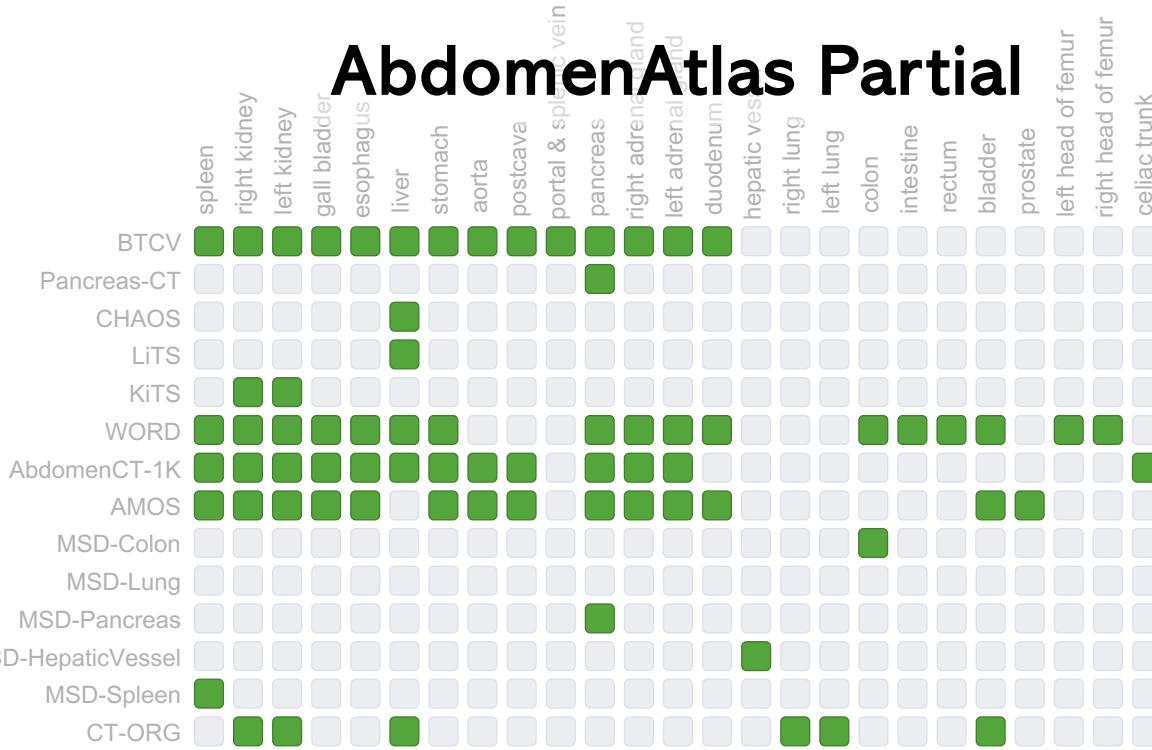


Transitioning to Fully-Supervised Pre-Training with Large-Scale Radiology ImageNet for Improved AI Transferability in 3D Medical Segmentation

