



Value of Metrology

Clinical Perspective:

Challenges and Hurdles Hindering Implementation of Advanced Image Analysis Tools for CT Screening

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Disclosures

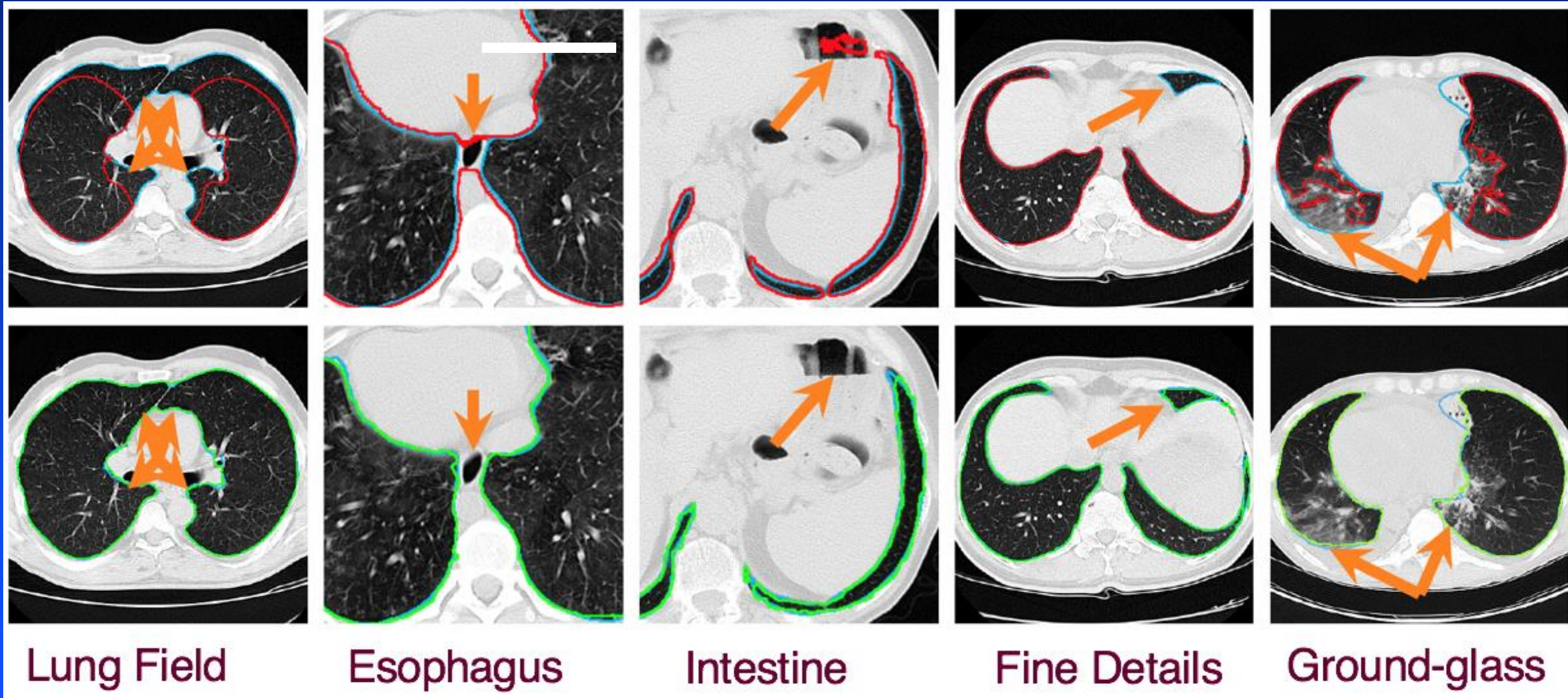
- Patent royalties from iCAD, ScanMed, PingAn, Philips, Translation Holdings
- Research support from Ping An & NVIDIA



