

## Smart Wireless Braille

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**Abstract**—Among the five senses, vision and hearing are the primary senses through which we collect information. As much as 80% of what we learn is learned visually. Hearing is the basis of the communication/language system that most people use. These two impairments together cause called Deaf-Blindness. Currently, the common method used by them for reading and communication is using Braille language[6]. In Braille for reading a book the entire book should have to be converted into Braille script. This process takes time and effort and it makes the learning process more complex since the printed data appears in mirror image form, the raised dots make the page thicker and the dots should be large enough to be sensed properly. The Smart Wireless Braille facilitates conversion of text to Braille within less time and low error and the system reduces complications of deaf-blind people about the reading of English electronic text with the ease of cost effectively from websites at any time. Based on Internet of Things (IOT) communication or chatting facility using supported devices such as smart phones. Furthermore, in the proposed system, Deaf-blind people are able to take the advantage of the electronic world like reading of digital data from the electronic content by proving data at their fingertip and exploring an environment to communicate with the digital world.

**Index Terms**—Automated value Thresholding algorithm, MCU, Braille board, Deaf-blindness

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### I. INTRODUCTION

Deaf-blindness is not just a deaf person who cannot hear, or a blind person who cannot see. The two impairments together increase the effects of each. When these two major channels for receiving information are impaired or not functioning, it affects areas including communication/language development, movement and motor development, cognitive development and the ability to learn emotional/social development, body image and self-concept[7]. A person who is deaf-blind has a unique experience of the world. For people who can see and hear, the world extends outward as far as his or her eyes and ears can reach. For the young child who is deaf-blind, the world is initially much narrower. If the child is profoundly deaf and totally blind, his or her experience of the world extends only as far as the fingertips can reach. Such children are effectively alone if no one is touching them. Their concepts of the world depend upon what or whom they have had the opportunity to physically contact. People have such a situation either by birth or as an after effect of accidents. Although there exist some systems like Braille for reading for the blind, no system was introduced for deaf-blind people for effective reading. Braille system has got many limitations such as it makes the learning process more complex since the printed data appears in mirror image form, the raised dots make the page thicker and the dots should be large enough to be sensed properly. In Braille system, in order to read a book or novel, the whole text needs to be converted into Braille book format which consumes more time and effort.

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### II. LITERATURE REVIEW

In paper[1] the Automated value Thresholding algorithm is discussed considering the text to Braille conversion. Also different techniques are analyzed upon the cost effectiveness, low error rate and also the hardware implementing system. It is found that the Automated value Thresholding algorithm is best suitable in designing and implementing a proposed system architecture for visually handicapped person with an efficient way of text to Braille conversion with flexibility, low cost and portability. In that every word has been given its threshold value and then after every word is compared according to its threshold value means that when a specific word is crossed beyond that level it gets changed into the corresponding word. Then the word conversion will be there internally and lastly the output of text to Braille word conversion is shown there on the Braille Board.

In the paper [2], the automated thresholding algorithm is used which is useful for conversion of captured Braille image into the normal text. In that first Braille image is captured by the designed camera and after that the image is processed by the designed kit and at last the captured image Braille text is converged into the display output for the reading of the sighted person

In the paper[3], System first receive the usual electronic text as input from the person who want to communicate with the blind person via SMS or from keyboard which is then stored in thememory of the system. It then converts thesenttext from the into Braille character series and then pass the word to the blind person. This system has a program which receives and stores the electronic text into the buffer memory of computer and then splits the text into character array.

In the paper[4], In this paper, the automatic recognition method is used but the method is not useful for the conversion into the Braille as scanning of the image is there and after the conversion into language of the respective one. Rather than Braille there are some other systems for deaf and blind people. They are given in Table 1. But Braille is more conveniently used.

III. NEED FOR SMART WIRELESS BRAILLE

In order to overcome these limitations of braille system and to offer reading of electronic data from digital world as well as communicating with individuals we are proposing this system.

Everything is at present available at digital and virtual world and the whole world is taking the advantages of that but the problem is arising when the visually impaired and deaf person will be concerned about the electronic and digitized world. Smart wireless braille is a learning aid for blind-deaf people. This system uses the concept of braille for reading the digital data in a mechanical setup. In this system, the identification of alphabets is done by the rotation of servomotor. This system is very useful for deaf people since there is no other learning aid for them. They can access the data through internet anytime at anywhere. With the help of this proposed work the blind person can read the electronic text as well whole of book or any novel with the help of this work on a single cell without the movement of the fingertip and chat with friends.