Wenxuan Li

Johns Hopkins University

E: wli131@jh.edu



3,410 CT scans

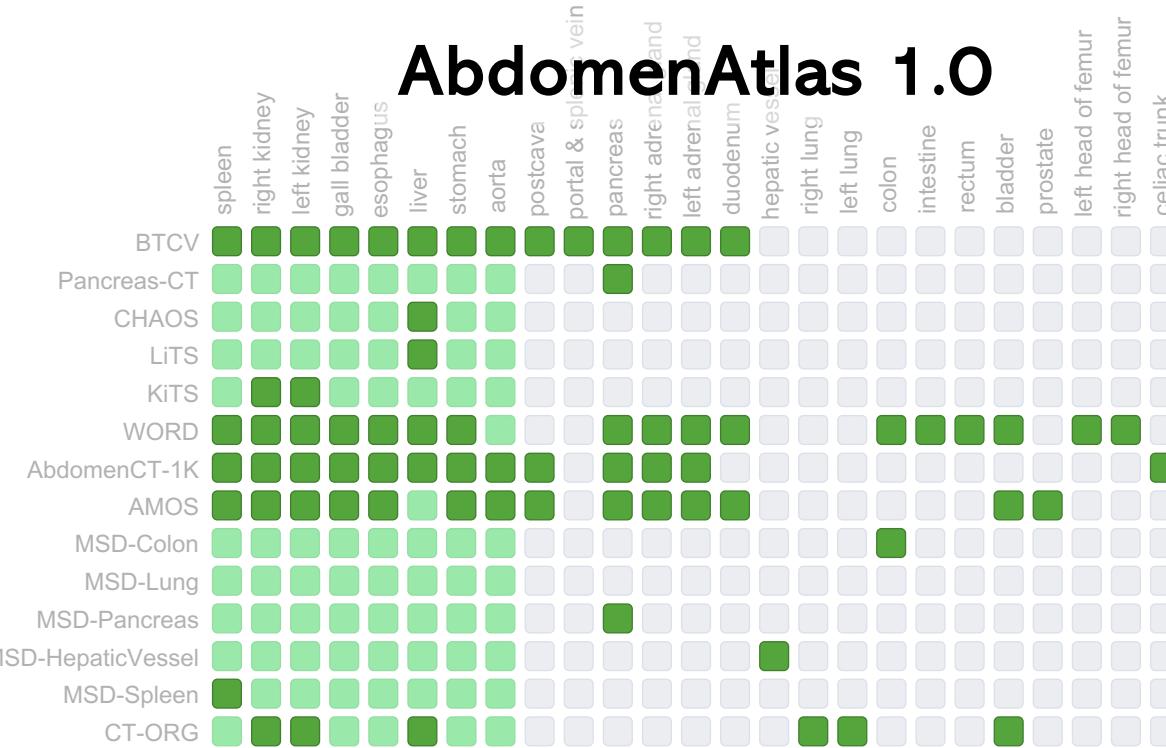
14 datasets

27 hospitals

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AbdomenAtlas 1.0

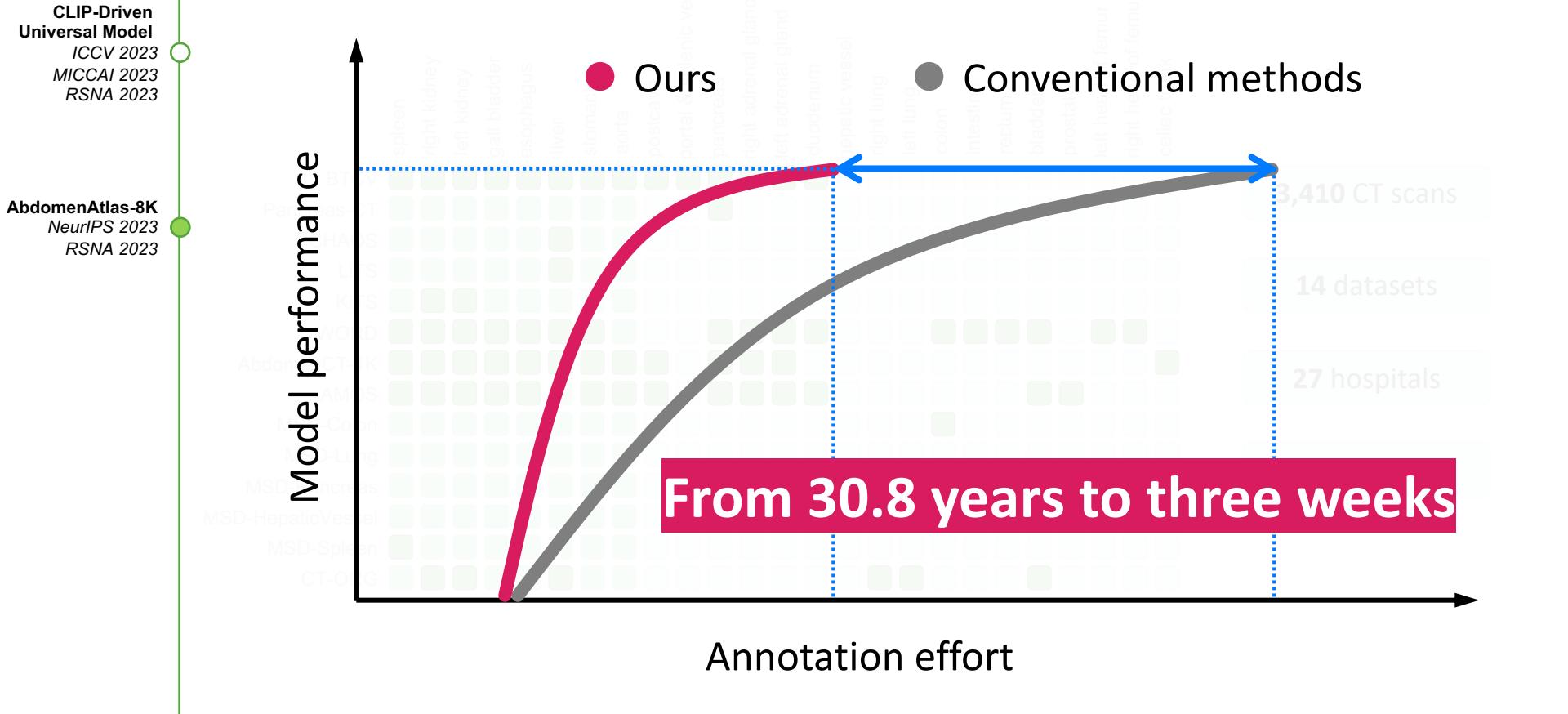


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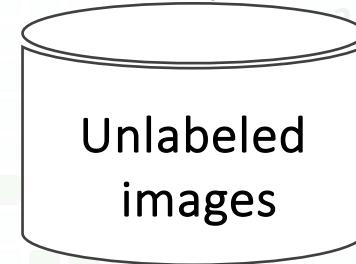


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Pre-train models



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Interactive Segmentation

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Pre-train models



Unlabeled
images

Select important
images

Interactive Segmentation

410 CT scans

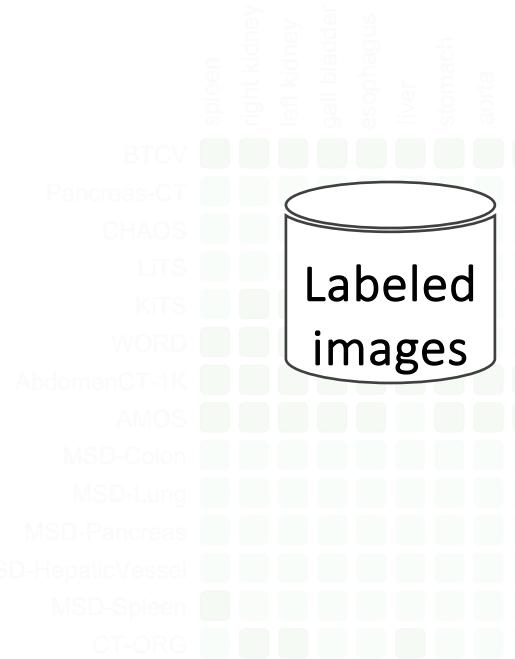
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Pre-train models



