European Journal of Interdisciplinary Research and Development
Volume-09 Nov. - 2022
Website: www.ejird.journalspark.org ISSN (E): 2720-5746

CONVERT BRAILLE TEXT FROM ARABIC APPLICATION

Noor Ali Alhelaly
Imam Al-Kadhum University, College of Islamic Sciences,
Computer Techniques Engineering
Noor.Ali@alkadhum-col.edu.iq

Abstract:
A language is means one or the most important ways of communication used by humans, and because blind people need to communicate with others or interact with their environment, Braille provides a lot of properties that help them read texts written in braille, whether books or paper texts. because in the era of technological and cognitive development and making the most of braille text in dealing with the blind, we will provide a set of algorithms that have been formulated in this research paper to be inserted into the computer in a digital scanner or digital imaging method , then applying algorithms to convert image to binary by using mane equation and set step of morphology from text segmentation and characters then excellence , discovering braille text and translating it into the corresponding Arabic text available for use in any application sent to someone else or speaking . we use the result of truth our algorithm exceeded 97%. we hope it will be applied in real life to help people with special needs.

Keywords: Braille, Arabic, blind, available, Text, Characters.

There are many people who are visually impaired throughout every community because blind people make up a significant portion of society. In addition, they want to understand the nuances of everything they encounter on a regular basis [1]. There are 2.2 billion visually impaired people in the world; 36 million of them are entirely blind, while the other one billion has vision impairment ranging from moderate to severe [2]. as a humanitarian duty, they must be taken care of and helped to mix with society and communicate knowledge with the world. Therefore, all possible services must be provided, especially in our Arab world, as a human duty in front of this important segment. This is only done through the use of other senses such as touch and the most famous the auxiliary systems are a Braille system, and because it is difficult to understand by everyone, and to overcome all the difficulties, make it available to everyone and facilitate interaction with any Arabic-speaking person, we present this research in an effort to provide a simple service that surmounts the difficulties of this kind of people.

The raised dots that make up Braille's tactile reading and writing technique stand in for the alphabet's letters. Additionally, Braille uses symbols to represent letter combinations and punctuation. To read Braille, move one or more hands along each line from left to right. When reading and reading in general, both hands are typically used [3] with the index finger.

I. Problem Statement

the first step in the research methodology is the Problem identification for this project, and a prototype system is needed to address the requirement for translating Braille symbols to Arabic

characters, where the vibration for the reading Arabic has a unique shaking that must be take into consideration, where any change in reading the Arabic text method may result in a different interpretation [5].

II.Objective

1. To identify obstacles to learning the Arabic language.
2. To Suggesting an effective system that converts Braille texts to Arabic texts.

III.Literature Review

A. Characters of the Braille System in English

Braille was first adopted as the recognized form of communication for the blind in France in 1854. The United Kingdom, Australia, and many other nations spoke English by the end of the eighteenth century. However, Braille was not accepted in the US until 1932. There are 5 tactually systems in used in the US at the beginning of the nineteenth century, including both British and American Braille [7].

Recent years have seen a plethora of studies involving English symbols that focus on the Braille system. The market-leading commercial translation products are created by The Duxbury Company in the USA [8]. They provide a wide range of services, including mass translation, graphical user interfaces, communication with other programs, and word processing and plain text document translation. There are numerous versions for single users that are compatible with desktop operating systems like Microsoft Windows and Apple Macintosh, as well as interpreters that can handle massive volumes of data. Despite the fact that they are relatively expensive, they are feature-rich and constantly updated. There are fourteen languages that are supported.

A twin shadows-based technique for optical Braille recognition was introduced in 1995 by Hentzschel and Blenkhorn [9], and it subtracts two images of the same Braille page that were taken in different lighting conditions. As a result, the paper's texture-related noise and image faults are diminished. The work Blenkhorn and Hentzschel created the next year encompassed all the elements of a pattern recognition system, including image processing, in contrast to the work Blenkhorn [10] provided in 1994, which only covered the classification procedure. Each routine in the image-processing module in [9] served a distinct and significant purpose, such as using the random-noise reduction filter that was necessary to minimize unintended noise emphasis.

B. Characters of the Braille System in Arabic

Being the primary language of the Qur'an in the Islamic religion, Arabic is one of the most significant languages in the world. The protector of 2 Holy Mosques Press, created in 1973 with the intention of publishing the Holy Qur'an, was overseen by the Middle East Committee for Affairs of the Blind. Other printing presses with educational content as their focus were also well-known in the Arab world. The Holy Quran could not be printed on manual Braille devices because they were regarded as rudimentary when printing businesses first started making educational books with them [8].

The first Quran in Braille was printed in the Kingdom of Saudi Arabia during "1985 - 1986" (1406 AH) by the Education Press of the Ministry of the Education, and several educational

institutions subsequently created educational materials in Braille. Between 1986 and 1987, the Regional Office Press also released the Mushaf's first edition.

IV.Methodology

The process of converting Braille text into Arabic depends on a number of stages, as shown in the following figure (1) where each stage will be discussed in detail, as these algorithms are very important in the conversion process.

