

TEXT-TO-BRAILLE TRANSLATOR

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Bachelor of Computer Science (Computer
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I/We* hereby declare that I/We* have checked this thesis/project* and in my/our* opinion, this thesis/project* is adequate in terms of scope and quality for the award of the degree of *Doctor of Philosophy/ Master of Engineering/ Master of Science in

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ABSTRAK

Braille merupakan satu bentuk bahasa bertulis yang dikhaskan untuk orang yang cacat penglihatan, di mana aksara diwakili oleh corak titik-titik yang timbul dan boleh dirasai oleh hujung jari. Masyarakat biasanya tidak dapat membaca tulisan Braille tanpa latihan. Oleh itu, terdapat ramai ibu bapa yang mempunyai kesulitan dalam mendidik anak-anak mereka yang cacat penglihatan. Seterusnya, guru-guru yang terlibat dalam pendidikan khas perlu bergantung pada penterjemah Braille ketika menandatangani kertas atau tugas Braille. Oleh itu, sistem ini bertujuan untuk membantu mereka yang tidak mempunyai pengetahuan terhadap kod Braille untuk mempelajarinya. Sistem ini juga akan mempunyai prospek yang lebih baik untuk aplikasi, mengurangkan masa yang diambil dalam menterjemah dan memberikan bantuan kepada pemula dalam pembelajaran Braille.

ABSTRACT

Braille is a form of written language for visually impaired people, in which characters are represented by patterns of raised dots that are felt with the fingertips. The discerning person can not usually read Braille information without training. Therefore, many parents have difficulty in educating their blind children. Next, teachers that are engaged in special education have to depend on Braille translator when marking Braille papers or assignments. Therefore, this system proposed are aiming to help the people who have zero knowledge in Braille code to learn the code. This system will also have better prospects for application, shorten the time taken to translate and provide assistance to the beginners in learning Braille characters.

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LIST OF ABBREVIATIONS

WHO	World Health Organization
AMD	Age-related Macular Degeneration
USH	Usher Syndrome
RAD	Rapid Application Development
AR	Augmented Reality
SDLC	System Development Life Cycle
UML	Unified Model Language
DFD	Data Flow Diagram
FSM	Finite State Machine
PHP	Hypertext Pre-Processor

CHAPTER 1

INTRODUCTION

1.1 Overview

This chapter will briefly explain about the overview of the Text-To-Braille Translator. Overall, this chapter consists of six sub sections which is in 1.2, it will describes about the background of the study. Then, in 1.3 will discuss about the problem statement of the project. Next, the goal and objectives of this project will be stated in 1.4. After that, the scope of the project and methodology will be discussed in sub section 1.5 and 1.6 respectively. Lastly, in section 1.7, it will explain about the thesis organization.

1.2 Background of Study

According to the World Health Organization (WHO), there are an estimated of 45 million people in the world who are blind (Binnawi, 2013). The value was expected to increase to 70 million in two years time if the current services provided are not being improved. Vision impairment or blindness is when a person's degree of seeing is very low and that particular person requires assistance in order to carry out their daily routine. The terms blind and blindness have been modified in our society to include a wide range of visual impairment (Dahl, 2017). Blindness is frequently used today to clarify serious visual problem in one or both eyes. However, vision impairments is not necessarily mean a total loss of sight or some call it as blind. There are people who are visually impaired can detect light, or shapes or forms, meanwhile others can see nothing at all.

Generally, blindness and vision impairment can be caused by problems that can interfere the forming of images or the transmission of retinal images to the brain in retina. Blindness or low vision affects approximately 1 in 28 Americans older than 40

years. (Congdon *et al.*, 2004). According to the World Health Organization (WHO), there are five major global causes of moderate to serious vision impairment which is shown in Figure 1.1. The highest leading cause of blindness is usually caused by uncorrected refractive errors followed by blindness caused by cataracts. Then, age-related macular degeneration was the third highest cause of blindness followed by glaucoma. The least cause of blindness or vision impairment can be caused by diabetic retinopathy. Nevertheless, in some cases, there are also other specific reasons that cannot be determined.

