

ABSTRAK

Aksara Jawa (Hanacaraka) merupakan salah satu warisan budaya Indonesia yang memiliki karakteristik bentuk kompleks, sehingga pengenalan otomatisnya menjadi tantangan tersendiri dalam bidang pengolahan citra. Penelitian ini bertujuan mengembangkan model klasifikasi citra aksara Jawa menggunakan arsitektur MobileNetV2 berbasis transfer learning yang dikombinasikan dengan metode *Stratified K-Fold Cross Validation*. Dataset yang digunakan mencakup 306 kelas aksara Jawa, meliputi aksara dasar, pasangan, sandhangan, aksara murda, aksara rekan, aksara swara, dan angka Jawa. Untuk mengoptimalkan efisiensi komputasi, dilakukan random sampling sebanyak 30 citra pada setiap kelas. Tahap preprocessing meliputi resize citra menjadi 224×224 piksel dalam format RGB serta normalisasi nilai piksel ke rentang -1 hingga 1. Pengujian model dilakukan melalui Stratified 5-Fold Cross Validation dengan mengeksplorasi 7 variasi kombinasi learning rate, batch size, dan epoch untuk menemukan kombinasi hyperparameter optimal. Hasil eksperimen menunjukkan bahwa kombinasi *learning rate* 0,001, *batch size* 64, dan *epoch* 100 menghasilkan performa terbaik dengan akurasi 94,01%, presisi 95,20%, recall 94,01%, F1-score 93,57%, dan *loss* sebesar 0,2362. Penelitian ini membuktikan bahwa arsitektur MobileNetV2 mampu mengenali ratusan kelas aksara Jawa yang kompleks secara efisien dan stabil.

Kata Kunci: Aksara Jawa, MobileNetV2, *Transfer Learning*, *Stratified K-Fold Cross Validation*, Klasifikasi Citra

ABSTRACT

Javanese script (Hanacaraka) is one of Indonesia's valuable cultural heritages, characterized by complex character shapes that made automatic recognition a distinct challenge in the field of image processing. This study aimed to develop a Javanese script image classification model using the MobileNetV2 architecture with a transfer learning approach, combined with the Stratified K-Fold Cross Validation method. The dataset used covered 306 classes of Javanese script, including basic characters, pasangan, sandhangan, murda characters, rekan characters, swara characters, and Javanese numerals. To optimize computational efficiency, random sampling of 30 images per class was performed. The preprocessing stage included resizing images to 224×224 pixels in RGB format and normalizing pixel values to the range of -1 to 1. Model testing was conducted through Stratified 5-Fold Cross Validation, exploring seven variations of learning rate, batch size, and epoch combinations to find the optimal hyperparameter configuration. The experimental results showed that the combination of a learning rate of 0.001, a batch size of 64, and 100 epochs produced the best performance, with an accuracy of 94.01%, precision of 95.20%, recall of 94.01%, F1-score of 93.57%, and a loss of 0.2362. This study proved that the MobileNetV2 architecture was able to efficiently and stably recognize hundreds of complex Javanese script classes.

Keywords: *Javanese Script, MobileNetV2, Transfer Learning, Stratified K-Fold Cross Validation, Image Classification*

