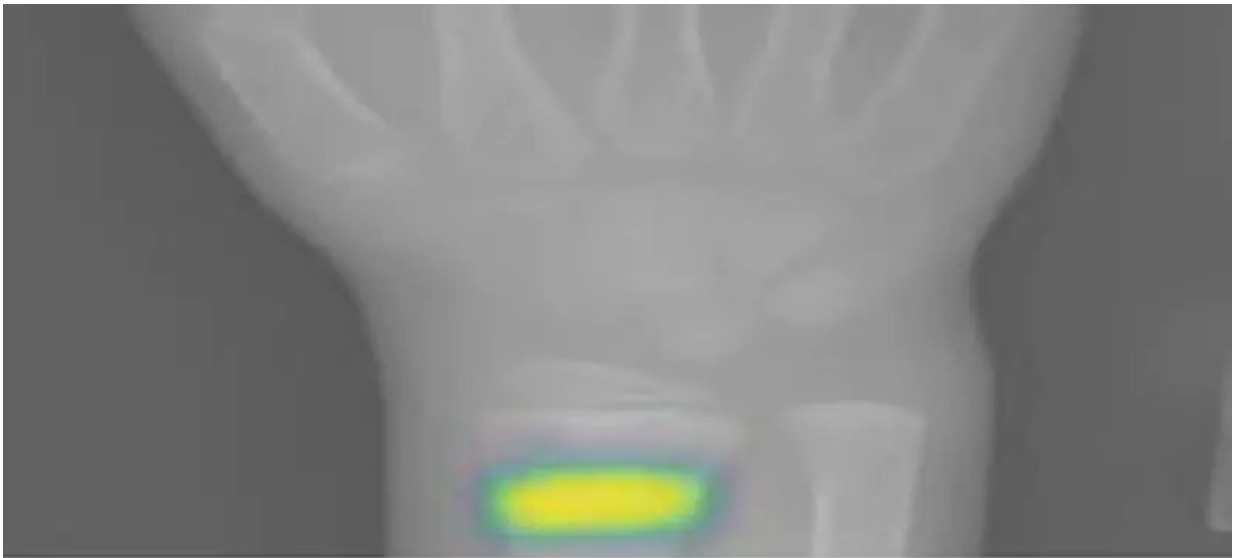


Deep neural network improves detection of wrist fractures

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When model determines that a fracture is present, heatmap represents model's confidence that

(HealthDay)—Deep learning methods allow senior medical specialists to deliver their expertise to emergency medicine clinicians via use of a deep neural network, which is associated with considerable improvement in sensitivity and specificity of detecting fractures in wrist radiographs, according to a study published online Oct. 22 in the *Proceedings of the*

National Academy of Sciences.

Robert Lindsey, Ph.D., from Imagen Technologies in New York City, and colleagues developed a [deep neural network](#) to detect and localize fractures in radiographs. The researchers had 18 senior subspecialized orthopedic surgeons annotate 135,409 radiographs to train the [network](#) to accurately emulate their expertise. A controlled experiment was then run to examine the ability of emergency medicine clinicians to detect [fractures](#) in wrist radiographs with and without the assistance of the deep learning model.

The researchers found that for the average clinician, sensitivity was 80.8 and 91.5 percent when unaided and aided, respectively, and the corresponding specificity was 87.5 and 93.9 percent. There was a 47 percent relative reduction in misinterpretation rate for the average clinician.

"This study shows that deep learning models offer potential for subspecialized clinicians (without machine learning experience) to teach computers how to emulate their diagnostic expertise and thereby help patients on a global scale," the authors write.

The authors are affiliated with Imagen Technologies, which funded the research.

Image courtesy of Imagen Technologies.

More information: Robert Lindsey et al. Deep neural network improves fracture detection by clinicians, *Proceedings of the National Academy of Sciences* (2018). [DOI: 10.1073/pnas.1806905115](https://doi.org/10.1073/pnas.1806905115)

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