
AI algorithm to compete in junior radiologist image quiz

An AI algorithm could help radiologists prioritize the review of critical cases



It's a cold and frosty day in Vienna as junior radiologists sit down for the annual junior image interpretation quiz. It's one of the main attractions at the European Congress of Radiology (ECR) and this year is no exception. Six experts in the field each present a case to the young radiologists in the room – one more complex than the other – and four possible diagnoses for every case. The audience then casts votes on the diagnoses they believe to be correct.

But this year presented a twist. There was a seventh case. One that had been assessed by Artificial Intelligence (AI), rather than a radiologist. The scan on the screen showed a pneumothorax – a collapsed lung which impacted more than 9,000 people in the UK in 2011^[1] and can be deadly if not diagnosed quickly and accurately. A lung can collapse if air leaks into the space between the lung and the chest wall and pushes on the outside of the lung. It can be caused by trauma, cigarette smoking, certain lung diseases, or by complications from surgery.

74,8% of the radiologists located the pneumothorax correctly.

"It's not a question about whether the radiologist is better than the AI or vice versa," said Mathias Goyen, chief medical officer at GE Healthcare, who presented the AI case. "If there's a patient with a pneumothorax in the middle of the night when there's only a few radiologists on call, each one with their hands full, having a smart computer that can flag that a patient is in need of acute care could be the difference of life and death".

Today, patients who present symptoms associated with the condition receive a chest X-Ray, which can take radiologists anywhere between two to eight hours to read^[2]. If the condition isn't treated fast enough, the patient can develop tension pneumothorax, or an enlarging pneumothorax^[3], potentially leading to fatal consequences if not treated quickly.

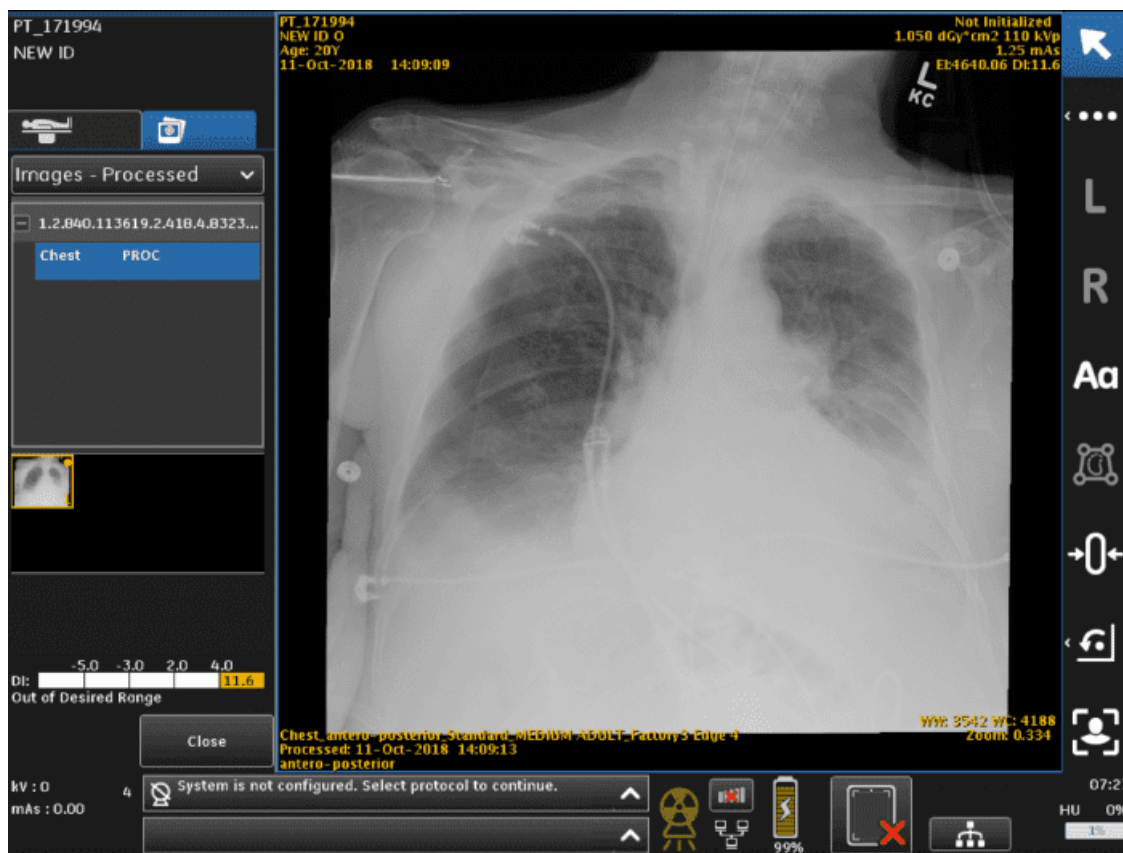
In such cases, patients would receive a "STAT" chest X-ray which is reserved for potentially life-threatening circumstances. STAT portable chest X-Rays can attribute to more than 60 percent of a radiology center's mobile chest X-ray volume, almost double that of routine exams^[4].

