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Cost Effective Braille Text Messenger Using GSM and PIC Microcontroller

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ABSTRACT: According to preliminary analysis, it has been found that around 1.7 percent of India's population is disabled. Out of them, more than 0.22 percent are visually disabled (blind) people in India. This is the highest among all other disabilities. In day to day life there is tremendous change in technologies in various field, specifically mobile phone plays a significant role in our life. Blind and deaf people face many problems to communicate with the people far and near. That is visually and hearing impaired people are not able to use message applications in the mobile phones. This system is specially designed for the visually impaired people to communicate with other people. To give knowledge to the blind peoples of technology, our approach focused on design a Braille Text Messenger (BTM) system for them, it interface Braille pad with the GSM , PIC microcontroller. This project describes a bidirectional translation system to facilitate communication. The Braille system is designed to translate text to Braille and wise versa. With the help of micro vibrators visually impaired people can easily understand the received SMS. Micro switch can send text SMS to normal people. This whole system is controlled by PIC microcontroller.

KEYWORDS: Braille Text Messenger, Braille System, bidirectional translation system, vibration motor, micro switch, buzzer.

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. 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. In our regular life the telecommunication field plays a significant role. There is a complete revolution in the way we communicate, specifically long distance communication, Irrespective of all these advancement in the field of telecommunication, the physically impaired people have not that much amount of access as compared to normal peoples for these technologies.

The proposed work is based on inventing a messenger for the differently disabled set of Humans, who may not be in the position of using mobile phones for messaging or any other kinds of communicating devices, with the satisfactory comfort, which is known as application. 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

II. RELATED WORK

Disabled people are always an integral part of our society. A largest community of blind people is found in India. New 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 generallyface many problems while communicating with the outside world. This means visually and hearing impaired people are not able to use message applications in the mobile phones.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.

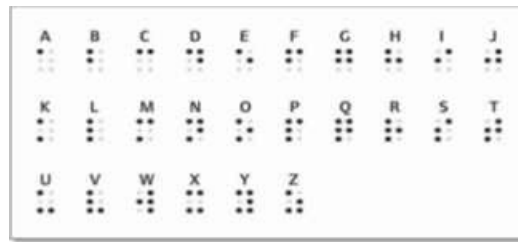


Fig. 1 BRAILLE LETTERS

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 skilfulness 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 translation system to facilitate communication.

Many researchers have worked in this area. Prof. Pushpakumari.R., Anila. V. K, Anjali. S, Greeshma. K.[1] found that the blind and deaf people face many distinct problems for communication with the outer world. Still now Braille technology is used by the blinds only for reading and writing purposes. They designed Braille Text Messenger (BTM), 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 their 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. Hansi Udupola, S R Liyanage,[2] designed 'Braille Messenger' as an integrated mobile application which was designed to send and receive text messages using Braille via short message service. Hand gesture recognition and touch screen facility is used in their work. This can support both blind and the blind-deaf communities also. The system enables a blind user to type with Braille when using any application on the phone. Apoorva Raghunandan and Anuradha M.R.[3], implemented a system using the microcontroller PIC16F877A, that uses fewer components, and was light weight and flexible, required less power and was easy to operate.

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 important tactile alphabet. Its characters are represented using six dot cells which give 64 possible characters. Mr.D. Vijaybharathi, et.al.[3]. designed a system which offers a way of communication for visually impaired people including writing and reading. They used GSM Modem, Micro vibrators, Micro switch, LCD, Battery power, Microcontroller, Shift registers.

III. METHODOLOGY

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 device use vibration motors to read the received messages and micro switch to reply messages back. Braille –Text Messenger provides the facility for disable people to use message application very easy as normal ones.

Braille Text Messenger (BTM) system includes PIC16F877A microcontroller, GSM, LCD, buzzer, motor driver, Vibration motors, micro switch, LEDs as shown in figure 2. PIC16F877A microcontroller is the heart of the system. It control all the system function. Here GSM is used to send as well as to receive the messages. Vibration motors and LED's will act as a Braille reading system. With the help of vibration motor driver present in circuit vibration motor performs the functions. The rated speed of the vibration motor is 12000 rpm with vibration amplitude 0.4 g. Micro switches serve the purpose for Braille keypads. The message received or generated will be display on LCD. When the message is received and transferred than beep is generated by the buzzer to indicate the message is transferred or received. To power up, all the 5V SMPS are connected and for motor driver 6V battery is connected. The block diagram of proposed model is shown in figure2.

