Rescue System for Visually Impaired Blind Persons

Bairoju Vishwa Rupa Chary[1], B Santosh Kumar [2]

[1]pursuing M.Tech (ES) , [2]Assistant Professor & HOD (ECE Department)

[1,2]Visvesvaraya College of Engineering and Technology (VCET), M.P.Patelguda, Ibrahimpatnam , RangaReddy, Telangana, INDIA

Abstract:-The purpose of this project is to provide the self-assistance for the visually impaired persons. In case of blind people fall in a critical position, the sensor network connected with microcontroller will senses the situation and passes the information to the caretakers. In this paper we proposed that GPS and GSM based navigation system for blind people with a Braille capacitive touch keypad. The reason behind choosing the Braille keypad is that blind people can't see the key digits, for that they need a touchable interface, with some symbols they will remember the input instructions on capacitive touch keypad. The navigation system consists of GPS for location finding along with wireless sensor nodes such as temperature sensor, ultrasonic sensor and accelerometer sensor. These sensors will be useful for monitoring the surrounding situations. Additionally we have a device control section which will be operated by using Braille touch keypad, the device control section of a microcontroller connected with the load devices as per our need. The AC devices such as bulbs, fans can be controlled to the controller through a relay.

*Keywords—***ARM 7 Microcontroller, Sensors, voice module,Touch keypad,GPSTechnology, and GSM Modem.**

I. INTRODUCTION

Now a day nearly 70% of Blind peoples face many problems like depends on other or else they used instrument called stick which is identify the path location near by area. In order to overcome that problem we proposed this project. In recent days the project has been proposed based GPS and RFID Technology. We can do in several ways to do this project depending upon advanced technology. We design a project for implementation of impaired blind person using modules like accelerometer, temperature sensor, ultrasonic sensor, voice module, GSM, GPS and KEYPAD. However, the project is suitable for blind people without using stick and can walk freely based on ultrasonic sensor. Therefore we have proposed a project is useful for impaired Blind persons.The accelerometer which is placed to human body used to sense motion of tilting direction depending upon person movement. The system can be implemented in various application like wearable navigation robot, blind people assistant ,home automation and wires device control etc. we control the

appliance's like fan, blub can be controlledthrough relay and as well as detect the obstacle when nearby area using ultrasonic sensor. By using voice module the person used to get information regarding corresponding values and controlled using microcontroller.

II. HARDWARE MODULE DESCRIPTION

User section:
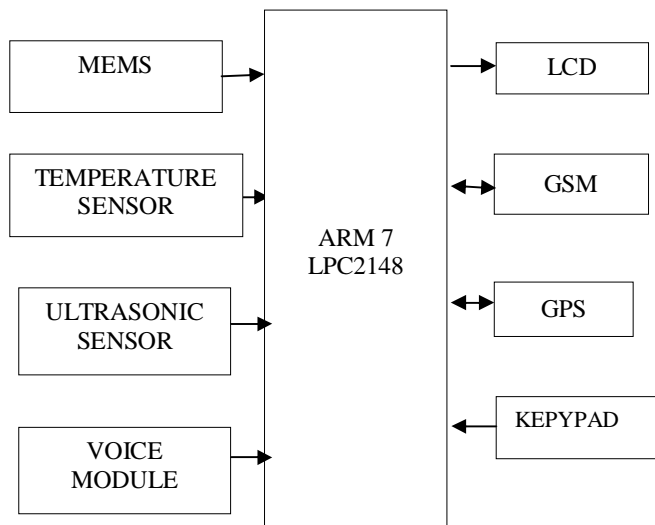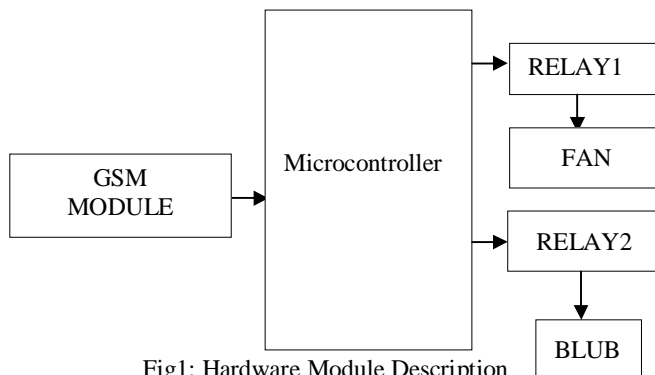

Device control section:

Fig1: Hardware Module Description

The Block diagram consists of several components like ARM 7 Microcontroller, voice module, ultrasonic sensor, LCD, MEMS sensor, temperature sensor, GSM and GPS.

