



DERMOSCOPY AND SKIN IMAGING

COMPARISON OF DIAGNOSTIC PERFORMANCE OF DERMATOLOGISTS VERSUS DEEP CONVOLUTIONAL NEURAL NETWORK FOR DERMOSCOPIC IMAGES OF PIGMENTED NEVUS AND SEBORRHEIC KERATOSIS

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Introduction: With the advances in big data and computer technology, the deep convolutional neural network (CNN) in medical imaging fields have become research hotspots.

Objective: To compare the diagnostic accuracies of deep convolutional neural network (CNN) and dermatologists for pigmented nevus and seborrheic keratosis.

Materials and Methods: CNN network ResNet-50 was trained with 5,094 dermoscopic images of pigmented nevus and seborrheic keratosis using transfer learning to establish a CNN two-classification model. Then, this model was applied to the automatic classification of 30 dermoscopic images of pigmented nevus and 30 dermoscopic images of seborrheic keratosis. Meanwhile, in combination with clinical photos of skin lesions, 95 experienced dermatologists who had received dermoscopy training gave their diagnosis for the above 60 dermoscopic images. The diagnostic accuracies were compared between the two methods, and misclassified images were further analyzed.

Results: The CNN automatic classification model had the diagnostic accuracies of 100%(30/30) and 76.67%(23/30) for pigmented nevus and seborrheic keratosis respectively, and the total accuracy was 88.33%(53/60). The average diagnostic accuracies of 95 dermatologists were 82.98%(25.8/30) and 85.96%(24.9/30) for pigmented nevus and seborrheic keratosis respectively, and the total accuracy was 84.47%(50.7/60). There were no significant differences in the diagnostic accuracies for pigmented nevus or seborrheic keratosis between the CNN automatic classification model and 95 dermatologists ($\chi^2=0.38$, $P>0.05$). The dermoscopic images misclassified by CNN were divided into 3 categories: special-type lesions with high pigment content and marked keratosis, typical skin lesions with interference factors, and typical skin lesions without definite reasons for





misclassification.

Conclusions: The performance of CNN automatic classification model is similar to that of experienced dermatologists in the two classification of pigmented nevus and seborrheic keratosis. The reasons for misclassification by CNN still need to be explored further.

