

Automatic Smart Self-Learning and Testing Portable Braille Device

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Abstract - The project consists of a 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. 6 logical sensing switches are used for acquiring the characters. The whole keyboard work based on the Braille system. There are also three other specially used switches. This keyboard is a device made of logical switches and uses the 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.

1. 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. This system 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.

1.1 Need

According to the World Health Organization, the number of visually impaired was estimated to be 285 million in 2010, from which 39 million were blind. Furthermore, 90% of visually impaired people live in low-and-middle-income countries such as the Philippines, where proper education could mean a luxury. Literacy is a key factor in developing

strong well-being and enables an individual to reach one's full potential as a member of society. For the visually impaired, learning Braille, a reading and writing system through touch, will be ultimately necessary to maintain literacy.

1.2 Literature Survey

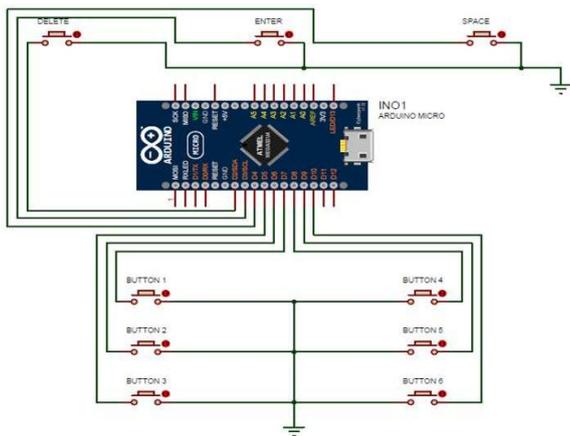
The traditional way of learning Braille language is known by all of us. But there is no system developed to learn the Braille language on our own. Schools for blinds are available all over and they provide regular courses for blinds. Braille is a tactile writing language of raised dots, mainly used by the blind and visually impaired. It is developed for our haptic perception, a combination of the sense of touch, movement, and finger pressure. The dots are arranged in cells. Every cell consists of a majority of six dots in a small rectangle

2. SYSTEM ARCHITECTURE

Our system is self-sufficient to teach Braille language. A blind person does not require any help from another person for the same. We developed 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.

Table -1: List of component

Apparatus	Quantity
Arduino Uno	1
Arduino Pro Micro	1
Vibrating motors	6
Push-button	6
Speaker	2



eFig -1: Mechanism of learner device

The project is based on the Atmega32U4 microcontroller. It is the controlling unit. It works as an actual keyboard. The user presses a combination of switches in the Braille cell to produce an alphabet, a number, etc. There are also some special switches with functions upper case alphabets, lower case alphabets, and numbers. These switches are also used to enter, spacebar and backspace functionalities.

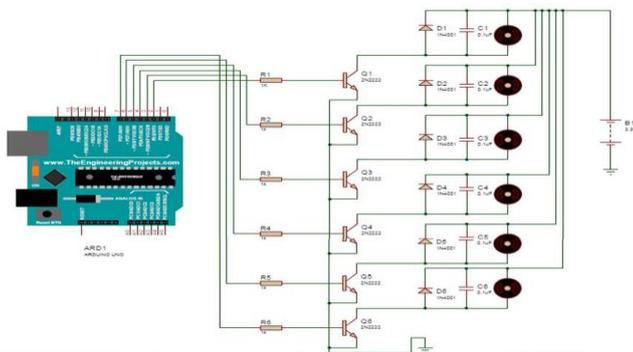


Fig -2: Mechanism of keyboard

The learning mechanism is based on the Atmega328P microcontroller. In the device, there are 6 vibrating cells to generating a particular braille language pattern automatically to vibrating at 3X2 matrix form with the help of a speaker to produce audio output.

3. CONCLUSION

The purpose of the project and design of the machine is to introduce and give knowledge of braille to visually impaired persons to easily learn this language as well as easy to use.

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