

***IMPLEMENTATION OF THE LeNet CONVOLUTIONAL NEURAL
NETWORK (CNN) ARCHITECTURE FOR A HIRAGANA CHARACTER
EDUCATIONAL GAME***

Mochamad Alfian Muawad

Program Studi Teknik Informatika
Jurusan Teknologi Informasi

ABSTRACT

Hiragana is a fundamental writing system that must be mastered by beginners learning Japanese. However, the differences between Hiragana characters and the Latin alphabet often make the learning process challenging. This study aims to develop an Android-based educational game equipped with a handwriting recognition feature using a Convolutional Neural Network (CNN) with the LeNet architecture. The dataset consisted of 13,800 Hiragana character images from 46 classes, divided into training and validation data with an 80:20 ratio. The model was developed using TensorFlow and integrated into a Flutter application through the ONNX format.

The experimental results showed that the proposed CNN model achieved a validation accuracy of 98.91%. Black box testing indicated that all application features functioned properly, while User Acceptance Testing (UAT) achieved an average score of 83.1%. These results demonstrate that the LeNet-based CNN can accurately classify Hiragana characters and can be effectively implemented in an educational game as an interactive and effective learning medium.

Keywords: Hiragana, Educational Game, CNN, LeNet, Flutter.