CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

A. Definition of Terms

The proponents would like to define some terms used in the study to help the reader understand the study.

a. Braille System– a method that is widely used by blind people to read and write

b. Character Isolation Box – algorithm that cuts the image into segments that contain Braille character

c. Depression or Back Side Dot – flat Braille dot in a Braille document

d. Dpi (dots per inch) – a measure of printing resolution

e. Double sided Braille document – also known as contracted, inter-point or literary Braille. It has protrusions on both sides of the document page.

f. Grade 1 Braille – a direct, one to one substitution of normal print letters for letters from the Braille alphabet

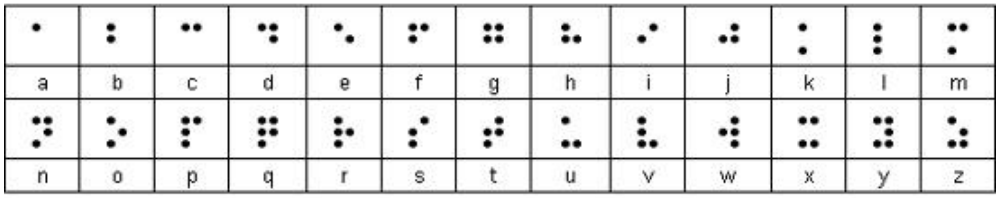

Figure 3.1
Grade 1 Braille Alphabet

g. Grade 2 Braille – a shorter form which makes reading and writing Braille much faster with the use of contraction rules

h. Image Skew– due to incorrectly scanned documents, the result of the image that has been scanned is sometimes slanted or skewed in an angle

i. Jpeg – commonly used method of compression for photographic images

j. Optical Braille Recognition – (OBR) is a Windows software package that allows to interpret single and double sided Braille documents with a standard scanner

k. Pattern Generation – a technique used in examining the presence of the dot in their possible positions/ predefined regions

l. Protrusion – raised or bulged Braille dot

m. Single sided Braille document – has protrusions on one side of the document page.

n. Slope –describes the steepness, incline, or grade of a line

o. Thresholding – is used to segment an image by setting all pixels whose intensity values are above a threshold to a foreground value and all the remaining pixels to a background value

B. Hypothesis

By improving the pattern generation algorithm to recognize Grade 2 Braille and successfully converting them to text documents, through adding an additional de-skew detection to make the system more flexible in the image inputs of the user and lastly to modify the segmentation of the current system to allow the input of double sided Braille because this would be the expected formats of published Braille documents.

C. Basic Assumption

The proponents assume the requirement for Braille recognition. The person assigned to scan the Braille document is assumed to have expertise in Braille and computer. The person is assumed to have knowledge in determining levels of Braille

and the front and back pages of the Braille document. The person is also assumed to have knowledge in scanning Braille documents and storing images. The system only accepts six Braille dots and assumed to interpret one row of Braille characters at a time. It is assumed that the scanned Braille documents are in Grades 1 and 2 alphabetic Braille and not in musical Braille. Other Braille languages aside from English are not accepted.

D. Research Design and Methodology

1. Specification of Research Data

The proponents' point of interest in this research was the limitations of the previous of the previous thesis because of those limitations; the system was far from being used in digitalizing Braille documents. After reading related documents, the proponents gain knowledge of certain solutions that the would take the previous on the next level such as improving then de-skewing, allowing Grade 2 Braille and double sided Braille documents as inputs.

2. Sources of Data

The proponents' sources come from books, online journals, internet and previous studies like an unpublished thesis on Optical Braille Recognition.

a. Books

The proponents are able to find books regarding image recognition and processing that can be helpful to know the methods and procedure.

b. Internet

The proponents are able to acquire much information in the internet. Most are whitepapers which contain discussions of the study and

explanations on the techniques used in the process of Braille recognition. The proponents also find some articles related to Optical Braille Recognition.

c. Previous Studies

The proponents are able to acquire many related studies that are done already. Those studies use many different approaches and procedures. With these researches, the proponents are able to determine the advantages and disadvantages of the algorithms used and plan to enhance those.

d. Resource Person

The resource person of the proponents is Miss Lorrie Barboza. She is a teacher, specifically for the blind. She teaches in the Resources for the Blind located in Cubao, Quezon City. Moreover, she is a chief Braillist in that organization.

3. Description of Research Methods

1. Information Gathering – The proponents find facts and other previous studies that can be used in the study.

2. Research Evaluation – The proponents study the facts gathered and try to know what to improve and add in the study, given those previous studies that are done before.

3. Identification of the Research Study – With the researches that the proponents are able to find, the proponents now identify the problems that occur in the previous studies which they want to focus on. Those problems that are image skewing, character recognition for Grade 2 Braille and

differentiation of the embossed side from the impressed side since the Braille document is double-sided.

4. Limitation of the Study – Optical Braille Recognition is a broad topic; the proponents limit the study in some areas like covering only until Grade 2 Braille, some contraction rules for Grade 2 Braille and recognition of a number of characters only at a time.

5. Outline of the System – This is also the creation and searching for algorithms. With the related studies that the proponents are able to find and study, they now combine, generate algorithms and sketch the system.

6. Code Formation for the System – The proponents convert the algorithms or methods applicable into program codes.

7. Testing and Debugging of the System – Testing and debugging is necessary to assure that the system will run, recognize Braille characters and converts those Braille characters in English text.

8. Maintenance of the System – The system should be maintained fully by updating the system since there is no system that is bug-free.

9. Implementation – At this point, the software created can be used not only by the visually impaired individuals but the normal ones too. The software created is also used to duplicate and preserve Braille documents.