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Braille Based Mobile Communication for Deafblind People

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Abstract - *The system is specially designed for the **Deaf-blind** communicate and socialize. In our day-to-day life the telecommunication technology plays an important role. It has completely revolutionized 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 Deaf-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. Here the caretaker sends the SMS to the Deaf-Blind person's mobile number which is connected to the microcontroller which reads the SMS using GSM module and then converts the letters of the SMS into the Braille language using the lookup table in its memory. According to the corresponding letters, the mini DC motors on the Braille Pad vibrates with the help of 6 relays connected to the microcontroller. The Deaf-Blind people can communicate to the caretaker with the help of 1 x 5 keypad which consists of inbuilt set of text messages and these messages are sent to the caretaker's mobile number through the GSM module.*

1. INTRODUCTION

Technology has become the integrated part of our day to day life. It has completely revolutionized the way we communicate, especially long distance communication. There was a time in history where people used to communicate with others through letters. And then came Alexander Graham Bell who invented telephone. Telephone had its own ups and downs and as time passed by, improvisations were made and was made available to every commoner. Further research led to 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 and deafblind people have limited access to these technologies. Limited access does not mean they can't afford it, their comfort was not given any importance. The innovations and the advancement comforted the normal people in all ways of life, but the physically and deafblind people's needs were never given importance.

Concentrating on deafblind people, they usually read and write through a sign language called 'Braille'. Braille is a writing system which enables blind and partially sighted people to read and write through touch. It was invented by **Louis Braille** (1809-1852), a French teacher of the blind. From that time to today, there has been many improvements in Braille technology, which has enabled the deafblind impaired to also taste the comfort of the electronic gadgets available. Following are few newspaper articles which shows the hindrances in the past and improvements in today's world.

After all of Braille's work, the code was now based on cells with only 6dots instead of 12 (like the example shown below). This improvement was crucial because it meant that a fingertip could encompass the entire cell unit with one impression and move rapidly from one cell to the next. Over time, braille gradually came to be accepted throughout the world as the fundamental form of written communication for blind individuals, and today it remains basically as he invented it.

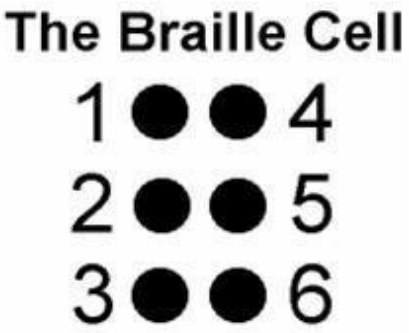

Fig – 1: Braille Cell

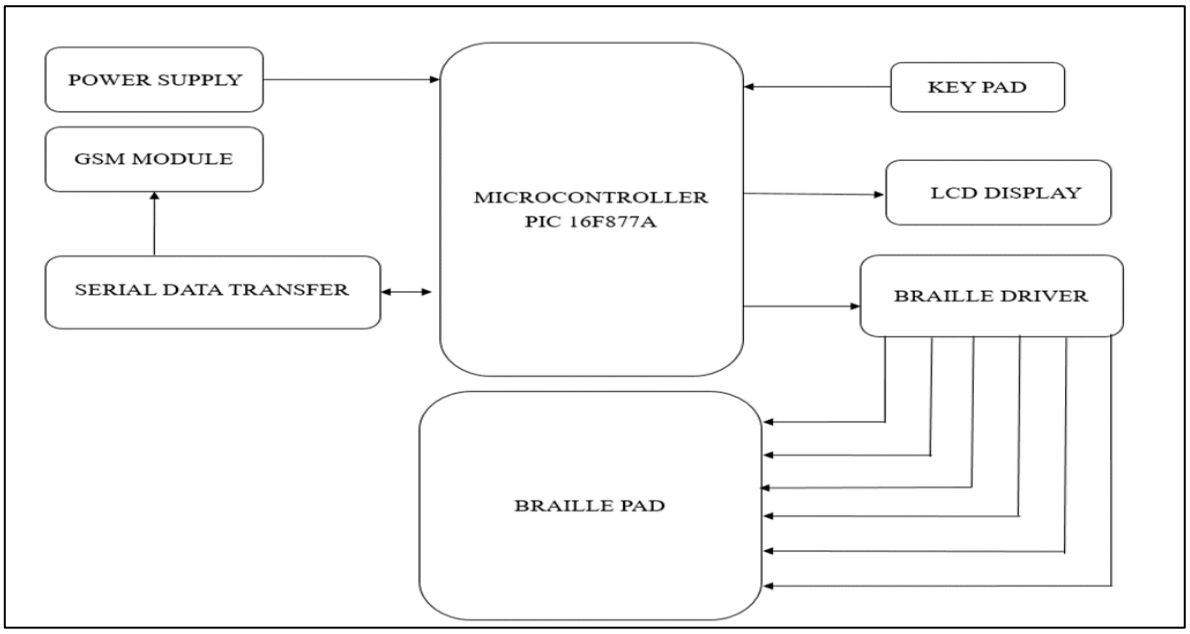

Fig -2: Block Diagram of the Proposed System

2. PROPOSED SYSTEM

In the proposed system, in order to remove the difficulty of the deafblind community communicating with the ordinary people we have a SMS system which is used between them.

