

“Artificial intelligence in health care: enabling informed care”?

We read with interest the Lancet Editorial on artificial intelligence (AI) in health care (Dec 23, 2017, p 2739).¹ Deep learning as a form of AI risks being overhyped. Deep neural networks contain multiple layers of nodes connected by adjustable weights. Learning occurs by adjusting these weights until the desired input-to-output function is achieved.² With many millions of weights, huge amounts of data are required for learning, a process facilitated by recent increases in computational power. However, the learning algorithm, known as the error back-propagation algorithm, was invented in the 1980s and has been used to train neural networks ever since.

Two decades ago, our neural network system scored sleep and diagnosed sleep disorders.³ Our machine learning algorithm,^{4,5} which now provides early warning of deterioration in many hospitals, was commercialized a decade ago.⁶

A key change occurred in the early 2000s. Since then, error back-propagation learns features directly from the input data, rather than relying on expert-selected features (eg, microaneurysms for a neural network assessing diabetic retinopathy). The first layers become implicit feature detectors.

The success of deep learning has been shown mainly in problems with inputs of image (or image-like) data, as demonstrated in medical image analysis,^{7,8} speech recognition, and board game playing. Deep learning also lacks explanatory power; deep neural networks cannot explain how a diagnosis is reached and the features enabling discrimination are not easily identifiable.

Clinicians should be aware of the capabilities as well as current limitations of AI. Properly integrated AI will improve patient outcomes and health-care efficiency. Augmented intelligence at the point of care is likely to precede artificial intelligence without human involvement.

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