Comparison Of Machine Learning And Deep Learning Algorithms In Batik Motif Image Classification Based On Feature Extraction

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ABSTRACT

Batik motifs, as part of a continuously evolving creative product, often pose challenges in recognition and preservation. A Batik motif recognition method based on digital image processing technology is needed. This study aims to analyze the effect of feature extraction methods on batik motif image classification results and compare the performance of Machine Learning and Deep Learning algorithms based on the extracted features. The feature extraction methods used are Histogram of Oriented Gradient (HOG), Local Binary Pattern (LBP), and Gray Level Co-occurrence Matrix (GLCM), while the classification algorithms include Support Vector Machine (SVM) and Convolutional Neural Network (CNN) with VGG16 and ResNet-50 architectures. Results show that feature extraction plays a crucial role in the classification process, especially for Machine Learning Algorithms like SVM, which rely on extracted feature values. Among the tested methods, GLCM achieved the highest result, outperforming HOG and LBP. Meanwhile, CNN performed well without additional feature extraction due to its built-in automatic feature learning. The comparison between Machine Learning and Deep Learning shows that each has its strengths in classifying batik motif images based on extracted features. GLCM combined with SVM achieved the highest accuracy of 98,33% using Gaussian kernels. Meanwhile, CNN, without additional features, attained a perfect accuracy of 100% on ResNet-50 architectures. However, CNN requires a longer training time due to its complex architecture and parameters. Therefore, choosing the right feature extraction method and classification algorithm is essential for optimal batik motif image classification.

Keywords: Batik, Feature Extraction, SVM, CNN, HOG, LBP, GLCM, Classification