

An Innovative Approach to Build a Low-Cost Braille Embosser

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ABSTRACT

Visually impaired people have to deal with various challenges since they cannot see anything with their eyes and even some visually impaired people are not able to read the content of their interest so they fail to gain knowledge from reading as much as a normal person can obtain. Visually impaired people have some content available in the braille format that they can read but not all content of their reading interest is available in the braille format. Therefore, braille embosser will help to make available the maximum content of their reading interest in the braille format at an affordable cost.

In this project, the user will have to upload an image of blinds reading interest, which is to be converted in the braille format. Initially, we will extract the text from a text image and save the text file using different image processing techniques. Then each character stored in the text file will be converted to the respective braille format using ASCII values and then converted text will be embossed using the braille embosser, which will make the content available for the blind community.

Keywords : Braille Book, Braille Cell, Braille Dots, Embosser, Images, Text File

I. INTRODUCTION

The Braille Embosser project will help in converting the text images into the readable format that blinds understand such that Braille Language format. This project will make the text images of blinds reading interest available in the braille language format, which will help the blinds to read the content of their interest, which is currently not available for them to read in Braille Language format. Currently, the existing applications do not provide extraction of text and embossing together. The objective of the product is to make the maximum content of the blinds reading interest made available in their reading format. The main purpose is to provide whatever content blinds want to read, which is currently available in text image format, into the braille language format. Braille Embosser will help

blinds to read embossed braille paper using the sense of touch.

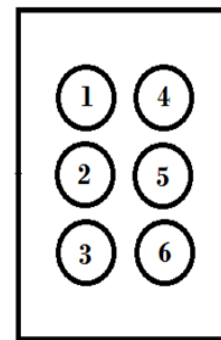


Fig. 1: Braille Cell

II. BRAILLE ORGANIZATION OF THE PROTOTYPE

Braille is the only format that is available for the blinds to read and understand. Braille is a raised impression on the paper that is read by the blind people by feeling the impression on the finger. In

Braille, each letter is formatted into the Braille Cell. Braille Cell consists of six dots that are used to represent a letter. For each letter, there is a specific representation of dots in the Braille cell. Dots are raised at any of the six positions giving a form of sixty-four combinations, including the combinations where no dots are raised. This braille cell helps to create the characters on the surface of the paper. An impression is done at the paper's back surface so that the top surface of the paper has the embossed contents.

III. DESIGN OF THE PROTOTYPE

The head for a Braille Embosser is a rectangular box of acrylic sheet with a length of 5.6 cm, breadth 4.4 cm and height of 3.9 cm.



Fig. 2: Embosser head

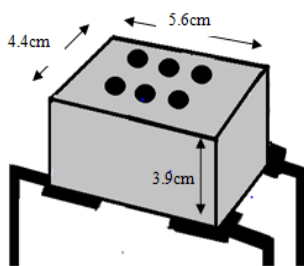


Fig. 3: Dimensions of the braille cell

This rectangular box is fixed onto the two wooden sheets that are placed parallel to each other for support. Three servomotors are assembled on one wooden sheet one after the other in the vertical

manner and three on the other. Six dots drilled in three rows and two columns are equally spaced with each dot having 0.2 cm on the top face of the head. The refills of the ball pen are used as pins to emboss the characters on the paper. When servomotor is at 180-degree position, the pins through the spring will be pulled down and when servo motor moves to the 0-degree position spring will release the pin, with the force of the spring the pin will be able to emboss on the paper. The head creates each character containing six dots with just a single stroke at a time.

Embosser has two rods connected to it. The embosser head is then mounted on these rods and are fixed with the screws. The extracted text is given as an input to the encoder. The encoder then gives a signal to the embosser head driver. Embosser head driver will give a signal to the stepper motor, which helps embosser head to move on the rods. For pattern combinations, the embosser head will have a delay of few milliseconds. When the pattern is completed, this delay gets activated and embossing will take place. It will emboss from left to right and then after the completion of a line, it will then emboss from right to left for faster embossing.

