

AbdomenAtlas

Radiologists and AI Unite to Map the Abdomen

Wenxuan Li, Alan Yuille, Zongwei Zhou

Johns Hopkins University

wli131@jh.edu





Johns Hopkins University



Johns Hopkins University is a private research university in Baltimore, Maryland. Founded in 1876, Johns Hopkins was the first American university based on the European research institution model. The university was named for its first benefactor, the American entrepreneur and Quaker philanthropist Johns Hopkins.

[Wikipedia](#)

Johns Hopkins University, Baltimore, MD
21218

89HH+XQ Baltimore, Maryland

[jh.edu](#)

(410) 516-8000

Acceptance rate
7.3% (2022)

[Save to project](#)

Atlas

 Baltimore



Baltimore is a major city in Maryland with a long history as an important seaport. Fort McHenry, birthplace of the U.S. national anthem, "The Star-Spangled Banner," sits at the mouth of Baltimore's Inner Harbor. Today, this harbor area offers shops, upscale crab shacks and attractions like the Civil War-era warship the USS Constellation and the National Aquarium, showcasing thousands of marine creatures.

 Baltimore, MD

 baltimorecity.gov

Population
576,498 (2021)

Area code
Area code 410

Congressional districts 2nd, 7th

 Save to project



Atlas



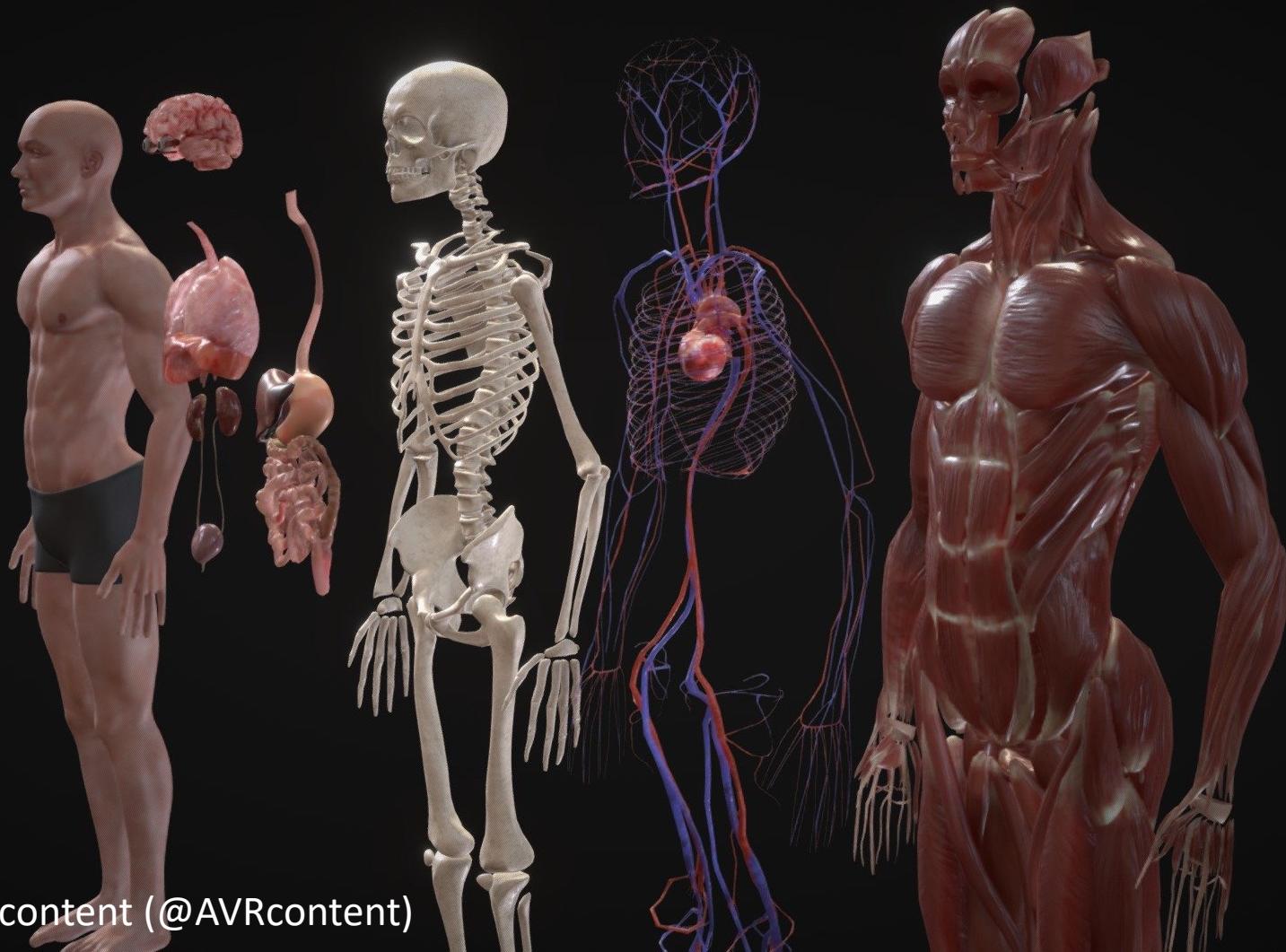
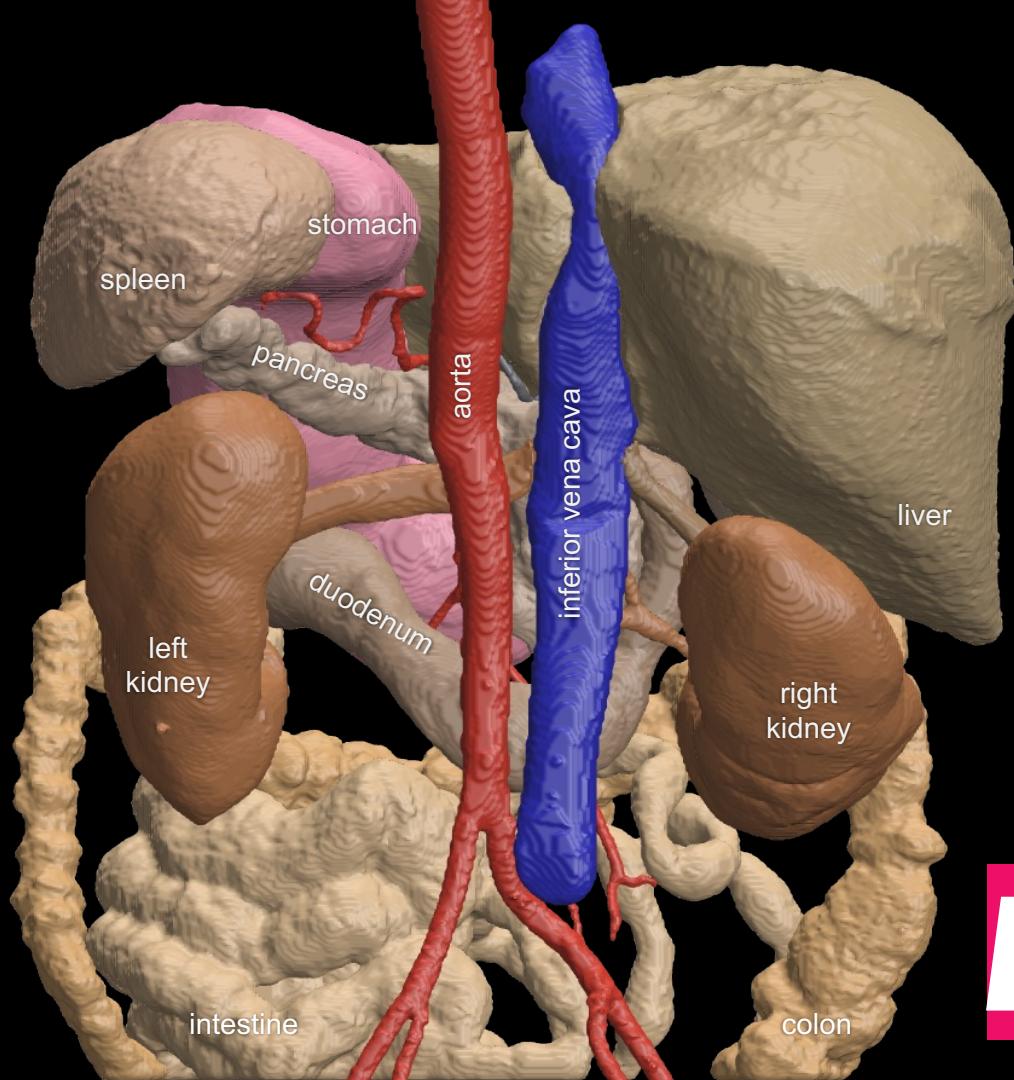
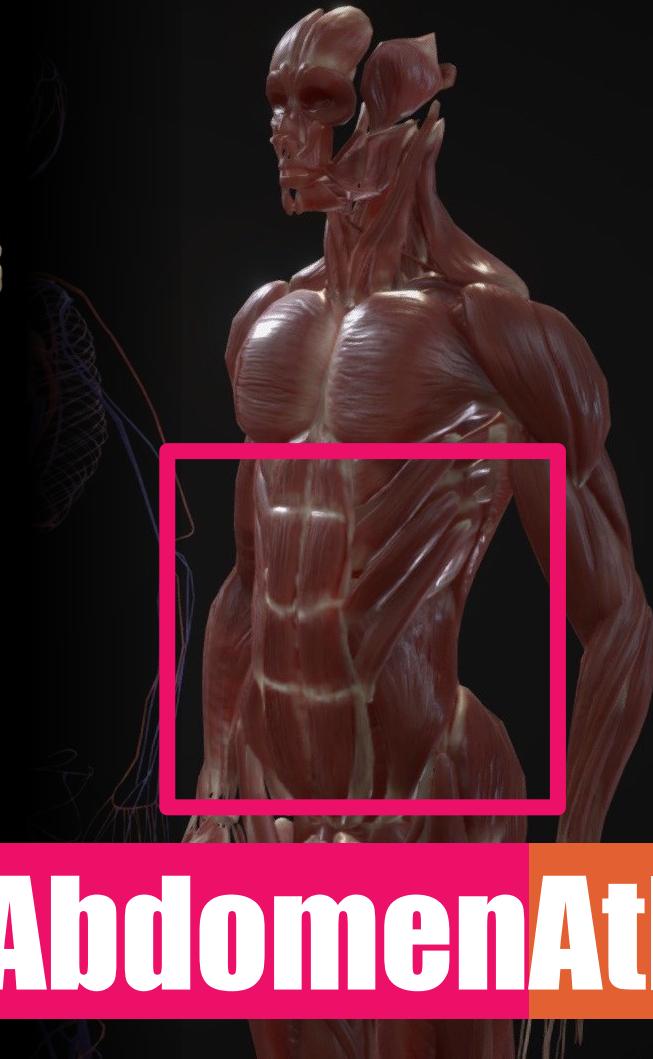
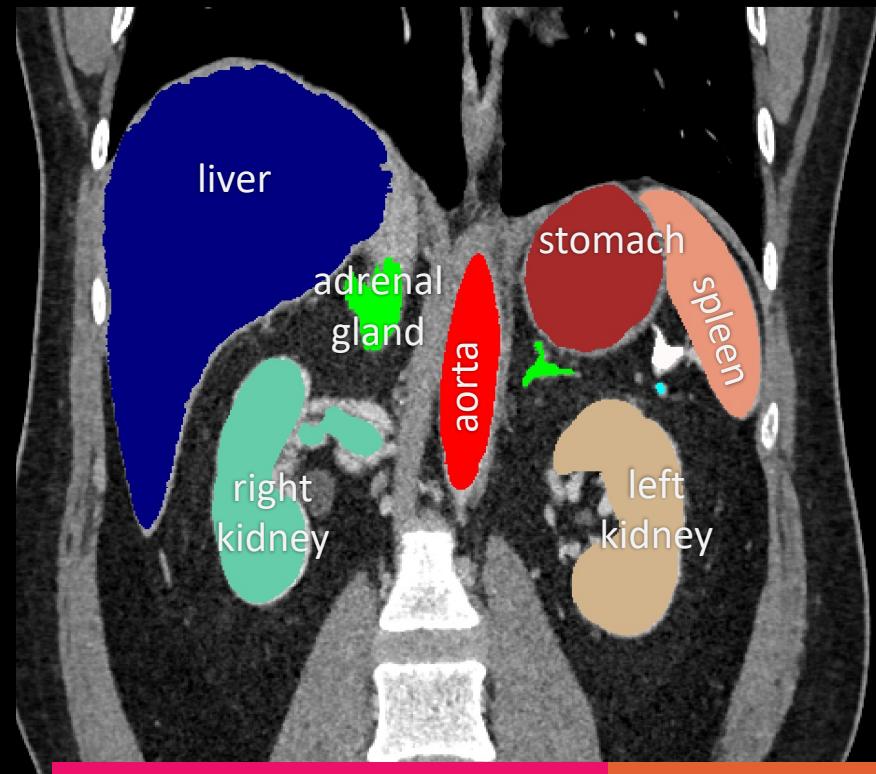
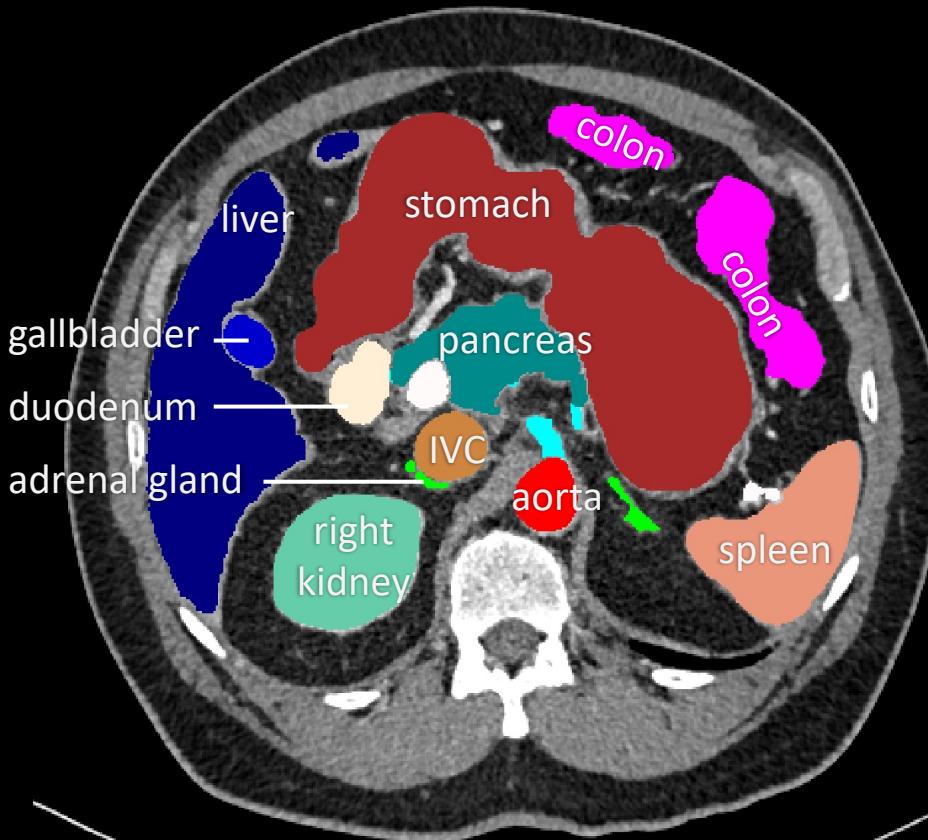


