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The Next Big Thing in eHealth

Getting Ready for the Impending AI Revolution in Diagnostic Imaging

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In their recent editorial in Academic Radiology, Cohan and Davenport refer to radiologist "burnout" and having reached a "tipping point".   They suggest that despite improvements in PACS and EMR systems, "Radiologists are still being told to work faster as the screws continue to tighten; more images, greater case volume, increasing complexity and less time to do the work".   Radiologists are increasingly being asked to perform quantitative analysis on complex dynamic studies such as prostate and breast MRI, analyze multi-parametric imaging from MRI, PET, CT, and to follow new guidelines for lung cancer and other screening studies.   Deep learning represents a fundamentally different approach to the development of algorithms for image acquisition, quantitative analysis, and interpretation based on learning by example from large image sets.   It offers numerous advantages over more "traditional" Computer Aided Design approaches including decreased time, and less specialized medical imaging expertise required for development as well as the potential for continuous and personalized refinement of algorithms in practice. In fact, Deep Learning may actually have its greatest initial success in solving non-image related challenges such as image quality, workflow efficiency, improved communication and patient safety.   This technology, however, is also fraught with limitations including the requirement for large amounts of annotated data, regulatory, medico-legal, and relative brittleness with regard to lack of generalizability from a few to a multitude of different scanners.