ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE
International Journal of Advanced Research in Computer and Communication Engineering
NCRICT-2017
Ahalia School of Engineering and Technology
Vol. 6, Special Issue 4, March 2017

Braille Text Messenger

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Abstract: Disabled people are an integral part of our society. India has the world's largest number of blind people. The technologies are developing day by day in communication field, especially in mobile phone which plays a crucial role in our life. The blind and deaf people face many problems to communicate with the outer world. That is visually and hearing impaired people are not able to use message applications in the mobile phones. This system introduces a new communication channel for the deaf blind and visually impaired people which consist of dissimilar subsystem providing services to improve the communication skillfulness of the visually impaired people. The proposed system is to help the blind and deaf person to use these applications through tactile communication. This project describes a bidirectional and bilingual translation system to facilitate communication.

Keywords: Braille system code, Vibration motor, Micro switches, Braille cell.

I. INTRODUCTION

"Access to communication in the widest sense is access to knowledge, and that is vitally important for us…. we do not need pity, nor do we need to be reminded that we are vulnerable. We must be treated as equals, and communication is the way we can bring this about" –Louis Braille 1841.

Louis Braille is the father of Braille system. Braille is a language system that uses pattern of raised dots to inscribe characters and numbers. Braille has become the most eminent tactile alphabet. Its characters are represented using six dot cells which give 64 possible characters.

To overcome the scarcity of accessible communication mediums and the challenges like cost, portability etc… "Braille – Text Messenger" is designed to send messages from mobile phones that can read by blind and deaf people and can reply back to the sender using Braille system.

Here we can implement this idea by the use of an embedded based system on PIC 16F877A micro controller which is the main part of the system It is a portable, simple, and versatile device for disabled ones that eases their difficulties in communication. The proposed system device offers the disabled people can access the message application as a normal one.

II. PROPOSED SYSTEM

The proposed system lets the disabled people read the messages and also helps people to send acknowledgement for the current incoming messages by interfacing Braille system with mobile phones.

Braille is a system that uses an aligned pattern of six raised dots to inscribe characters on paper. It therefore allows disabled people to read and write using tactile system. The BTM device use vibration motors to read the received messages and micro switch to reply messages back.

III. WHAT IS BRAILLE

Braille is a language system for reading and writing purposes for blind people found by Louis Braille in 1821. It contains raised dots arranged in "cells". A cell consists of six raised dots that lay under the fingertips, arranged in a 3*2 matrix. Letters, words, numerals or punctuation marks can be represented using each cell. Different letters can be represented by position of dots.

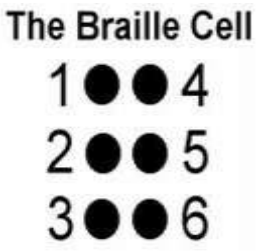

Fig. 1:Braille cell.