Photo by AVRcontent (@AVRcontent)



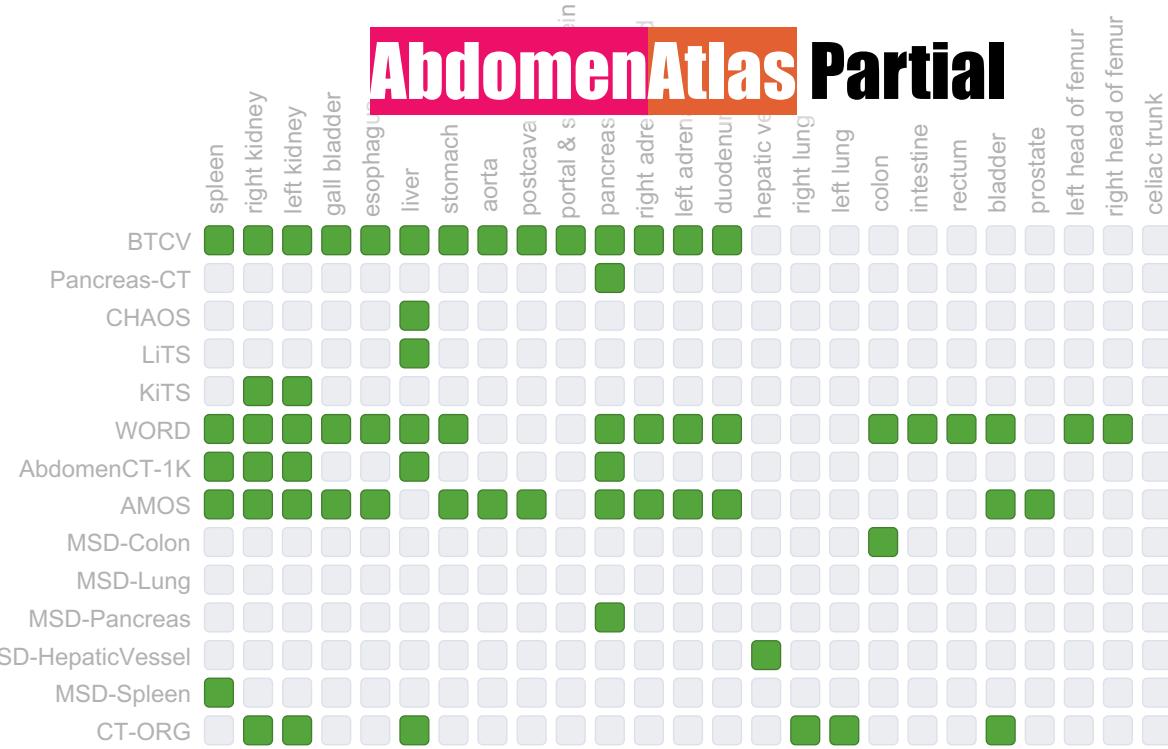
AbdomenAtlas





AbdomenAtlas

Example: an abdominal CT scan



AbdomenAtlas Partial

unlabeled
labeled (public)

