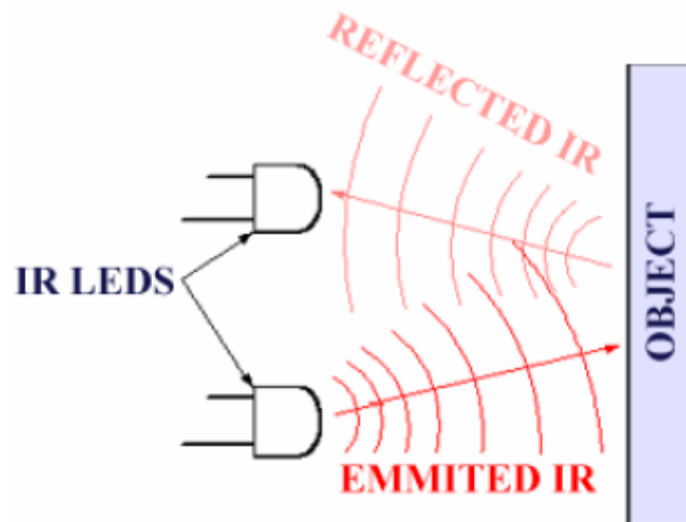


Fig.3.IR Sensor

In this system, a robot is fitted with motors. A microcontroller is used to control all operations. According to the motor operations the ROBOT will operate in specified directions. The detection of parameters is done in a continuous manner and the detected value is transmitted using the Zigbee transceiver to the Control section. Then at the control section, it receives the data with the help of Zigbee transceiver and these data is displayed in the PC and if any live human is detected, the message will be displayed on PC. Robot keeps on moving in two modes i.e., Manual mode and self-mode. It's brought under user's control in the case of manual mode. In self- mode, robot starts moving over surface and takes action according to the scenario. To detect the obstacles, we have deployed Infrared sensors (left sensor and right sensor) in the front portion of the module. While moving on the surface, if the left sensor is detected, robot takes back the position for a moment and moves right. If the right sensor is detected, robot gets back and moves left.

CONCLUSION

This paper "Rescue Robotics Using Artificial Intelligence" has been successfully designed and tested. Integrating features of all the hardware components used have developed it. Presence of all reasoned out and placed carefully thus contributing to the best working. The controller makes use of a PIR based input sensor to sense the human being and give us an alert indication. Also use of a Temperature sensor leads to identify the fire. Hence this paper provides best solution for the live human detection for who need help and also finds the fire. As we all know, these days India is sick off massive terror attacks, bomb explosions at plush resorts. To avoid such disasters power must exceed HUMAN power. Human life and

time are priceless. It's our onus to take an initiative to design a model of an apt robot that meets combatant needs. So to avoid terror attacks, to ensure more security at the border and high density areas it's wise to maintain a world class military technology in accordance with combatant needs. Even every nation needs its own defense system for their integrity and security. In such a way construction of these robots will carry nation's name, fame globally.

REFERENCES

- [1] Patrick Lina,^{*,1} Keith Abney^{bb,c,2} George Bekey^{a,3} "Robot ethics: Mapping the issues for a mechanized world"
- [2] George Bekey, "Autonomous Robots: From Biological Inspiration to Implementation and Control", MIT Press, Cambridge, MA, 2005.
- [3] Mr. M. Arun Kumar, Mrs. M. Sharmila "Wireless Multi Axis ROBOT for Multi-Purpose Operations", Department of ECE, SVCET & JNT University Anantapur, India.
- [4] Dr. S. Bhargavi, S. Manjunath, "Design of an Intelligent Combat Robot for war fields", Department of Electronics and Communication Engineering, S.J.C.I.T, Chikballapur, Karnataka, India
- [5] www.Atmel.com
- [6] Atmel data sheets http://www.keil.com/dd/docs/datashts/atmel/at89s51_ds.pdf.
- [7] Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", 8th Edition, 2006.
- [8] Pete Miles & Tom Carroll, Build Your Own Combat Robot, (2002).