AI FOR PNEUMOTHORAX (PTX) DETECTION & IMPROVED WORKFLOW PRODUCTIVITY

MEDICAL FIELD, OR MEDICAL METHOD
Radiology / Trauma & ER / Surgery

TYPE
☒ Decision support
☐ Autonomous decision making

CATEGORY
☒ Prevention
☒ Detection
☐ Diagnosis
☐ Treatment
☐ Other

DESCRIPTION
The Critical Care Suite (CCS) and Quality Care Suite (QCS) are optional computer-aided triage and notification software from GE Healthcare.

The CCS Suite is a suite of algorithms that analyses frontal chest X-Ray images to identify those cases with a critical finding (pneumothorax) and enables case prioritisation at PACS.

The QCS includes a set of algorithms to determine whether the acquired X-ray image is a frontal chest image and whether lung coverage is adequate. It will automatically rotate the frontal chest image where the image found to be tilted (i.e. not heads up).

The CCS employs on-device Artificial Intelligence (AI), which brings awareness to the technologist on the user interface of cases that are flagged for review by the radiologist.

The CCS notifies radiologists of cases with a suspected critical finding – Pneumothorax via PACS worklist image flag and secondary capture DICOM image.

AIM / PURPOSE
AI-based algorithm embedded on-device and the point of care, which analyses frontal chest X-Ray images to identify those cases with a critical finding (pneumothorax) and enables case prioritisation at PACS for the Radiologist.

OUTPUT / RESULTS
The CCS can detect almost all large PTXs (96%) and 3 out of 4 small PTXs (75%), with limited false alerts (94% specificity).

The CCS’s overall accuracy for detecting a pneumothorax with AP patient positioning is 0.96 (Area Under Curve).

- Large PTXs are detected with extremely high accuracy (AUC = 0.99).
- Small PTXs are detected with high accuracy (AUC = 0.94).

AI METHODOLOGY
Convolutional Neural Network

INPUT / SIZE OF THE DATA
CCS’s PTX AI Algorithm was trained on >12,000 unique patient images, from 6 data sources, in 3 countries using 11 different X-ray detector manufacturers, including CR and DR with an even split between fixed (PA) vs. portable (AP) systems – using the strongest form of annotation (pixel level and image level).

REFERENCE DOCUMENTS / LINKS / PUBLICATIONS
www.gehealthcare.com/criticalcaresuite

SOURCE
GE Healthcare