3,410 volumes

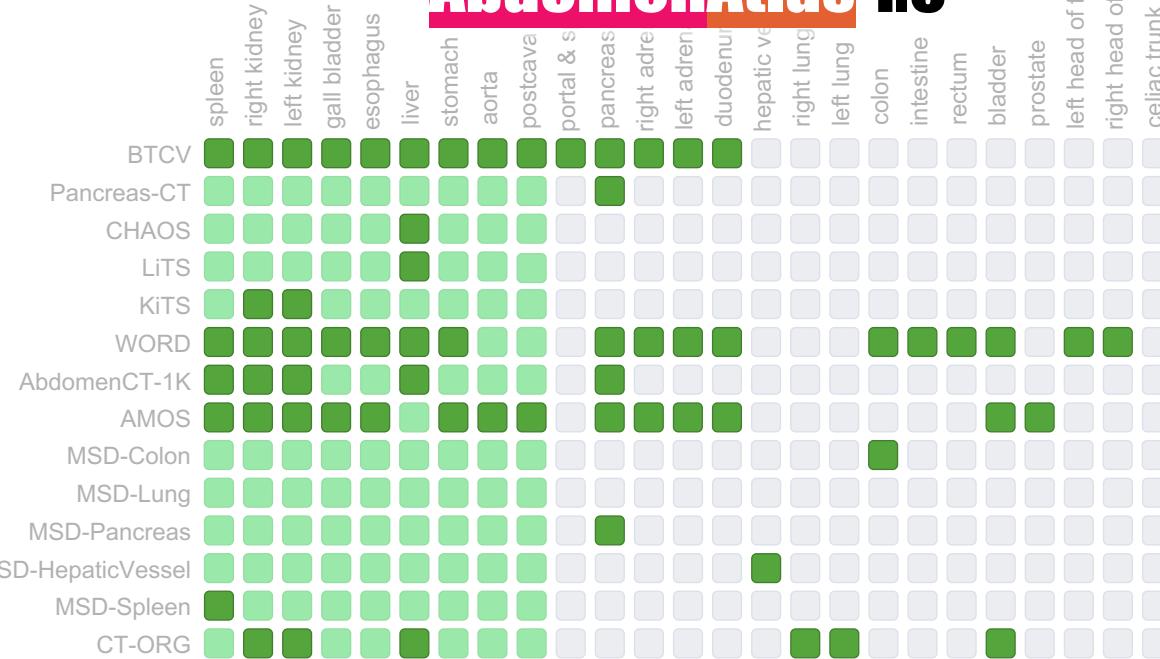
14 datasets

26 hospitals

8 countries

CLIP-Driven
Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0



unlabeled
labeled (public)
labeled (by us)

3,410 volumes

14 datasets

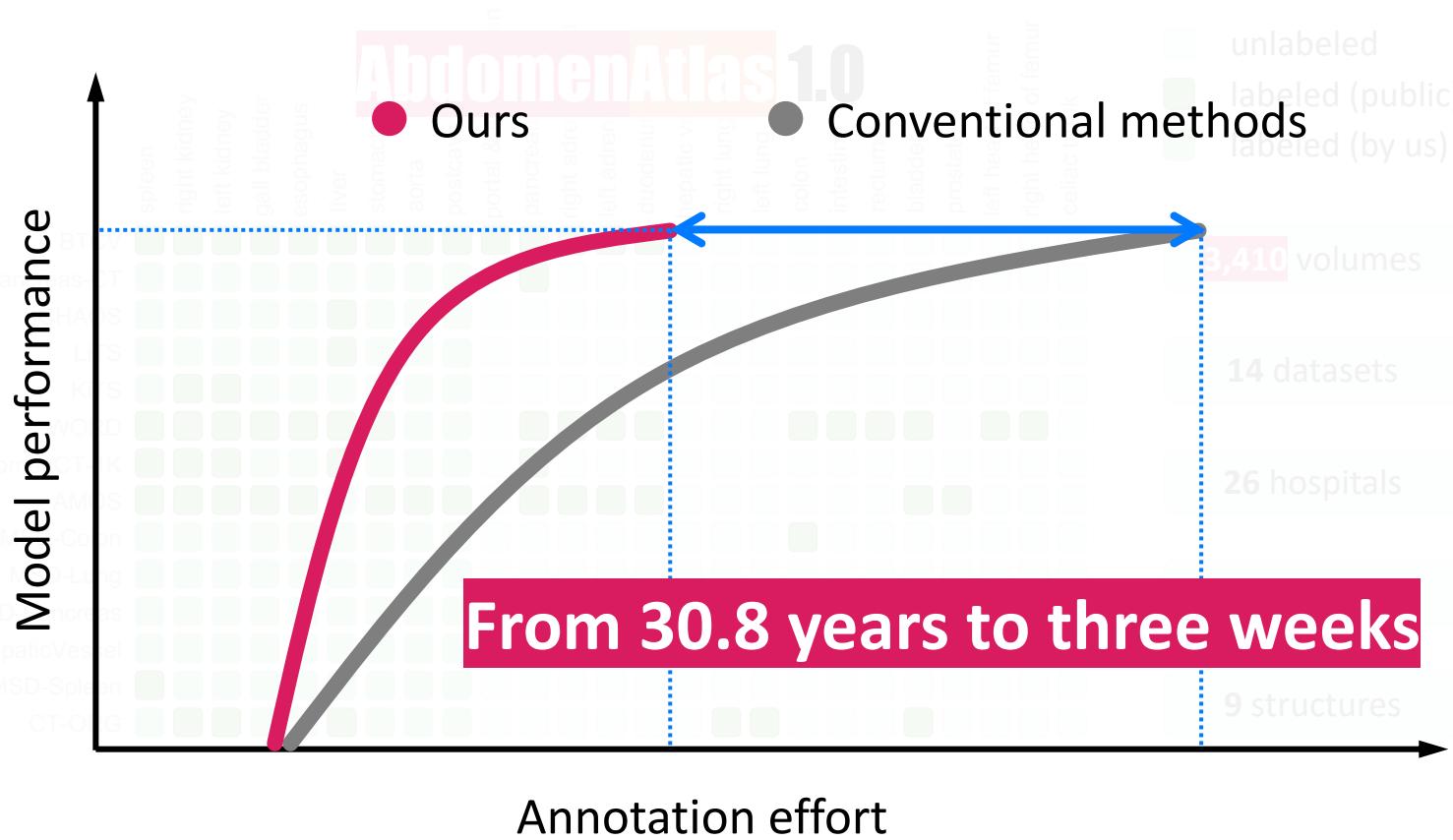
26 hospitals

8 countries

9 structures

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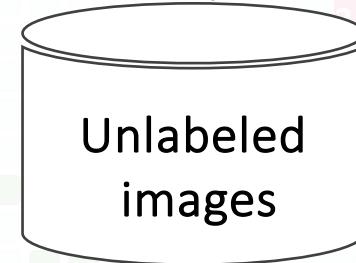


