

UNIVERSITI TEKNOLOGI MARA

**BRAILLE CHARACTERS' RECOGNITION
USING CONVOLUTIONAL NEURAL NETWORK**

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ABSTRACT

For the past few decades, braille is one of the tools that are being used to help visually impaired people to engage with the world. Braille is the most popular system used for interaction between visually-impaired and sighted people using tactile means. As the numbers of people with vision impairment are growing over the years, they also need a system that can aid their impairment. The main purpose of this project is to develop and evaluate a prototype of braille characters' recognition that is able to identify Grade 1 and Grade 2 braille characters. This study develops a CNN-based system to recognize Braille characters, addressing the translation challenges faced by people with vision impairments. The dataset comprises 28x28 black and white images of 26 characters, each with three augmentations, sourced from Kaggle. CNNs analyze dot patterns for classification. Target users, particularly Braille instructors, benefit from this learning aid, enhancing accessibility and inclusivity for visually impaired individuals. Therefore, Convolutional Neural Network (CNN) technique is used to construct a model that is able to identify the braille characters. Two experiments were conducted on the number of epochs and splitting data ratios. Based on the results, the most outstanding model achieved 97.1% accuracy with the 600 number of epochs. The future works for this prototype system are to develop a mobile application or web-based application to identify the braille characters and translate the characters. Besides, another recommendation is to add another braille characters along with symbols for the system to identify.

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