ORIGINAL RESEARCH PAPER

Engineering

KEY WORDS: Disabled people, Zigbee, Atmega8, voice recognisation, 8051microcontroller.

ZIGBEE BASED HOME APPLIANCE CONTROL USING VOICE RECOGNITION FOR DISABLED PEOPLE

D.Gayathri Assistant Professor/EEE & IFET College of Engineering Villupuram

K.Mukundan* Department of EEE & IFET College of Engineering Villupuram *Corresponding Author

ABSTRACT

Now a days, the automatic control of home appliances highly demand for that modern society.in my work ,I had designed a system which will be helpful for the differently abled people .it can be operated by either keypad (or) through voice note. A low cost remote controller for activating the home appliances using ZigBee has been designed and implemented Atmega8 microcontroller used for remote section and an 8051 microcontroller used for the device section, together with a voice recognition kit have been employed in the system and the recorded voice is used for guiding the operator. With the advent of this technology, household operations would become much simpler for the disabled people.

INTRODUCTION

The world has become a global village due to revolution in the technology; in this revolution the Information technology plays an important role. Home automation system has been around for more than a decade. The main concept is to form a network connecting the electrical and electronic appliances in a house which is suitable for disabled people. According to a report published by the World Health Organization (WHO) around 785 million people of 15 years and older live with disability. The main aim of the paper is to design a low cost device which reduces the difficulty in functioning of the home appliances for physically challenged in a best possible way.

Home automation use microprocessor-based intelligence to integrate or control electronic products and systems in the home. The incentive behind home automation is efficient utilization of electricity. In this paper a method is devised which control the home appliances through (a) voice recognition (voice commands) for blind, (b) by pressing the appropriate buttons where a recorded voice would run behind in guiding the disabled and (c) LCD display. Such application is developed using ZigBee.

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. An advanced technology for guiding the people in usage of the device is used. A recorded voice is interfaced which runs on pressing the buttons. C.Abhishek Vichare et al (2012) presented a paper on 'Home Appliances Control using Embedded Web Server'. IEEE Transactions on Industrial Electronics, Vol.56,No.4,pp.11471157 [1].

AbuFarzan Mitul et al (2012) presented a paper on 'Microcontroller Based Remote Control of Home Appliances'. IEEE Transaction on Industrial Electronics, Vol.55, No. 2, pp.813-846 [2].

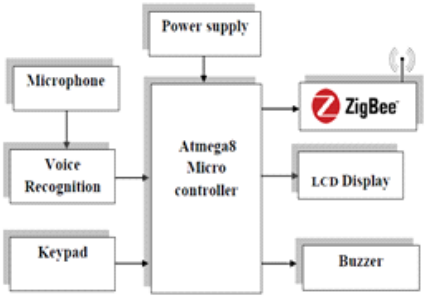

Figure 1: Block diagram for Remote section

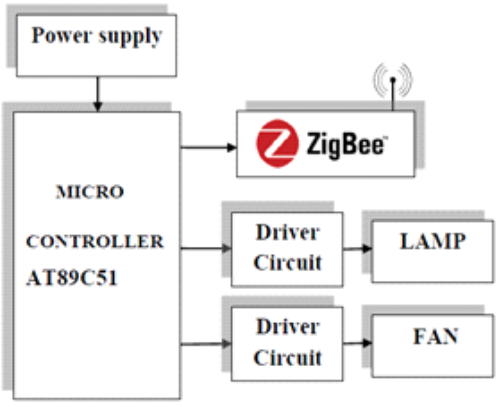

Figure 2: Block diagram for Device section

The block diagram of remote section using Atmega 8Micro controller. The two input commands that is voice command and keypad is given to the Micro controller unit. The processed commands are displayed using LCD display unit and announced through buzzer. Using ZigBee the signal from the voice recognition kit is transmitted to microcontroller of device section.

DESCRIPTION OF COMPONENTS

Power supply unit

The supply of 5V DC given to the system, which is converted from 230V AC supply. Firstly, the step down transformer used here is for converting the 230V AC into 12V AC. The microcontroller will support only the DC supply, so the AC supply is converted to DC using the bridge rectifier.

Microcontroller Unit

Microcontroller is used for triggering the gate pulses of the MOSFETs and for controlling those pulses so that the MOSFETs are turned ON and OFF in the desired sequence.

A micro controller is an integrated circuit or a chip with a processor and other support devices like program memory, data memory, I/O ports, serial communication interface are integrated together. Unlike a microprocessor (ex: Intel 8085), a microcontroller does not require any external interfacing of support devices.

Atmega8 microcontroller

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pinout.