That's why clinicians are looking for opportunities to read STAT chest X-Rays faster and in a more prioritized manner to enable a quicker diagnosis. One such opportunity is the Critical Care Suite* on Optima XR240amx, which is designed to identify cases with the critical condition of pneumothorax at point-of-care to enable prioritization of image review.

"I think the idea and concept about an on-device alert really gets to the heart of early warning detection technology," said Dr. Rachael Callcut, Associate Professor of Surgery at the University of California, San Francisco (UCSF) Medical Center and Director of Data Science for the Center for Digital Health Innovation, who worked with GE Healthcare to develop the Critical Care Suite. "There are many opportunities to use early alerts

and early warnings and it's very clear that the sooner the clinician knows of a potential life-threatening or major finding, the more likely they are to be able to do a timely intervention that could perhaps change the trajectory of a patient.”

Critical Care Suite will employ a suite of AI algorithms, such as pneumothorax detection, designed to identify this potentially life-threatening condition in chest X-Rays with high accuracy (>0.95 AUC). The AI algorithm is hosted on the mobile X-Ray system – a first of its kind AI-embedded imaging device – designed to share the output through an onscreen notification. Critical Care Suite on Optima XR240amx is powered by Edison – a next generation intelligence platform that helps accelerate the development and adoption of AI technology and empowers providers to deliver faster, more precise care.



When a pneumothorax condition is identified, the point-of-care notification alerts the clinical team, enabling prioritization of image review. The AI results are sent to PACS for review of the critical findings by a radiologist. An AI algorithm could help radiologists prioritize the review of critical cases and bring confidence when diagnosing difficult cases.

“AI has the potential to transform the way we diagnose and deliver care,” said Goyen. “I think future radiologists will have more tools like these in their arsenal, helping them meet the increased radiology demand and ultimately, treat patients faster”.

*510(k) pending at FDA. Not available for sale. Not CE marked

Find out more about GE Healthcare [here](#)

Find out more about Revolution Apex [here](#)

[1] <https://statistics.blf.org.uk/lung-disease-uk-big-picture>

[2] Rachh, Pratik, et al. “Reducing STAT Portable Chest Radiograph Turnaround Times: A Pilot Study.” Current problems in diagnostic radiology (2017).

[3] Lorenz, Jonathan, and Matthew Blum. “Complications of percutaneous chest biopsy.” Seminars in interventional radiology. Vol. 23. No. 2. Thieme Medical Publishers, 2006

[4] Rachh, Pratik, et al. “Reducing STAT Portable Chest Radiograph Turnaround Times: A Pilot Study.” Current problems in diagnostic radiology (2017).

Published on : Sat, 2 Mar 2019