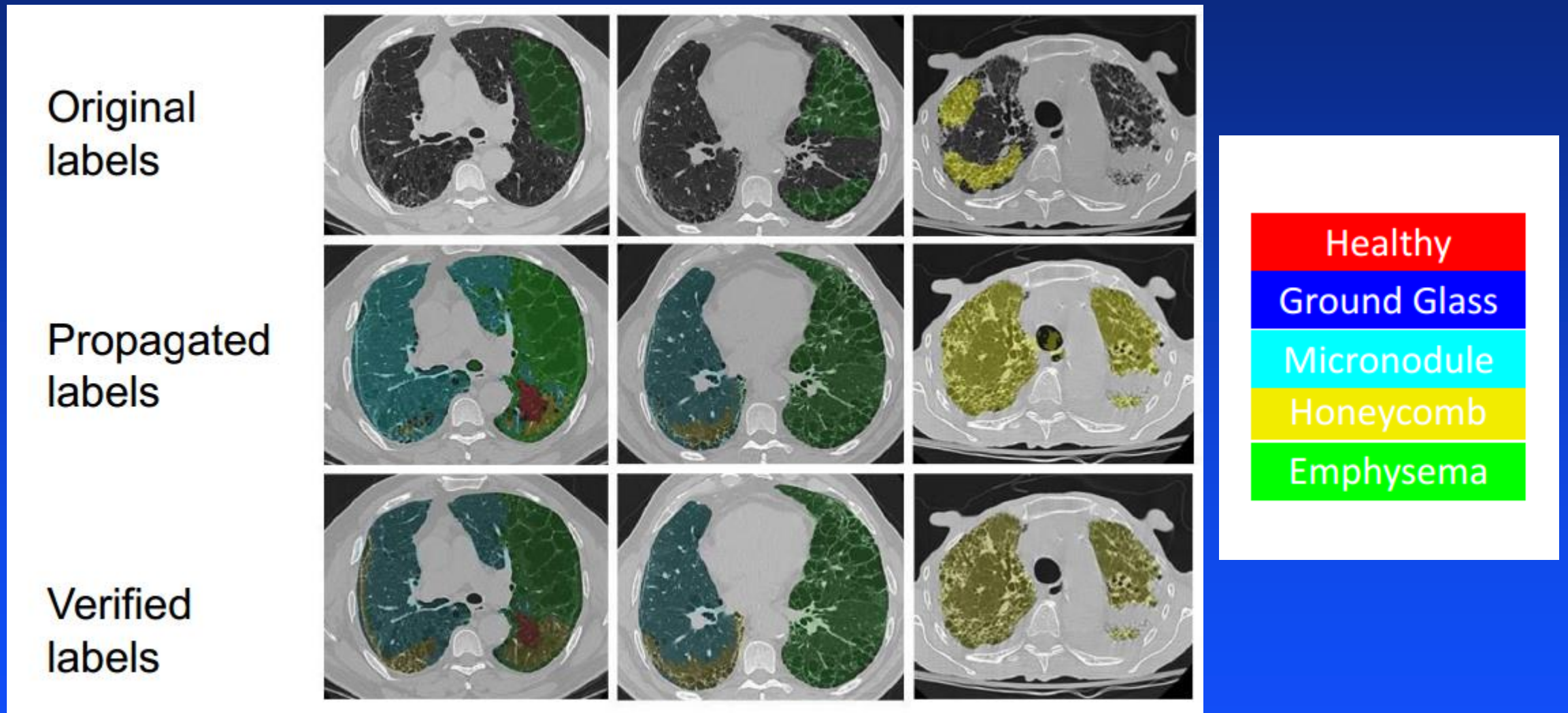
Challenges

- Limited datasets for training
- Insufficient diversity of data
- Domain shift
- Multi-task analysis
- Robustness in presence of other diseases

