Hardware Based Braille Pad on Mobile Phone

G.Devi Priya¹, N.Indumathi², N.Kalaimagal³, A.Suriya⁴, J.T.Vasuki⁵
U.G. Students, Dept. of Electronics and communication, Narasu’s Sarathy Institute of Technology, Salem, India¹,²,³,⁴
Assistant Professor, Dept. of Electronics and communication, Narasu’s Sarathy Institute of Technology, Salem, India⁵

ABSTRACT: In our day to day life the telecommunication technology plays an important role. It has completely revolutionaries the way we communicate, especially long distance communication. Despite of all these advancement in the telecommunication field, the physically impaired people have no access for these technologies. So as a step to bridge the gap between the blind people and the technological advancement in the telecommunication field we decided to design a SMS system for them by interfacing Braille pad with the cell phone so that dual impaired person can have the access to the SMS system and through which they can take important notes. Here the user sends the SMS to the blind person’s mobile number which is connected to the microcontroller which reads the SMS using GSM module through the AT commands and then converts the letters of the SMS into the Braille language using the lookup table in its memory. With the help of 6 relays Microcontroller vibrates the Braille pad on which the blind person can read the SMS. For sending a SMS, the microcontroller converts the typed Braille letter on Braille pad to the English alphabets using the Lookup table. Loud speaker is also used for making the voice announcement.

KEYWORDS: Braille pad, AT commands, GSM module, lookup table, bridges the gap.

I. INTRODUCTION

The telecommunication technology has become the integrated part of our day to day life. It has completely revolutionaries the way we communicate, especially long distance communication. Then there came the age of mobile communication which facilitates a great deal to communicate on a go. Mobile cell phones are the milestone in telecommunication technology. Despite of all these advancement in the telecommunication field, the physically impaired people have limited access for these technologies. So as a step to bridge the gap between the blind people and the technological advancement in the telecommunication field we decided to design a SMS system for them. We are designing a modular device which is accessible by blind person. For that we are using Braille language as the basis of the project. Blind people use the Braille language for reading and writing purpose. Till date they conventionally use Braille books. But it is not an economical way of communicating now a day. It has limitation on the maximum number of words per page and pages per book. So we are interfacing Braille pad with the cell phone so that impaired person can have the access to the SMS system. We are also providing voice announcement system with it as extra feature. Braille is named after its creator, Frenchman Louis Braille, who lost his eyesight due to a childhood accident.

PREVIOUS METHOD USING TO READING THE LETTER

Braille characters are small rectangular blocks called cells that contain tiny palpable bumps called raised dots. The number and arrangement of these dots distinguish one character from another. Since the various Braille alphabets
originated as transcription codes of printed writing systems, the mappings (sets of character designations) vary from language to language. Furthermore, in English Braille there are three levels of encoding: Grade 1, a letter-by-letter transcription used for basic literacy; Grade 2, an addition of abbreviations and contractions; and Grade 3, various non-standardized personal shorthand’s.

Braille is a tactile writing system used by the blind and the visually impaired. It is traditionally written with embossed paper. Braille-users can read computer screens and other electronic supports thanks to refreshable Braille displays. They can write Braille with the original slate and stylus or type it on a Braille writer, such as a portable Braille note-taker, or on a computer that prints with a Braille embosser.

Then many parents have difficulty educating their blind or visually impaired children. Teachers engaged in special education have to depend on Braille translator when marking Braille papers or assignments, so subjective factors are brought into the evaluation process. This system Braille characters from image taken by a high speed camera to Chinese character and at the same time automatically mark the Braille paper. Machine translation algorithm and image processing and recognition technology are used and improved in the system. Experiments show that methods described in this paper can effectively extract and identify Braille, and eventually translated into Chinese. Research results will have better prospects for application, and provide assistance to the visually impaired people.

Braille is named after its creator, Frenchman Louis Braille, who lost his eyesight due to a childhood accident. In 1824, at the age of 15, Braille developed his code for the French alphabet as an improvement on night writing. He published his system, which subsequently included musical notation, in 1829. The second revision, published in 1837, was the first digital (binary) form of writing.