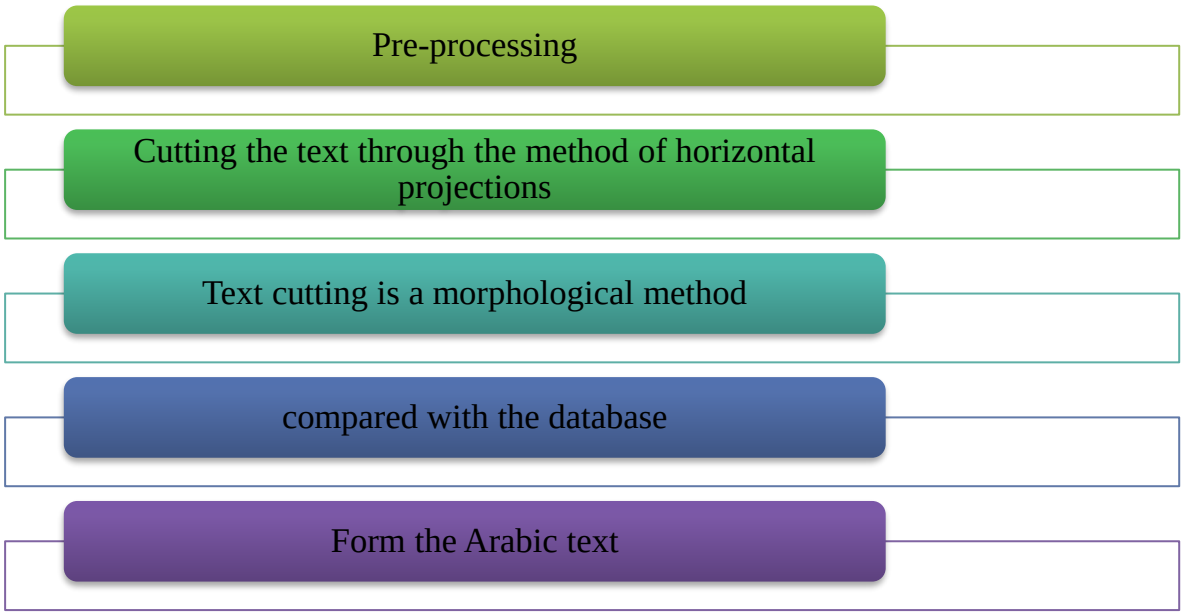
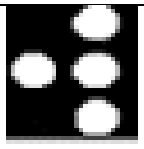


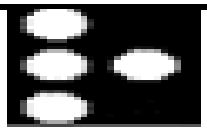
Figure1: Outline of the process

A. Data collection

At first, we collected the texts that represent the data that contains all the characters in Braille. Using the scanner, these texts are converted into digital images and thus are ready to be entered in the processing stage, where each letter is read separately and then the process of searching for circular shapes and then locating them is applied and stored in the database in the form of cells that include the number of circles and their location for each Braille letter and its equivalent from the names of the Arabic as example in table (1).

Table1: show the names of the Arabic as example

Image character	character	Features	
	ن	6.5758	4.9545
		6.7015	30.2090
		19.4143	4.9000
		19.4026	17.6623
	و	6.6667	17.0290
		20.5352	4.9437
		20.2603	16.9589
		20.5286	29.0286



8	5
7.8636	17.1364
7.8714	29.8429
21.3478	17.1304

B. Image to Gray Level

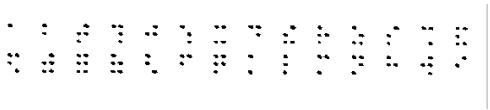
In a computer system, grayscale images are stored in 2-D arrays and RGB images are stored in 3-D arrays. 2-D arrays are simpler, speedier, and don't require any extra features when doing work. As a result, the first step in the suggested system converts colorful scanned images to gray level so that each pixel value in the image falls within the range of 0-255. This is shown in Figures 2 and 3. As shown in figure 1, we employ the Luminosity Method because it effectively addresses the drawbacks of earlier approaches.

Based on the aforementioned observations, we should take a weighted average of the components. The contribution of blue to the final value should decrease, and the contribution of green should increase. After some experiments and more in-depth analysis, researchers have concluded in the equation below:

$$\textbf{grayscale=0.3 * R + 0.59 * g + 0.11 * b}$$

and after gray scale convert it to binary image using threashoulad cause don't need details as show in fig 1.

(a) R.G.B image (b) gray image



(c) binary image

Figure1: Converting the Image to Gray Level

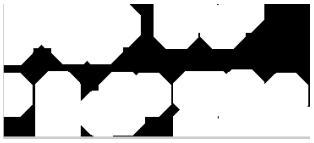
C. Pre-processing

We apply many operations to ready image extract character in other steps

1. After convert image to binary apply canny filter to find edge image
2. fill hole
3. Remove small objects

D. Segment line

Create structure disk to merge character in one line, Image dilate sum all row to find horizontal project profile if the row is empty summation is zero that mean space between lines we can segment it.