IV. BRAILLE REPRESENTATIONS

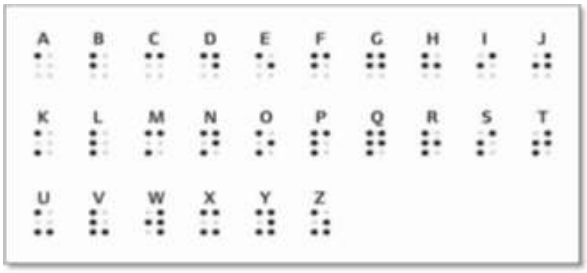

Fig. 2: Braille representations

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IV. BLOCK DIAGRAM

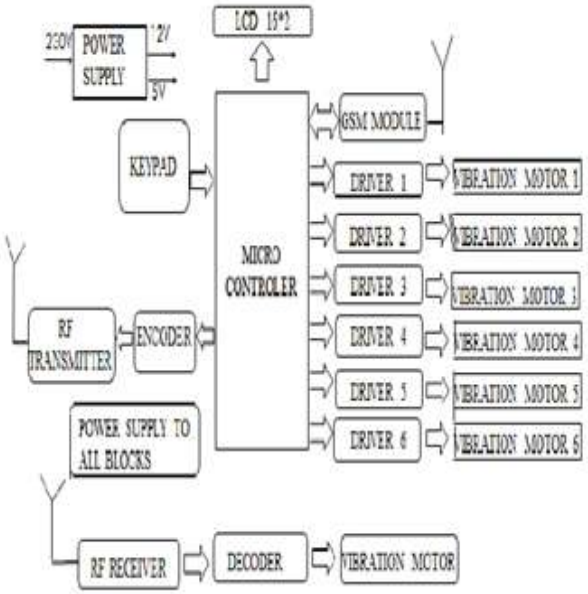

Fig. 3. Block diagram of Braille text messenger

The block diagram basically consists of three parts: input section, output section, and processing system.
The input section consists of:

- GSM modem
- RF module
- Power supply

The processing section consists of

- Microcontroller PIC 16F877A

The output section consists of

- Vibration motors
- LCD display
- Micro switches

A. MICROCONTROLLER-PIC16F877A
Gain The microcontroller used in this project is from PIC series.PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complementary metal oxide semiconductor) which make use of separate bus for instruction and data so as to allow access of program and data memory at a time.

Microcontrollers' offer various kinds of memories like EEPROM, EPROM, FLASH etc… Flash technology is used in PIC16F877A so that data is recovered even when the power is switched off. Easy programmings are the other features of PIC16F877A,

The main features of this microcontroller are;

- High – performance RISC CPU.
- Only 35 single word instructions to learn.
- All single cycle instructions except for program branches which are two cycle.
- Operating speed: DC- 20 MHz clock input.
- DC – 200ns instruction cycle

B. RF MODULE
RF module, as the name it operates at radio frequency. The frequency range varies between 30 kHz & 300 GHz. In RF system, the digital data is represented as variations in amplitude of carrier wave. This type of modulation is known as Amplitude Shift Keying (ASK). Transmission through RF is better than IR because, RF can travel through larger distances making it suitable for long range applications. RF signals can travel even when there is an obstruction between transmitter & receiver.
RF module comprises of an RF transmitter and an RF receiver. The transmitter/receiver pair operates at a frequency. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna. The transmission occurs at the rate of 1Kbps - 10Kbps.The transmitted data received by RF receiver operating at the same frequency as that of transmitter. The RF module is used along with a pair of encoder/decoder. The encoder is used for encoding parallel data for transmission while reception is decoded by the decoder.

C. GSM MODULE
GSM technology is one of the new technologies in the embedded field to make the communication between microcontroller and mobile. Today embedded system is used to communicate with other system using GSM and GPRS technology. In this project GSMMODEM is used to access the message sent by user to display in notice board.

D. LCD DISPLAY
Liquid crystal display is a thin, flat display device made up of any number of colour or monochrome pixels arrayed in front of a light source or reflector.

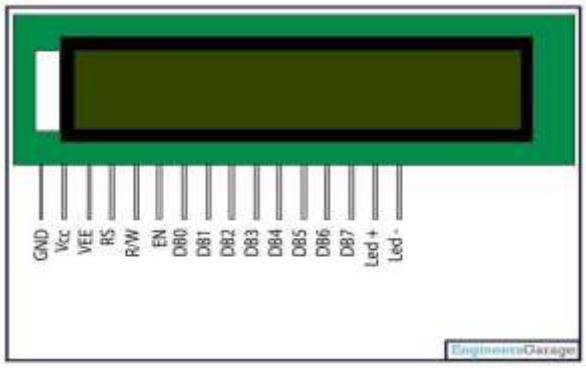

Fig. 4 LCD display.

LCD display helps user to manage operation easily. It is a 16X2 lines alpha numeric display unit displays all events which lead the operation. It receives input according to the information from the micro controller.

