Deep convolutional neural network models for the diagnosis of thyroid cancer

The study by Xiangchun Li and colleagues[1] adds to the growing body of evidence that application of the newly developed deep convolutional neural network models on sonographic images can improve accuracy, sensitivity, and specificity in identifying patients with thyroid cancer at levels similar to or higher than skilled radiologists. The deep convolutional neural network model is a key component of the deep learning framework, and it has been widely employed to analyse visual imagery.[2,3] We agree that a reliable deep learning model can broadly influence clinical practice. Li and colleagues[1] developed and validated the deep convolutional neural network algorithms using the largest number of images to date, yet the accuracy in three small-scale validation sets is not satisfactory, ranging from 0·857 to 0·889. Apart from sample size, several factors could be considered when interpreting the findings by Li and colleagues.[1] In this study, the deep convolutional neural network models were merely developed on the basis of sonographic images. Given that thyroid cancer is a complex and heterogeneous disease,[4] data from multiple sources, such as demographic characteristics, laboratory test results, and images, are available in practical clinical scenarios. To create a reliable diagnostic model, a more robust deep learning model combining different types of medical data sources is encouraged, and it is technically feasible at present.[5] The image-based deep convolutional neural network model developed by Li and colleagues[4] will be more generalisable and less susceptible to bias pending further, more comprehensive explorations.

We declare no competing interests.

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