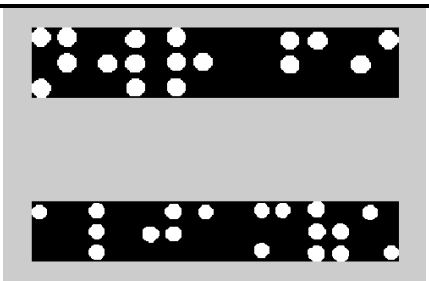


Figure2: Segment line

E. segment character:

Take all line from line crop step, apply dilate image and close morphology measure properties of image regions using connected components and Clip image region as show in Figure3.

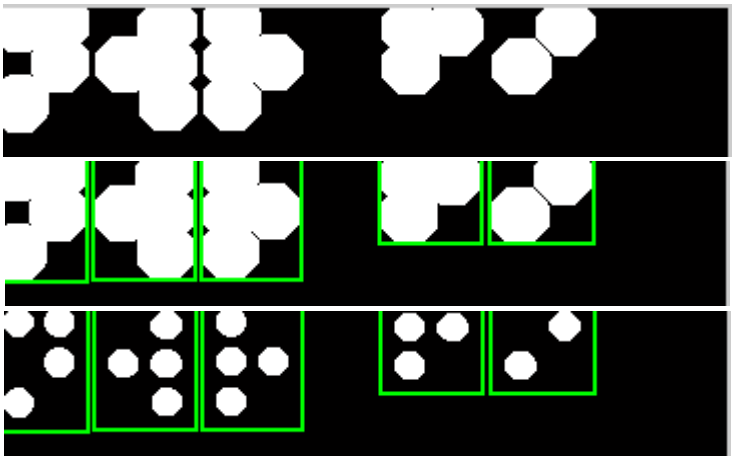


Figure3: segment character

F. Match characters

After we extract all character from braille image we take char after char and find centroid for all point in character and match with data base from character features as show in Figure4.

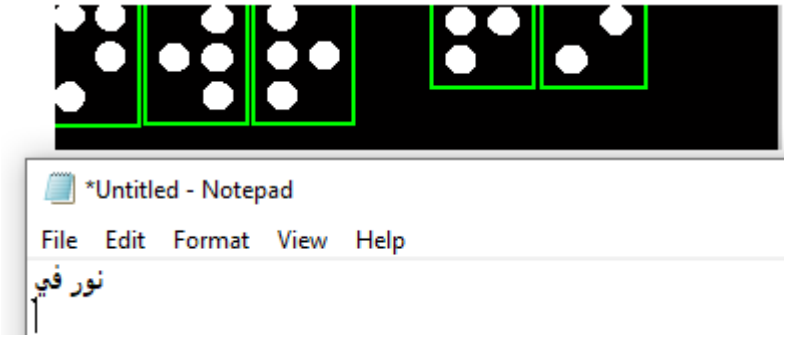


Figure4: Match characters

V.Conclusion and Future Work

The methodology used in our algorithm has proven its efficiency in the speed of performance and the accuracy of the results, which exceeded 97%. As for some of the problems that appear

to us, they are only in the case that the entered document is of low accuracy and is not characterized by clarity and can be applied in several future works such as the application of ease of dealing with qualified people or the transfer of written messages Braille text to voice to make it clearer and easier to communicate in a more efficient way.

REFERENCES

1. WHO, Blindness and Vision Impairment, WHO, Geneva, Switzerland, 2018.
2. Shokat, S., Riaz, R., Rizvi, S. S., Khan, K., Riaz, F., & Kwon, S. J. (2020). Analysis and evaluation of braille to text conversion methods. Mobile Information Systems, 2020.
3. El Ghoul, O., Ahmed, I., Othman, A., Al-Thani, D. A., & Al-Tamimi, A. (2020, September). An Overview of the New 8-Dots Arabic Braille Coding System. In International Conference on Computers Helping People with Special Needs (pp. 339-345). Springer, Cham.
4. Foulke, Emerson. "Braille." The psychology of touch. Psychology Press, 2013. 231-246.
5. Abualkishik, A. M., & Omar, K. (2008). Quranic braille system. International Journal of Computer and Information Engineering, 2(10), 3306-3312.
6. Masanet, Maria Jose, et al. "Teens and digital image creation on social media: informal learning, transmedia skills and professional profiles." BiD 45 (2020).
7. Jolley (2006), Access to literacy through Braille or print, International Council for Education of People with Visual Impairment, Twelfth ICEVI World Conference Kuala Lumpur
8. Abualkishik, Abdallah M., and Khairuddin Omar. "Quranic braille system." International Journal of Computer and Information Engineering 2.10 (2008): 3306-3312.
9. Blenkhorn, P., “A System for Converting Braille into Print”, IEEE transactions on rehabilitation engineering, Vol. 3, No. 2, June 1995.
10. Hentzschel, T. W., and P. Blenkhorn, “An Optical Reading Systems for Embossed Braille Characters using a Twin Shadows Approach”, Journal of Microcomputer Applications, pp. 341-345. 1995.