Labeled
images

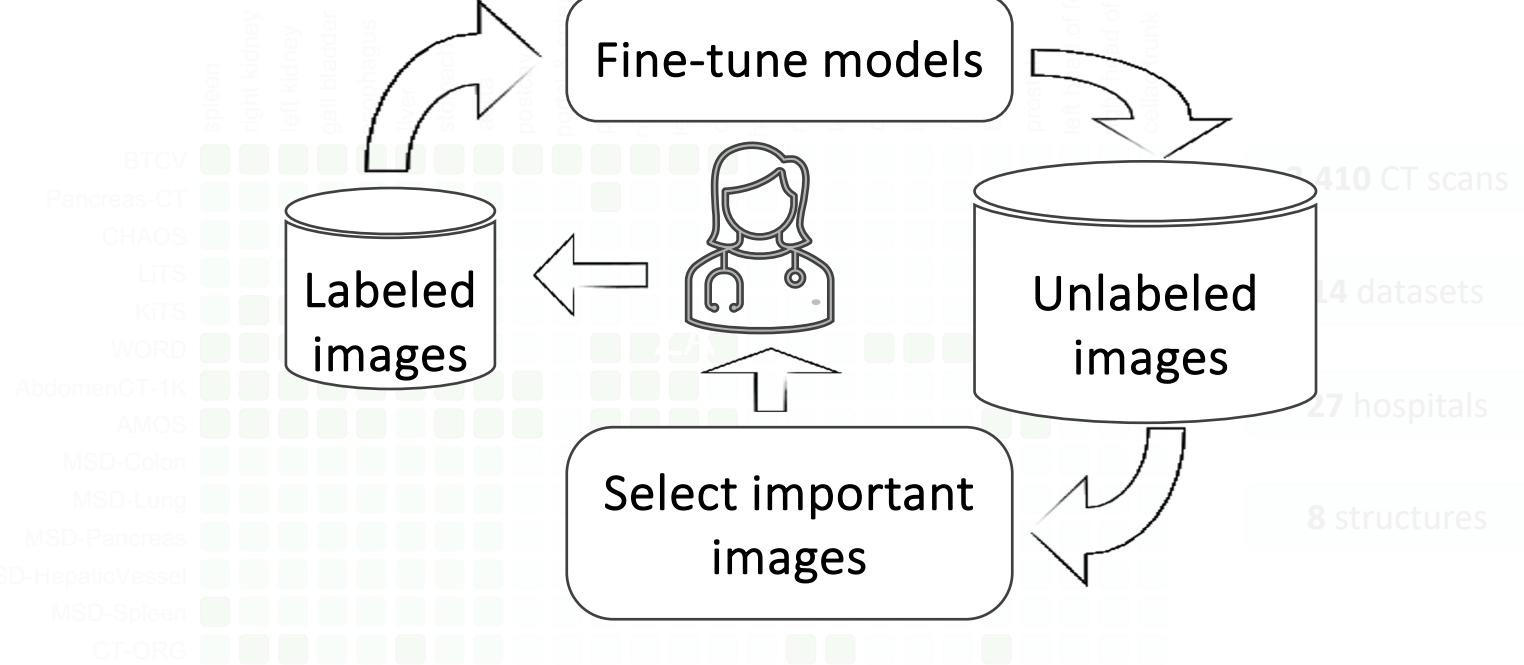
Unlabeled
images

Select important
images

Interactive Segmentation

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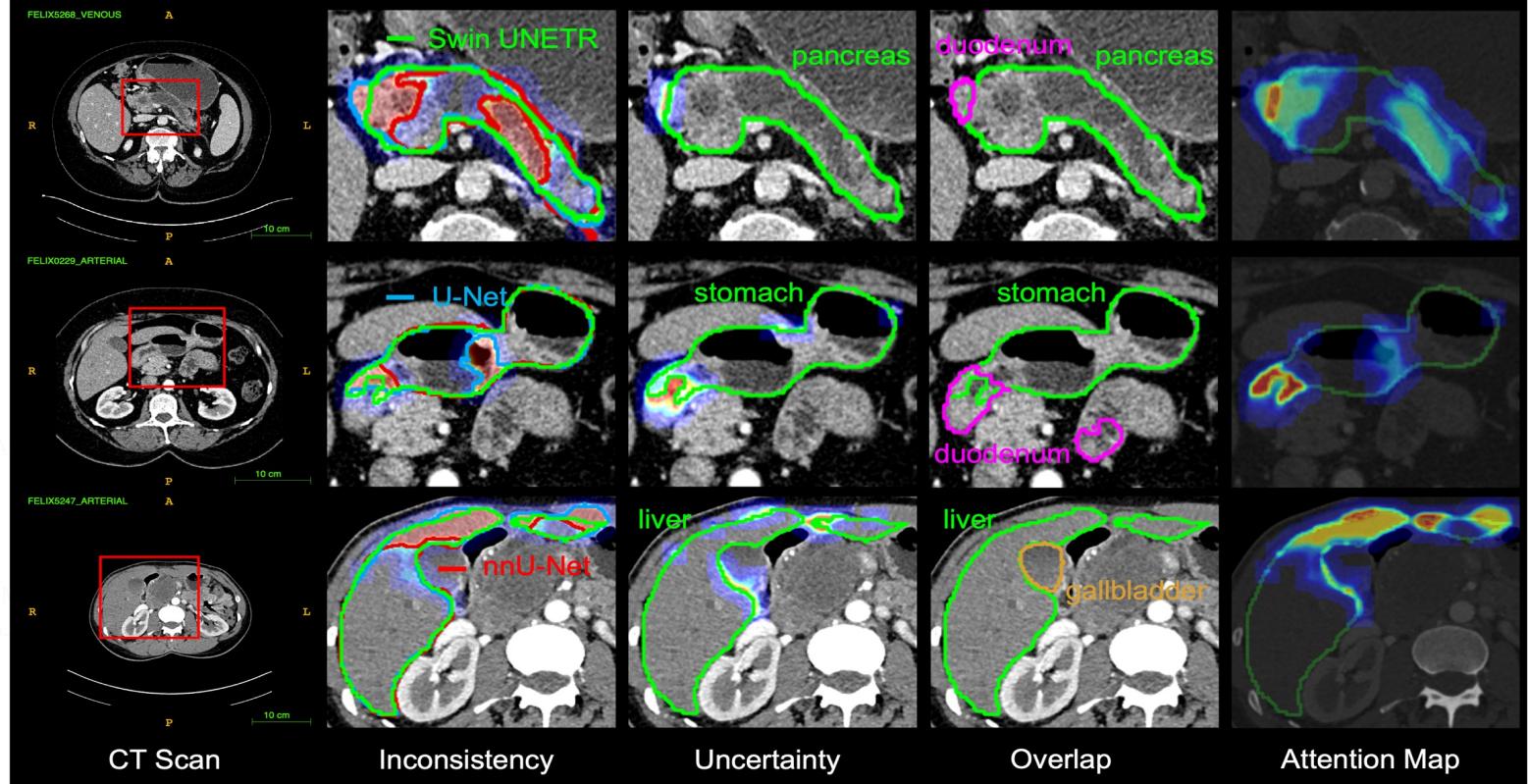
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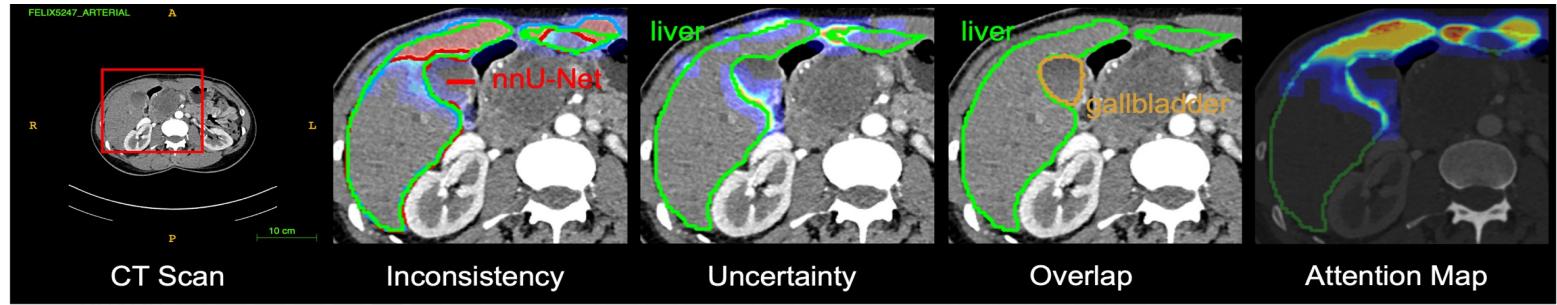


