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FIRE ALARM BASED OBSTACLE AVOIDING AND BLUETOOTH CONTROLLED ROBOT

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Abstract - *This project aims to develop a fire alarm-based obstacle-avoiding and Bluetooth-controlled robot. The robot is designed to detect fires, navigate its environment while avoiding obstacles, and be controlled remotely via Bluetooth. By combining these features, the robot can autonomously detect and respond to fires while providing a convenient means of control. The hardware components of the robot include a chassis, wheels or tracks for mobility, motors, a microcontroller or single-board computer, fire sensors, obstacle detection sensors (such as ultrasonic or infrared sensors), and a Bluetooth module for wireless communication. The fire detection system is responsible for monitoring the environment and triggering an alarm or alert when a fire is detected. The obstacle avoidance system utilizes sensors to detect obstacles in the robot's path and employs appropriate maneuvers to avoid them. By combining these features, the robot can autonomously detect and respond to fires while providing a convenient means of control. In autonomous mode, the robot operates independently, detecting fires and navigating obstacles. In manual mode, the user can direct the robot's movements and control its actions using a Bluetooth-enabled device.*

1.INTRODUCTION

These days machines have turned out to be fundamental parts of human life and robots are composed so as to limit the inconveniences in this manner making life simple. Robots are utilized as a part of assortment of fields keeping in mind the end goal to limit the challenges like medicinal, space investigation, submerged investigation, protection and humanoid robots. PDAs are cell phone based on a portable processing stage, with cuttingedge figuring and network highlights. These are substantially more moderate and viable to use in nowadays thus there are greater headway in cellphone innovation. Step by step people are investigating better approaches to convey and control machine since their dominant part of day by day life manages machines. Current advanced mobile phones are implanted withdifferent sorts of sensor like accelerometer, whirligig, vicinity sensor, light sensor and so on and fueled by different working framework likeapple IOS, Blackberry OS, Windows OS, BADA, Symbian, Android, Web-OS and so forth. Among them Android utilization is exceptionally basic nowadays in versatile world. For association advanced mobile phones have Wi-Fi module, Bluetooth modules. We are focusing on this correspondence module keeping in mind the end goal to convey and control our portable robot most especially bluetooth. Here information are exchanged serially to our putting out fires versatile robot by means of bluetooth correspondence module which is now introduced on advanced mobile phones utilizing an android application. In view of the got information the controller plays out a specific activity suitable to the information got.

1.1 EXISTING SYSTEM:

Current fire alarm systems primarily focus on detecting smoke or heat to trigger alerts and activate sprinkler systems or alarms. These systems are crucial for fire safety but typically do not include autonomous robot functionalities for obstacle avoidance or remote control.

1.2 PROPOSED SYSTEM:

The proposed system integrates a fire alarm-based obstacle avoiding and Bluetooth-controlled robot. This robot will be equipped with sensors to detect obstacles and navigate autonomously in environments affected by fire or smoke. The system will also include Bluetooth connectivity for remote control operations, allowing fire fighters or rescue personnel to guide the robot's movements and access real-time video or sensor data from the robot's perspective. This integrated approach aims to enhance fire fighting efforts by providing safer and

more effective reconnaissance and obstacle clearance capabilities in hazardous conditions.

PROJECT DESCRIPTION

An embedded system can be defined as a computing evice that does a specific focused job. Appliances such as the air-conditioner, VCD player, DVD player, printer, fax machine, mobile phone etc. are examples of embedded systems. Each of these appliances will have a processor and special hardware to meet the specific requirement of the plication along with the embedded software that is executed by the processor for meeting that specific requirement. The embedded software is also called "firm ware". The desktop/laptop computer is a general-purpose computer. You can use it for a variety of applications such as playing games, *word* processing, accounting, software development and so on. In contrast, the software in the embedded systems is always fixed listed below: · Embedded systems do a very specific task, they cannot be programmed to do different things. . Embedded

systems have very limited resources, particularly the memory. Generally, they do not have secondary storage devices such as the CDROM or the floppy disk. Embedded systems have to work against some deadlines. A specific job has to be completed within a specific time. In some embedded systems, called real-time systems, the deadlines are stringent. Missing a deadline may cause a catastrophe-loss of life or damage to property. Embedded systems are constrained for power. As many embedded systems operate through a battery, the power consumption has to be very low. · Some embedded systems have to operate in extreme environmental conditions such as very high temperatures

and humidity.