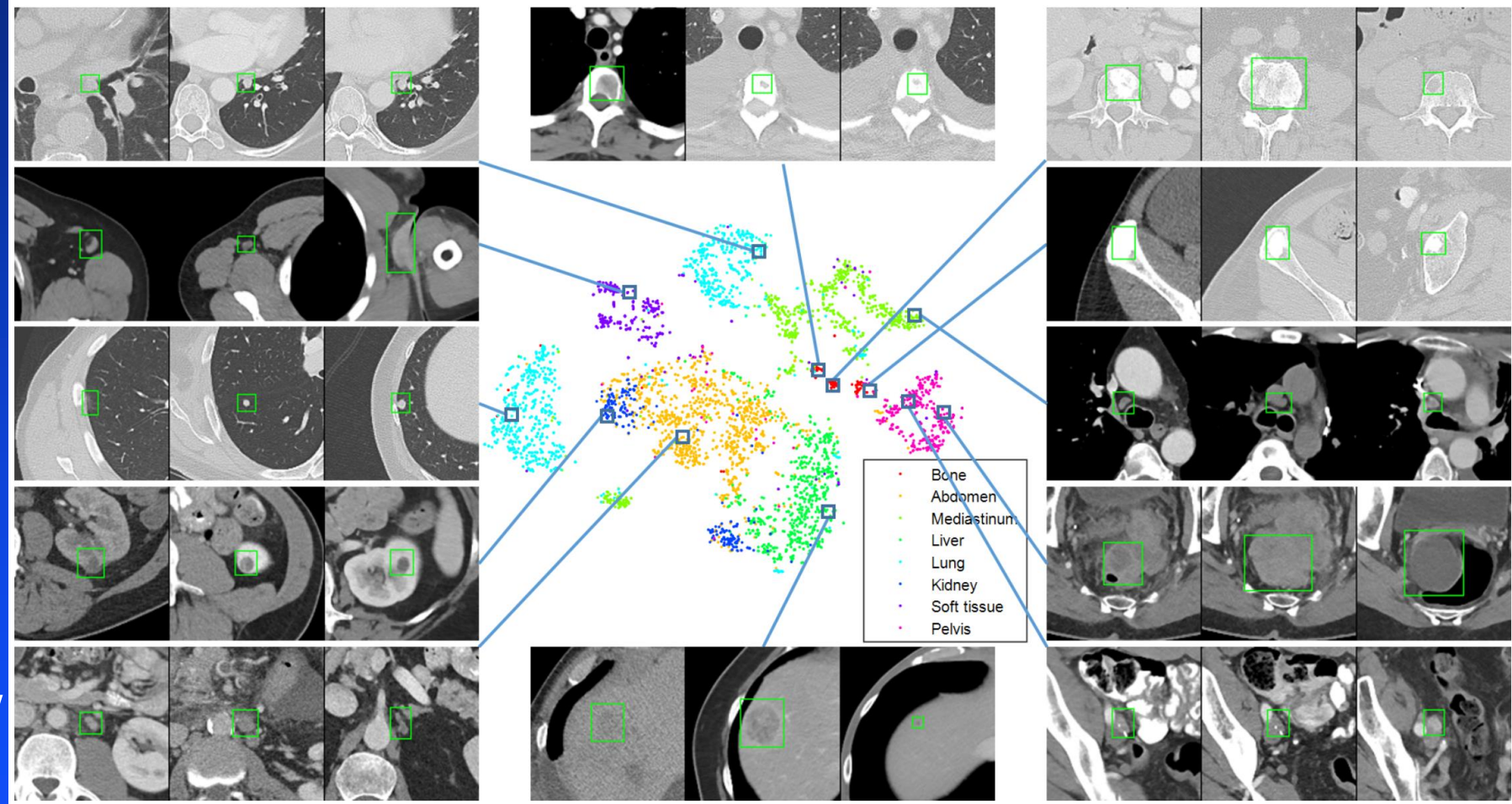
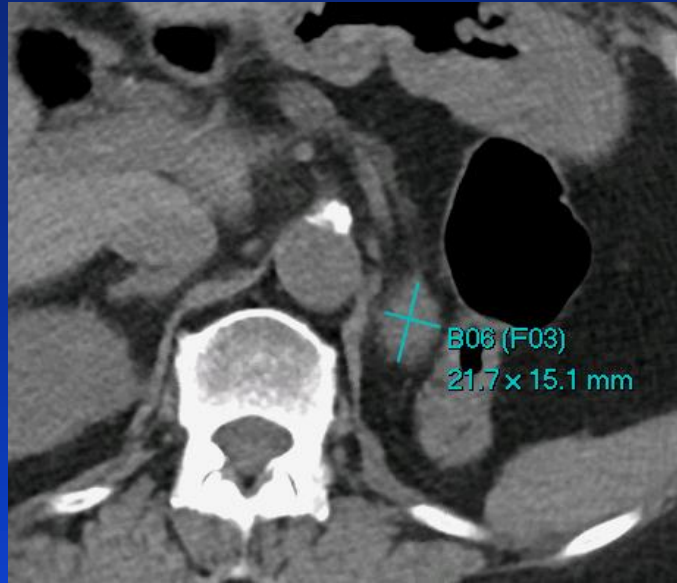
Pathologic Lung Segmentation



