

## INTISARI

### **Deteksi Kulit Manusia Menggunakan Model Probabilitas Adaptif dan Fitur Berbasis Warna**

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Deteksi kulit manusia adalah proses identifikasi yang memisahkan kulit manusia dengan latar belakang objek. Salah satu metode dengan pendekatan pixel based adalah *Gaussian distribution* yang memiliki kelebihan sederhana dalam memodelkan distribusi warna kulit secara probabilistik. Tetapi metode ini memiliki kelemahan sensitif terhadap variasi pencahayaan, perbedaan warna kulit antar ras dan latar belakang yang kompleks. *Contrast Limited Adaptive Histogram Equalization* (CLAHE) dan pemisahan *channel* yang mengandung pencahayaan digunakan untuk mengatasi variasi pencahayaan. Adapun untuk menangani variasi warna kulit antar ras, sampel kulit diambil secara adaptif dari area wajah yang terdeteksi oleh Viola-Jones. Metode Otsu dan *Adaptive Neighborhood Support Filter* digunakan untuk menentukan *smooth region* secara adaptif, sehingga proses deteksi dapat menyesuaikan secara dinamis terhadap kondisi latar belakang yang kompleks. Hasil pengujian menunjukkan bahwa model probabilistik adaptif dan kombinasi ruang warna RGB, YCbCr, dan HSV menghasilkan kinerja terbaik pada *channel* CbCrHS. Kombinasi ini mampu mencapai akurasi sebesar 92,95%, *precision* 83,35%, *recall* 72,74%, dan *f-measure* 77,69%. Hasil ini mengindikasikan bahwa model probabilistik adaptif pada *channel* CbCrHS memberikan kontribusi signifikan dalam meningkatkan performa deteksi kulit.

**Kata Kunci:** deteksi kulit manusia, probabilistik adaptif, *gaussian distribution*, *otsu*, *fitur* warna

## ABSTRACT

### **Human Skin Detection Using Adaptive Probabilistic Model and Features Based on Color**

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*Human skin detection is the process of identifying and separating human skin from the background objects. One of the pixel-based approaches is the Gaussian distribution method, which offers the advantage of simplicity in modeling skin color distribution probabilistically. However, this method has weaknesses, such as sensitivity to lighting variations, differences in skin tone across races, and complex backgrounds. Contrast Limited Adaptive Histogram Equalization (CLAHE) and separation of illumination-containing channels are used to address lighting variations. To handle differences in skin tone across races, skin samples are adaptively extracted from facial areas detected by the Viola-Jones method. The Otsu method and Adaptive Neighborhood Support Filter are used to adaptively determine smooth regions, allowing the detection process to dynamically adjust to complex background conditions. Experimental results show that the adaptive probabilistic model and the combination of RGB, YCbCr, and HSV color spaces yield the best performance on the CbCrHS channels. This combination achieves an accuracy of 92.95%, a precision of 83.35%, a recall of 72.74%, and F-measure of 77.69%. These results indicate that the adaptive probabilistic model on the CbCrHS channels makes a significant contribution to improving skin detection performance.*

**Keywords:** *human skin detection, probabilistic adaptif, gaussian distribution, otsu, color feature*