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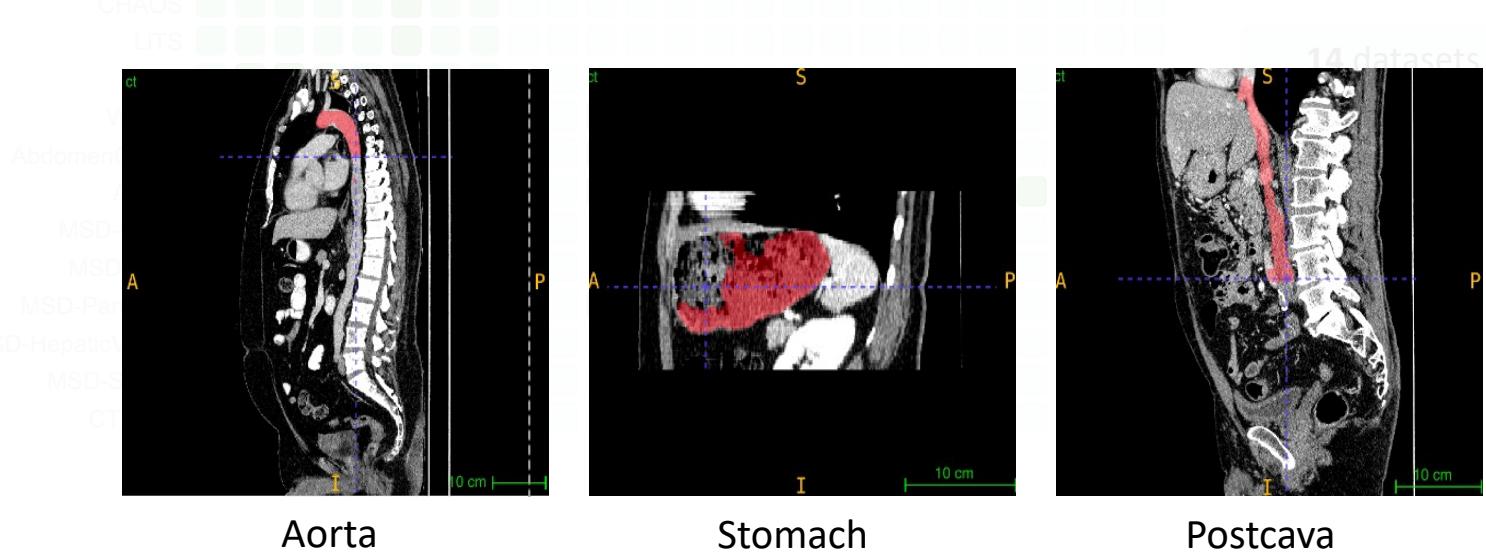
Code, Dataset, & Model:
<https://github.com/MrGiovanni/AbdomenAtlas>



