BRAILLE KEYBOARD AND PRINTER INTERFACED

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Abstract - *Braille is vital to all visually impaired individuals and it's the only system through which visually impaired children can learn to read and write, yet the rate of Braille literacy among visually impaired people belonging to developing countries including Pakistan is alarming low. The designed system takes the input through Braille keyboard and produces the speech output and it also has the capability to read documents. It is believed that by implementing the designed Braille system in schools and homes, Braille literacy rate can be increased and visually impaired people can be employed and can fully participate in society. Braille printer or braille embosser (is the same thing), do the same thing as a regular printer, but it prints for blind people. Braille is named after its creator, Frenchman Louis Braille, who lost his eyesight due to a childhood accident. A full Braille cell includes six raised dots arranged in two lateral rows each having three dots. The dot positions are identified by numbers from one through six. 64 solutions are possible from using one or more dots. A single cell can be used to represent an alphabet letter, number, punctuation mark, or even an entire word.*

Key Words: *Arduino, Braille Keyboard, Braille, Braille Code, Speech Output(Speaker).*

1. INTRODUCTION

According to the survey of world health organization (WHO), there are more number of visually impaired people living in various countries. Because of the rate of Braille literacy in various countries is alarming low which effect on the significant relationship between higher income and employment, braille literary and academic success and also an education plays a crucial role. Now a days a very less number of people are learning to read and write. A Braille system consists of 6 dots, in two columns where 3 dots in each column. Using this 6 raised dots 64 different sign can be created. There are three types of Braille system encoding such as Grade 1, Grade 2 and Grade 3. Where Grade 1 consists of letter-by-letter transcription it is used for basic literacy and it also consists of English standard alphabets and punctuation marks. In Grade 2 Braille system is made up of English alphabets, punctuation marks, number(0 to 9) and contractions. This system is used for books, menus and other Braille materials. It also consists of few words. Grade 3 Braille system is used for personal use. It consists of entire words shortened to a few letters.

1.1 I. NEED OF PROJECT

Keyboard:-
-The presented solution is low cost
-It is portable to carry everywhere
-It is user friendly and easy to use
-It is based on text to speech concept
-User would be able to here what they type

Printer:-
-The presented solution is handy and can be carried anywhere
-It consumes very less energy
-It also uses coding in C language so it is easy to interface it with the keyboard
-It uses a simple A4 size paper.

1.2 I. LITERATURE SURVEY

There is variety of brands devices available in the market for visually impaired people to help them in educational activities and to bridge the communication gap between visually impaired people and people with sight.

According to World Health Organization (WHO), about 89% of world's visually impaired live in developing countries and majority of the people are living with the lowest pay as the national salary i.e. the average salary if the person is so low that. Most of the devices in the market are too costly and not so comfortable to use, or Braille scanners, yet a low-cost Braille system is not available in the market for visually impaired persons in the developed countries where braille reading and writing can be teached without a Braille teacher . Braille Keyboard : A Self-Learning Braille System for Visually impaired at cheap price, easy to use, low-power, portable, self-learning, and user friendly Braille writing and reading tutor with the capability of reading documents and works on text-to-speech technology which is the helpful technology for visually impaired individuals.

EXISTING SYSTEM

A. Braille Keyboard

The designed braille keyboard is very helpful for visually impaired people. It is also a low cost, portable, low-power, light in weight, self-learning and user friendly device. It works on text to hear technology. It has a capability of reading documents and shows in text form using cool term software. We can save that document. We can use PC monitor as a display.

B. Braille Printer

It operates as a normal printer, but it gives an output in Braille form for visually impaired people.

Braille Displays
In addition to the use of Braille printers, refreshable Braille displays are segregate devices that connect to a computer. Each Braille cell consists of six solenoids. The Braille codes are formed by sets of pins being raised and lowered electro-mechanically. As the input is typed, the user can review it on the 1 line display.

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a. Braille Codes

C. SYSTEM ARCHITECTURE

1. Braille Keyboard :-

Fig. 1 shows the circuit diagram of Braille keyboard. The designed Braille system is based on text-to-hear technology which is the assistive technology for visually impaired people. The circuit diagram of the designed system is shown in

Figure 1. You can use a Breadboard or either solder everything on a PCB. The input can be provided by either typing through the provided Braille keyboard, or inserting text files. The designed Braille keyboard supports all levels of the Braille system encoding so beginners as well as advanced users can use it for typing. The entered characters or words by Braille keyboard and/or inserted text files are then processed by the computer. The designed Braille system then converts the Braille character sets into the standard alphabets of English, numbers, and punctuation marks. The circuit diagram of the designed system is shown in Figure 1.