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MICCAI 2023
RSNA 2023*

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*NeurIPS 2023
RSNA 2023*



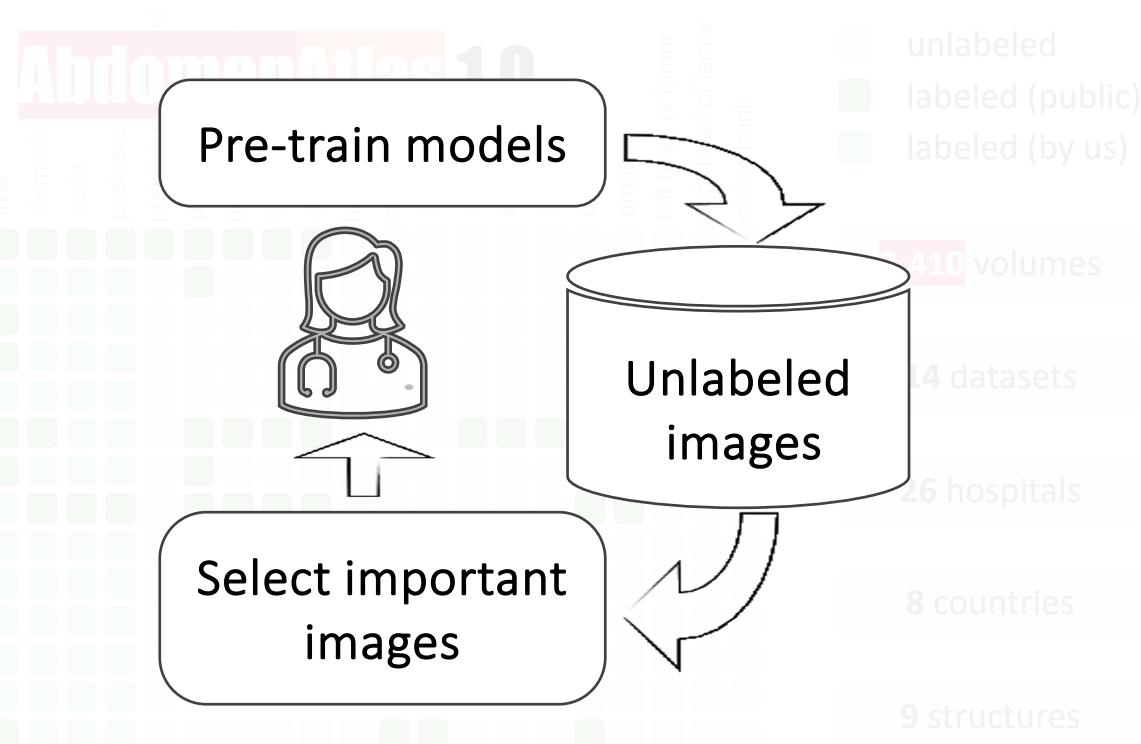
Pre-train models



Interactive Segmentation

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RSNA 2023*

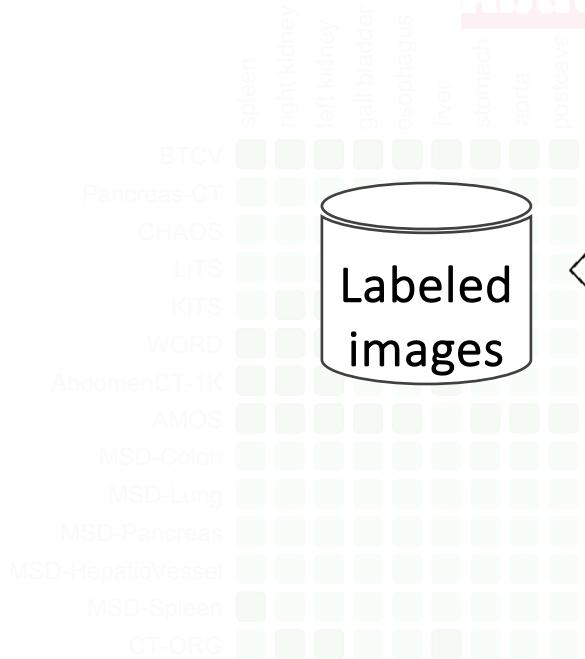
AbdomenAtlas 1.0
*NeurIPS 2023
RSNA 2023*



Interactive Segmentation

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Universal Model
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RSNA 2023

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AbdomenAtlas 1.0

Pre-train models



Labeled
images

Unlabeled
images

Select important
images

- unlabeled
- labeled (public)
- labeled (by us)

410 volumes

14 datasets

26 hospitals

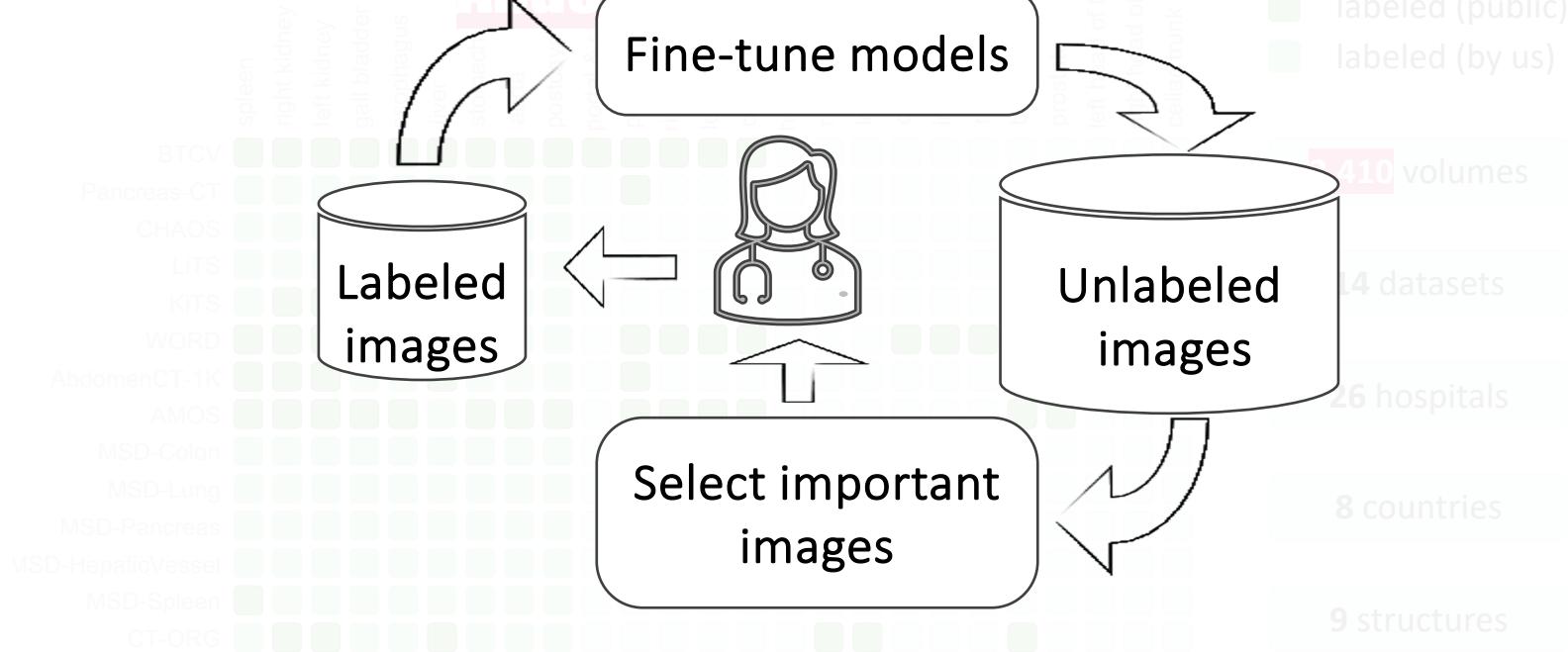
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Interactive Segmentation

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Universal Model
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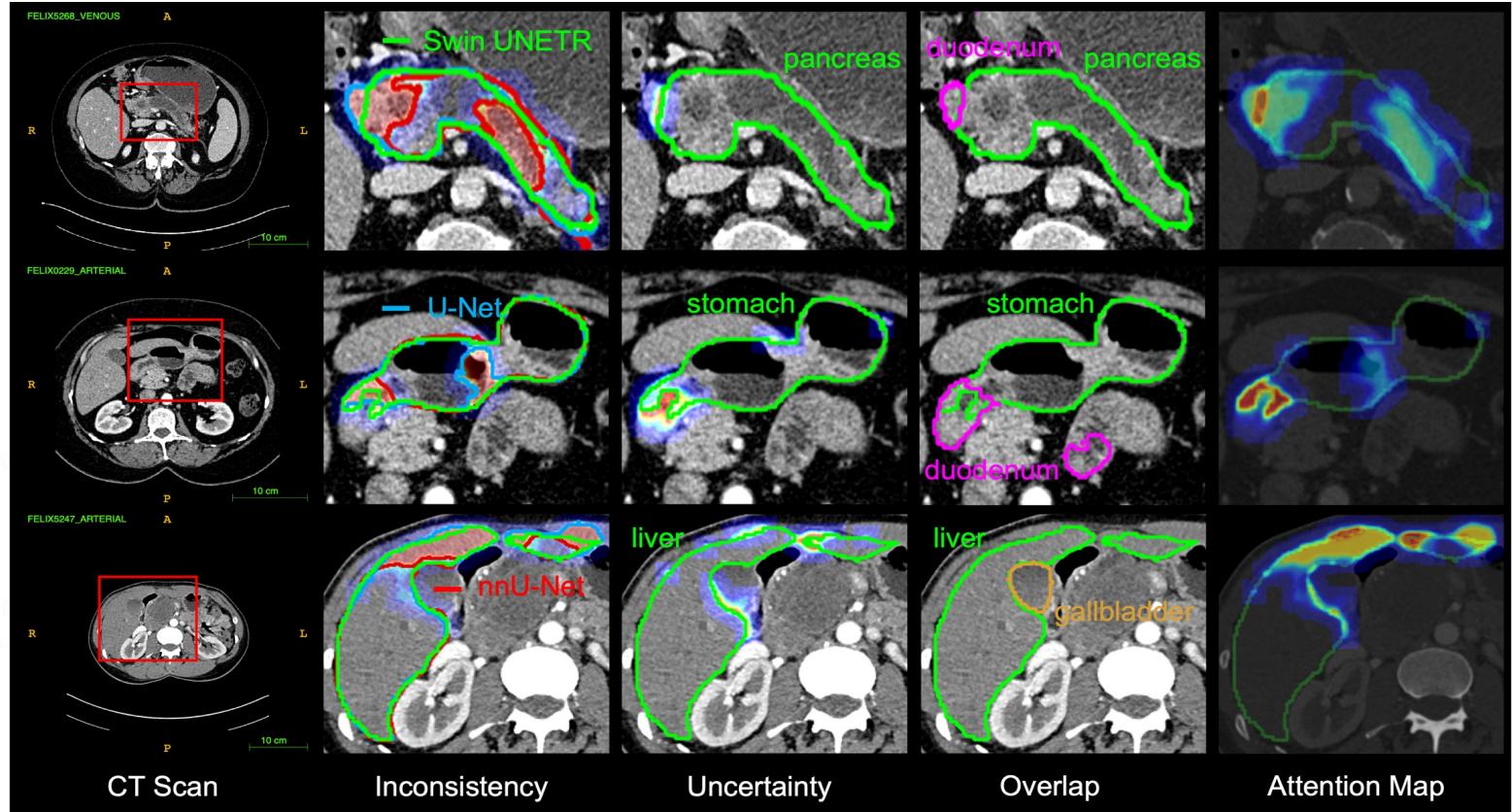
AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023



