

Braille Keyboard for Blind People

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Abstract: Braille keyboard is a wired portable keyboard comprises six dots similar to braille lipi designed for the blind people, it can interface with laptops and desktops. The keyboard comprises 6 push buttons, represented as six dots, which produces every character or a number. The system consists of an audio jack, through which the blind person can able to hear whatever he or she types. We can interface the Braille keyboard with a PC through an open source software cool term. Blind people can type in the word are PPT by using this braille keyboard which can improve their employability skills and they can write their online exams without a third person assistant

Index Terms: braille keyboard, cool term

I. INTRODUCTION

As per WHO, in this world, there are 39 million blind people. Out of which 90% are illiterates and 70% are unemployed. The major reason behind this is their poor access to technology. Technology is growing day by day but the use of technology by the blind people is very less due to lack of interfacing gadgets operated by the blind. We have designed a keyboard based on braille lipi. Using this, a blind person who knows braille lipi, will type and enter data into the system, and later convert it into a Word, Spreadsheet, PowerPoint or Text document [1]. This will help the person improve his employability skills and hence increase the chances of employability. One of the major key factors is it will help to write the exams without the need of a third person. The braille keyboard will act has a braille language trainer [2] for those who are in its learning stages. This will also prove to be an effective tool for communication for a blind and dumb person.

I.1 BRAILLE SYSTEM

The raised six dot system is known as braille. Braille is a tactile writing system for visually impaired people. Braille system was developed by a Louis Braille, who lost his eyesight at the age of 15 due to an accident. After that, he was unable to attend the school, since he cannot read due to the loss of his eyesight. So, he decided to develop a code which could be useful for the education of the blind and developed a code using six dots which is named after him as Braille.

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In the Braille system, it arranges all the dots in the form of rectangular blocks of 3*2 membrane called the cell. It can form all the alphabets using the different combinations of these six dots. Not only alphabets, but it can also represent numbers and punctuation marks too. The six dots are arranged in three rows, each row has two dots. It is written with embossed paper. The following Figure 1 shows sample Braille representation of some characters.

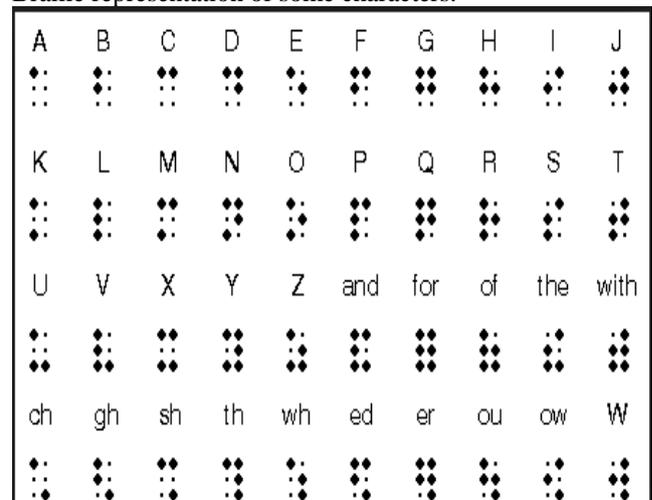


Fig:1 Sample braille representation of characters

II. PROPOSED WORK OF BRAILLE KEYBOARD

The Braille keyboard consists of six push buttons arranged linearly, which represents six dots in Braille Lipi. This keyboard can be interfaced with a micro-controller, such that a blind will type all the alphabets, numbers and punctuation marks as per the braille lipi[3,4]. As it contains only six buttons, it can be easily understood by blind people rather than searching for keys on traditional braille keyboards which were existed. The keyboard can be operated with a 5V power supply which can be obtained by connecting the 9V battery with a 7805 voltage regulator IC. Push button has four terminals in which individually two pins are internally shorted. So, out of these four pins, two internally shorted pins are connected to 5V i.e., 7805 IC output and other is connected to ground. So, when the pushbutton is pressed, VCC and ground gets connected in the circuit and makes it a closed circuit. This output is given to the Arduino board. Based on the different combination of inputs from the six push buttons, the microcontroller gives a relevant output. The buttons operate in two modes, one is the number mode, and the other is the alphabets mode. The user can switch to any of the modes as per the requirement.

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This keyboard also has an audio jack, to which a speaker or an earphone can be connected. Through this, the person will be able to listen to all that he or she types [5]. This is better than the conventional braille keyboard. So, simultaneously along with the serial motor, the Arduino output is given to the speaker using the SD card module. So, it can have a voice output[6].