Segmentation: ILD Label Propagation

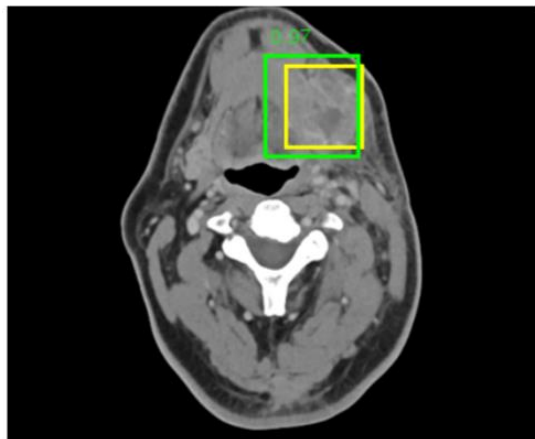


Deep Lesion Dataset

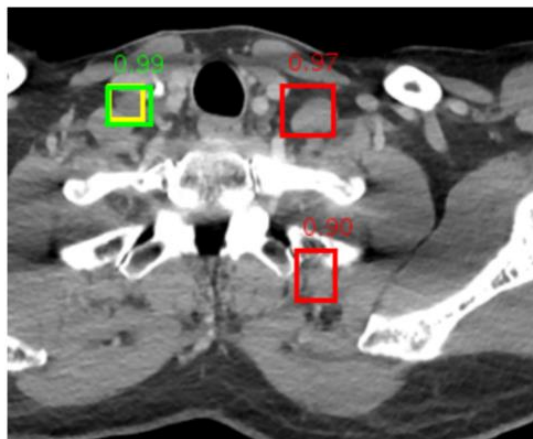


- 32,735 lesions
- 32,120 CT slices
- 10,594 studies
- 4,427 unique patients
- <https://nihcc.box.com/v/DeepLesion>

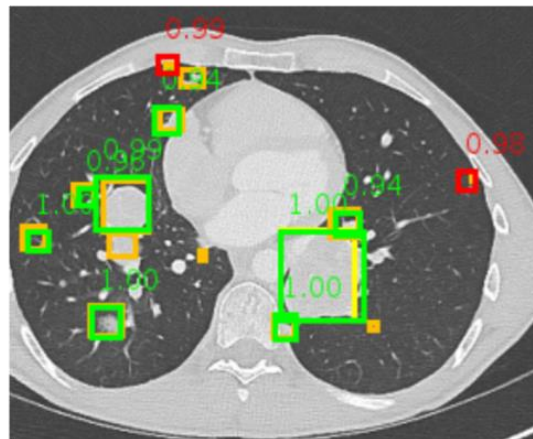
Universal Lesion Detector



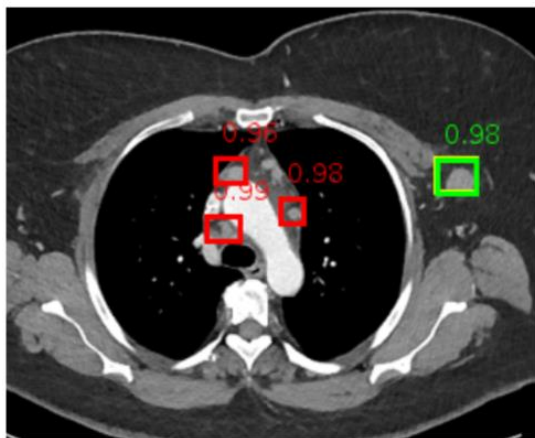
(a)