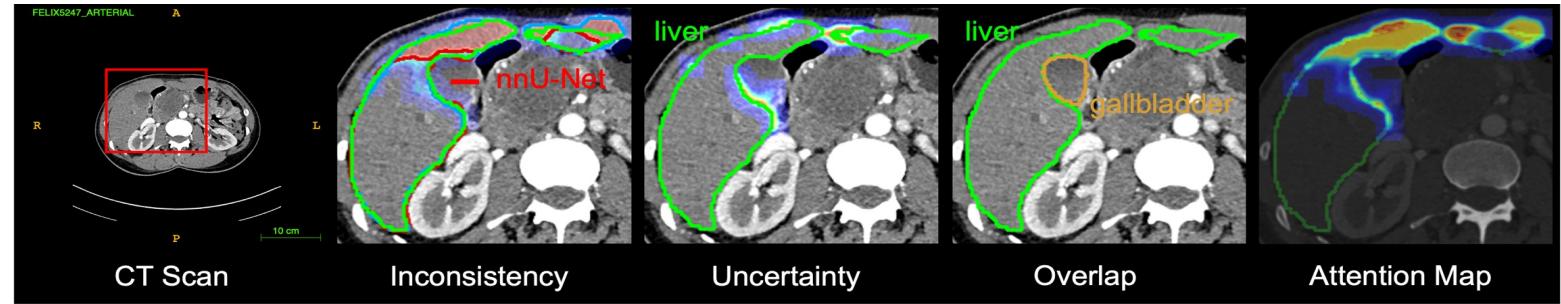
Interactive Segmentation

CLIP-Driven
Universal Model
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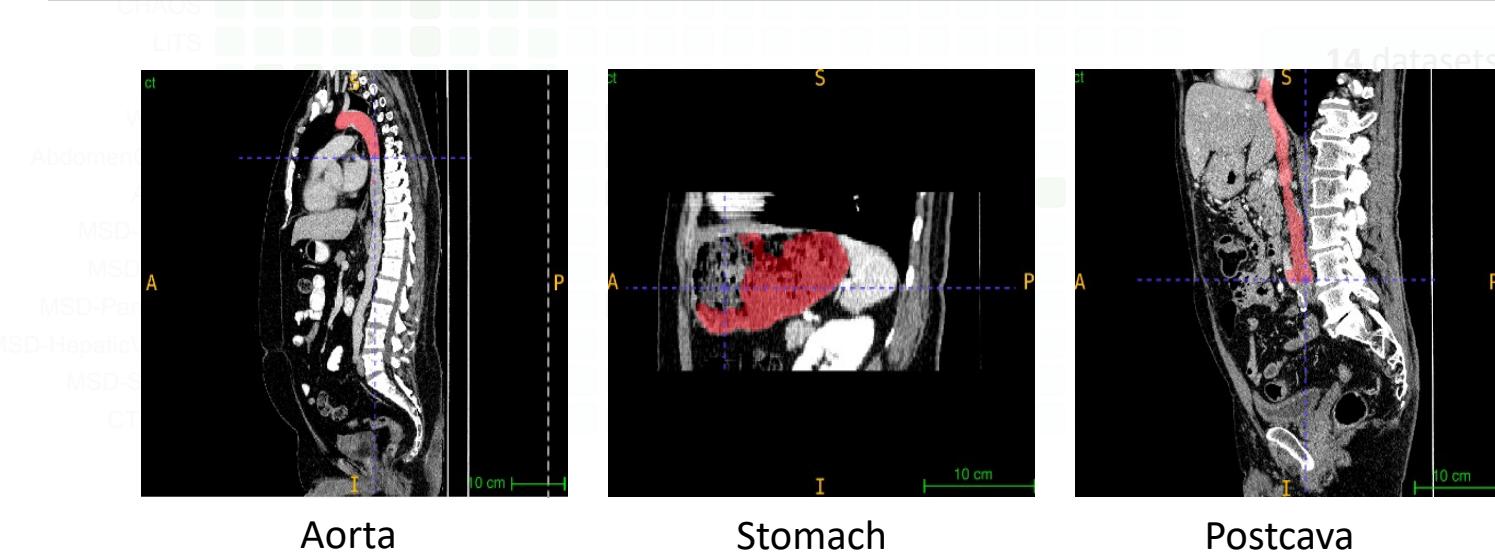
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Universal Model
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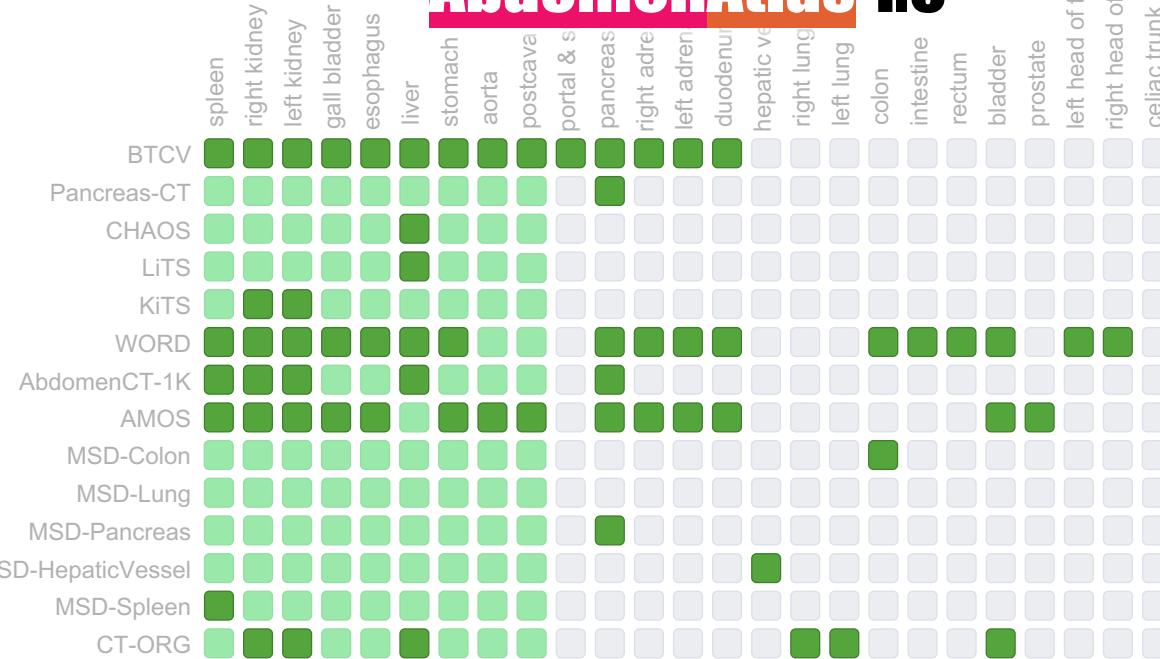


Wenxuan Li
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Code, Dataset, & Model:
<https://github.com/MrGiovanni/AbdomenAtlas>

CLIP-Driven
Universal Model
ICCV 2023
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RSNA 2023

AbdomenAtlas 1.0



unlabeled
labeled (public)
labeled (by us)

3,410 volumes

14 datasets

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AbdomenAtlas 1.0

@ISBI 2024 Challenge



IEEE INTERNATIONAL SYMPOSIUM
ON BIOMEDICAL IMAGING
ISBI 2024
27-30 MAY, 2024 – ATHENS, GREECE
MEGARON ATHENS INTERNATIONAL CONFERENCE CENTRE (MAICC)