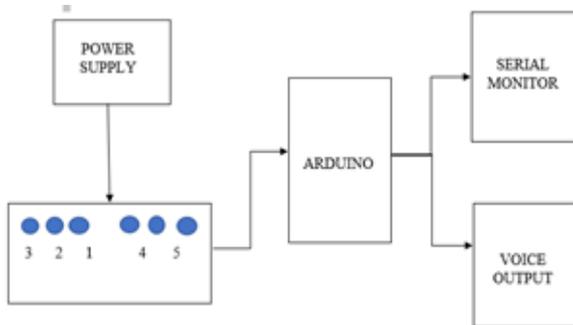


Fig: 2 Block diagram

III. ARDUINO

It is a development board whose working is based on ATmega series of microcontroller. This board has a set of digital, analog, power and PWM pins. It also has pins for serial communication and for interfacing of SPI devices. All these are programmed using embedded C programming language. These pins can be used to interface various types of sensors and actuators which will help it interact with the environment.

III.COOL TERM

It is an application, which is used to exchange data with the hardware such as a microcontroller, connected to one of the serial ports of the system. It is generally used to collect data from various sensors for the sake of analysis. It also enables to convert the format of the data into various types like document, text, power point and even a spreadsheet. Here, it is used to collect the output of the microcontroller and display it, which can be converted into the desired format.

III. SD CARD MODULE

SD card module had four pins and connect these with Arduino board. SD card module has an SPI interface which is compatible with Arduino board. SD card module has a memory chip in which audio files are stored in .wav format. Its operating voltage is 3.3V/5V. it supports FAT16 and FAT32 and also supports 2GB to 4GB. Firstly, to connect with Arduino, download the library files that support the SD card module and add this library file to the existing Arduino IDE library files and upload the program to the Arduino UNO board. This program helps to read the files in the SD card module. This module can be configured by sending the commands via a serial port and used for processing and playing audio files in the memory card according to the input given to the push buttons. This output is given to the speaker for voice output [7]. It is a module which is used to receive and transfer data to an SD card. This can be interfaced with a microcontroller. Since the SD Card module has an SPI interface, a communication can be established between the microcontroller and the SD card module using SPI protocol.

The SD card module has 4 pins apart from VCC and ground. They are- MISO (Master In Slave Out), MOSI (Master Out Slave In), SCK (Serial Clock) and SS (Slave Select).On Arduino Uno board, pin 11 is used for MOSI, pin 12 is used for MISO, and pin 13 is used for CLK. Along with this, pin 10 of the Arduino Uno is be used as the chip select pin (SS). Here, it is used to store the audio files.

IV.APPLICATIONS

- Helps in improving employability skills and chances of getting employment.
- Helps the blind person to write online exams without any assistance.
- Can acts as braille language trainer kit.
- Establishes communication among dumb, deaf and blind people.

V.RESULTS



Fig 3: Designed braille keyboard

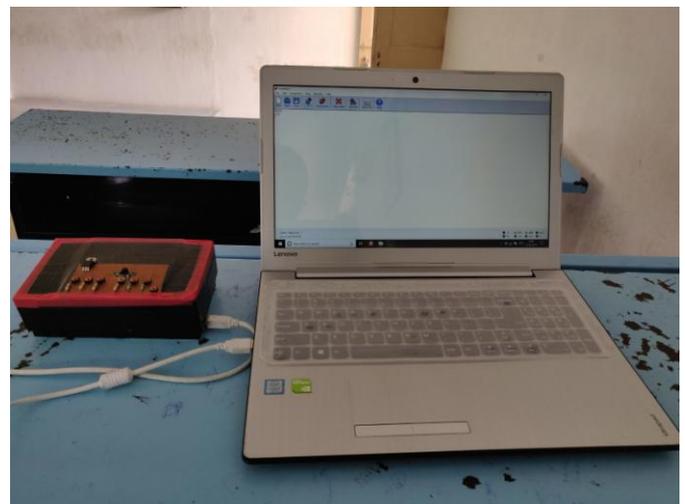


Fig:4 Interfacing Keyboard with Computer

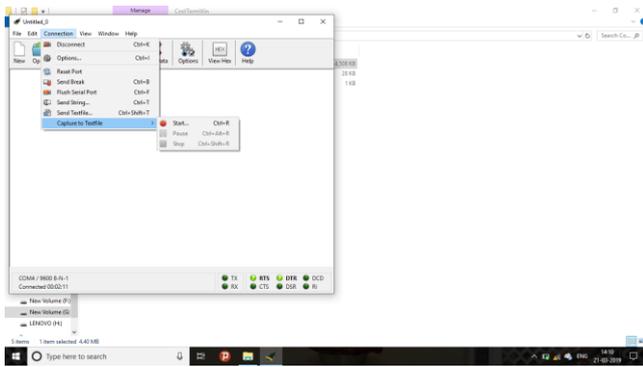


Fig: 5 first Step in capturing text file to a desired format by clicking on Start.