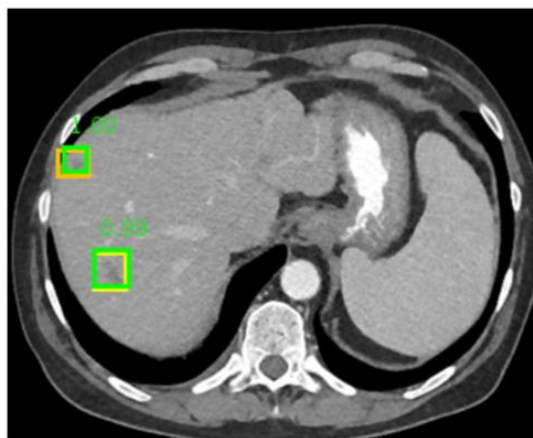
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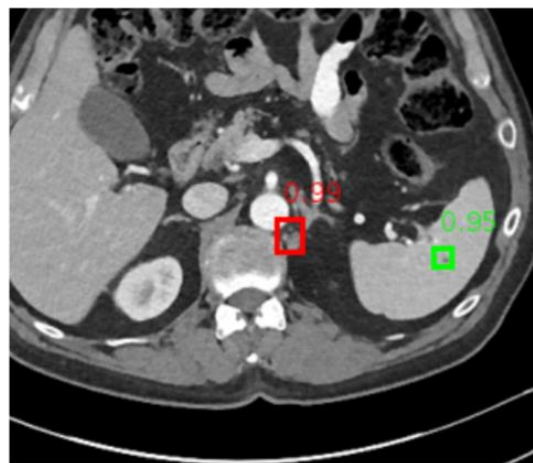
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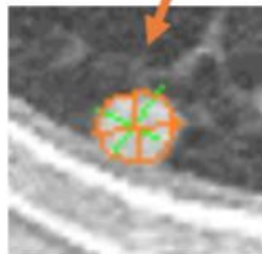
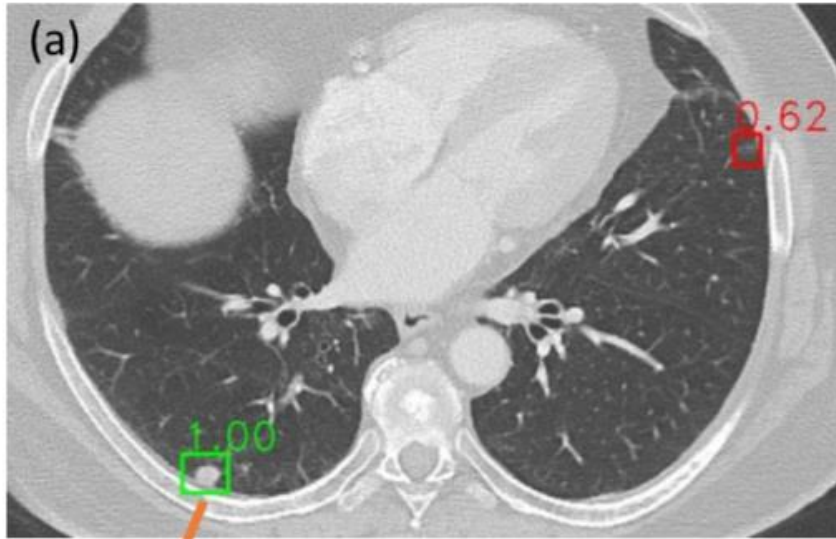
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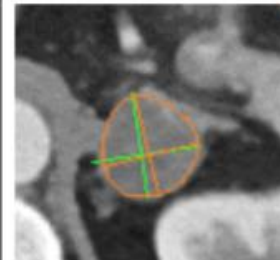
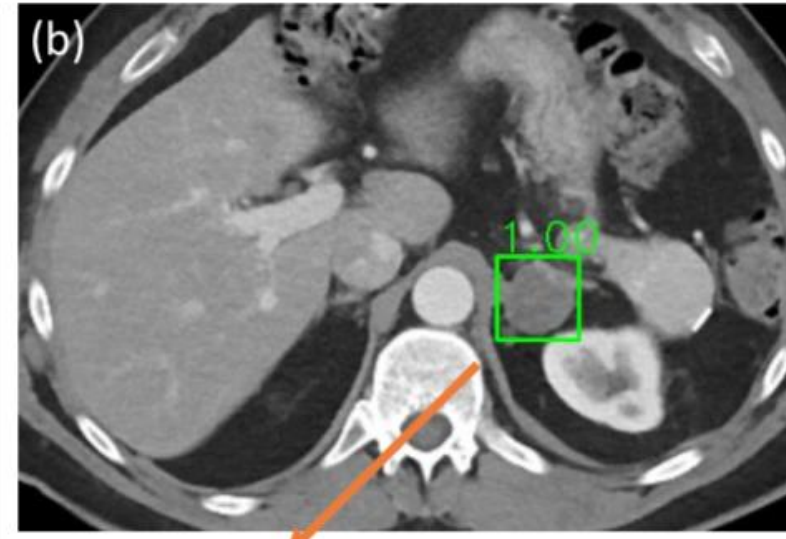
(e)



