

Chapter 7

Indic Language: Kannada to Braille Conversion Tool Using Client Server Architecture Model

Shaila H. Koppad
Bangalore University, India

T. M. Shwetha
Bangalore University, India

ABSTRACT

The aim of this research paper is to convert Kannada script to Braille, to enable the visually-impaired lead a better life by means of providing better learning aides. It proposes a possibility of facilitating the regional teachers to teach Kannada through Braille. “Braille Lipi” is instrumental in providing an able platform for the visually-impaired to habituate studying. This paper addresses the various aspects of “Braille Lipi”, it throws light on the origin and various levels, which depends on user-type (either simple, moderate or expert) explained with architecture of Braille system. Kannada to Braille Conversion Tool mainly focuses on elaborating the conversion of Kannada script to Braille script. An attempt to better understand, by a brief insight to Kannada script, Kannada alphabets is made and the whole intention of the contribution is a humble gesture to humanity. The main advantage of the model is visually-impaired can also have access to e-governance.

INTRODUCTION

All over the world, persons who are visually impaired have used Braille as the primary means of accessing information. Also, the concept of Braille has been accepted as a universal approach that works across the boundaries of the world. Different countries of the world have adapted the system of Braille to suit their languages. Irrespective of these changes or modifications, visually disabled persons understand standard Braille for the English language making it possible to exchange information in a consistent fashion across different countries. Standard Braille is an approach for creating documents which could be sensed through touch. This is accomplished through the concept of a Braille cell consisting of raised

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dots on thick sheet of paper. Also there are several communication methods that involve tactile sensation, such as Braille-Based typewriter (Baulblenkhorn,1997) a system for converting print to Braille (Basu & Lachikawa,2004), Braille text on a finger using Braille pin textile method (Blenkhorn,2010) and various Braille emulator method (Lee,2010;Gill,1992) available. However, some problems arise in such conversion, like lack of privacy for slow learners, complexity operation and mismatch for computer environment. Also person having problem like long term diabetics often have a condition known as “diabetic neuropathy a circulatory problem causing many of the complications that the diabetics might encounter. Neuropathy causes not only insensitivity in the fingertips and toes; it causes more blindness, kidney failure, heart attacks and other related medical problems. The continuous readings in Braille produces swelling in the ankles which cause reading times are very slow. So this proposed system gives easy conversion of Kannada text to Braille.

A man named Charles Barbier who served in Napoleon Bonaparte’s French army developed a unique system known as “night writing” so soldiers could communicate safely during the night. Being a military veteran, Barbier had seen several soldiers killed because they used lamps after dark to read combat messages. The light shining from the lamps told enemy combatants where the French soldiers were and inevitably led to the loss of many men. Barbier based his “night writing” system on a raised 12-dot cell; two dots wide and six dots tall. Each dot or combination of dots within the cell represented a letter or a phonetic sound. The problem with the military code was that the human fingertip could not feel all the dots with one touch.

The Braille script was created in 1821 by the Frenchman Louis Braille who was born in the village of Coupvray, France on January 4, 1809. He was blinded at a very young age after he accidentally stabbed himself in the eye with his father’s awl. Braille’s father was a leather-worker and used the awl to poke holes in the leather goods he produced. At eleven years old, Braille was inspired to modify Charles Barbier’s “night writing” code in an effort to create an efficient written communication system for fellow blind individuals. One year earlier he was enrolled at the National Institute of the Blind in Paris and spent the better part of the next nine years developing and refining the system of raised dots that has come to be known by his name, Braille. After all of Braille’s work, the code was now based on cells with only 6-dots instead of 12 (like the example shown below). This improvement was crucial because it meant that a fingertip could encompass the entire cell unit with one impression and move rapidly from one cell to the next. Over time, braille gradually came to be accepted throughout the world as the fundamental form of written communication for blind individuals, and today it remains basically as he invented it.

The system is based on a code called night writing, which had been developed by Charles Barbier to enable soldiers to communicate silently and without the need for a light. Barbier’s system used letters comprised of up to twelve raised dots, and proved too complex to be useful to the military. Louis Braille modified this concept to produce a script which used letters comprised of six dots. A dot may be raised at any or all of six positions called “cell”. Braille is usually written using larger letters than standard printed text, to enable the reader to more easily make the distinction between letters. The figure 1 represents a cell which is made up of six dots that fit under the fingertips, arranged in two columns of three dots each. Each cell represents a letter, a word, a combination of letters, a numeral or a punctuation mark. Counting a space in which there is no dot raised, there are 2 to the 6th power ($2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$) possible combinations.

However, there have been some small modifications to the braille system, particularly the addition of contractions representing groups of letters or whole words that appear frequently in a language. The use of contractions permits faster braille reading and helps reduce the size of braille books, making them

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