Sparsha Drishti: Digital Braille

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Abstract— **Book is considered as the best friend of a person, one tries to deliver their idea or methodology through various forms where writing being the ancient. One can gain almost all of the information available via books or written stuffs. But for the people who are visually impaired have a limitation to such resources, they use a different type of script, known as Braille, named after its founder, Louis Braille.**

Braille uses the sense of touch to communicate, they are embossed letters transcribed into papers of high quality to guarantee their durability. Even a small tear or destruction of paper can make a noticeable impact on the script. As a part of "Digital INDIA" initiated by our Prime Minister Narendra Modi we are trying to digitalize braille script. Our device will read the source text from .txt file and encode the same in braille and protrude it on the product so that the consumer can utilize it. Through this a blind person can read news, novels and other books which are not exactly available in braille script.

Key Terms— **digital Braille, Braille symbol, childhood education tools, visually impaired, Digitalization, Books, Novels, Web pages, News**

I. INTRODUCTION

According to the statistical analysis of the World Health Organization's visually impaired, 246 million vision capacity is less than 285 million people, and 39 million are visually impaired. This figure indicates that visually impaired people can not be ignored or ignored when facing an unpleasant problem.

In order to get sight and knowledge, vision is the most important feeling, and we are in contact with normal people. People who are visually impaired to live as normal as other people are forced to build powerful characters and make full use of touch. In order to read the information, people with visual impairments use the tactile touch to prepare points called braille weave touchscreen.

For those with a sense of touch, this concept is designed to help visually impaired people to communicate with end-users of intuitive technology, in a sense of secondary sensation, that is, touching. Braille or touchwriting was discovered by Louis Braille, born in France in 1809. Louis Braille has renewed the touch-reading and reading system in 1820, but the system was not readily available for writing and reading for people who could not see it.

Standardized touchscreen reading and writing for visually impaired have been accepted

Since 1918, visually impaired people are understood to read and write world knowledge, only through Braille. The International Cell Cell Indicates that a Braille cell consists of six points arranged in the matrix. Braille is a textile reading and writing system developed by Louis Braille in 1821. It uses the raised points at any point in six positions to represent printing marks. Braille point sizes are determined by the weights of the person's fingertips. Numeric points are from 1 to 3 universal numbers from left to bottom and dots from 4 to 6 on the right. By counting the space not raised at all, these compounds are sixty-four (26). Black circles are embossed points, light gray circles represent relief points.
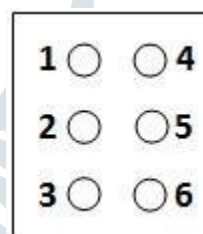

Figure 1. A schematic of a Braille cell.

A study by Ruby Ryles revealed that blindness was the first time that a blind child was educated. The study was then open to Braille training. However, many parents of this special child are preparing for early learning in Braille and Brilliant Education in their area, financial problems, and expensive educational tools. In addition, devices that provide Braille print or voice access papers have limited set limits for input and interaction rates.

By counting the space not raised at all, these compounds are sixty-four (26). Figure 2 shows some indicators combination by naming the positions where dots are raised and a photograph of a page of Braille. The black circles represent embossed dots while the light grey circles represent unbossed dots.
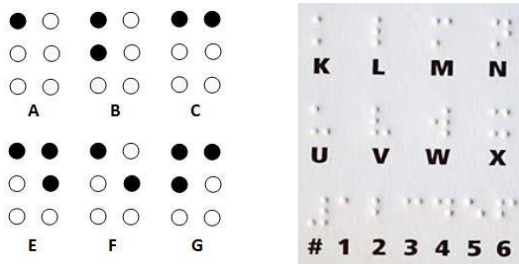
Figure 2. A sample of Braille alphabet (left) and and a sample of printed Braille symbol (right).

Many researches focus more on the tactile communication method of people with visual impairment [9-11]. The development system to facilitate communication among the blind mostly required Braille. However, very few researchers focus on early childhood education for children whose visual impairments. Early childhood is the period from prenatal development to eight years of age. For children who have disabilities, it is a vital time to ensure access to interventions that can help them reach their full potential.

II. IMPLEMENTATION OF THE SYSTEM

We have proposed a system that allows the blind to read the script in Braille without investing much in the real script. The model first takes the actual file and then converts it into another file that separates all the words in the paragraph. After which, this updated file is fed as input to the Arduino program, which enters each word one by one into the file assigns individual characters to its braille standard and sends them to the device. The reader can read any text format you want to read. Not only electronic books, the reader can read news, articles that are available in text format.

The main objective of the project is to create a device in which the visually impaired person can read material, such as daily news, novels or other publications, without investing heavily in bulky scripts that are easily damaged. And to provide a way through which the person can get more knowledge without being limited to resources,
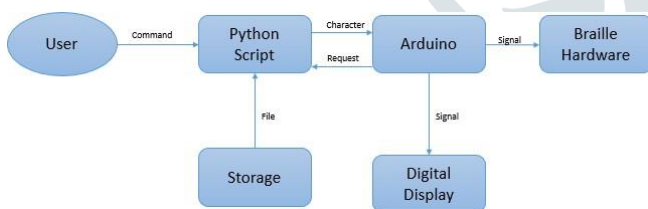

Figure 3. Data flow diagram of Braille code system.

