

Hybrid CNN-LSTM Model with Multi-Scale Attention for Enhanced Detection of Melanoma in Dermoscopic Images

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Abstract:

Identifying melanoma in dermoscopic images is an immense challenge due to the varied appearances of the lesions. This research introduces a hybrid CNN-LSTM model augmented with a multi-scale attention mechanism to tackle this complexity, utilising CNNs for spatial feature extraction and LSTMs for temporal pattern recognition. Our model surpasses traditional CNN and MobileNet V2-LSTM models, with an accuracy of 96.98%, a recall of 96.65%, a specificity of 97.56%, and a JSI of 95.78%. These measurements demonstrate enhanced sensitivity and reliability compared to baseline models, signifying strong diagnostic capabilities. This study improves melanoma detection, aiding in more precise diagnoses for clinical environments and remote telemedicine applications. Future initiatives involve enhancing the model for more comprehensive skin lesion categorisation.