If a normal person wants to communicate with the deafblind person he can send SMS to the corresponding mobile number which has been connected to the GSM module. Using the serial data transfer the message sent is transferred to the microcontroller (PIC 16F877A).The microcontroller maps the corresponding letters of the message according to the **Braille Script**. The PIC microcontroller is connected with the **braille pad.**

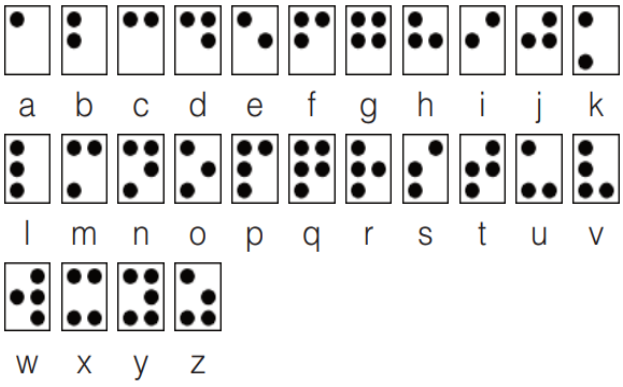

Fig -3: Braille Script

The braille pad consists of 6 DC motors which are aligned in the form of the **Braille cell**. Thus the motors in the Braille pad rotate according to the letters in the message in such a way that the deafblind people can understand.

Similarly if the deafblind person wants to communicate with the care taker then there is a 1X5 keypad which is connected with the microcontroller that has certain inbuilt messages. He can send any of the messages to the caretaker by pressing the corresponding buttons in the keypad which will be sent to the number that has been connected in the GSM module. There is also a LCD display connected to the microcontroller to view the message sent by the deafblind person.

3. IMPLEMENTATION

The input is given from a cellphone to a cellphone number which is connected to the GSM module. The PIC microcontroller is used for its number of available ports and also for the advantage of minimum power consumption. Using the pic microcontroller the information is converted into the braille format of 6 dots. A letter to letter conversion is done and the information are sent to the braille driver. In the braille pad, mini DC motors are used for the reducing the size and also for the easy usage. Regulated power supply is an electronic circuit that is designed to provide a constant dc voltage of predetermined value across load terminals irrespective of ac mains fluctuations or load variations. Or in other words it converts unregulated AC into a constant DC. With the help of a rectifier it converts AC supply into DC. Its function is to supply a stable voltage (or less often current), to a circuit or device that must be

operated within certain power supply limits. The output from the regulated power supply may be alternating or unidirectional, but is nearly always DC.

A regulated power supply essentially consists of an ordinary power supply and a voltage regulating device, as illustrated in the figure.

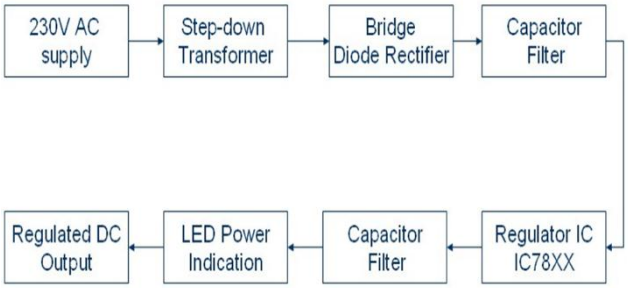

Fig -4: Power Supply Block Diagram

4. FUTURE SCOPE AND CONCLUSION

Similar to other smartwatches on the market, Dot is designed to pair with a Bluetooth-enabled phone. When a text message arrives on the phone, the app translates it to Braille and sends it to Dot (which vibrates) and then the pins rise and fall to relay the characters. Other Dot features include a watch, alarm and notifications. The face of the Dot smartwatch consists of four cells with six active dots, which rise and fall to produce the four Braille characters. The rate at which the watch displays new characters can be calibrated to meet the user's reading speed.

Fig -5: Braille Watch

This portable device will generate Braille format using vibration motor. The visually impaired person can sense the Braille letters using their fingers. Now, this device will generate Braille letters for English language only. In future, the system can be implemented to generate Braille letters for any languages.

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 number of physically challenged people in communication system and some modifications in conventional communicating device, we can include large number of physically challenged people in communication system.

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