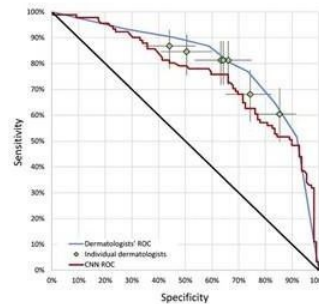


Machine Learning in Dermatology: Algorithm Versus Doctor



How does artificial intelligence perform in diagnostics of skin melanoma and compare with a dermatologist' assessment?

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A team of researchers from the University of Gothenburg has trained an ML algorithm to identify the risk of metastasis in skin melanoma and evaluated how efficient the algorithm's diagnosis was in comparison with the assessment provided by dermatologists. The results of the study are published in the Journal of the American Academy of Dermatology (Gillstedt et al. 2021).

The clinical diagnosis of melanoma is relatively easy in most cases, but identifying if a melanoma is invasive (risk of metastasis) or in situ (no risk of metastasis) can be more complicated. To address this binary classification problem, the researchers trained a convolutional neural network (CNN) on a sample of 1,137 images divided into three sets: training set (n=749), validation set (n=188) and test set (n=200). Overall, the sample included 515 images of invasive melanoma (45.3%) and 622 images of in situ melanoma (54.7%).

Despite the relatively small size of the sample, the algorithm provided a correct diagnosis for 139 out of 200 test set images (a 69.5% accuracy rate). A parallel evaluation by seven dermatologists resulted in the accuracy rate of 75%.

Notably, in 23 out of 200 cases the dermatologists provided a correct diagnosis when the CNN model was wrong, and vice versa in 12 cases (P=.090).

The authors note that the CNN was trained only on dermatoscopic images whereas dermatologists usually base their diagnoses on a wider range of available data, such as patient history and the clinical image. However, there is increasing evidence that deploying ML for skin tumour classification can yield results similar or even better than human professionals. In this particular case, none of the participating dermatologists performed significantly better than the algorithm. Acknowledging that the model needs further refinement and evaluation, the authors hope that in the future the algorithm can be used as clinical decision support.

Source: [Göteborgs universitet](#)

Image credit: Gillstedt M et al. (2021)

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