GSM(Global system for mobile): It is a long distance communication device used to interact similar like our mobile phones. The modem is used for voice (call), send and receive depending upon require application. The ARM 7 have two serial ports i.e. UART0 and UART1.By using these two serial ports we are easy to communicate with GSM. We can simultaneously send and receive data to ARM 7 microcontroller and perform the task depending upon application. This Modem used to get alertness whenever accident occurs to a respective owner or hospital or police station.

MEMS Sensor: MEMS Technology is the fabricated Technology consists on a same chip is the combination of both mechanical and electrical function. The mechanical devices like moving, sensing a device and heating etc. it is made up of size in between   1 -100 meter .Generally, MEMS in the range from 20 mm to a 1 mm in size. MEMS are work under principle of capacitance technology. It consists of three axes depends upon to X, Y and z directions.

ARM 7 Microcontroller: It is 32 bit RISIC architecture and high advanced feature compare to different controller like 8051, AVR and PIC. It has inbuilt feature like 2 I2C, 2 SPI, ADC, 32 GPIO pins and 2 CAN etc. The power consumption is very less compare to different controllers like 8051, AVR and PIC i.e. 3.3v.The time consumption is less and perform efficient speed and reliability. It has integrated with several components compare to other controllers. It can Implementation in two modes. One is 32 bit ARM instruction set   and other is 16 bit THUMB instruction. Depending upon application used to operate 32 or 16 bit. All ports are used for both general input output pins like we can interface several sensor as I/O such as IR Sensor, LM35,LDR,obstacle detection and so on etc.This port are directly connected to ARM 7 depending upon application. It has 128/256 kB on-chip Flash Program Memory. The SD Card has inbuilt feature to store the database. It provided In-System Programming (ISP) and also In-Application Programming (IAP) via on-chip boot-loader software.

GPS: It is used to find the exact location and time in climate condition anywhere on the earth.The GPS module is arranged at baud rate 9600.It can interface with TTL/CMOS logic.
The detail protocol of NMEA:
1:GPVTG: Track Made Good and Ground
2: GPGGA - Global Positioning System Fix Data
3:GPGSV - GPS Satellites in view
4: GPGSA - GPS DOP and active satellite
5: GPRMC: Recommended minimum specific GPS/Transit data Speed.

III. SOFTWARE REQURIMENTS

Kiel µvision4 IDE:

It is used for writing embedded c program depending upon application. It includes integrated with compiler and assembler for running program in software. Standard libraries are used depending upon controller specification.

Flash Magic:

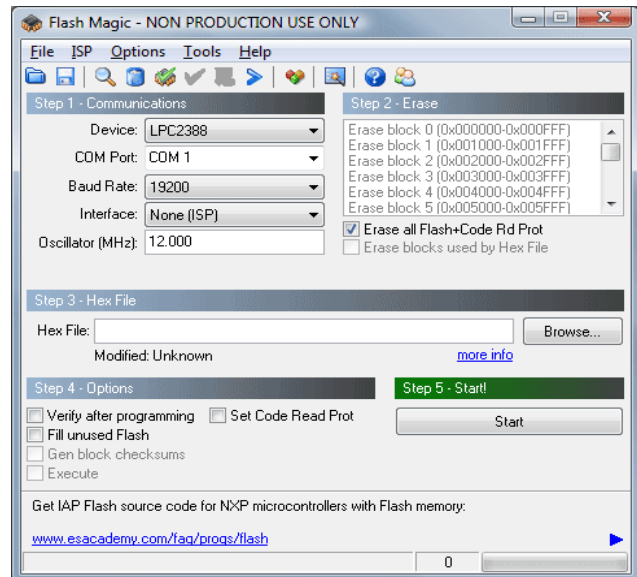Flash Magic is a programming flash basic controller. It is used for dumping purpose.

Fig 2: Simulation Result of program dumping hex file code in ARM 7 LPC2148.

IV WORKING

The system consists of two sections.one is user and other is device control section.