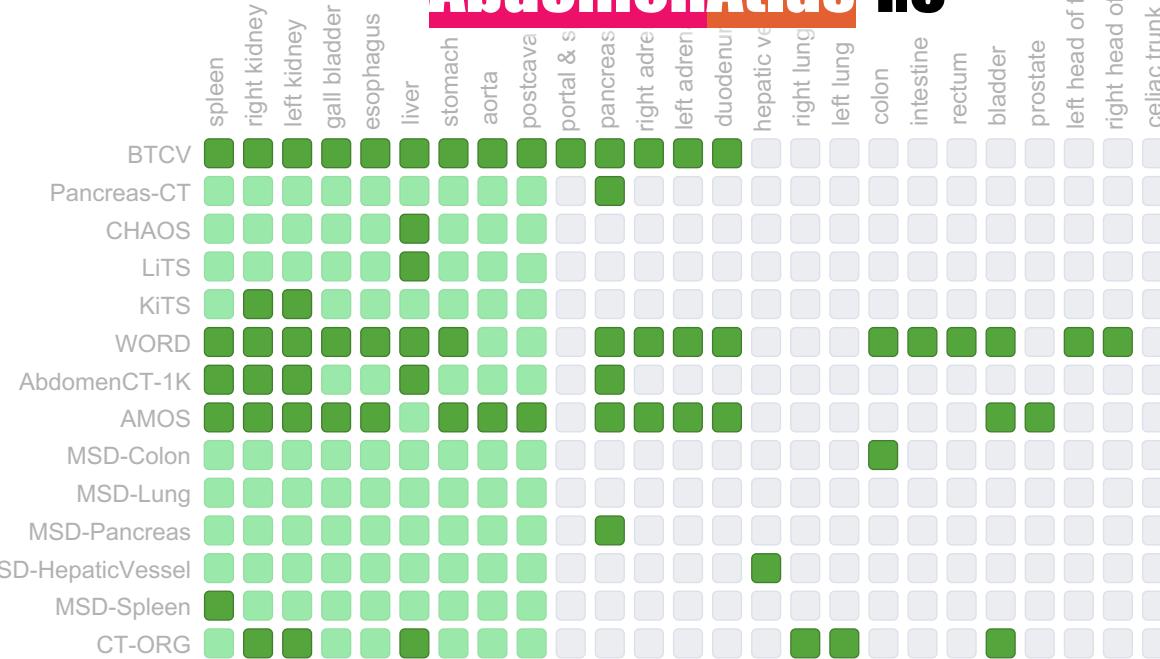
Backbone	Author	Institute	Publication	Backbone	Author	Institute	Publication
Swin-Unet	Hu Cao	Huawei	ECCVW	UniSeg	Yiwen Ye	NPU	MICCAI
nnFormer	Hong-Yu Zhou	HKU	TIP	SAT	Ziheng Zhao	SJTU	arXiv
CoTr	Yutong Xie	NPU	MICCAI	Swin UNETR	Ali Hatamizadeh	NVIDIA	MICCAIW
UniverSeg	Victor Ion Butoi	MIT	ICCV	VM-UNet	Jiacheng Ruan	SJTU	arXiv
UNet++	Zongwei Zhou	ASU	TMI	MagicNet	Duowen Chen	ECNU	CVPR
TransUNet	Jieneng Chen	JHU	ICMLW	MedSegDiff	Junde Wu	NUS	AAAI
U-Mamba	Jun Ma	UToronto	arXiv	3D UNeXt	Jeya Maria Jose	JHU	MICCAIS
DiNTS	Yufan He	JHU	CVPR			

So far, **31 groups** have confirmed the contribution—we will invite more authors of **famous backbones** for medical segmentation.



CLIP-Driven
Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0



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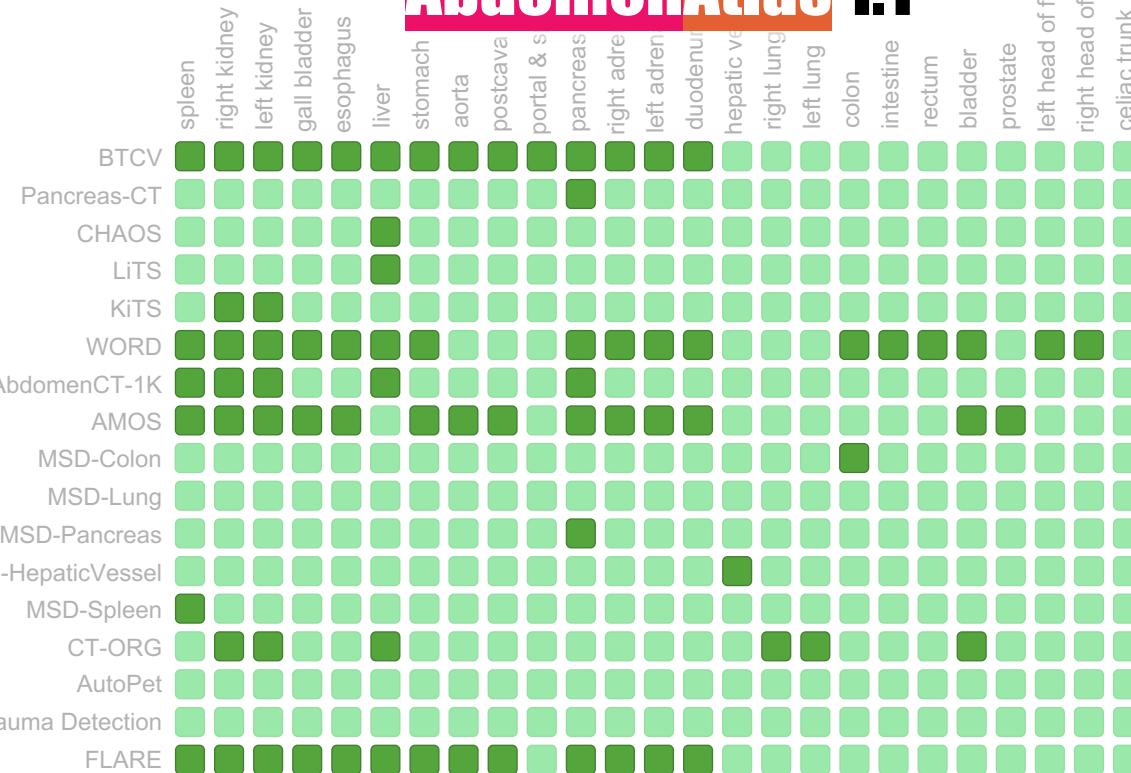
9 structures

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MICCAI 2023
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AbdomenAtlas 1.1

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

SuPreM
ICLR 2024 (oral)
RSNA 2023



unlabeled
labeled (public)
labeled (by us)