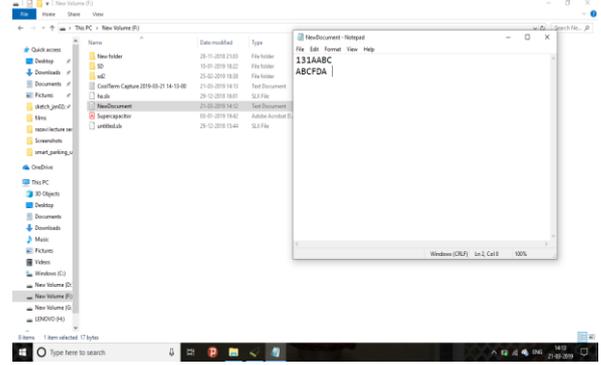


Fig: 9 Figure showing the text data converted to desired format

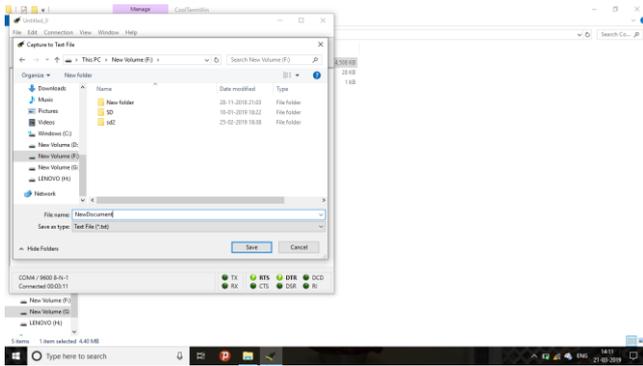


Fig: 6 Mentioning the desired filename extension (Text File in this case)

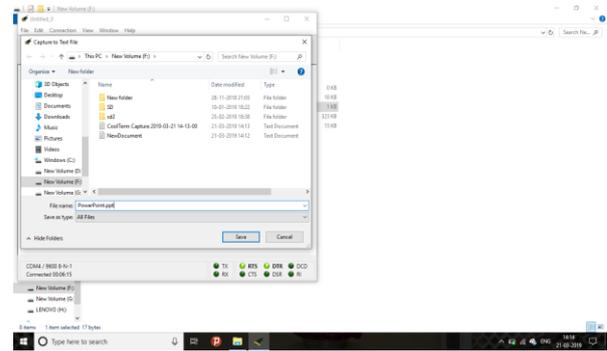


Fig:10 Mentioning the desired filename extension (Power Point in this case)

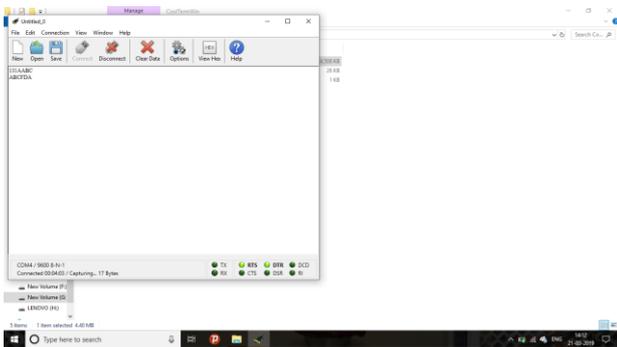


Fig:7 Entering data through the Braille Keyboard

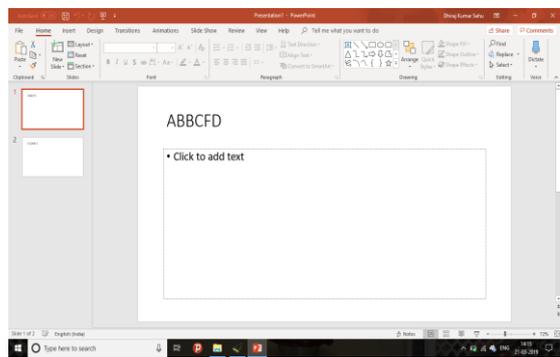


Fig:11 Figure showing the text data converted to desired format.

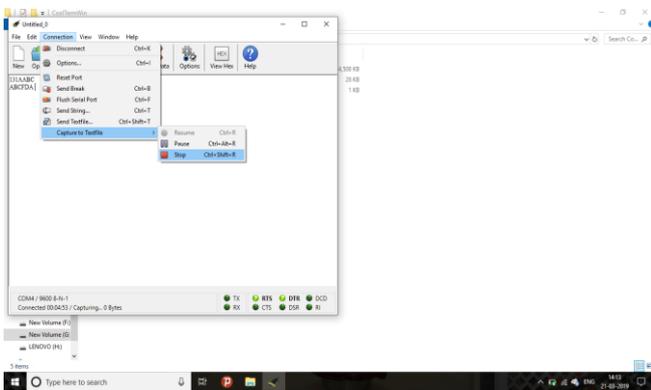


Fig: 8 Ending the capturing text file by clicking on Stop.

V.CONCLUSION

This design will help the blind in improving their employability skills and will also provide a platform to establish communication between blind and deaf. This a low-cost braille keyboard comprises six dots similar to braille lipi. By using this keyboard the person can connect to the system and he can work on word documents and PPT, etc. This keyboard provides a facility that the blind people can write an online exam with no third person help. Blind people can write their online exams without any assistance.



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signal processing, deep learning.

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