(f)



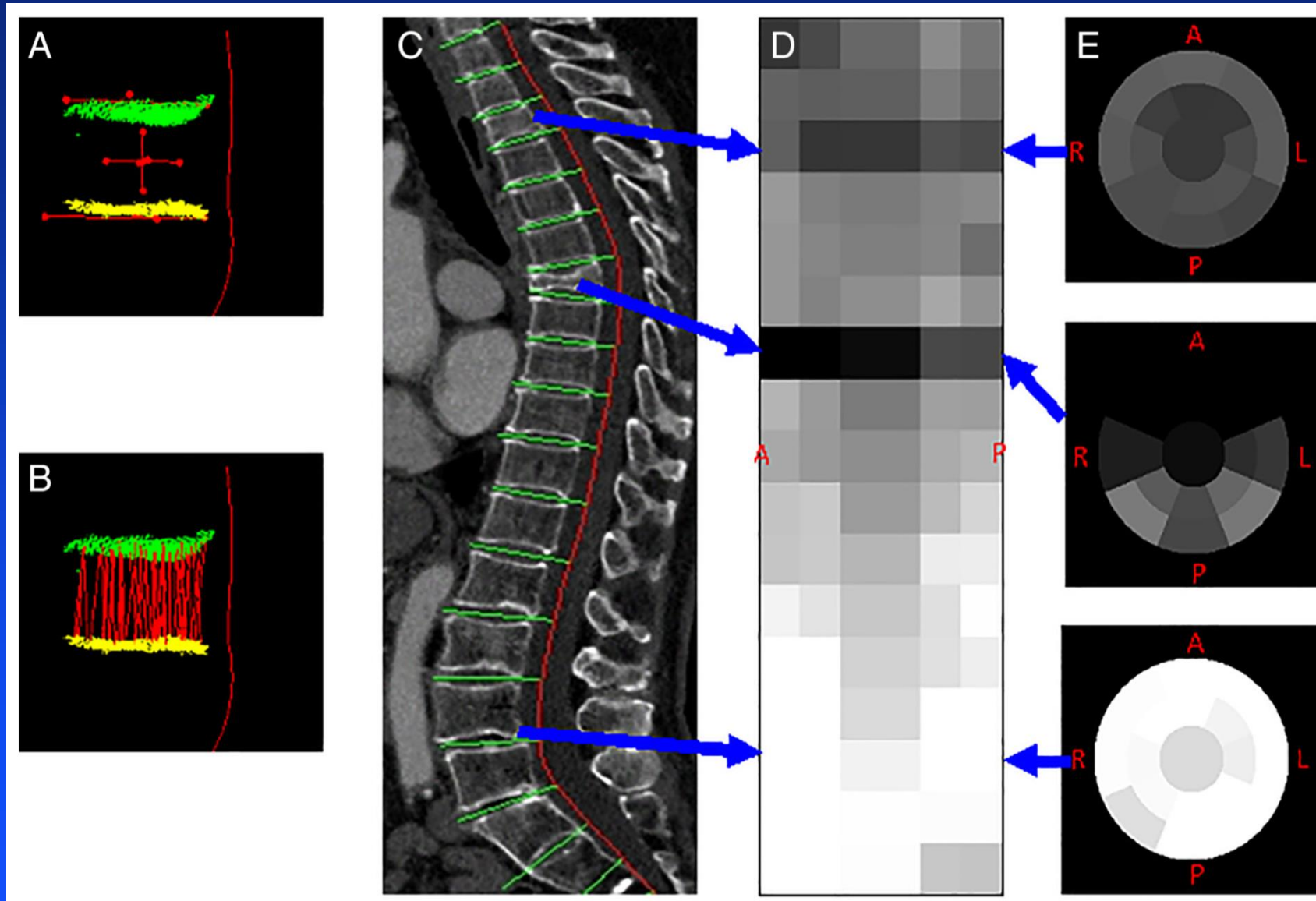
right lower lobe, lung
nodule, solid pulmonary
nodule, *noncalcified, lung
base*



