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Self Learning Braille Keyboard

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Abstract: The project consists of braille keyboard and learner. A braille learner enables visually impaired people to learn braille. The learner consists of 6 vibrating motors arranged in a 3x2 matrix as a braille cell. A braille keyboard is specially designed and constructed to provide easy typing technology for the visually impaired. There are totally 6 logical sensing switches that are used for acquiring the characters. The whole keyboard works based on Braille system. There are also five other specially used switches like SHIFT (Number Alphabet toggle button), SPACE, BACK SENSE, CAPS LOCK and SPEAK. This keyboard is a device made of logical switches and uses Braille system technique for sensing the characters. In this system, the sensors are aligned according to the Braille language i.e. alphabets or numeric/special characters. The main advantage of this project is that the visually impaired will also get to learn braille and can also use this as a keyboard to type. This keyboard is interfaced with a computer in a similar way to that of the primary keyboards that are available

Keywords: Visually impaired, hardware keyboard, See thro' touch, logical switches, Rows & Column sensors, modes of operation Braille language).

I. INTRODUCTION

Braille has been central to the literacy of blind and visually impaired people since it was first developed by louis braille in the 1800s. As a system of touch reading and writing that uses raised dots to represent letters of the alphabet, it is also used to represent symbols, numbers and music. Learning braille also allows users to develop an understanding of the formal structure of language, including spacing, formatting and grammar. For some subjects, notably science, mathematics and foreign languages, braille is essential in comparison with alternative methods, such as audio learning. Perhaps unsurprisingly, greater literacy through braille has been shown to improve employment and life chances for blind and visually impaired users, even though employment rates remain disproportionately low for visually impaired people overall. However the context for braille learning and teaching is changing rapidly. Technological developments, especially the development of audio texts, synthesised speech and higher magnification, have opened up opportunities for blind and partially-sighted people to access much more written material. At the same time, concerns have been raised about over – reliance on audio and synthesised speech in education, resulting in a decline in braille.

II. BRAILLE SYSTEM

Braille is a system of raised dots that can be read with the fingers by people who are blind or who have low vision. These Braille characters are embossed in lines on paper and read by passing the fingers lightly over the manuscript. Louis Braille, who was blinded at the age of three, invented the system in 1824 while a student at the Institution Nationale des Jeunes Aveugles (National Institute for Blind Children), Paris.

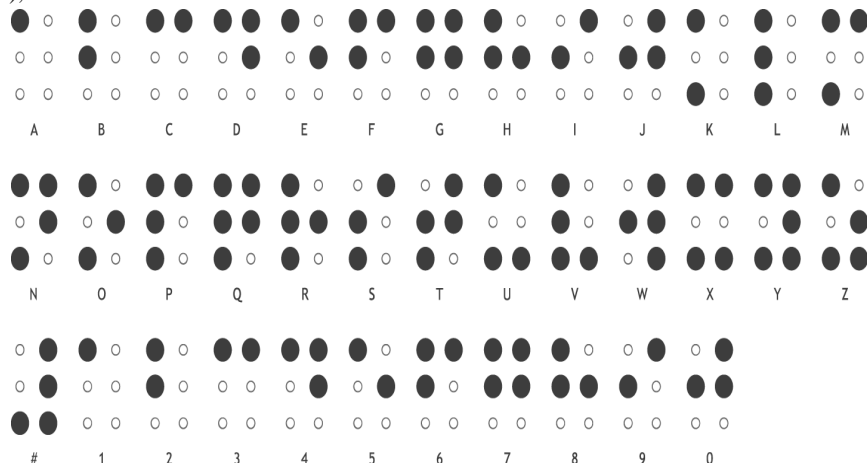


Fig 1. Braille Language alphabets and numbers

III. PROPOSED METHODOLOGY

Our system is self-sufficient to teach Braille language. Blind person does not require any help of other person for the same. We will develop a controller based system which will be connected to the pc. When the software will start the system will announce the name of the character and on the hardware we will generate the same character in Braille format with the help of 6 sensors. Blind person can touch and feel the character to understand it. The process will repeat for all the characters. Our system will also help the blind person to cross check what he have learn. With the help of keypad blind person will generate the character learn by him and software of the system will verify and announce whether it is right or wrong.

Along with typing alphabets and numbers it also has five special buttons for shift (number alphabet toggle button), space, back sense, caps lock and speak.

IV. BLOCK DIAGRAM AND DESCRIPTION

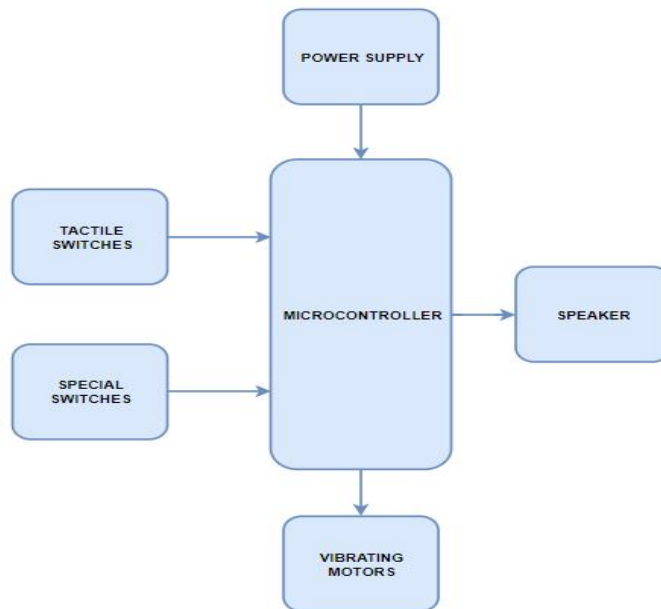


Fig 2. Block Diagram

The above block diagram has the following units:

- 1) Microcontroller.
- 2) Tactile switches.
- 3) Special switches.
- 4) Vibrating motors.
- 5) Speaker.
- 6) Power supply.

Microcontroller - It is the basic unit that controls all the functionalities of the devices connected to it. The microcontroller used in this project is Atmega328P.

Tactile Switches - Six tactile switches are arranged in a Braille cell in order to type Braille.

Special switches - Five special switches are used to perform various functions.

Vibrating motors - Six vibrating motors are arranged in a Braille cell order to learn Braille.

Speaker - It is used to convert the text typed to speech or to dictate letters which are to be learnt.

Power supply - It provides power to the entire circuit.

V. WORKING

The project is based on Atmega328P microcontroller. It is the controlling unit. The user can choose between two modes of operation. The first mode is the self-learning mode. In this the device creates vibration in the 6 Braille pattern cell and also announces the letter or number which it will display through a speaker. In this way user can learn using Braille box. In the second mode the device is



used as a key board. The user presses combination of switches in the Braille cell to produce an alphabet, a number etc. There are also some special switches with functions such as changing from lower to upper or upper to lower case, switching between alphabets and number etc.

VI. CONCLUSION

The proposed system can be designed in such a way to meet the requirements of the visually impaired people. It is an easy to use device with self-learning and typing features which provides a platform for the blind.

VII. ENHANCEMENTS

A. Limitations

As all the systems have some limitations, the proposed method has some as follows:

- 1) Someone has to start the computer first
- 2) Currently our system only supports alphabets and numbers

B. Future Modifications

- 1) The size of the keyboard can be reduced using small Braille cells
- 2) All special characters can be incorporated

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