The methodology used in this project is called digital Braille. This prototype allows the blind to read the Braille script without investing too much in real text. The sample first takes the actual file and converts it to another file that separates all the words in the paragraph. This updated file is then inputted into the Arduino program, which enters each word one by one in the file, assigning individual characters to the Braille standard and sending it to the device.
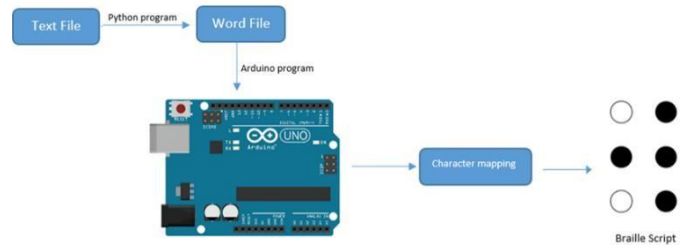

Figure 4. Architecture Diagram Braille code system.

The architectural conduct has to do with the construction of a basic platform for the frame. It includes the identification of the real parts of the framework and the intersections between these sectors. The initial configuration procedure to identify these subsystems and build a subsystem and a correspondence control structure is called a building modeling scheme. The return of this schema procedure is a snapshot of the structural planning of the product. The proposed structure of the system is described below. It explains how the system is designed and its work is done.
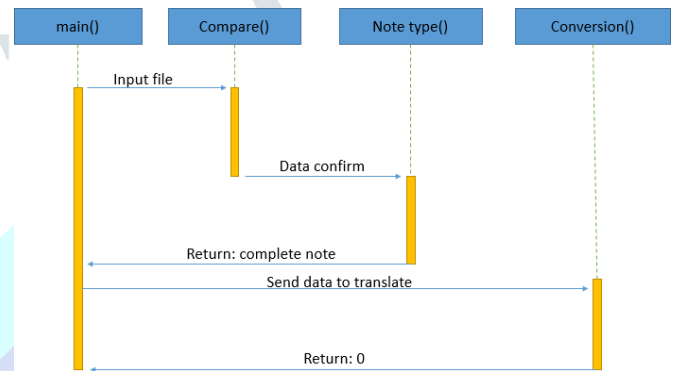

Figure 3. Sequence Diagram Braille code system.

The architectural setup procedure refers to the construction of a fundamental basic framework for a framework. This includes recognizing the real parts of the framework and exchanging these segments. The initial configuration procedure for recognizing these subsystems and constructing a subsystem control and correspondence structure is called a construction modeling scheme and the implementation of this schematic procedure represents the structural planning of the product. The proposed architecture for this system is presented below. It shows the way this system is designed and a short system operation.

In addition, the techniques used here are the conversion of the character to their respective braille scripts, and thus savings papers and the setting up of the digital braille concept. The proposed system is cost effective and uses modern technology, which is easy to manage text records, as the file in question can be modified at any time. Translate each line word by word by covering the entire

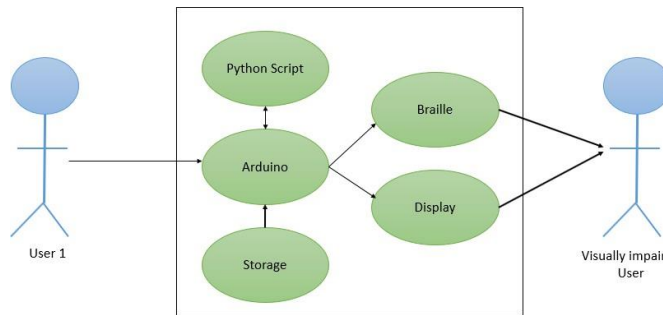book, helping the disabled read the book of their choice.

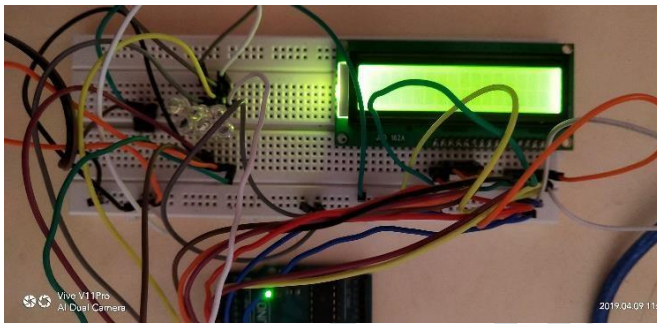Figure 4. Use case diagram of Braille code system.

Figure 5. The LCD output display: (a) when the module chosen and (b) the keyboard alphabet output 'B'

III. FUTURE DEVELOPMENT

This system operates well and fulfills the requirements satisfactorily. However, some improvement can be made by downloading the web page as a file and there by treating that as an input. Also creating a series of Braille cell to behave as a page. Further development might include adding play/pause button, adding bookmark, converting the script to audio and so on.

IV. CONCLUSION

The objective of this work is to contribute to Braille digital access by developing an integrated hardware and software solution. For this purpose, a single Braille cell design was created by six servos taught by a microcontroller. This cell must be large enough, so it is not necessary to use the dynamic sweep of the finger on the cell as in most piezoelectric solutions. A computer driver recommends the movement of the servo through the UART serial protocol. Arduino UNO is used to send the code that the device sends and receives the Braille data. The Android phone is used to receive voice from users with visual impairments and to read data received from Braille.

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