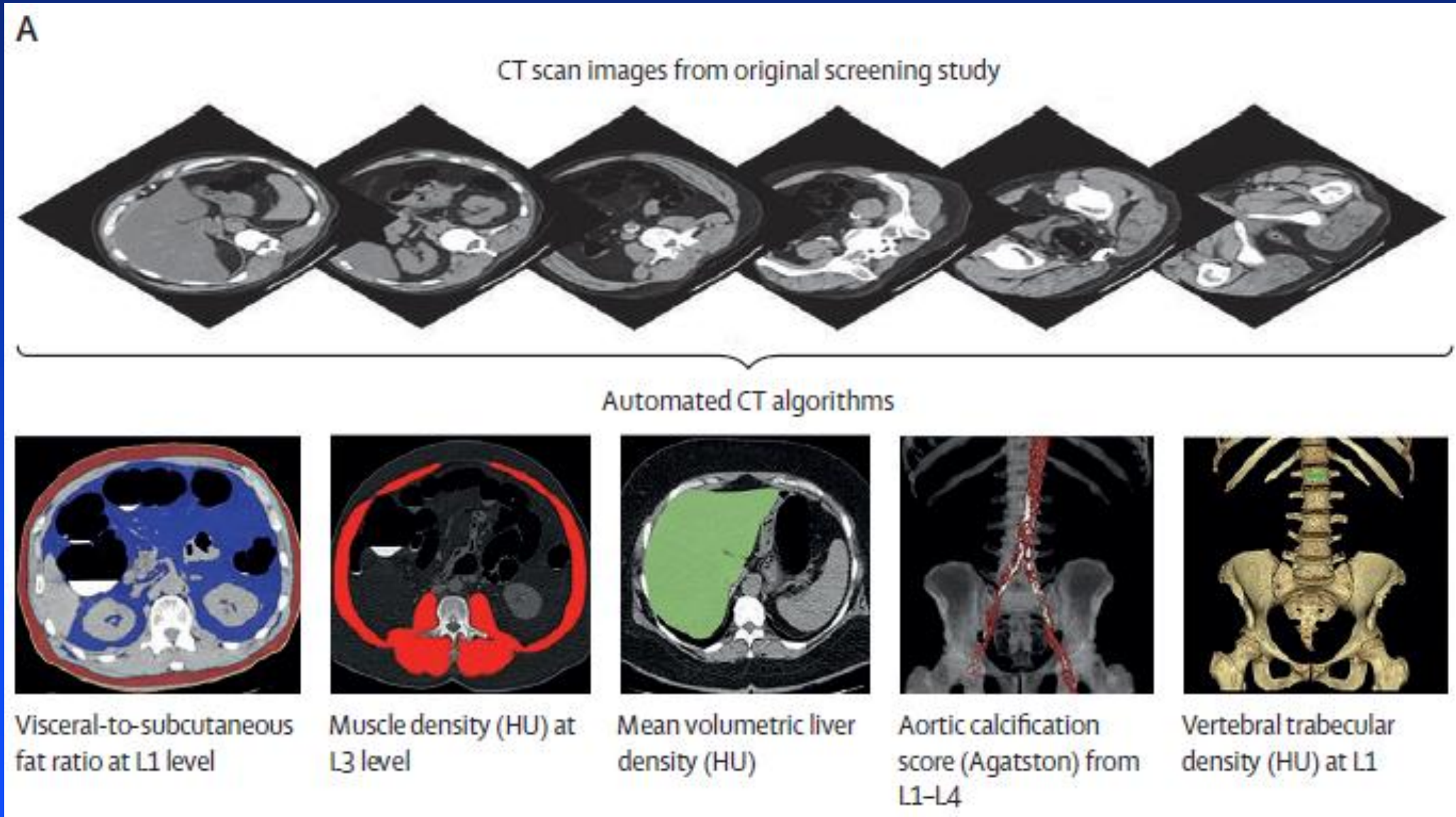
left adrenal gland,
adenoma, nodule, mass

