

ABSTRAK

Perkembangan *e-commerce* di bidang kecantikan memberikan kemudahan dalam pembelian kosmetik secara daring, namun masih menyisakan permasalahan dalam pemilihan *shade* produk *complexion*. Konsumen tidak dapat mencoba produk secara langsung sehingga sering mengalami ketidaksesuaian *shade* akibat keterbatasan informasi produk, perbedaan tampilan warna pada layar perangkat, serta penilaian yang masih bersifat subjektif. Oleh karena itu, diperlukan sistem yang mampu mendeteksi *skintone* secara otomatis agar dapat memberikan rekomendasi *shade* yang lebih sesuai dengan karakteristik warna kulit pengguna. Penelitian ini bertujuan menerapkan algoritma *EfficientNet-B0* untuk mengklasifikasikan *skintone* wajah ke dalam empat kategori, yaitu *dark*, *light*, *mid-dark*, dan *mid-light*, serta menerapkan metode *Rule-Based System* untuk memberikan rekomendasi *shade foundation* dan bedak Wardah berdasarkan hasil klasifikasi tersebut. Model dibangun menggunakan *EfficientNet-B0* dengan pendekatan *Transfer Learning* pada dataset Kaggle berisi 7.680 citra wajah, dan dievaluasi menggunakan *accuracy*, *precision*, *recall*, *F1-Score*, serta *Confusion Matrix*. Hasil penelitian menunjukkan bahwa skenario pembagian data 70:15:15 menghasilkan performa terbaik dengan *test accuracy* sebesar 78,23%, dengan *precision*, *recall*, dan *F1-score* tertinggi pada kelas *dark* serta terendah pada kelas *light* dan *mid-light*. Hasil klasifikasi berhasil diintegrasikan dengan *Rule-Based System* untuk menghasilkan rekomendasi *shade* secara otomatis, dan diimplementasikan dalam *prototype* aplikasi web berbasis *Streamlit* yang berfungsi sebagai *decision support system* bagi pengguna dalam menentukan *shade complexion* secara lebih objektif.

Kata Kunci: *Deep Learning*, *EfficientNet-B0*, Klasifikasi *Skintone*, *Rule-Based System*, *Shade Complexion*.

ABSTRACT

The growing trend of e-commerce in the beauty industry has made purchasing cosmetics online more convenient, yet it still leaves unresolved challenges in selecting the appropriate shade for complexion products. Consumers are unable to physically try products before purchase, so they often experience shade mismatches due to limited product information, differences in color rendering across device screens, and assessments that remain subjective. Therefore, a system capable of automatically detecting skintone is needed to provide shade recommendations that better correspond to the user's skin color characteristics. This research aims to apply the EfficientNet-B0 algorithm to classify facial skintone into four categories, namely dark, light, mid-dark, and mid-light, as well as to apply a Rule-Based System method to provide Wardah foundation and powder shade recommendations based on the classification results. The model was built using EfficientNet-B0 with a Transfer Learning approach on a Kaggle dataset consisting of 7,680 facial images, and was evaluated using accuracy, precision, recall, F1-score, and Confusion Matrix. The results show that the 70:15:15 data split scenario achieved the best performance with a test accuracy of 78.23%, with the highest precision, recall, and F1-score obtained for the dark class and the lowest for the light and mid-light classes. The classification results were successfully integrated with the Rule-Based System to automatically generate shade recommendations, and were implemented as a web-based application prototype using Streamlit, functioning as a decision support system to help users determine complexion shade more objectively.

Keywords: Deep Learning, EfficientNet-B0, Rule-Based System, Skintone Classification, Shade Complexion.