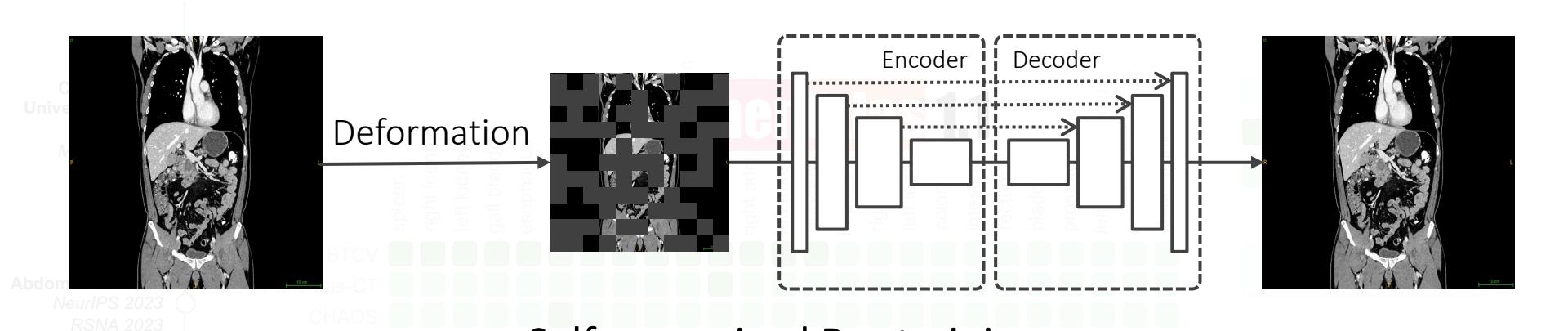
9,262 volumes

17 datasets

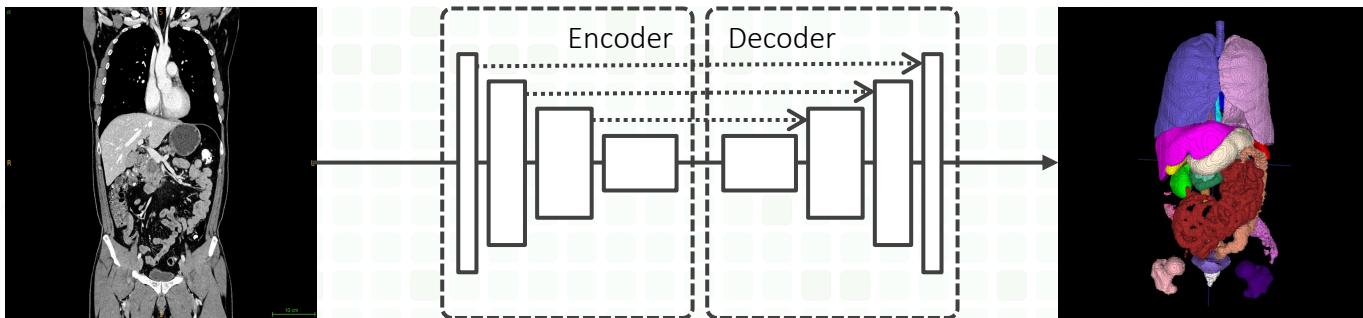
88 hospitals

19 countries

25 structures

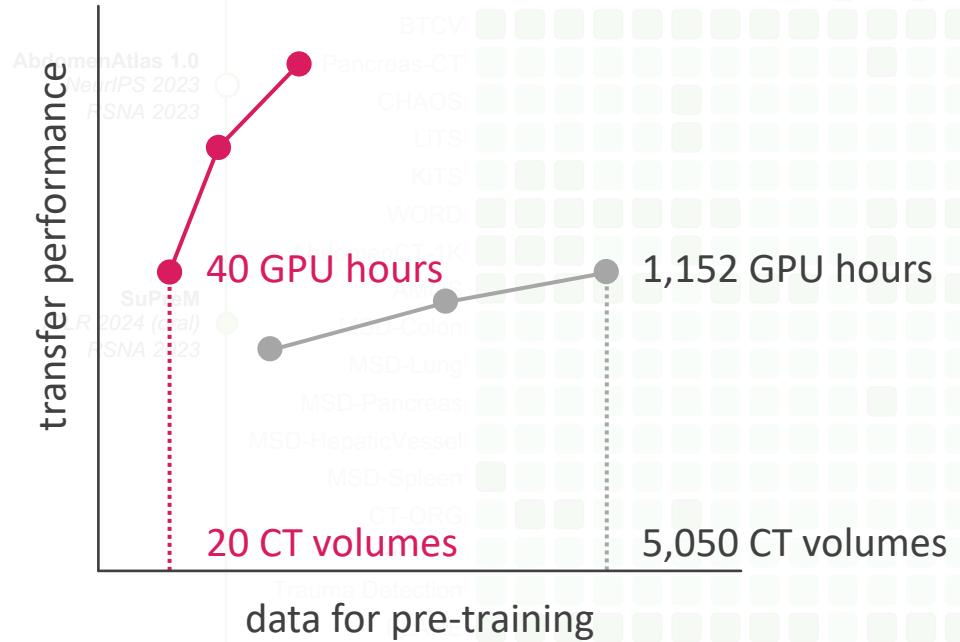


Self-supervised Pre-training

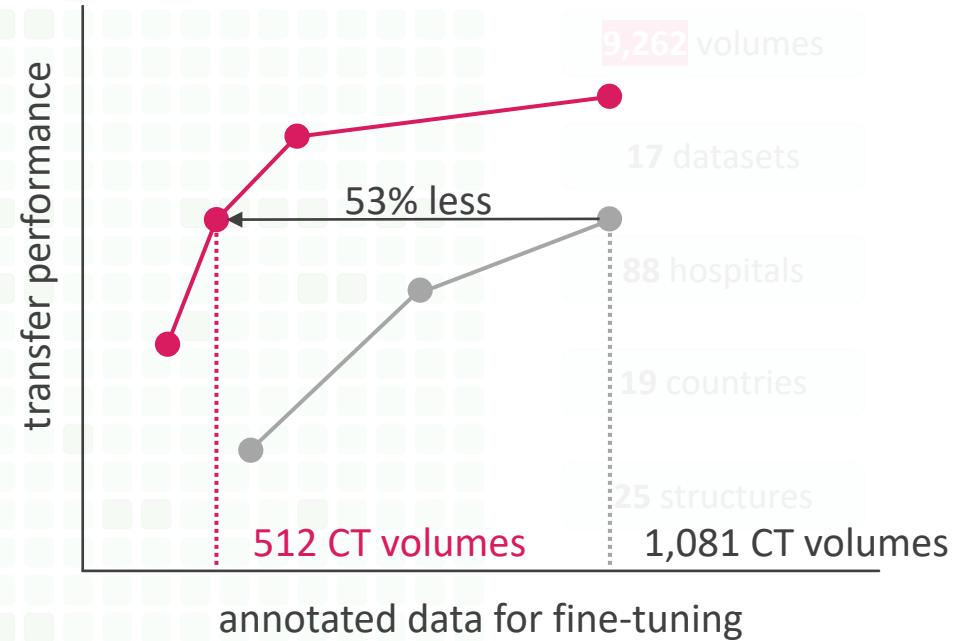


Supervised Pre-training

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

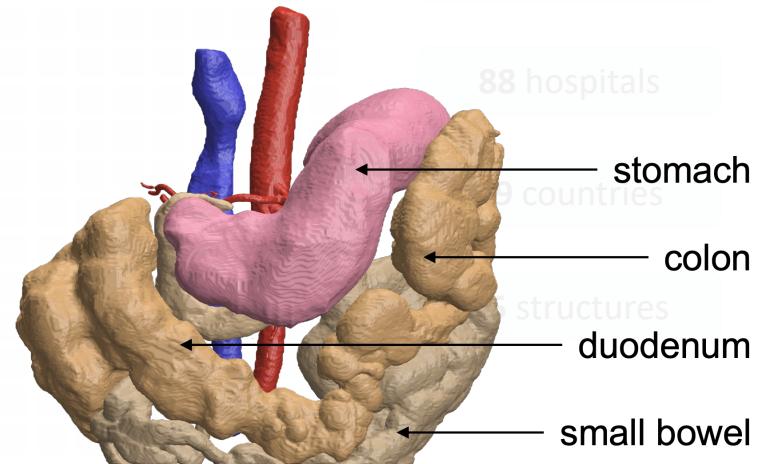
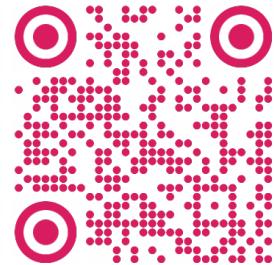
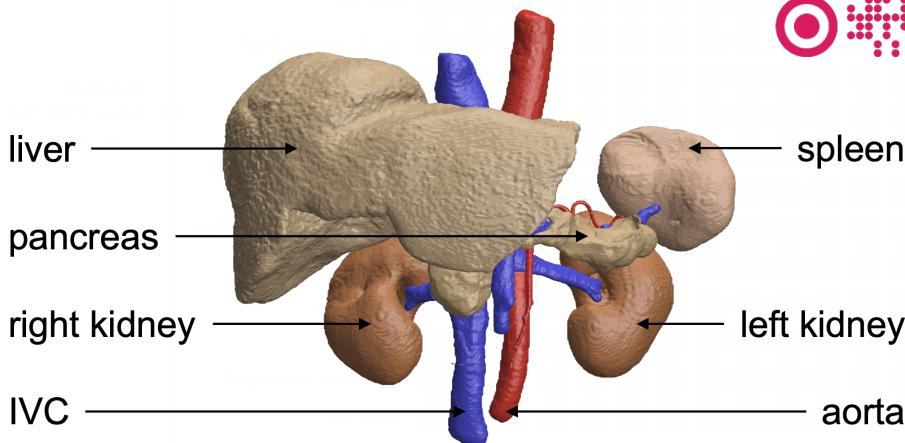
name	params	pre-trained data	resources	download
SuPreM	62.19M	2100 CT	ours 🌟	weights





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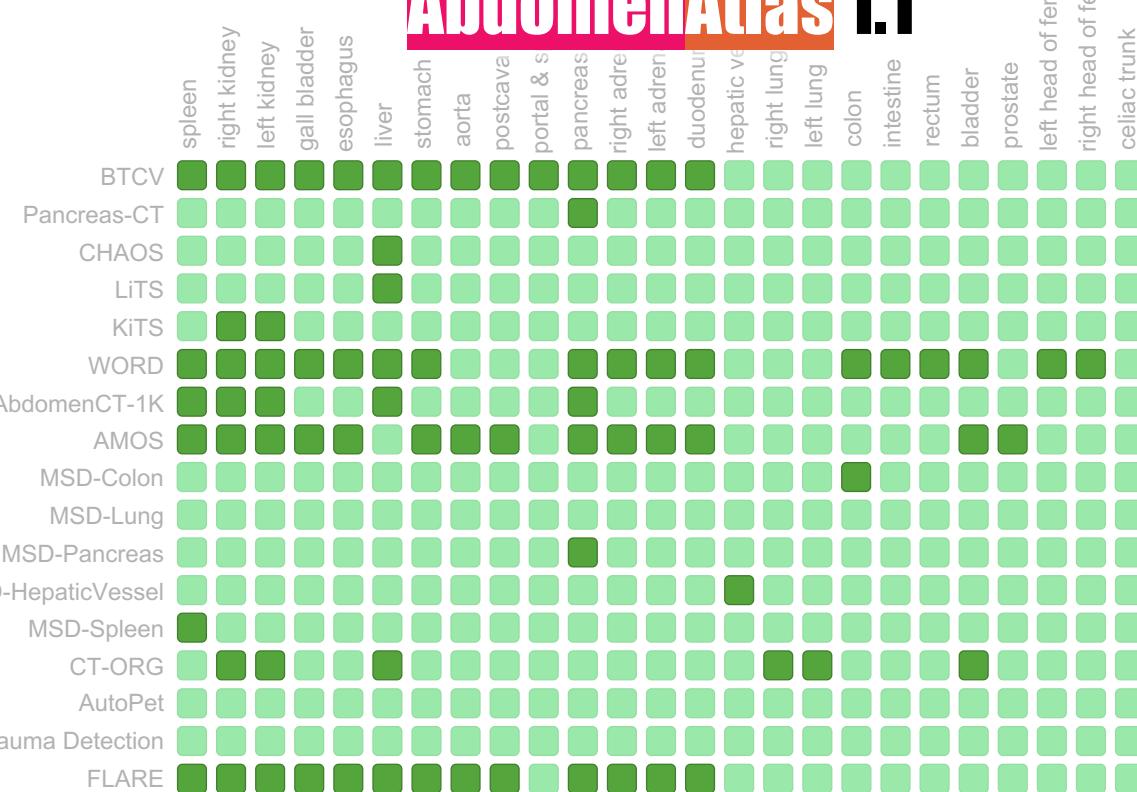


