

What happens when you can't go behind the curtain?  
Deep Neural Networks and their implications for medical malpractice liability

Technological advancements are critical mechanisms for improving medical imaging, surgical practices, and the treatment of disease. Breakthroughs like x-rays, ultrasounds, and MRIs give medical practitioners earth-shattering insight into patient care and create an imperative for the law to respond to these radical alterations to the landscape of the medical field.

One such technology that has the potential to revolutionize modern medicine is the introduction of deep neural networks (“DNNs”). Deep neural networks were inspired by human brains, employing “connecting layers with artificial neurons.” (Kim, et al.) These networks are distinguished from other forms of deep learning by their tremendous potential “to improve pattern recognition from raw data,” resulting in “descriptive, predictive and prescriptive” applications. (Aggarwal, et al.) Applying deep learning in this way can make imaging data easier to interpret and free up time for providers and researchers to focus on other things. (Harned, et al.)

Of course, DNNs are not without complication. A critical issue with DNNs is that they are essentially black boxes. Their design is so complex that often DNN creators themselves cannot reproduce the results the DNN outputs or even retrace the steps the network took to reach them. There is considerable disagreement among medical professionals regarding the reliability of DNNs and whether doctors should reference DNN-created results when practicing medicine, some arguing that it is not advisable to rely on something that cannot be repeated.

This disagreement in the medical community regarding the application of DNNs could gravely obfuscate medical malpractice analysis in cases on the subject. Since the primary standard of care courts recognize in medical malpractice lawsuits is whether the physician complied with generally accepted medical custom, significant disagreement in the field may prevent a court from finding such a custom exists. This could expose practitioners to greater tort liability should they decide to rely on DNNs.

DNNs are not the first medical breakthrough of their kind, and they will not be the last. Such technological innovations have immense potential to improve medical diagnostics and care, and the courts will likely have a difficult road ahead in appreciating the need for such innovation while comporting with the existing test for medical malpractice liability.

Sources:

1. <https://jolt.law.harvard.edu/digest/machine-vision-medical-ai-and-malpractice>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6945006/>
3. <https://www.nature.com/articles/s41746-021-00438-z>

Summary: Deep neural networks (“DNNs”), an emerging tool in the medical imaging space, have the potential to revolutionize diagnostic imaging. However, due to the opaque nature of DNNs’ operations, the prospective widespread reliance on such networks poses interesting questions concerning medical malpractice liability.

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