Abstract

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Intelligent Dermatologist Tool for Classifying Multiple Skin Cancer Subtypes by Incorporating Manifold Radiomics Features Categories

The rates of skin cancer (SC) are rising every year and becoming a critical health issue worldwide. SC’s early and accurate diagnosis is the key procedure to reduce these rates and improve survivability. However, the manual diagnosis is exhausting, complicated, expensive, prone to diagnostic error, and highly dependent on the dermatologist’s experience and abilities. Thus, there is a vital need to create automated dermatologist tools that are capable of accurately classifying SC subclasses. Recently, artificial intelligence (AI) techniques including machine learning (ML) and deep learning (DL) have verified the success of computer-assisted dermatologist tools in the automatic diagnosis and detection of SC diseases. Previous AI-based dermatologist tools are based on features which are either high-level features based on DL methods low-level features based on handcrafted operations. Most of them were constructed for binary classification of SC. This study proposes an intelligent dermatologist tool to accurately diagnose multiple skin lesions automatically. This tool incorporates manifold radiomics features categories involving high-level features such as ResNet-50, DenseNet-201, and DarkNet-53 and low-level features including discrete wavelet transform (DWT) and local binary pattern (LBP). The results of the proposed intelligent tool prove that merging manifold features of different categories has a high influence on the classification accuracy. Moreover, these results are superior to those obtained by other related AI-based dermatologist tools. Therefore, the proposed intelligent tool can be used by dermatologists to help them in the accurate diagnosis of the SC subcategory. It can also overcome manual diagnosis limitations, reduce the rates of infection, and enhance survival rates.