IV. THE ACTUAL PROTOTYPE



Fig. 4: Start of user interface

The Fig. 4. Is the start screen the user will see every time on starting the system or every time the next text image is to be uploaded.



Fig. 5: Selecting or upload the text image

Fig. 5 shows how the text image will be selected from the folder.

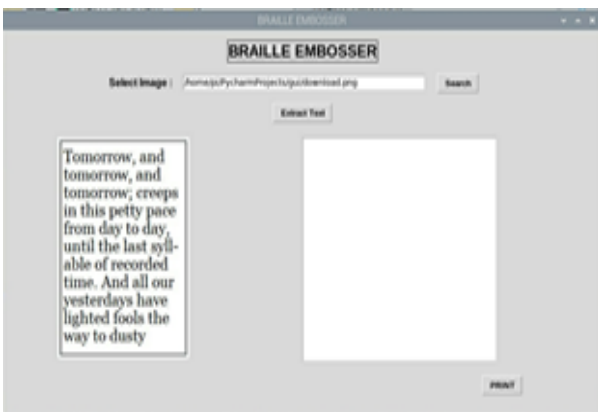


Fig. 6: Selected text image is at the left side of the screen

In Fig. 6 the text image that needs to be extracted for embossing the content is selected and is been displayed on the left side of the screen. Now the user needs to click the “Extract text” button.

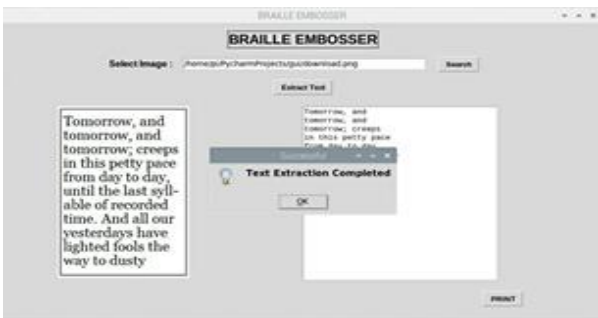


Fig. 7: Completion of text extraction

After clicking on the “Extract text” button operations on the selected text image are carried out and the dialog box pops out saying the extraction is completed as shown in Fig 7.



Fig. 8: Extracted text

The extracted text is at the right side of the screen as shown in Fig. 8. Now for embossing the text contents, user has to click on the “PRINT” button that is at the bottom right side of the screen.

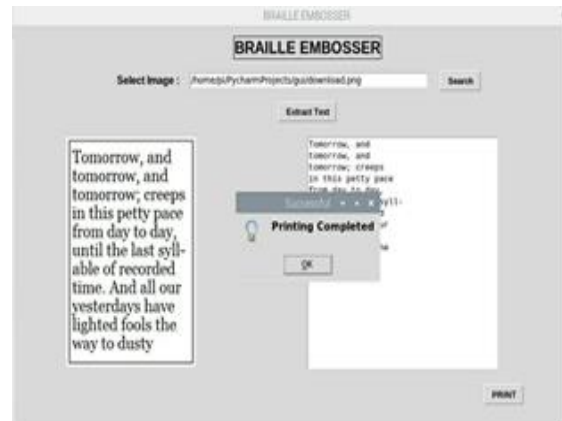


Fig. 9: Printing extracted text

Finally, the printing of extracted text is completed as in Fig. 9.

V. THE OUTCOME

This paper provides a new way of designing a Braille embosser, which is of low cost. We have carried both extraction and embossing in a single process. The system provides a faster combination that reduces

time. Both visual person and blinds can use this system equally. This is a simple solution for a visually impaired person who wants to read the contents of his or her interest.



Fig. 10: Embossed "ball" word

VI. CONCLUSION

Many visually impaired people lack due to improper technology. Technology has become an important element for the goodness of visually impaired people. Looking at this scenario, this step will help blinds to achieve something in life. The braille embosser can help a visually impaired person. Blinds are always interested to read books but this can be made possible by using a braille embosser. Once they are educated then they can achieve lots and would not be a burden but will help with the betterment of others. The braille system constitutes literacy access for blinds with low cost.

VII. REFERENCES

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