Braille glove

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ABSTRACT

About 37 million people across the globe are visually impaired which is a substantial proportion of world's population In this fast developing world which is tending more towards the use of digital communication, the blind people find it really difficult to cope up with the pace of it. Although there have been some attempts made to develop several systems to help them to connect digitally with the society. Considering the present condition of the visually impaired people, we have developed a system (Braille Glove) which will help the user to send and receive text message using the standard Braille code. This paper describes a low-cost Braille Glove for blind people using touch sensors and vibration motors. This glove allows the person to type characters representing the Braille combination using the touch sensor which is placed on the palm side of the glove. This glove also allows the person to read the incoming message using the vibration motors which we have placed on the back side of the glove.

Keywords: *Braille Glove, Braille, Touch Sensor, Vibrating Motors, Bluetooth Module, GSM Module.*

1. INTRODUCTION

It has become very important for each and every person to have the access to information and resources for the smooth conduction of their life. However, the society is developing in such a way that only the sighted people have all the access to the required information. They can use this information to have a better lifestyle and optimize all the resources and information they have, but this trend leaves the visually impaired people on the verge of an exclusion from the society. The internet has also become effective and essential for obtaining vital and important educational information.

A significant percentage of the world's population is suffering from visual problems, they have to rely on someone else for the access of the information which is necessary and easily available to the rest of the world. They also have the equal right to have education and knowledge but their abilities to learn are compromised. They have to rely on the conventional methods of obtaining which includes tactile sensation such as finger Braille, manual alphabet, and print on palm method. But these methods are very tedious, slow and inefficient. These methods are not suited for computer or mobile environment. As a result, they are unable to access the information from phone or internet.

In recent times e-mails, text messages, e-book etc have become an integral part of our life. Visually impaired people are deprived of such facilities. They use Braille language for reading which has a wide variety of characters. This is a small attempt by us to try and solve some of their problems. We have developed a real-time low-cost device which is helpful for them to send or receive text messages using touch sensors and vibrating motors.

2. DESCRIPTION OF THE BRAILLE GLOVE

The Braille cell is a combination of six dots placed arranged in the form of a 3x2 rectangular matrix. This six dots allows 64 different dots arrangement. The Braille characters are represented by using these combinations. Our hand glove comprises of six touch sensors placed in the same manner as the Braille cell on the palm side of the glove and the vibrating motors are placed in the same manner on the opposite side of the glove. The figure shows the placement of the touch sensors and vibrating motors in correspondence with the Braille cell.

The Braille Cell

Fig. 1

If the user wishes to write a character, say for example the user wants to write the letter 'c'. This letter is represented by the 1st and the 4th dot on the Braille cell. Similarly, all the characters are represented by a unique combination of the dots. This combination is a standard algorithm for the Braille language. The user can touch the touch sensors placed on the glove to write any message using this combination. The standard Braille chart which we have used for conversion of Braille to text is shown in the Fig. 2
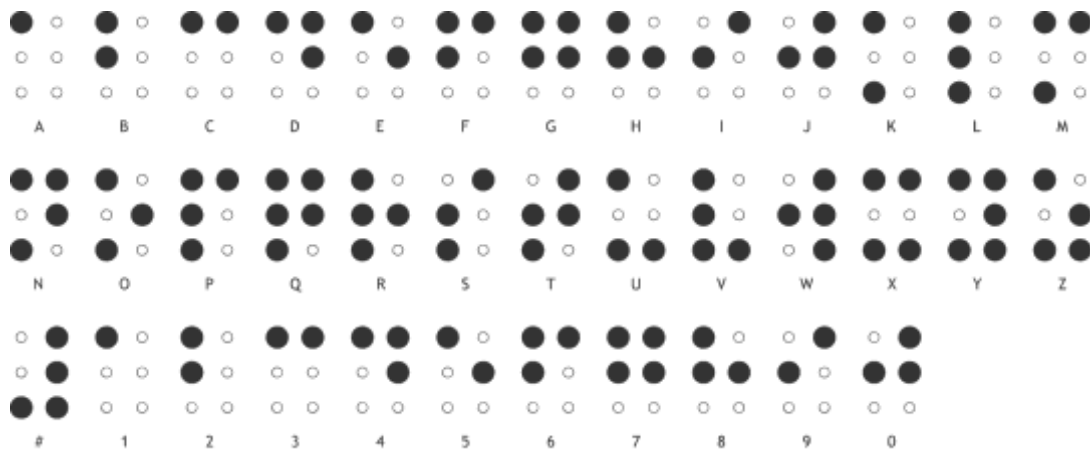

Fig. 2

For the convenience of the user, we have introduced two switches and a buzzer in the glove. The first switch is a limit switch, which is pressed once a combination of a character is touched. Once the switch is pressed the character will be stored in the buffer memory of the microcontroller which is being used for the operation of the glove.

As the combination of numbers and letters are same, we have used a push button for switching between alphabets and numbers. In case if the user enters a wrong combination on the Braille, the buzzer will make a sound indicating the user to type the combination again.