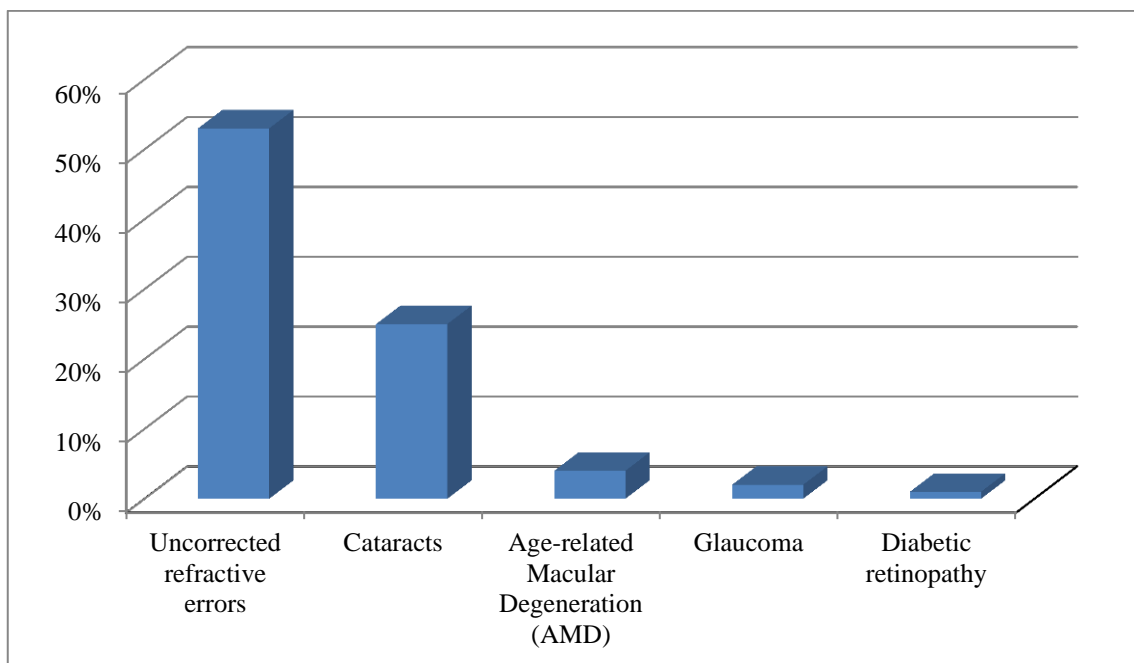


Figure 1.1 Major global causes of moderate to serious vision impairment
Source : World Health Organization (WHO) (2016)

Most common cases of disability other than blindness are the hearing impairments or most commonly called as deafness. Hearing impairment means impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but is not included under the definition of "deafness" ("Individuals with Disabilities Education Act," n.d., para 5). A normal person can hear a sound when the sound waves go through into the ear canal until they reach the eardrum. The eardrum will then pass the vibrations all the way through the ossicles into the cochlea where there are thousands of tiny hair cells. However, when the ossicles are damaged, this can cause the hearing loss or deaf.

There are also some cases where a person suffering from both blindness and deafness. Usher syndrome (USH), clinically and genetically heterogeneous, is the leading genetic cause of combined hearing and vision loss (Mathur and Yang, 2014). This syndrome can be divided into three major types, which are described as Type I, Type II and Type III. These types are differentiated by the severity of hearing loss, the presence or absence of balance problem, and the age at which symptoms become visible. The blindness occurs from a progressive retinal degeneration termed retinitis pigmentosa (Yan and Liu, 2010). However, commonly used practices for detecting the disease fail to identify the disease until it is in a quite advanced phase and the person who suffered from it is usually in his late teens.

Nowadays, blind people read Braille code that is aiming to help them in order for them to be able to read. Braille is a tactile reading and writing systems used by blind and visually impaired people who cannot access print materials (“National Braille Week,” n.d., para 2). It is traditionally written with embossed paper. Braille code is made up of raised dots which represent the letter of alphabets and symbols that can be felt by using fingertips. A series of raised dots are evenly arranged in quadrangular letter spaces called cells as shown in Figure 1.2. A full cell is three dots high and two dots wide. A standard Braille is made up of six dots and Unicode renders eight dots Braille. The number and arrangement of the dots in Braille distinguish one character from another. Blind people read Braille by moving their fingers over those cells and feel the letters and numbers. There are different Braille codes used that are meant to show letter in different languages as well as sets of codes that are used for mathematics and music use. There are two types of English Braille which are Grade I Braille and Grade II Braille.

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