ABSTRACT

Javanese script is one of the cultural heritages of the archipelago that is increasingly rarely used in everyday life. As a result, the current generation has difficulty in reading and writing the script. The lack of digital media that supports the learning and preservation of Javanese script also worsens this situation. This research aims to design an artificial intelligence-based system that is able to transliterate Javanese characters automatically, accurately, and easily accessible to the wider community.

The developed application has two main features. First, the transliteration of Latin text to Javanese script uses the Gemini AI-based Natural Language Processing (NLP) model, which was chosen because it is able to understand the language context generatively and does not require local retraining. Second, image-based transliteration (OCR) that utilizes an image classification model using TensorFlow's Convolutional Neural Network (CNN) algorithm. CNN was chosen for its ability to recognize visual patterns and extract features from script character images with high accuracy. The system was built using a Flask-based backend service connected to an Android application interface.

The test results show that the text transliteration feature produces Javanese script output that is structurally consistent and in accordance with the writing rules. Meanwhile, the OCR model is able to recognize Hanacaraka characters with an accuracy of 96.25%, showing reliable performance in recognizing characters from images. With the combination of these technologies, the developed application is expected to be an effective, interactive, and easily accessible digital media in supporting the preservation of Javanese script in the digital era.

Keywords: Javanese script, OCR, NLP, CNN, Gemini AI, Transliteration, Android