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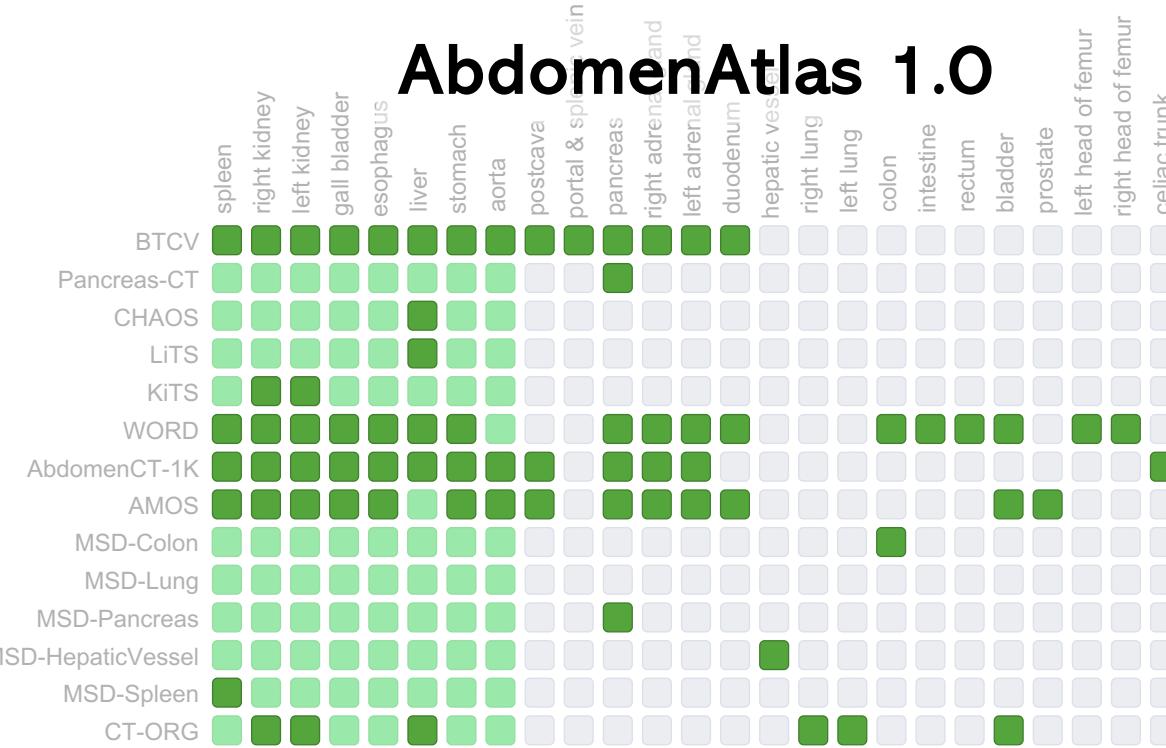
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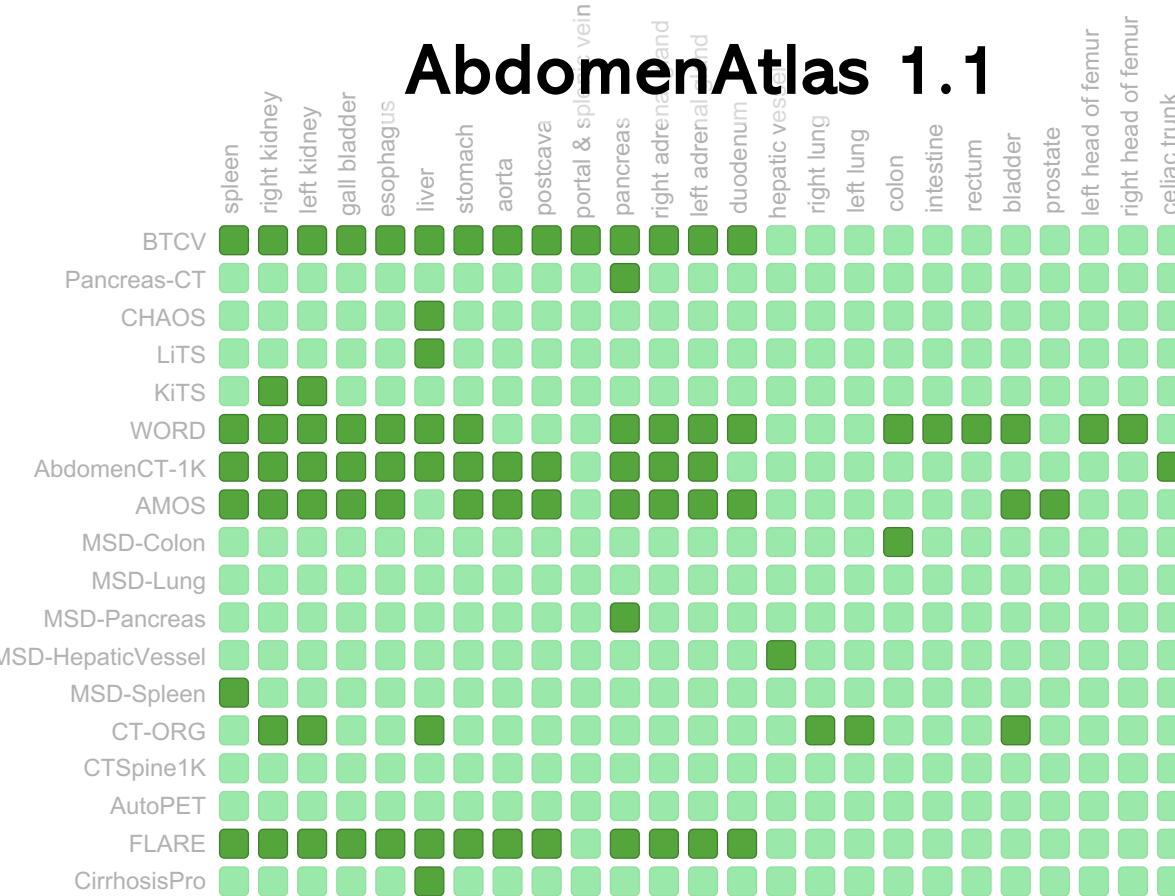
8 structures

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SuPreM
RSNA 2023

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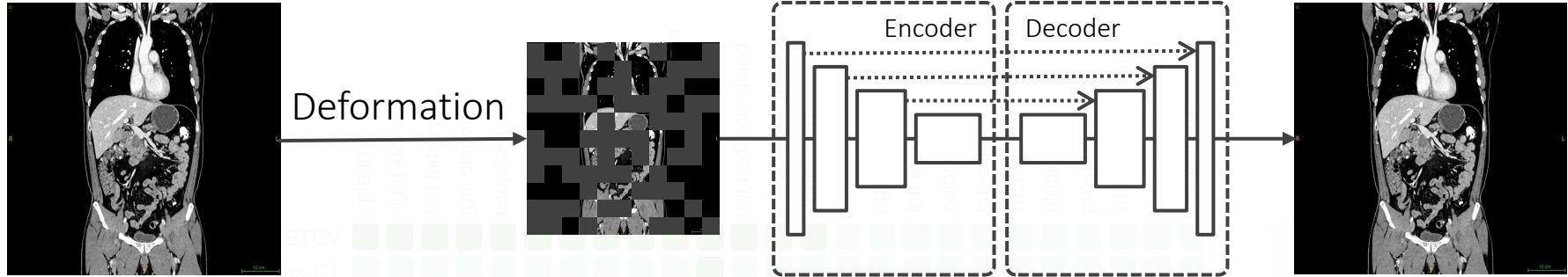