The circuit diagram of Braille Keyboard consists of:

- Arduino Uno (1)
- SD Card Module (1)
- SD Card (1)
- Push Buttons (6)
- Slide Switch(1)
- PCB or Bread Board (1)
- Male to Female Audio Jack 3.5mm (1)
- Jumper Wires (Few)
- USB 2.0 Cable Type A/B (1)
- 9V battery with clip (1)
- 1K Resistors (7)
- On/Off Switch (1)
- 5V Regulator (1)
- Materials Required
- A Hard-Cardboard box (1)
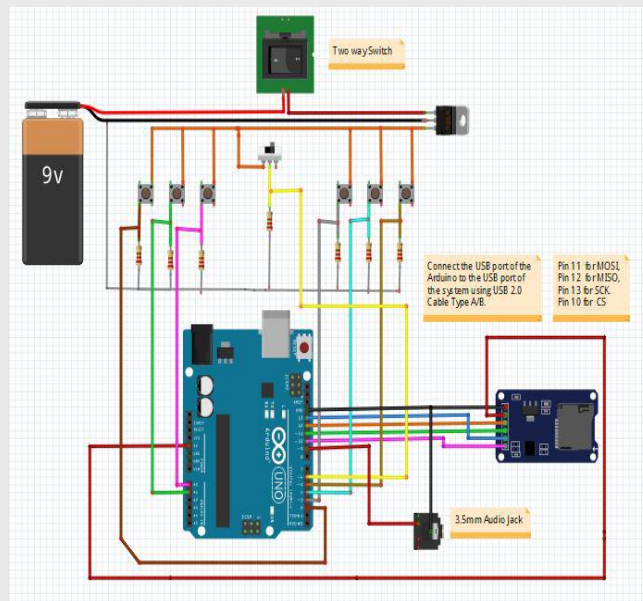
Fig :- 1. Circuit Diagram of Braille Keyboard

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the speech output accordingly. This feature of the designed Braille system distinguishes it from the other available text-to-speech Braille systems which only produce the speech output in character form.

Connecting and Assembling the Whole Circuit :-
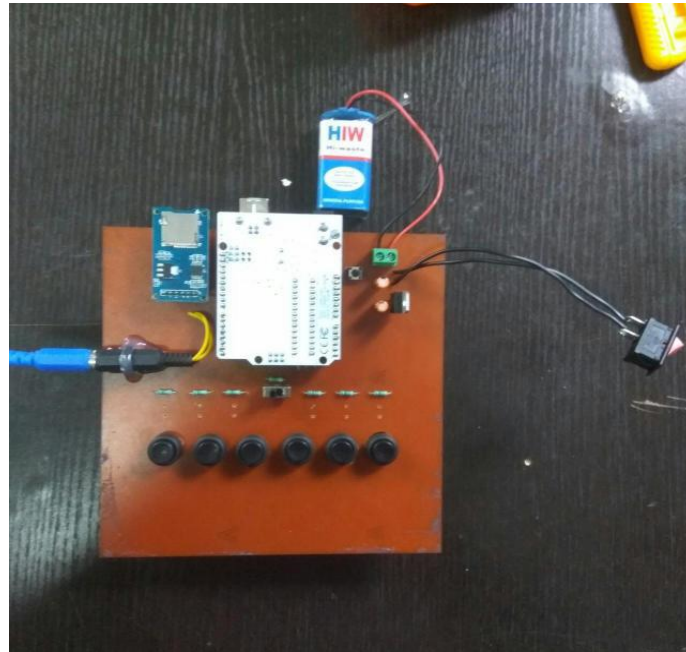
2. Braille Printer :-

 Braille is named after its creator, Frenchman Louis Braille, who lost his eyesight due to a childhood accident. A full Braille cell includes six raised dots arranged in two lateral rows each having three dots. The dot positions are identified by numbers from one through six. 64 solutions are possible from using one or more dots. A single cell can be used to represent an alphabet letter, number, punctuation mark, or even an entire word.

