ABSTRACT

IMPLEMENTASI ARSITEKTUR *CONVOLUTIONAL NEURAL NETWORK* UNTUK DETEKSI DAN KLASIFIKASI CITRA AKSARA SUNDA

Alfan Fadhil Baihaqi – 1217050005

Department of Informatics Engineering

Sunan Gunung Djati State Islamic University Bandung

Sundanese script is one of Indonesia's cultural heritages with significant historical value, yet its usage has gradually declined due to the dominance of the Latin alphabet. This research focuses on developing a Sundanese script image classification system by utilizing Convolutional Neural Networks (CNN). The main objective of this study is to design a CNN-based classification model capable of automatically and accurately recognizing various forms of Sundanese script. The research was conducted using the CRISP-DM methodology, which consists of business understanding, data understanding, data preparation, modeling, evaluation, and deployment. A total of 21,000 Sundanese script images were collected from printed sources, followed by data cleaning, augmentation, and splitting into several training scenarios to compare model performance. The CNN model was adapted from the LeNet-5 architecture with adjustments in the number of filters, convolutional layers, and the use of regularization techniques such as dropout to prevent overfitting. Model evaluation employed classification metrics including accuracy, precision, recall, and F1-score, supported by K-fold cross validation to ensure consistency of results. The experiments demonstrated that the model achieved very high accuracy, exceeding 99% across most classes, with stable performance distribution across folds, although minor variations were still considered reasonable. For implementation, the trained model was integrated into an interactive web prototype built with Flask, featuring a canvas for direct script drawing. This prototype enables users to instantly obtain prediction results, providing a practical and adaptive solution to support the preservation and learning of Sundanese script in the digital era.

Keywords: Sundanese script, character recognition, CNN*, handwritten image classification, deep learning, cultural preservation*.