10,295 CT scans

18 datasets

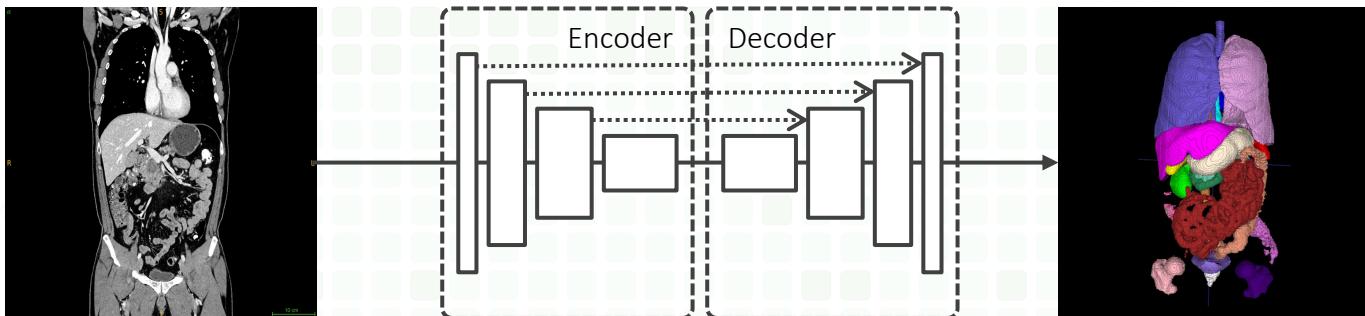
68 hospitals

25 structures



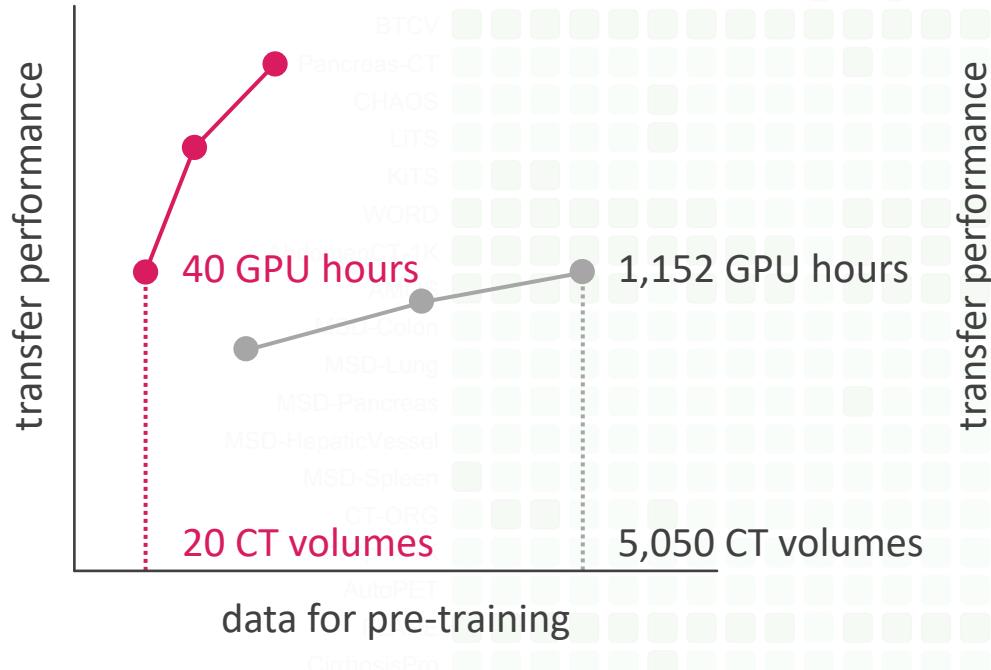
Self-supervised Pre-training

18 datasets

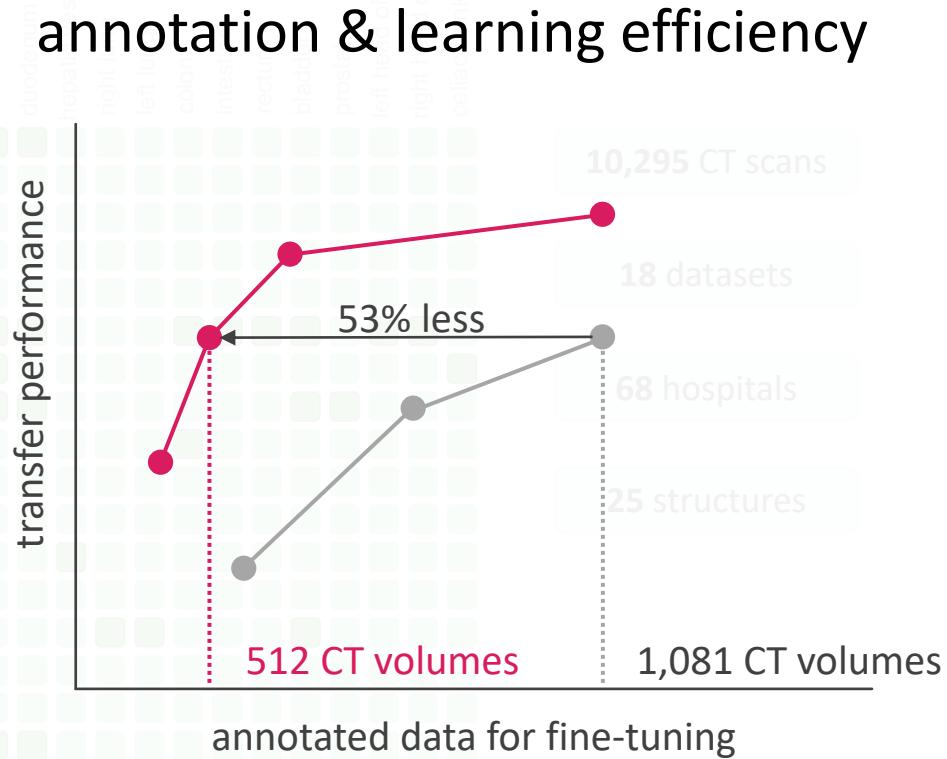


Supervised Pre-training

Supervised > Self-supervised data & computation efficiency



Supervised > Self-supervised annotation & learning efficiency



▼ Swin UNETR

name	params	pre-trained data	resources	download
Tang et al.	62.19M	5050 CT	Stars 850	weights
Jose Valanaras et al.	62.19M	50000 CT/MRI	Stars 850	weights
Universal Model	62.19M	2100 CT	Stars 371	weights
SuPreM	62.19M	2100 CT	ours 🌟	weights

▼ U-Net

name	params	pre-trained data	resources	download
Models Genesis	19.08M	623 CT	Stars 693	weights
UniMiSS	tiny	5022 CT&MRI	Stars 39	weights
	small			weights
Med3D	85.75M	1638 CT	Stars 1.7k	weights
