Build Trustworthy Medical Imaging AI

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Imaging AI 1.0: Proof of Concept

Nature
International journal of science
International evaluation of an AI system for breast cancer screening

Cell
Identifying Medical Diagnoses and Treatable Diseases by Image-Based Deep Learning

JAMA
Development and Validation of a Deep Learning System for Diabetic Retinopathy and Related Eye Diseases Using Retinal Images From Multiethnic Populations With Diabetes

Nature
International journal of science
Dermatologist-level classification of skin cancer with deep neural networks

RSNA 2019 AI Showcase
Imaging AI 2.0: Trustworthy AI

- robust & safe
- customizable
- explainable
- generalizable
- knowledgeable
- biological

Diagnosis, Prediction
Inaccurate labels in weakly-supervised deep learning: Automatic identification and correction and their impact on classification performance

Degan Hao, Lei Zhang, Jules Sumkin, Aly Mohamed, and Shandong Wu
Generative adversarial networks (GANs) generate adversarial examples that lead to 67% mis-diagnosis for breast cancer patients.

<table>
<thead>
<tr>
<th>Certified Breast Imaging Radiologist</th>
<th>Experience</th>
<th>Before Education</th>
<th>After Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reader 1</td>
<td>12 years</td>
<td>39%</td>
<td>54%</td>
</tr>
<tr>
<td>Reader 2</td>
<td>11 years</td>
<td>69%</td>
<td>75%</td>
</tr>
</tbody>
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Deep learning modeling using normal mammograms for predicting breast cancer risk

Localized prediction

Spatiotemporal changes
Imaging AI 2.0: Trustworthy AI
Intelligent Computing for Clinical Imaging (ICCI) Lab

- NIH/NCI R01 (#CA193603) (2015)
- NIH/NCI R01 Supplement (#CA193603-S) (2017)
- NIH/NCI R01 (#CA218405) (2018)
- UPMC Enterprise (Early Commercialization Development) (2018)
- RSNA Research Scholar Grant (#RSCH1530) (2015)
- Amazon AWS Machine Learning Award
- University of Pittsburgh Physician (UPP) Foundation Award (2017)
- UPMC CMRF Grant (2014)
- Pitt CTSI Biomedical Modeling Pilot Award (2016)
- Stanly Marks Research Foundation (2018)

- Scientific Consultant: Cognistx