AN ENSEMBLE APPROACH FOR ACNE SCAR CLASSIFICATION AND TREATMENT RECOMMENDATION SYSTEM

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Abstract

This document addresses the issue that is currently a major concern for a significant number of people who suffer both physically and psychologically because of acne scars. Acne scarring can be taken place as a result of untreated acne. Most of the time acne scars can be result in permanent scarring on the face which can make the person uncomfortable and embarrassed. It can be even worse without any treatments which may lead the person to harder situations. However, there are lot of misbelieves and lack of knowledge about acne scaring and treatment options.

A few studies have been carried out on the identified problem throughout the years, but there is no application that can be used by a patient or fulfil the patient's requirements, which is the primary goal - cure acne scars and improve quality of life. To classify acne scars a deep ensemble model is suggested, with Keras pre-trained models Resnet50 and EfficientNetB0 used as the base models, providing the maximum accuracy and performance among DenseNet121 InceptionV3 and VGG16. As the ensemble approach, 'stacking' was employed, and a sequence of both models was developed by concatenating both models. The core functionalities of the system would be acne scar classification system which classify five main acne scar types and finally, vitamin deficiencies will detect based on the user input health and personal data.

Base models were trained and tested using a small dataset of 200 images per class with 3 classes (Healthy skin, Hypertrophic and Atrophic) and achieved 93% and 94% accuracy from ResNet50 and EfficientNetB0 respectively. By combining both models the ensemble model has achieved accuracy of 95%. However, this can be further improved and can be used to other classification problems medical domain since it works and perform well with small and sensitive datasets.

Subject descriptor

- Computing methodologies » Artificial Intelligence » Computer vision
- Computing methodologies » Machine learning » Machine learning approaches » Neural networks
- Computing methodologies » Machine learning » Learning paradigms » Supervised learning by classification
- Computing methodologies » Machine learning algorithms » Ensemble methods