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| Title | A Hybrid CNN Framework DLI-Net for Acne Detection with XAI | | |
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| Abstract |  |
| Acne is a prevalent skin condition that can significantly impact individuals’ psychological and physiological well-being. Detecting acne lesions is crucial for improving dermatological care and providing timely treatment. Numerous studies have explored the application of deep learning models to enhance the accuracy and speed of acne diagnoses. This study introduces a novel hybrid model that combines DeepLabV3 for precise image segmentation with InceptionV3 for classification, offering an enhanced solution for acne detection. The DeepLabV3 model isolates acne lesions and generates accurate segmentation masks, while InceptionV3 efficiently classifies the different types of acne, improving the overall diagnostic accuracy. The model was trained using a custom dataset and evaluated using advanced optimization techniques. The hybrid model achieved exceptional performances with a validation accuracy of 97%, a test accuracy of 97%, an F1 score of 0.97, a precision of 0.97, and a recall of 0.97, surpassing many of the existing baseline models. To enhance its interpretability further, Grad-CAM (Gradient-Weighted Class Activation Mapping) is utilized to visualize the regions of the image that the model focuses on during predictions, providing transparent insights into the decision-making process. This study underscores the transformative potential of AI in dermatology, offering a robust solution for acne detection and classification, which can significantly improve clinical decision making and patient outcomes. | |