

ABSTRAK

Batik Madura merupakan warisan budaya Indonesia yang dikenal dengan warna cerah dan motif flora khas. Tantangan dalam inovasi desain digital terletak pada integrasi elemen flora tanpa menghilangkan identitas visual batik. Penelitian ini menerapkan *Cycle-Consistent Generative Adversarial Network* (CycleGAN) untuk melakukan *style transfer* dari citra flora ke motif Batik Madura sebagai pendekatan otomatisasi desain baru. Dataset terdiri atas 150 citra flora (anggrek, seruni, teratai) dan 300 citra Batik Madura, dikelompokkan dalam dua skenario berdasarkan kompleksitas pola: kompleks dan sederhana. Data diperoleh melalui observasi dan *web scraping*, serta divalidasi oleh pembatik lokal dan akademisi bidang seni. Model dilatih secara terpisah untuk masing-masing skenario menggunakan arsitektur generator berbasis *ResNet* dan diskriminator *PatchGAN*. Evaluasi mencakup *training loss*, *Fréchet Inception Distance* (FID), dan *Mean Opinion Score* (MOS). Pada skenario pola kompleks, *generator loss* menurun dari 3,31 menjadi 1,62 pada pola sederhana, dari 3,34 menjadi 1,86. *Discriminator loss* stabil di kisaran 0,10. Skor FID menunjukkan hasil lebih baik pada pola kompleks (192,1076) dibanding sederhana (265,1566), dengan nilai MOS rata-rata 3,71 (pengrajin) dan 3,77 (masyarakat umum). Dari segi kemudahan implementasi ke kain nyata, skenario pola sederhana dinilai 75% lebih mudah diproduksi secara manual dibanding pola kompleks (37,5%). Model ini telah diimplementasikan dalam aplikasi web berbasis *Streamlit*. Penelitian ini menunjukkan adanya *trade-off* antara kualitas visual dan kemudahan produksi, serta membuka peluang inovasi desain Batik Madura melalui teknologi generatif.

Kata kunci: Batik Madura, *Style Transfer*, *Cycle Consistency Generative Adversarial Network* (CycleGAN), *Fréchet Inception Distance* (FID), *Mean Opinion Score* (MOS).

ABSTRACT

Batik Madura is a cultural heritage of Indonesia, recognized for its vibrant colors and distinctive floral motifs. The challenge in digital design innovation lies in integrating floral elements without losing the visual identity of batik. This study applies a Cycle-Consistent Generative Adversarial Network (CycleGAN) to perform style transfer from floral images to Madurese batik patterns as a new approach to automated design. The dataset consists of 150 floral images (orchids, chrysanthemums, lotuses) and 300 Madurese batik images, grouped into two scenarios based on pattern complexity: complex and simple. Data were collected through observation and web scraping, and validated by batik experts. The model was trained separately for each scenario using a generator architecture based on ResNet and a PatchGAN discriminator. Evaluation included training loss, Fréchet Inception Distance (FID), and Mean Opinion Score (MOS). In the complex pattern scenario, generator loss decreased from 3.31 to 1.62 in the simple pattern scenario, from 3.34 to 1.86. Discriminator loss remained stable around 0.10. FID scores showed better results in the complex pattern (192.1076) than in the simple pattern (265.1566), with average MOS scores of 3.71 (artisans) and 3.77 (general public). In terms of implementation feasibility on real fabric, the simple pattern scenario was rated 75% easier to manually produce than the complex pattern (37.5%). The model has been deployed in a web application using Streamlit. This study highlights a trade-off between visual quality and production feasibility, and encourages innovation in Madurese batik design through generative technology.

Keywords: *Madura Batik, Style Transfer, Cycle Consistency Generative Adversarial Network (CycleGAN), Fréchet Inception Distance (FID), Mean Opinion Score (MOS).*