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A median based quadrilateral local quantized ternary pattern technique for the classification of dermatoscopic images of skin cancer

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ABSTRACT

Skin Cancer is one of the most widespread forms of cancer in the world which can be detected using dermatoscopic images. In this paper, a texture based feature extraction algorithm is presented for the classification of dermatoscopic images. A median based Local Ternary Pattern is extracted followed by the computation of local quantized ternary patterns. The feature set extracted is then classified using a modified convolutional neural network. The images used for the detection of multiple types of skin cancer are obtained from two publicly available datasets, HAM10000 and ISICUDA11. For the proposed technique, the average recall value, average precision and average accuracy is found to be 75.20%, 95.44% and 96% respectively. An average increase in accuracy for the proposed algorithm is up-to 50.6%, 24.1% and 4.7% over LTP, DLTerQEP and a DE ANN based algorithm respectively.

1. Introduction

Skin cancer is lethal if not detected in an early stage. This disease contributes for approximately 75% of the world's cancer. Mainly skin cancer is the abnormal growth of skin cells due to various reasons. One of the primary reasons could be exposure to ultra-violet sub-band of visible spectrum. Lesions are one of the main symptoms of skin cancer which can be analyzed to know if the lesion is due to abnormal growth of cells (cancer) or otherwise [1].

Many researchers worldwide have estimated that detection of skin cancer through traditional methods is much more invasive as compared to the automated detection. Further these procedures cannot determine melanoma at an early stage and also cannot distinguish between multiple types with enhanced precision. Thus detection of skin cancer using dermatoscopic images is a wide area of research and can contribute a lot to society if an efficient way can be proposed for the same. Existing classification methods are based on various feature extraction techniques; however, these do not ensure the best results. This research suggests integrating gradients with local binary patterns to further utilize the lesion segmentation mask's border-line properties (LBP) to enhance classification accuracy. These border-line properties are combined with conventional models in the suggested strategy to enhance the efficacy of skin lesion classification algorithms [2].

Many researchers have presented a variety of texture or shape based methods to extract features for the classification of skin cancer

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