TABLE – 1 MAXIMUM RATINGS OF AT89C51

Operating temperature	-55 o C to +125 o C
Storage temperature	-65 o C to +150 o C
Voltage at any pin with respect to ground	1.0 V to 7.0 V
Maximum operating voltage	6.6V
DC output current	15.0 mA

Zigbee

ZigBee is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power, wireless sensor networks. The ZigBee module acts as both transmitter and receiver. The main advantage of using ZigBee is that it can transmit the signal over a distance of 10 to 100 meters.

ZigBee operates on the IEEE 802.15.4 specification and is used to create networks that require a low data transfer rate, energy efficiency and secure networking. It is employed in a number of applications such as building automation systems, heating and cooling control and in medical devices.

Device Driver Circuit

A device driver is a program that controls a particular type of device that is attached to our computer. It is mainly used to convert the general input/output instructions of the operating system into the messages that the devices can understand.

Software Unit

Software is used to compile the coding of the desired application for the corresponding embedded system. This is the embedded C compiler which is compatible for the 8051 microcontroller to compile the code. Keil Software makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, and evaluation boards for the 8051, 251, ARM, and XC16x/C16x/ST10 microcontroller families.

Voice Recognition

The speech recognition system is a completely assembled and easy to use programmable speech recognition circuit. Programmable, in the sense that you train the words (or vocal utterances) you want the circuit to recognize. This board allows you to experiment with many facets of speech recognition technology. It has 8 bit data out which can be interfaced with any microcontroller for further development. Some of interfacing applications which can be made are controlling home appliances, robotics movements, Speech to text translation.

Display Unit

A Liquid Crystal Display (LCD) is a flat panel display, electronic visual display or video display that uses the light modulating properties of Liquid Crystals (LCs). LCDs do not emit light directly. The main use of this is to view the operation going on the remote section. The main use of this is to view the operation going on the remote section.

PROGRAM FOR MICROCONTROLER

```
#include<pic.h>
void delay1(int dtd)
{
unsigned int m,n,o;
for(m=0;m<dtd;m++)
{
for(n=0;n<1000;n++) //1 sec
{
for(o=0;o<50;o++);
}
}
}
main()
{
TRISD4=1;RD4=1;
TRISD5=1;RD5=1;
TRISD6=1;RD6=1;
TRISD7=1;RD7=1;
{
if(!RD4)
{
while(1) //forward
{
RB4=0;RB5=1;
RB6=0;RB7=1;
//delay1(10);
if((!RD5)||(!RD6)||(!RD7))
break;
}
}
else if(!RD5)
{
while(1) //reverse
{
RB4=1;RB5=0;
RB6=1;RB7=0;
RB4=0;RB5=0;
RB6=0;RB7=1;
delay1(3);
RB4=0;RB5=0;
RB6=0;RB7=0;
}
else if(!RD7)
{
RB4=0;RB5=1;
RB6=0;RB7=0;
delay1(3);
RB4=0;RB5=0;
RB6=0;RB7=0;
}
}
}
```

This program used in the controller to recognize the voice command and control the home appliance through these voice command.

The output can be displayed in the system by using the eclipse software

HARDWARE IMPLEMENTAION

Figure 3: Implementation of Remote section

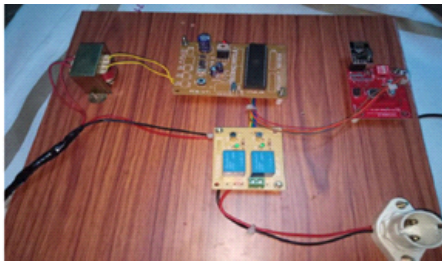

Figure 4: Implementation of device section

The remote section and device section has been implemented to satisfy the needs of disabled people

OUTPUT

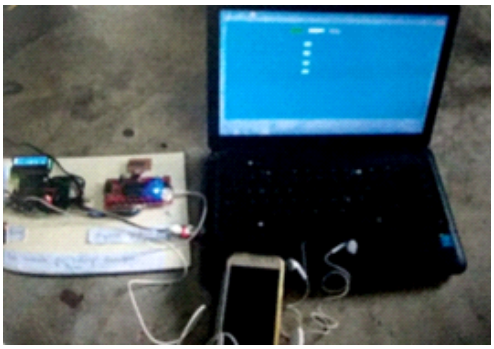

Figure 5: Output of the circuit

The output has been displayed in system

CONCLUSIONS

This paper has designing a circuit that enables easy operation of the household appliances that satisfies all needs of disabled people. The cost of the designing circuit is lesser than other circuits and microcontroller provides efficient control of the interfaced devices. The ZigBee which is used to transmit and receive signals provided low power consumption, high security and reliability

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