International Journal of Multidisciplinary Conference Proceedings
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A Comprehensive Analysis of Acne Classification through Deep Learning Algorithms

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KEYWORDS

Acne classification, Convolutional Neural Network, Deep Learning, Dermatology, Image recognition, ResNet 50, MobileNet V3, Inception V3

ARTICLE HISTORY

Date of Publication:16-04-2025

Conference Organizer(s)

Research Consultancy on Social & Management Development
&
University of Karachi
DHA Suffa University

ABSTRACT

Acne vulgaris is a prevalent and chronic inflammatory skin condition, categorized by blackheads, whiteheads, pimples, nodules, and cysts, affecting up to 80% of adolescents and often extending into adulthood. The psychological, social, and economic effect of acne is profound, contributing to issues such as low self esteem, depression, and in severe cases, suicidal thoughts. Traditional methods for assessing acne rely on the manual expertise of dermatologists, which, while valuable, can be time-consuming, prone to observer inconsistency, and potentially partial. Accurate and timely diagnosis is essential for effective treatment, making the need for automated acne classification systems increasingly apparent. Advances in artificial intelligence, particularly Convolutional Neural Networks (CNNs), present promising opportunities to enhance the accuracy and consistency of acne classification. This study develops acne types classification system using a proposed CNN model and evaluate its performance against well-established pretrained models, including ResNet50, MobileNetV3, and InceptionV3. The proposed model achieved an accuracy of 71%, outperforming ResNet50 (62%), MobileNetV3 (49%), and InceptionV3 (46%). Implementing such automated systems has the potential to enhance treatment outcomes, reduce the burden on healthcare professionals, and provide a more consistent and objective approach to acne diagnosis.

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Volume-Issue-Page Number: 2(1) 40

Citation: Odho, A. A. (2025). A Comprehensive Analysis of Acne Classification through Deep Learning Algorithms. *Proceedings of the 1st International Conference on Innovation and Sustainability in Management and Social Sciences, *International Journal of Multidisciplinary Conference Proceedings, 2(1).*