DoDNet	17.29M	920 CT	Stars 151	weights
Universal Model	19.08M	2100 CT	Stars 371	weights

▼ SegResNet

name	params	pre-trained data	resources	download
SuPreM	62.19M	2100 CT	ours 🌟	weights





MICCAI

AbdomenAtlas 1.1

IMSeg - MICCAI & ISBI Challenge

Goal: Improving AI algorithms in performance and efficiency

Performance

- Out-of-distribution CT scans (scanners, protocols, demography, etc.)
- Hard-to-segment anatomical structures (small organs, tubular structure, etc.)

Efficiency

- Inference time per CT scan; computational cost

Setting

Training AI algorithms on *AbdomenAtlas 1.1*;
evaluating the AI on our proprietary multi-organ *JHH-1K dataset*.



IEEE INTERNATIONAL SYMPOSIUM
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10,295 CT scans

18 datasets

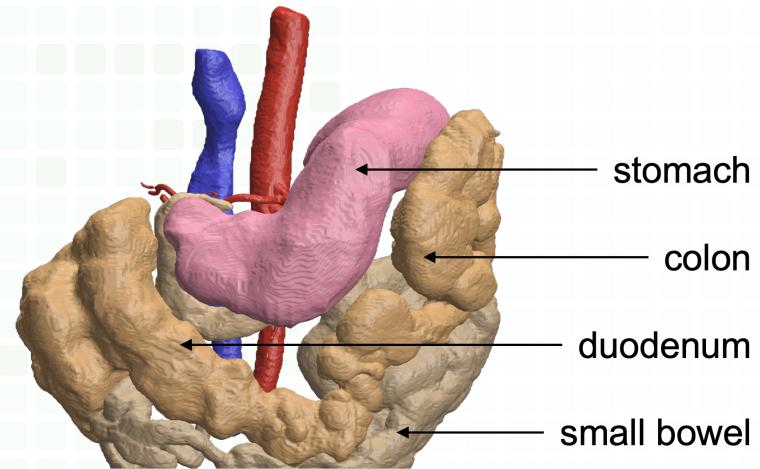
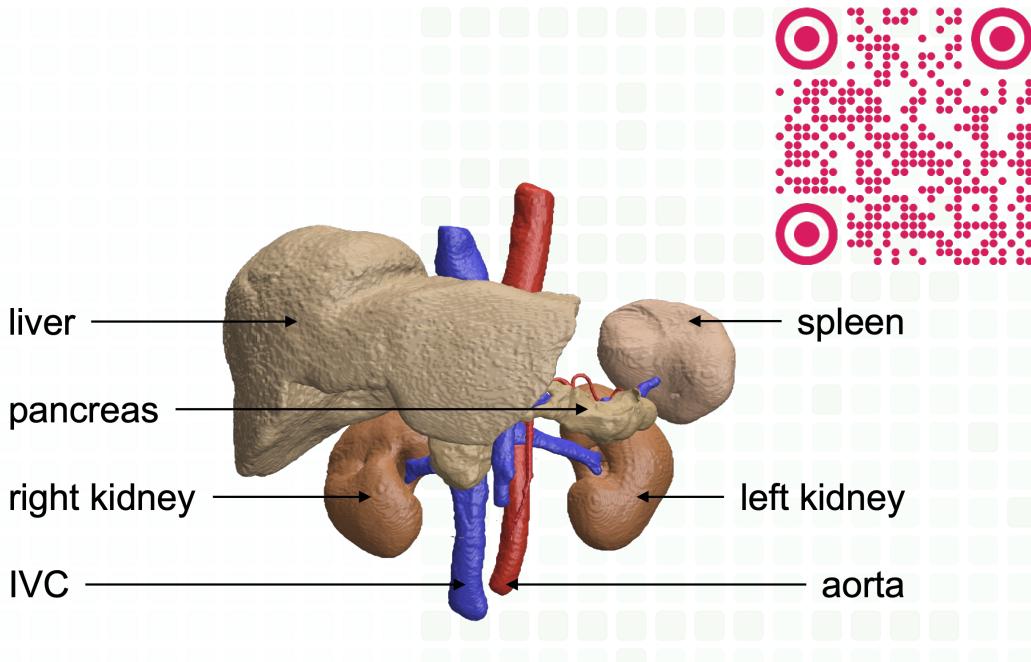
68 hospitals