- “MULAN”
- Lesion detection, tagging, and segmentation

Comprehensive Spine Fracture Analysis



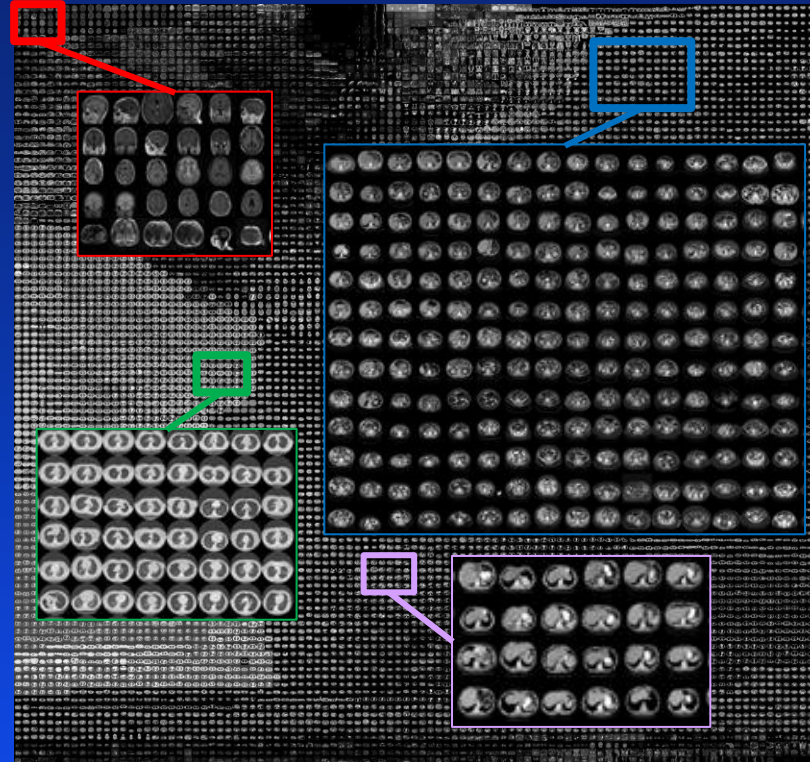
Large-scale Body Composition Analysis



Additional Challenges

- How to annotate data more efficiently?
- How to get multi-institutional data?

To Learn More ...



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www.cc.nih.gov/drd/summers.html

github.com/rsummers11

X Wang et al. RSNA 2016