Chapter 23
Braille-Lippi Numbers and Characters Detection and Announcement System for Blind Children Using KSK Approach: AI-Driven Decision-Making Approach

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ABSTRACT

In order to develop a Braille-Lippi character recognition system, a number of different strategies and procedures have been utilized, with the KSK Approach being the primary tool utilized. When doing analysis, the KSK Approach makes use of DT, ANN, and K-NN classifiers. In comparison to other computational methods, the KSK Approach is superior in terms of its efficiency and reliability when it comes to recognising Braille characters. The page contains the results of testing and system development, as well as the technique, design, and architecture of the Braille character recognition system, which has a 99% accuracy rate. This also makes it possible to use the Voicing System, which is responsible for announcing the letter that has been recognized.

INTRODUCTION

Braille L. is the inventor of Braille-Lippi lettering and production system for the blind. This technique creates letters, characters, and other characters that can be read by touch by combining visible dots or points. Persons who become sightless or partly sighted will read for rest of their life if they make the effort to learn Braille. Erudition Braille at an early age is extremely helpful for literacy since Braille is significantly effective medium than audio for realizing syntax, spelling, and punctuation. Text can be typed and written in braille in a variety of formats, not simply books and magazines. Additionally, it is utilized for the purpose of labeling commonplace goods such as prescribed medications, door signs, elevator

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keypads, and tariffs from eateries located in public areas. The accessibility of a variety of documents, including bank statements, is improved by the utilization of this tool (see, Kutubuddin,2024a; for more).

In 1824, the Frenchman Louis Braille was the one who came up with the idea. The “cells” of Braille, which have the appearance of a domino, are composed of six dots, each of which is generated using a different pattern for each letter. There are around 250 letters (phonograms) that make up this language. Additionally, there are numerals, punctuation, formatting symbols, contractions, and abbreviations (logograms). Certain Braille characters in the English language, such as the letter “ch,” correlate to multiple letters in their print form. It is common practice to refer to Braille-cell as a fundamental Braille character. The Braille cell is comprised of up to six dots that are arranged in rectangular shape, with 3-dots hight and 2-dots wider. These 6-dots may form a symbols in certain circumstances. The two varieties of Braille that are utilized the most frequently are Grades 1 and 2, which are also known as un-contracted and contracted Braille respectively. The first grade of Braille, frequently acknowledged as alphabetic Braille or uncontracted Braille, is the most fundamental form of the writing system.

The ability to recognize Braille characters and information has become more significant in today's digital world because it is useful in a variety of jobs that are performed daily. This is evidenced by the fact that in recent years, several recognition systems have been developed or predicted for application in a variety of fields where there is a requirement for an excessive amount of categorization efficiency. With the help of equipment that can recognize Braille Lippi letters, characters, and numerals, individuals can complete more difficult tasks that would otherwise require a significant amount of time and would ultimately be inaccessible to them. The biotic Braille-Network, which enables humans to acquire and depict complex, non-linear interactions, can serve as a source of inspiration for Braille-Lippi detection systems. The development of it was accomplished by utilization of Artificial Neural Networks(ANN) (see, Liyakat,2024; Prasad et a,2024; & Kutubuddin,2024d; for more). Because of their Braille, people may discriminate between several Braille-Lippi things, such as digits, letters, and characters. This ability allows them to communicate effectively. Individuals may read Braille letters and numbers in various ways because they are biased. Other hands, independent computer systems can perform extremely difficult jobs that would require a certain amount of period and effort for individuals to complete in similar manner.

It is generally agreed that the KSK Approach, which makes use of ANN, DT, and K-NN, is the most effective course of action for the development of computers that are capable of recognising Braille letters. The KSK Approach is a method that helps to replicate how human Braille operates when it comes to condensing Braille Lippi characters. Technology is now capable of reading on par with or even better than humans as a result of development. A neural network is a most appropriate kind of algorithm for recommended system because of its capacity to create meanings from byzantine data and recognize patterns in data that are difficult for people or other manual methods to recognize. This makes neural networks the ideal choice for the system. The primary objectives or goals of the research is to develop a prototype that will make use of the KSK-Approach from machine learning and artificial intelligence as a concept to read and pronounce Braille-Lippi characters, numbers, and sentences from an image(see, Sayyad,2025f; Kazi K S,2025c; Liyakat,2025d; Sayyad,2025e; & Sayyad,2025g; for more). This KSK approach is suggested by Dr. Kutubuddin S Kazi, so looks like the author name KSK. This method improves the accuracy of overall system.