As shown in the block diagram, microcontroller is the brain of this project. All components like LCD display, buzzer, GSM module, keypad, motor driver and vibration motors are connected to the respective port pins of controller.

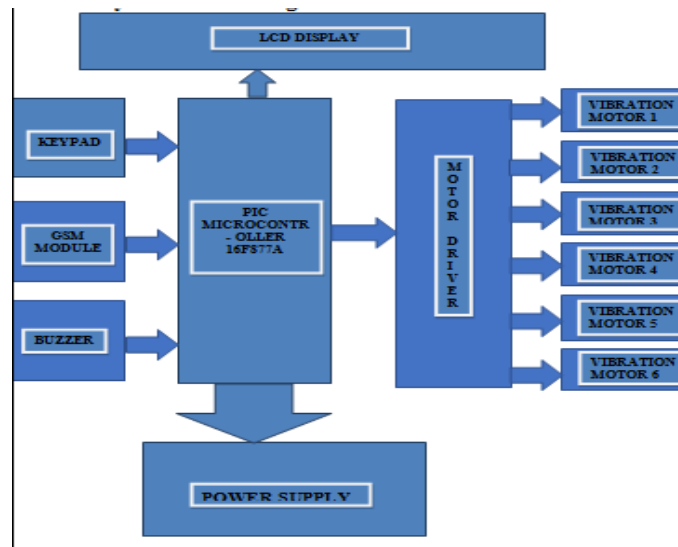


Fig 2. Block diagram of Proposed system

IV. EXPERIMENTAL RESULTS

LCD pins connected to port A and port E, port C was interface with motor driver ULN2003, port D connected to motor driver, vibration motor, LED's respectively, port B is connected to keypad. The hardware designed is shown in figure 3.

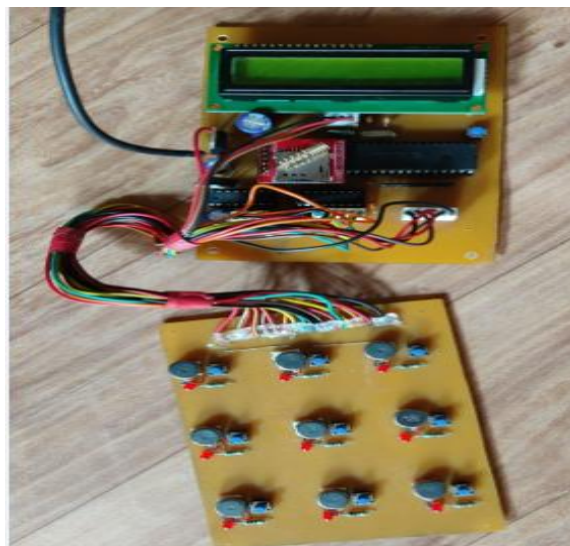


Fig. 3 System hardware

As per project flow, when the GSM module receive the message, the controller will generate a beep to indicate that message is received. The received message will be displayed on the LCD. According to the received character the controller will convert the alphanumeric later to Braille code and it will send to motor driver, and motors and LEDs will work according to code. When the message is generated by keypad, the generated message will be displayed on the LCD. According to the generated character the controller will convert the Braille code to alphanumeric later and it will send to motor driver, and motors and LEDs will work according to code. The controller will generate a beep to indicate that message is transmitted by GSM module. The algorithms used to send and receive the GSM messages is given as,

- **Read SMS system algorithm**

- a) Active the GSM module.
- b) Check whether the message is received or not from sender.
- c) If message not received.
- d) Wait until the message is received.
- e) If message is received
- f) Then display the message on LCD.
- g) And the buzzer will produce the sound.
- h) The alphanumeric character will be converted into Braille code.
- i) The motors and LED's will be on according to Braille data.
- j) Continue the above process for next message to be received.

- **Send SMS system algorithm**

- a) Type the message with the help of keypad.
- b) According to message character generated the motors and LED's will work.
- c) Then display the message on LCD.
- d) The Braille code will be converted into alphanumeric character.
- e) Transmit message to GSM module.
- f) The GSM module will transfer generated message to the receiver.
- g) Continue the above process for next message to be transmitted

V. CONCLUSION

We have implemented a low cost Braille Text messenger which is very useful for disabled like blind and deaf people. Some of the advantages of this work are listed below

- 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.
- This device is low cost and consumes less power

This Cost effective Braille Text Messenger is a device which solves the communication problems. By using our device the disabled person can read the received messages and can reply or send messages by interfacing braille system with mobile phones. The proposed project uses Braille technology and the disabled people can access the message application as a normal people.

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