Challenges Hindering Implementation of Image Analysis Tools for CT Screening

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A Roadmap for Foundational Research on Artificial Intelligence in Medical Imaging: From the 2018 NIH/RSNA/ACR/The Academy Workshop

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Conflicts of interest are listed at the end of this article.

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A Road Map for Translational Research on Artificial Intelligence in Medical Imaging: From the 2018 National Institutes of Health/RSNA/ACR/The Academy Workshop

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Publicly-Released Labeled Radiology Datasets

- **ChXpert:** A dataset consisting of 624,316 chest radiographs of 65,245 patients who underwent a radiographic examination from Stanford University Medical Center between October 2002 and July 2017. Both inpatient and outpatient centers included are their associated radiology reports.

- **LERA:** The LERA dataset contains data from 162 patients who underwent a radiographic examination at the Stanford University Medical Center between 2003 and 2014. The dataset consists of images of the foot, knee, ankle, or hip associated with each patient.

- **MIRNet:** The MIRnet dataset consists of 1,370 knee MRI exams performed at Stanford University Medical Center. The dataset contains 1,104 (80.4%) abnormal exams, with 319 (23.3%) ACL tears and 508 (37.1%) meniscal tears; labels were obtained through manual annotation from clinical reports.

- **MURA:** MURA (musculoskeletal radiographs) is a large dataset of bone X-rays from the Stanford University Medical Center.

- **Echocardiographic:** Echocardiographic is a dataset of over 400 echocardiograms, or cardiac ultrasound, videos from unique patients at Stanford University Medical Center. Each apical–four-chamber video is accompanied by an estimated ejection fraction, end-diastolic volume, end-systolic volume, and tracings of the left ventricle performed by an advanced cardiac sonographer and reviewed by an imaging cardiologist.

- **RSNA: CT Brain:** RSNA: CT Brain is a dataset of CT brain scans from the RSNA AI Challenge 2018, a dataset labeled chest X-rays from the National Institutes of Health (NIH).

- **RSNA: Bone Age:** From the RSNA AI Challenge 2017, a dataset of bone age X-rays from Stanford University, the University of Colorado, and the University of California, Los Angeles.

Visit the website: [https://aimi.stanford.edu/research/public-datasets](https://aimi.stanford.edu/research/public-datasets)
Data Science Challenges

Pediatric Bone Age Challenge
Organized by RSNA.organizing.committee - Current server

Current
Test
Oct. 7, 2017, midnight UTC

Next
Leaderboard
Sept. 1, 2017, midnight UTC

RSNA STR Pulmonary Embolism Detection
Classify Pulmonary Embolism cases in chest CT scans

RSNA Intracranial Hemorrhage Detection
Identify acute intracranial hemorrhage and its subtypes

RSNA Pneumonia Detection Challenge
Can you build an algorithm that automatically detects potential pneumonia cases?

Geographic Distribution of Cohorts to Train Deep Learning Algorithms

• 60,000 COVID studies released in Y1
• 5 technology development projects
• 12 collaborative research projects
• >20 organizations across the U.S.
Opportunistic Screening for Coronary Artery Disease

Gated CT

Routine CT

AI Algorithm

AI algorithm applied to all chest CTs for risk stratification