Braille cells are not the only thing to appear in embossed text. There may be embossed illustrations and graphs, with the lines either solid or made of series of dots, arrows, bullets that are larger than Braille dots, etc. In the face of screen-reader software, Braille usage has declined. However, Braille education remains important for developing reading skills among blind and visually impaired children, and Braille literacy correlates with higher employment rates.
BRAILLE CODE:

\[
\begin{array}{cccccccc}
\text{a} & \text{b} & \text{c} & \text{d} & \text{e} & \text{f} & \text{g} & \text{h} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
\text{i} & \text{j} & \text{k} & \text{l} & \text{m} & \text{n} & \text{o} & \text{p} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
\text{q} & \text{r} & \text{s} & \text{t} & \text{u} & \text{v} & \text{w} & \text{x} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
\text{y} & \text{z} & & & & & & \\
\vdots & \vdots & & & & & & \\
\end{array}
\]

II DESCRIPTION

A SMS Read
Here the sender sends the SMS to the blind person’s mobile connected to the controller. The microcontroller reads the SMS through the AT commands and then converts the letters of the SMS into the Braille language using the lookup table stored in its memory. Then with the help of 6 relays the Microcontroller vibrates the Braille pad on which the blind person can read the SMS.

B SMS Send
Here the blind person can type the SMS using the key pad interfaced to the microcontroller. The microcontroller then converts the Braille letter to the English alphabets using the Look table. After the message is translated into alphanumeric English letters the microcontroller sends the typed SMS via the dedicated mobile using AT commands.

C Braille System
Braille is writing system which enables blind and partially sighted people to read through touch. It was invented by Louis Braille (1809-1852), who was blind and became a teacher of the blind. It consists of patterns of raised dots arranged in cells of up to six dots in a 3 x 2 matrix configuration.

Block Diagram:

Fig. 2: Block Diagram for hardware based Braille Pad
The proposed project consists of following modules
1. GSM interfacing module.
2. Braille keypad vibration module.
3. Speaker module.
4. 

**GSM INTERFACING**

To design a SMS system for them by interfacing Braille pad with the cell phone so that dual impaired person can have the access to the SMS system. Here the user sends the SMS to the blind person’s mobile number which is connected to the microcontroller which reads the SMS using GSM module through the AT commands.

i. Microcontroller
ii. LCD display
iii. RS232 interface
iv. Global System for Mobile communication

i. **MICROCONTROLLER**

ATmega8 is the microcontroller, that controller has peripheral features like inbuilt ADC, required to get the signals from the sensors. Maximum clock frequency is 20MHz and hence faster than 8051. It is based on RISC and Hardware architecture and hence even faster. Embedded C is used for programming the microcontroller.

ii. **LCD DISPLAY**

LCD is used in a system to output the application. Graphics LCD can also used in a system to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role in a system to see the output and to debug the system module wise in case of system failure in order to rectify the problem.

iii. **RS232 INTERFACE**

The serial/Column port of the computer is used for communication with the hardware. The serial port of the computer uses RS232 standard for communication. RS232 standard voltages are not compatible with conventional TTL / CMOS circuits. Hence IC MAX232 is used for voltage conversion between RS232 port and the microcontroller. MAX232 enables full duplex communications, while doing the necessary voltage conversions.

iv. **GLOBAL SYSTEM FOR MOBILE COMMUNICATION**

GSM (Global System for Mobile communication) is a digital mobile telephony system. With the help of GSM module interfaced, we can send short text messages to the required authorities as per the application. This technology enables the system a wireless system with no specified range limits. This is a plug and play GSM Modem with a simple to implement RS232 and TTL serial interface. It is used to send SMS, make and receive calls, and do other GSM operations by simple AT commands through a serial interface from microcontrollers and computers. It uses the SIM300 module for all its GSM operations. Thus GSM Module is connected to the controller and transmits the incoming messages to the controller. It also receives the messages from controller. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band.

**BRaille KEYPAD VIBRATION**

The letters of the SMS converts into the Braille language using the lookup table stored in its memory. It consists of 6 keys arranged in 3x2 format i.e. 3 rows and 2 columns. These keys are connected to the I/O port of the controller. Relays are energized according to the input from controller. As per the received commands the relays are toggled up and down. Thus the blind person will be able to sense the letter. It operates in two modes:

- Normally Open
- Normally Closed

Relay can be used to control different devices by turned on and off these devices whenever required.
SPEAKER
After indicating the ready to voice record, that can be recording the voice from the microcontroller input. Loud speaker is used for making the voice announcement.

IV. CONCLUSION
In future the system can be modified to read the SMS in a string also blind person able to read the e-mail also. Thus we can conclude that with some modifications in conventional communicating device, we can include large no. of physically challenged people in communication system.

REFERENCES