3. SYSTEM DESCRIPTION

In this system, we have used Arduino Uno as our microcontroller. We have also used GSM module and Bluetooth module for the communication purpose. The GSM module is used to send and receive a message while the Bluetooth module is used to connect with the mobile terminal for display purpose.

This system can be divided into two parts:-

- Transmitter module
- Receiver module

3.1 Transmitter module

The Fig. 3 shows the transmitter module block diagram, here we take the input from the user using the touch sensors which is in the Braille language. The microcontroller is used to convert this Braille language into ASCII format. The message typed is stored in the buffer memory of the microcontroller, once the message is complete we can send it using the GSM module. For sending the message we have created a new combination which is the 2nd, 3rd, 5th and 6th of the touch sensor. The Bluetooth terminal is also used to display the message which is being typed, this is done for an understanding purpose.
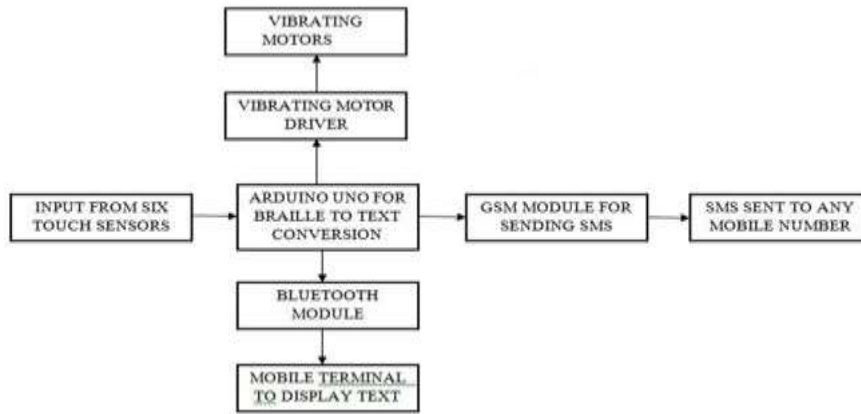
Fig. 3

3.2 Receiver module

Fig. 4 represents the receiver module of the project. Here the incoming message is received using the GSM module, once the message is received the respective vibrating motors vibrates indicating each word at a time. The microcontroller is used to convert the text message into Braille language. The vibration from the vibrating motors enables the user to read the incoming message.
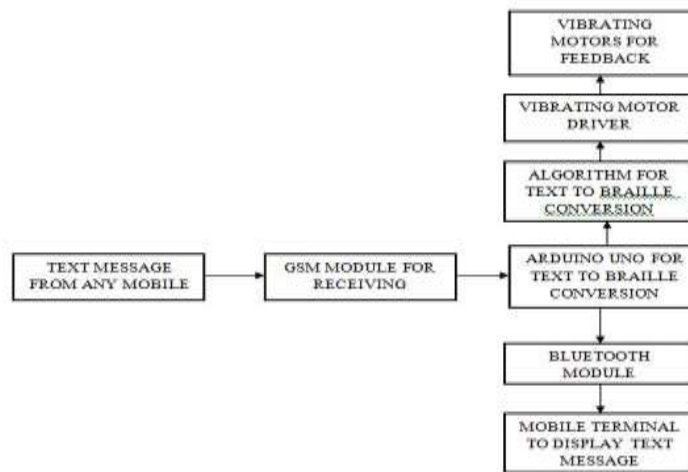

Fig 4

4. CONCLUSION

Fig 5 shows the working model of our project. Here we have mounted the Arduino on the glove and the PCB is mounted over the Arduino. We also have used three different power sources as the power requirement of this system is high.
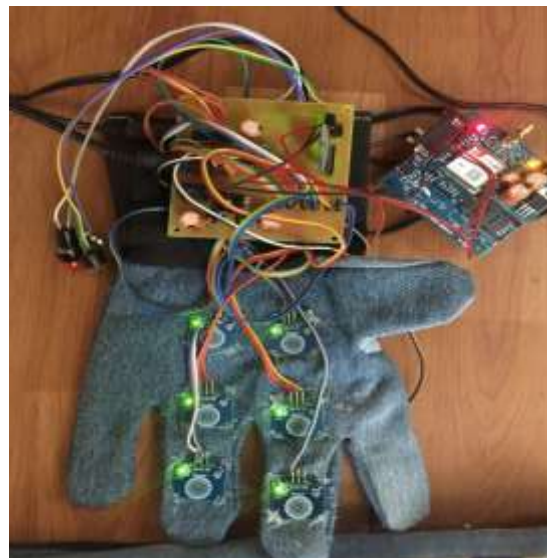

Fig. 5

In this paper, we have implemented the concept of Braille glove. It is useful for communication for a blind person, the glove provides six touch sensors which can be touched in a given set of combination to type a letter or a number. The glove is working properly as we see its output on the Arduino ide. For the communication part, we have used Bluetooth which also connects and works fine with any mobile phone

The GSM needs to in proper network and has sufficient balance to send or receive the message. The 2 buttons included in the glove simplifies its working as compared to just with the touch sensors.

5. REFERENCES

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