TABLE I

SYSTEM	FEATURES	DRAWBACKS
Braille System	1. Transcribe print text into embossed Braille output 2. Speech feedback as you uses the embosser. 3. Embossers vary with printing speed, line width and type and weight of paper used.	1. Bulk. 2. Complicated learning process.
Braille Translation Software	1. It translates script to Braille 2. Translator can run on a smart phone, personal computer, network server, or larger mini-computers or mainframes of larger institutions.	1. Computers make these decisions in braille translation. 2. Difficult part of producing braille is making the decision of when and when not to use contractions
Screen Reader	1. Read the text that is displayed on the computer screen with a speech synthesizer or braille display. 2. It allows users to perform more advanced functions	1. Difficult in installation. 2. It is only applicable for blind people
Text to Speech Converter	1. Visually impaired listen to an audio read-back of any scanned text. 2. Scanned image and to convert the extracted text to speech.	1. Difficult to understand the text converted speech.

#### IV. SYSTEM ARCHITECTURE

Fig 1 shows block diagram of proposed system. It includes,

1. *Switches*

For our system we have made use of switches to input the braille word. These are connected to Arduino module.

2. *Processing unit*

It comprises of Arduino module. The processing unit acts like an intermediate between the switches and cloud. From the switches the system get the Braille input and that information is pass to arduino. With that information the data from internet had taken and convert it into Braille. That Braille is given as output which is the rotation of servomotor.

3. *Servomotor*

**Servo motor** is nothing but a simple electrical motor, controlled with the help of servomechanism. Here servomotor serves as an output giving device to communicate with deaf-blind people.

4. *Website*

We are able to access data from website.

5. *Wi-Fi Module*

Node MCU is firm wire or an IOT platform chip with which manufacturers are making wirelessly networkable modules. Wi-Fi module is mainly used for communication with internet and system.

which further used to give the identification of alphabets. Then the motion of the motor will be set to its original position automatically after displaying of the word. The six servo motors connected to the digital pins of arduinonano and the transmitter and receiver pins of arduinonano are connected to the corresponding pins of the ESP8266 module. By touching the pattern generated in the board we can identify the data. And there is an app also to do communication. The person can enter the English word through smart phone. Then the pattern corresponds to it appears as motor rotation on the board. It is identified by Deaf-blind people, then the can enter braille input by using switches and the data entered appears as English word in our phone. Likewise communication facilitates. Figure 2 shows the implemented system.

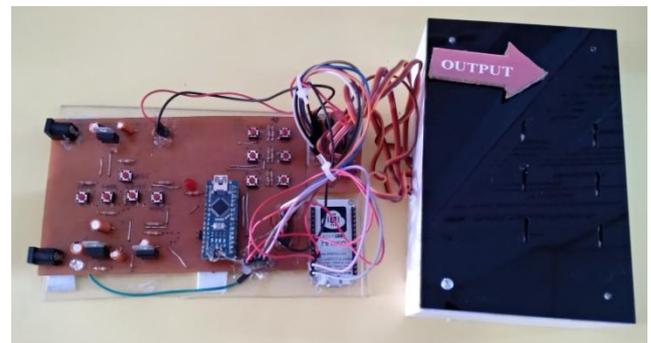


Fig 2. .Implemented System

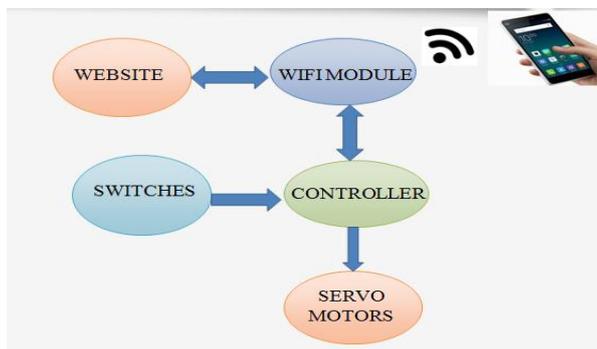


Fig 1.Block diagram

#### V. IMPLEMENTATION AND FUTURE WORKS

To Create a website for uploading the data. And when the system gets request for the data, through ESP8266 module the data can be accessed from the website. Then this data can be transferred to the arduinonano. Then the word is trace on the board with pattern generation using the motion of the motor. Use a palm sized board with 6 holes which resembles braille. A servomotor is attached to each hole

The future scope for this Smart Wireless Braille will involves accessing of data from all websites.

#### VI. CONCLUSION

A technique to overcome the difficulties of reading and communication of Deaf-blind people is presented. Requirement had achieved with this model. It helps to read electronic data from website and chatting. It is one of the steps to uphold the people with disabilities.

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