

Deep Learning for Medical Point-of-Care: Using Neural Networks to Diagnose Skin Cancer

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Context: Treatment for metastasised melanoma skin cancer is limited, resulting in a 5-year survival rate for stage-four melanoma of less than 15 percent. Better patient outcomes can be effected through early and accurate diagnosis using machine learning.

Objective: This study examined the viability of developing and deploying a deep learning algorithm for a point-of-care treatment (POCT) application using publicly available data and commercial off-the-shelf (COTS) computing equipment. The algorithm was required to be capable of taking images of skin lesions as input and returning a diagnosis with high accuracy.

Method: A convolutional neural network (CNN) was used to analyse labelled images of skin lesions in order to classify seven different types of lesions. The results were compared with human expert assessment.

Results: The results show that a CNN can be an effect diagnostic tool for skin cancer. The test data applied to the model achieved a predictive accuracy of 78.1 percent over the seven classes. This was in alignment with the accuracy performance measured on the validation data during training (78.7

Novelty: The application of this model for POCT skin cancer diagnosis could greatly expand the capacity of general practitioners and catch malignancies earlier.

Figure 1: Skin Lesion Image Classification Specificity