Overview of Embedded System Architecture

Every embedded system consists of custom-built hardware built around a Central Processing Unit (CPU). This hardware also contains memory chips onto which the software is loaded. The software residing on the memory chip is also called the 'firmware'. The embedded system architecture can be represented as a layered architecture as shown in Fig. The operating system runs above the hardware, and the application software runs above the operating system. The same architecture is applicable to any computer including a desktop computer. However, there are significant differences. It is not compulsory to have an operating system in every embedded system. For small appliances such as remote control units, air conditioners, toys etc., there is no need *for* an operating system and you can write only the software specific to that application. For applications involving complex processing, it is advisable to have an operating system. In such a case, you need to integrate the application software with the operating system and then transfer the entire software on to the memory chip. Once the software is transferred to the memory chip, the software will continue to run *for* a long time you don't need to reload new software.

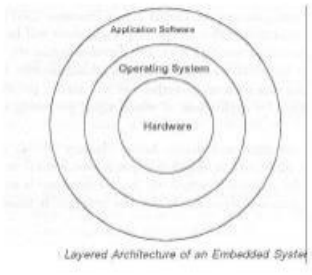
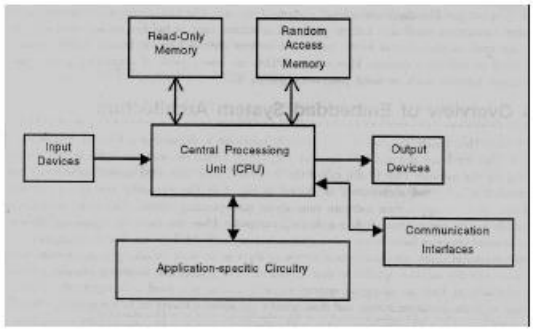
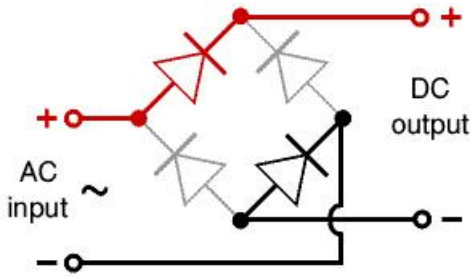


Fig -1: Layerd Embedded System Architecture

Now, let us see the details of the various building blocks of the hardware of an embedded system. As shown in Fig. the building blocks are;

- Central Processing Unit (CPU)6
- Memory (Read-only Memory and Random Access Memory)
- Input Devices
- Output devices
- Communication interfaces
- Application-specific circuitry





2.TRANSFORMER

Transformers convert AC electricity from one voltage to another with little loss of power. Transformers work only with AC and this is one of the reasons why mains electricity is AC. Step-up transformers increase voltage, step-down transformers reduce voltage. Most power supplies use a step down transformer to reduce the dangerously high mains voltage (230V in India) to a safer low voltage. The input coil is called the primary and the output coil is called the secondary. There is no electrical connection between the two coils; instead they are linked by an alternating magnetic field created in the soft-iron core of the transformer. Transformers waste very little power so the power out is (almost) equal to the power in. Note that as voltage is stepped down current is stepped up.

The transformer will step down the power supply voltage (0-230V) to (0- 6V) level. Then the secondary of the potential transformer will be connected to the bridge rectifier, which is constructed with the help of PN junction

diodes. The advantages of using bridge rectifier are it will give peak voltage output as DC.

BRIDGE RECTIFIER

When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners. Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4.

3. CONCLUSIONS

At first you can switch on the robot button. Open the application on the mobile phone and connect its Bluetooth

to robot (Bluetooth module HC 05).Place the camera on robot then we can connect the camera to handset through IP address and used it to see the situation in thefire field. It sense the temperature, if the temperature raised the limited temperature value then robot detects there is fire then robot take the action and sprinkles the water to extinguish the fire. When the robot detects as obstacle then robot take action and goes back.

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