25 structures



AbdomenAtlas 1.1

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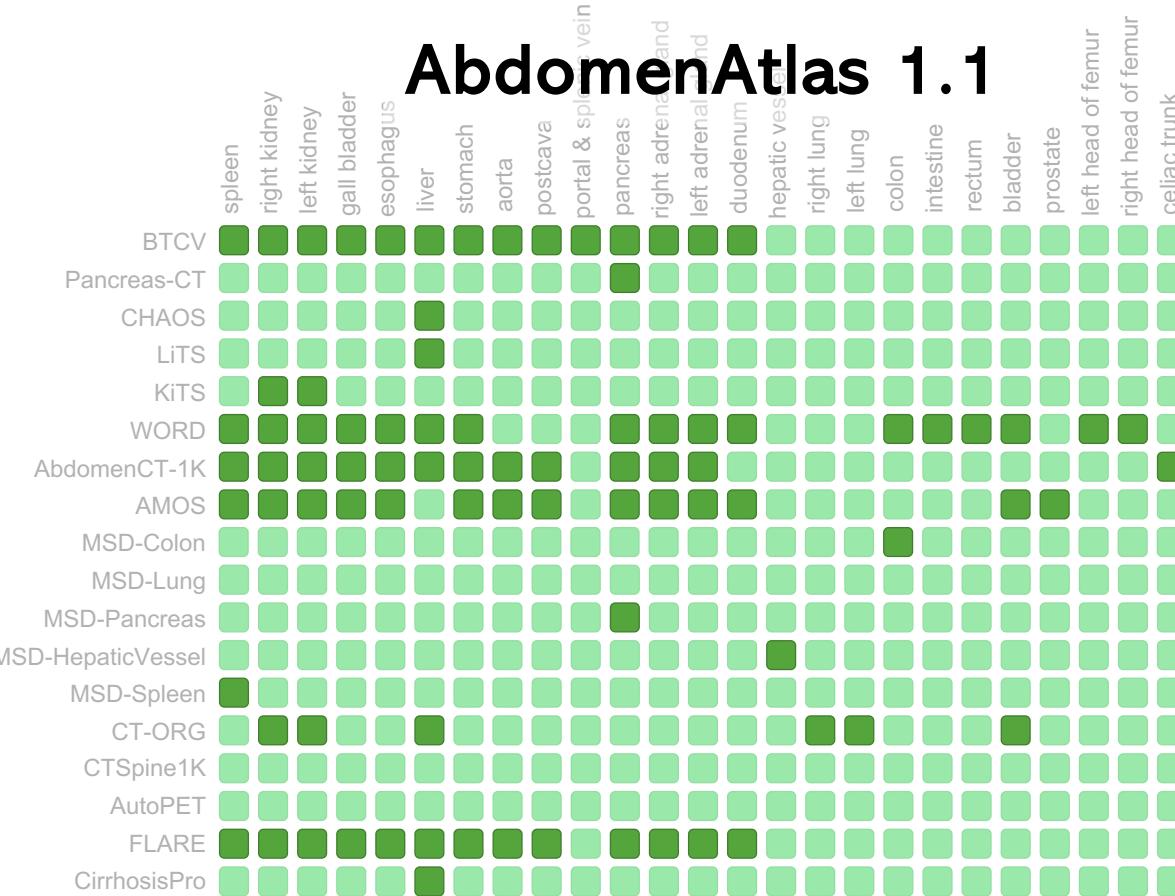


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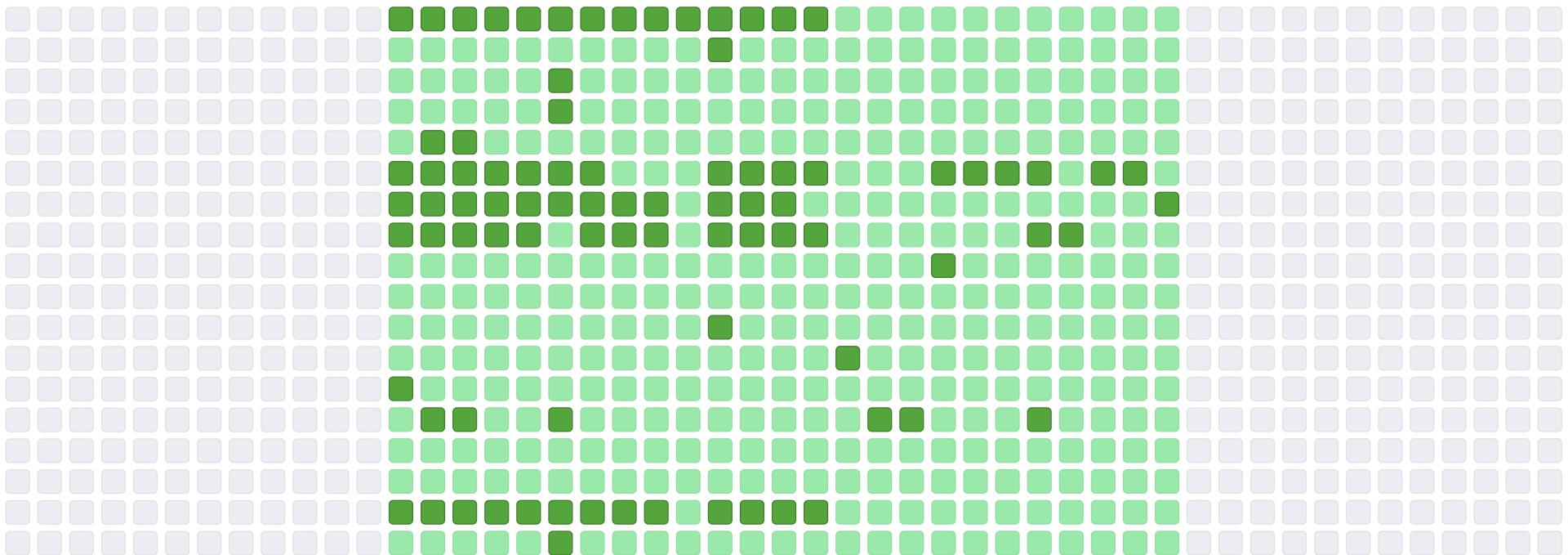
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THANK YOU