Regulator :-

A regulator is a device which has the function of maintaining a designated characteristic. It performs the activity of managing or maintaining a range of values in a machine. The measurable property of a device is managed closely by specified conditions or an advance set value; or it can be a variable according to a predetermined arrangement scheme.

Servo Motor :-

- Torque: 1.8 kg cm
- Weight: 9 gram

A servo motor is an electrical device which can push or rotate an object with great precision. If we want to rotate and object at some specific angles or distance, for that purpose we must use here servo motor.Fig. 2 shows the circuit diagram of Braille Printer. Braille printer or braille embosser (is the same thing), do the same thing as a regular printer, but it prints for blind people.

The circuit diagram of Braille Printer consists of :-

- Arduino Mega 4
- Battery
- Regulator
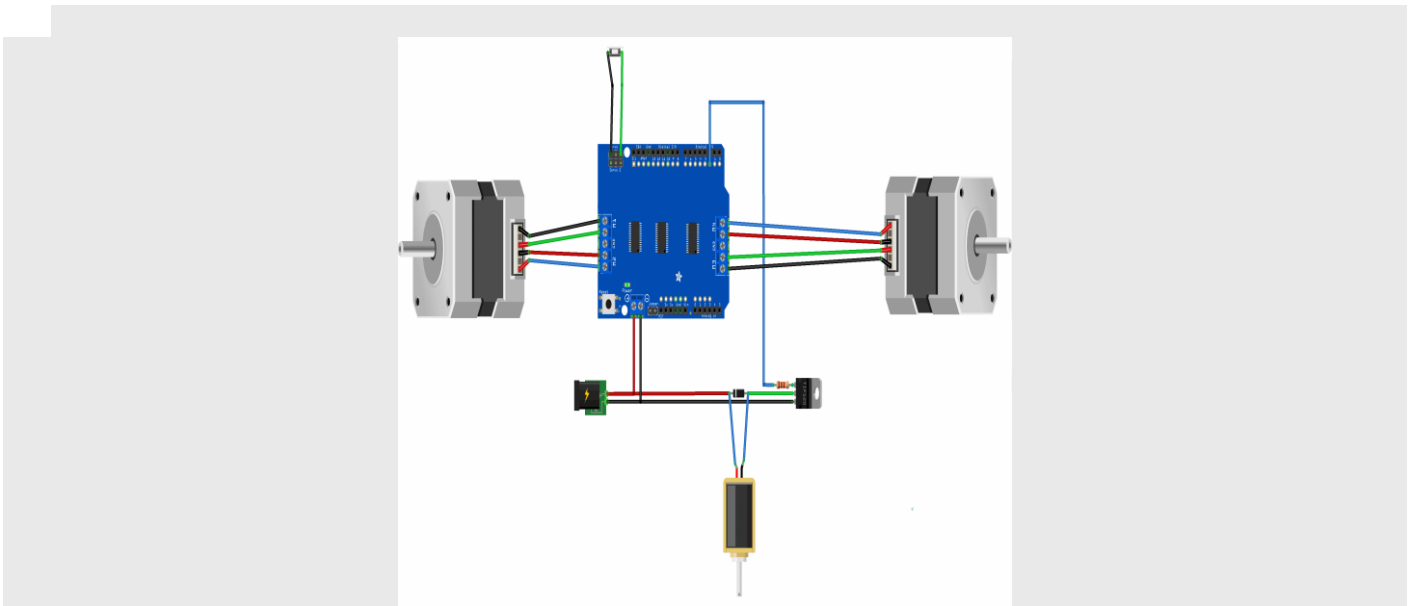- Wheel
- Servo Motor
- Stepper Motor

Fig 2: Circuit Diagram of Braille Printer

The wheel is actioned by stepper motor (X axis) and it drag the paper in. The Y-Axis is made from old CD reader, on top is the servo which will empos the paper.

2. CONCLUSION

The presented solution may be a low-cost, low-power, portable, self-learning, and user friendly Braille system. The presented solution may be a comprehensive system for Braille writing and reading and relies on text-to-speech technology. The designed Braille system supports all levels of the Braille system encoding so beginners moreover as advanced users can use it for typing. Blind Aid may be a self-learning system so by implementing this Braille system in schools and houses, time, money, and human resources is saved. It is believed that by implementing this method in developing countries, the speed of Braille literacy is increased and visually impaired people is employed and may fully participate in society.

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