Blind Man Protection System Using Embedded System

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Abstract - The main objective of this project is to develop an embedded system, which is used as blind man protection system to detect the obstacles using ultrasonic sensor. A blind man protection device is to protect against misshapenness such as automobiles collisions, obstacles, and accident that leads to great loss of human lives and can have disastrous results. Technology used for this purpose worked by detecting the other automobiles, obstacles and bystanders. This project is designed for blind people to avoid obstacles. Here, an ultrasonic sensor is used to detect any obstruction and it in turn signals the microcontroller. Whenever the obstacle comes near the stick an ultrasonic sensor senses the obstacle and signals to the microcontroller and in turn the microcontroller will on the voice chip. The detector circuitry consists of two way ultrasonic integrated detection. The detector houses the transmitter as well as receiver. The detectors are positioned on the blind man stick. Once the detector recognizes any obstacle, the microcontroller signals and in turn on the sensor which is interfaced to the microcontroller. The system uses a compact circuitry build around flash version of AT89S52 microcontroller with a non-volatile memory.

Keywords - Microcontroller, Transmitter

I. INTRODUCTION

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market. An embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded & lower end embedded systems. High-end embedded system - Generally 32, 64 Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc .Lower end embedded systems - Generally 8,16 Bit Controllers used with an minimal operating systems and hardware layout designed for the specific purpose.

A. Characteristics of Embedded System

- An embedded system is any computer system hidden inside a product other than a computer.
- They will encounter a number of difficulties when writing embedded system software in addition to those we encounter when we write applications
- Throughput – Our system may need to handle a lot of data in a short period of time.
- Response–Our system may need to react to events quickly
- Testability–Setting up equipment to test embedded software can be difficult
- Debugability–Without a screen or a keyboard, finding out what the software is doing wrong (other than not working) is a troublesome problem
- Reliability – embedded systems must be able to handle any situation without human intervention
- Memory space – Memory is limited on embedded systems, and you must make the software and the data fit into whatever memory exists
- Program installation – you will need special tools to get your software into embedded systems
- Power consumption – Portable systems must run on battery power, and the software in these systems must conserve power
- Processor hogs – computing that requires large amounts of CPU time can complicate the response problem
- Cost – Reducing the cost of the hardware is a concern in many embedded system projects; software often operates on hardware that is barely adequate for the job.
- Embedded systems have a microprocessor/ microcontroller and a memory. Some have a serial port or a network connection. They usually do not have keyboards, screens or disk drives.

Password Based Door Lock System is designed using ARDUINO UNO where in once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. Password Based Door Lock

System using Arduino UNO is a simple project where a secure password will act as a door unlocking system. Old fashioned lock systems use mechanical locking and these can be replaced by new advanced techniques of locking systems. These methods are a combination of mechanical and electronic devices and are highly intelligent. One of the distinct features of these intelligent lock systems is their simplicity and high efficiency. Such an automated lock system consists of electronic control assembly, which controls the output load through a password. The example of this output load can be a motor or a lamp or any other mechanical/electrical load. Here, we made an electronic code lock system using Arduino UNO, which provides control to the actuating the load. It is a simple embedded system with takes input from the keyboard and the output being actuated accordingly..This system demonstrates a Password based Door Lock System using Arduino UNO, wherein once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. If another person arrives, it will ask to enter the password again. If the password is wrong, then door would remain locked, denying access to the person. Main idea behind this project is of a door-latch opening using a password entered through keypad. As well as turning on the Buzzer when passcode is entered wrong for multiple times. User can modify this password anytime he/she wishes using a keypad. The main component in the circuit is Arduino UNO which is basically used to send a text message to owner of the house about the breach of security. 4*4 keypad is used to enter the password. The entered password is compared with the known password. If it is correct password, the system opens the door by servo motor and displays the status of door on LCD. If the password is wrong then door remains closed and displays "WRONG PASSWORD" on LCD.

B. Applications

- Military and aerospace embedded software applications
- Communication Applications
- Industrial automation and process control software

1) Mastering the complexity of applications.
2) Reduction of product design time.
3) Real time processing of ever increasing amounts of data.
4) Intelligent, autonomous sensors.
5) Hard Real Time Systems
6) Soft Real Time System

C. Hard Real Time System

1) "Hard" real-time systems have very narrow response time.
2) Example: Nuclear power system, Cardiac pacemaker.

D. Soft Real Time System

1) "Soft" real-time systems have reduced constrains on "lateness" but still must operate very quickly and repeatable.
2) Example: Railway reservation system – takes a few extra seconds the data remains valid.

II. OVERVIEW OF EMBEDDED SYSTEM ARCHITECTURE

1) 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 Figure.
2) 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.
3) 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;

III. CENTRAL PROCESSING UNIT (CPU)

The Central Processing Unit (processor, in short) can be any of the following: microcontroller, microprocessor or Digital Signal Processor (DSP). 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 converter 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.

D5P is used mainly for applications in which signal processing is involved such as audio and video processing.

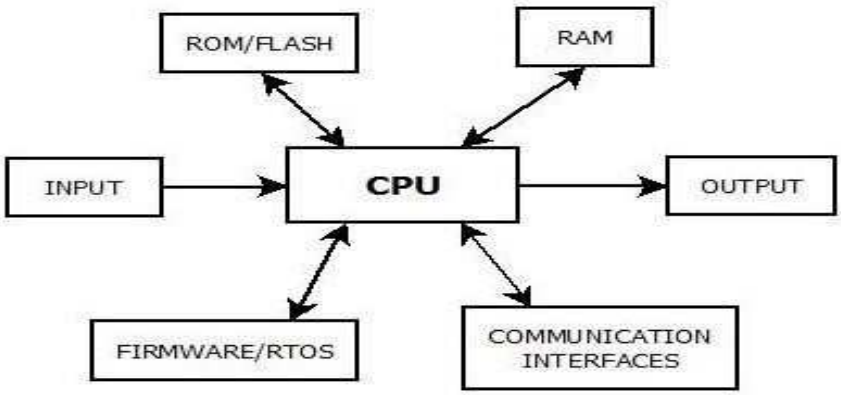

Fig. 2. Block Diagram

A. Memory

The memory is categorized as Random Access 11emory (RAM) and Read Only Memory (ROM). The contents of the RAM will be erased if power is switched off to the chip, whereas ROM retains the contents even if the power is switched off. So, the firmware is stored in the ROM. When power is switched on, the processor reads the ROM; the program is program is executed.

B. Applications

- Some more applications like vehicle detection, slippery floor, on-coming vehicle detection and fire or smoke alarm can also be included.
- One more application is for the family members to gain access to the blind person‟s location through the server whenever needed.
- Also, use of RFID tags will transmit the location information automatically to the PCB unit when the intelligent stick is in its range

IV. CONCLUSION

The project proposed the design and architecture of a new concept of Navigation of blind person using ultrasonic sensors. The advantage of the system lies in the very fact that it is cost efficient and brings solution to millions of blind people worldwide. The proposed combination of various working units makes a real-time system. It can be further improved to have more decision making capacity by employing varied type of sensors and thus could be used for different applications. It aims to solve the problems faced by blind people in their daily life. It also ensures to maintain safety

V. FUTURE SCOPE

It can be further enhanced my using VLSI technology to design the PCB unit. This makes it further more compact. Also the use of RFID tags will transmit the location information automatically to PCB unit , when the intelligent stick is in its range. The global position of the user is obtained using the Global Positioning System (GPS) and their current position and guidance to their destination will be given to the user by voice.

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