User Section:
          This section contains sensor nodes which includes temperature sensor, accelerometer sensor and ultrasonic sensor for monitoring the surrounding conditions of blind people. This sensor temperature sensor monitors the room temperature and gives the alert if the room temperature exceeding the limit. The ultrasonic sensor senses obstacle when the blind people walking in busy traffic or somewhere else. The Accelerometer sensor is to sense the tilt angle when any abnormal health conditions occurred to the blind people. A voice module is placed in this section for giving audible alert to the people. The GPS used for the location identification and GSM is for information passing. The braille touch keypad is used for the device control signalling. The following diagram describes the schematic representation of user section.
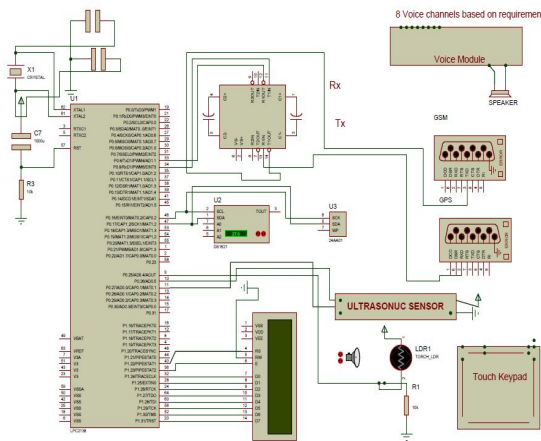
Fig 3: User Control Section

Device control section:

The device control section consists of relays and load devices to be controlled by the signal given by the user section. The system will be operated in two modes; one is Monitoring mode that is for sensing the conditions by using sensors and alerting according to that. Another one is device control mode, in this mode the system waits for input message from user section through GSM and the message text will be according to the load device to be controlled and the control will be given by braille touch keypad. The following diagram describes schematic representation of Device control section.
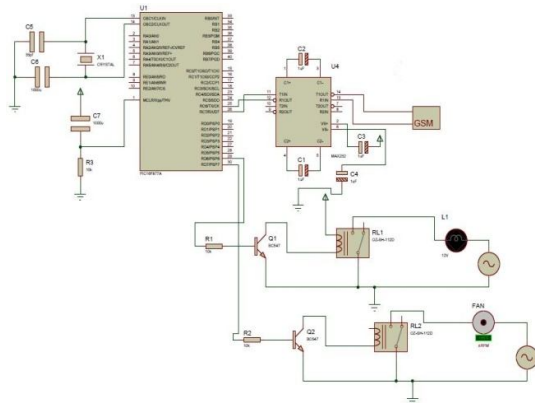

Fig 4: Device Control Section

V. CONCLUSION

To provide the self-assistance for the visually impaired persons the project has been implemented. The advantage of this project is to provide secure navigation for blind persons and it is easy way through control the different devices like fan and blub etc. In future we can maintain database and update the person information through Html sever.

VI.REFERENCES

1)Takeshi Ando, RyotaTsukahara, Masatoshi Seki, and Masakatsu G. Fujie, "A Haptic Interface "Force Blinker" for Navigation of the visually impaired", IEEE Transactions on Industrial Electronics, VOL. 59, NO. 11, November 2012.

2) PawelStrumillo, "Electronic Interfaces Aiding the Visually Impaired in Environmental Access, Mobility and Navigation", Rzeszow, Poland, May 13-15, 2010.

3) S. SaiSanthosh, T.Sasiprabha, R.Jeberson, "BLINAV Embedded Navigation System for Blind People"

4) A.R. Garcia, R. Fonseca, A. Duran, "Electronic long cane for locomotion improving on visual impaired people. A case study", Pan American Health Care Exchangess-PAHCE.Conference, Workshops, and Exhibits.Cooperation/Linkages.

5)EstebanBayro Kaiser, Michael Lawo,"Wearable Navigation System for the Visually Impaired and Blind People", IEEE, 2012.

6)S. Kammouna, G. Parseihian, O. Gutierrez, "Navigation and space perception assistance for the visually impaired-The NAVIG project", IRBM Vol. 33, 2012.

7)SinMurad, Abdullah Rehman, Arif Ali Shah, "RFAIDE – An RFID Based Navigation and Object Recognition Assistant for Visually Impaired People", IEEE, 2011.

8)A. R. García, R. Fonseca. A. Durán, "Electronic long cane for locomotion improving on visual impaired people. A case study", IEEE, 2011

9)MohdHelmyAbdWahab, Amirul A. Talib, A. Kadir, AyobJohari, A. Noraziah, Roslina M. Sidek, Ariffin A Mutalib, "Smart cane: Assistive cane for the visually impaired people", International Journal of Computer Science Issues, Vol. 8, Issue 4, No 2, July 2011.

VII. AUTHOR DETAILS

BairojuVishwaRupaChary , Pursuing M.Tech (ES) from Visvesvaraya College of Engineering and Technology (VCET), M.P.Patelguda, Ibrahimpatnam, RangaReddy, Telangana, INDIA

B.SanthoshKumar,working as Assistant Professor & HOD (ECE Department) from Visvesvaraya College of Engineering and Technology (VCET), M.P.Patelguda,Ibrahimpatnam, RangaReddy. He obtained Ph.D in Wireless Communications .He has morethan nine years of Experience in Teaching Field.