

PENGEMBANGAN APLIKASI WEB KLASIFIKASI JENIS DAN KUALITAS KAIN BERBASIS DEEP LEARNING

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ABSTRAK

Identifikasi jenis dan kualitas kain masih menjadi kendala bagi masyarakat maupun pelaku tekstil karena kemiripan tekstur, variasi kualitas, dan keterbatasan penilaian visual secara langsung. Penelitian ini bertujuan mengembangkan aplikasi web PATTERNA untuk mengklasifikasikan jenis dan kualitas kain berbasis Deep Learning. Metode penelitian dilakukan melalui pendekatan Agile secara bertahap, meliputi pengumpulan data primer, pra-pemrosesan citra, augmentasi, pelatihan dan evaluasi model, implementasi website, deployment, serta pengujian sistem. Dataset yang digunakan berjumlah 1000 citra *close-up* kain yang terdiri dari 10 kelas, yaitu katun, poliester, linen, polikatun, dan rayon dengan kategori kualitas baik dan buruk. Model yang dibandingkan meliputi Custom CNN, MobileNetV2, ResNet50, dan EfficientNetB0. Hasil penelitian menunjukkan ResNet50 H1 P1 memperoleh akurasi tertinggi sebesar 85% dan Macro F1-score 0,85, sedangkan EfficientNetB0 H3 P2 dipilih sebagai model final karena lebih seimbang pada implementasi website, terutama dalam menolak citra non-kain. Hasil Black-Box Testing menunjukkan seluruh fungsi utama berjalan sesuai, User Acceptance Testing memperoleh indeks 89,18% dengan kategori Sangat Setuju, sedangkan pengujian non-fungsional menunjukkan sistem telah memenuhi standar performa, kompatibilitas, responsivitas, dan keamanan yang ditetapkan.

Kata Kunci : Klasifikasi kain, kualitas tekstil, Deep Learning, aplikasi web, User Acceptance Testing (UAT)

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ABSTRACT

The identification of fabric types and quality remains a challenge for both general users and textile practitioners due to texture similarities, quality variations, and the limitations of direct visual assessment. This study aims to develop PATTERNA, a web-based application for classifying fabric types and quality using Deep Learning. The research method follows a gradual Agile approach, including primary data collection, image preprocessing, augmentation, model training and evaluation, website implementation, deployment, and system testing. The dataset consists of 1,000 close-up fabric images divided into 10 classes, covering cotton, polyester, linen, polycotton, and rayon, each categorized into good and poor quality. The models compared in this study include Custom CNN, MobileNetV2, ResNet50, and EfficientNetB0. The results show that ResNet50 H1 P1 achieved the highest accuracy of 85% with a Macro F1-score of 0.85, while EfficientNetB0 H3 P2 was selected as the final model because it provided a more balanced performance in the web implementation, particularly in rejecting non-fabric images. Black-Box Testing showed that all main features worked properly, User Acceptance Testing achieved an index of 89.18% categorized as Strongly Agree, while non-functional testing confirmed that the system met the established performance, compatibility, responsiveness, and security standards.

Keywords: Fabric classification, textile quality, Deep Learning, web application, User Acceptance Testing (UAT)