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RSNA 2023

SuPreM
ICLR 2024 (oral)
RSNA 2023



unlabeled
labeled (public)
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9,262 volumes

17 datasets

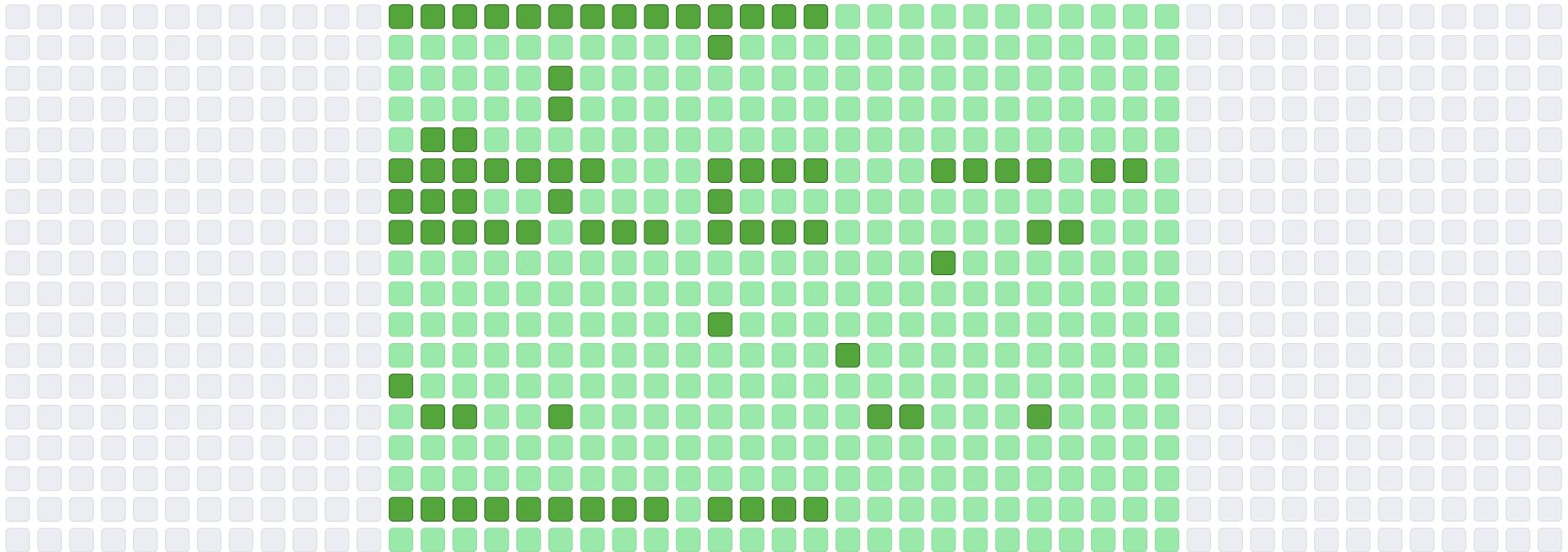
88 hospitals

19 countries

25 structures

AbdomenAtlas

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



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AI and Radiologists Unite to Map the Abdomen

Hopkins researchers have leveraged the synergy between medical professionals and artificial intelligence algorithms to create the largest annotated multi-organ dataset to date.

PUBLISHED
February 9, 2024

AUTHOR
Jaime Patterson

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Annotated

1.2M

CT slices

Annotated

3,410

CT volumes

Annotated

9

body structures

AbdomenAtlas 1.0

release date: 02/09/2024 Happy Chinese New Year

PUBLISHED

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CT volumes

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body structures

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8.5M

CT slices

Annotated

22,682

CT volumes

Annotated

142

body structures

AbdomenAtlas Pro

internal use only open for collaboration

PUBLISHED

February 9, 2024

AUTHOR

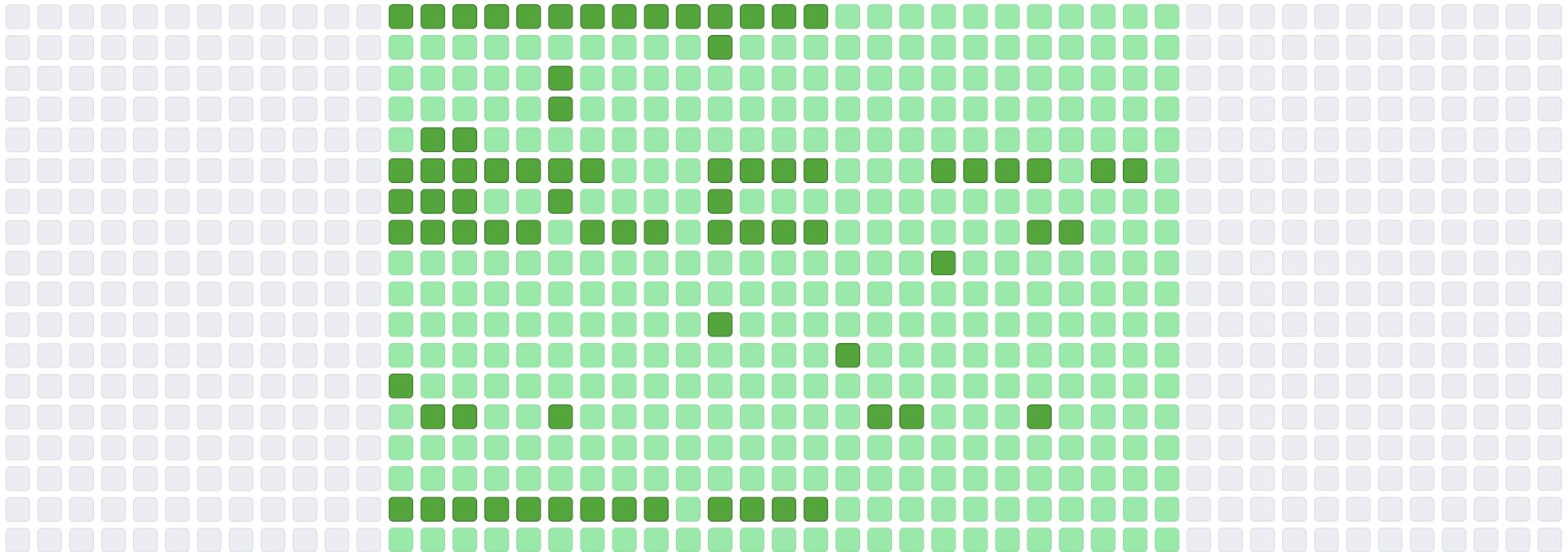
Jaimie Patterson

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



Thank you!

Acknowledgement: Chongyu Qu, Xiaoxi Chen, Linda Chu, Satomi, Kawamoto, Seyoun Park, Christopher Wolfgang, Ammar Javed, Daniel Fadaei, Shahab Shayesteh, Jefferson Graves, Alejandra Blanco, Eva S. Zinreich, Benedict Kinny-Köster, Kenneth Kinzler, Ralph H. Hruban, Bert Vogelstein, Elliot K. Fishman, Tiezheng Zhang, Hualin Qiao, Jessica Han, Jie Liu, Yucheng Tang, Pedro Ricardo Ariel Salvador Bassi, Yijia Shi, Lihua Gao, Wenlan Zhou, Guiqin Zhang, Damin Li, Yixiao Zhang, Jieneng Chen, Jaimie Patterson, Junfei Xiao, Yongyi Lu, Xinyi Li, Huimiao Chen, Yaoyao Liu, Qi Chen, Jianning Li, Yu-Cheng Chou, Angtian Wang, Yixiong Chen, Yuxiang Lai, Jincheng Wang, Huimin Xue, Yining Cao, Haoqi Han, Xiaorui Lin, Yutong Tang, Meihua Li, Yujiu Ma, Jinghui Xu, Jiawei Liu, Zheyuan Zhang