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E. VIBRATION MOTORS

There are two mainly two types of vibration motor. **An eccentric rotating mass vibration motor (ERM)** uses a small unbalanced mass on a DC motor, when rotates it creates a force and that translates to vibrations. **A linear resonant actuator (LRA)** contains a small internal mass attached to a spring, which creates force while operation..These days miniature vibrating motors are used in a wide range of products, such as tools, scanners, medical instruments, GPS trackers, and control sticks. Vibrator motors are also the main actuators for haptic feedback which is an inexpensive way to increase a product's value, and differentiate it from competition.

Fig. 5 Vibration motor

F. VIBRATION MOTOR DRIVERS

Vibration motor driver will decides the working of vibration motor. Here transistor works as vibration motor driver. BC 546 is used here as vibration motor.

G. BATTERY WITH RECHARGING SYSTEM

The circuit to work has to be provided with the power and is supplied to other blocks through the power supply section. Microcontroller and all other components get its power from battery. The battery can be recharged with a power supply.

H. POWER SUPPLY

Main building block of any electronic system is the power supply to provide required power for their operation. For the microcontroller, audio amplifier, keyboard, edge connector +5V is required. The power supply provides regulated output voltage of +5V, and non-regulated output voltage +12V.

I. KEYPAD

Fig. 6: Micro switch

A computer keypad is an input device used to enter characters and functions in computer system by pressing keys or buttons. Here micro switches are used to enter characters in Braille. It is called miniature snap action switches is a type of momentary contact switches used widely in industry, medical etc…

J. EMBEDDED C

Embedded C is a set of language extensions for the C programming language by the C standards committee to address commonality issues that exist between C extensions for different embedded system. Historically, embedded programming requires nonstandard extensions to the C language in order to support exotic features such as fixed point arithmetic, multiple distinct memory banks and basic I/O operations. Some of the functions are;

- To display Braille text, the sense board would fetch ASCII text from the removable memory.
- Send them to the control board via serial interface
- Control board will then convert the ASCII characters in to servo control signals to actuate the Braille pins.

V. WORKING PRINCIPLE

The circuit diagram consists of a PIC16F877A microcontroller. It acts as CPU. It is a five port microcontroller. It is a software controlled system also it is a high performance , CMOS 8 bit microcontroller with 8Kb words of flash programmable and erasable ROM. Software used here is EMBEDDED C. Braille –Text Messenger provides the facility for disable people to use message application very easy as normal ones. Here GSM is used to send as well as to receive the messages. Vibration motors will act as a Braille reading system. With the help of vibration motor driver present in circuit vibration motor performs the functions. Micro switches serve the purpose for Braille keypads.

VI. EXPECTED OUTPUT

Fig.7 Model graph

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VII. ADVANTAGES

- Less weight and flexible.
- User friendly.
- Require less power.
- Low cost
- Portable.
- Rechargeable.

VIII.DISADVANTAGES

- Chances of manual errors.
- Lack of privacy for slow readers.

IX. APPLICATIONS

- Braille – Text messenger is very useful for disabled like blind and deaf people.
- This serves as a communication link between physically challenged and normal people.
- This software can be used for all other languages too.
- This device helps to improve social inclusion.

X. CONCLUSION

Here the analysis shows that the blind and deaf people faces many distinct problems for communication with the outer world. Still now Braille technology is used by the blinds only for reading and writing purposes. Braille – Text Messenger is a device which solves the communication problems. By using BTM device the disabled person can read the received messages and can reply or send messages by interfacing braille system with BTM. The proposed system describes bilingual or bidirectional translation for communication. The BTM project uses Braille technology and the disable people can access the message application as a normal people.

XI. FUTURESCOPE

Future work may include the GPS module to help disabled people where ever they want to go by providing instructions to follow path. Text to Audio converter can be added for the visually impaired people to read the books by listening to them directly. This technique can also be used in various language translation. Vocabulary can be improved using flux sensors. The BTM device can make all other gadgets user friendly for physically challenged people too.

ACKNOWLEDGEMENT

Special thanks to our HoD, Mrs. **PRINCY PRINCE** and our guide **Mrs. PUSHPAKUMARI.R**. Assistant Professor, Department of ECE, Prime College of Engineering.

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