

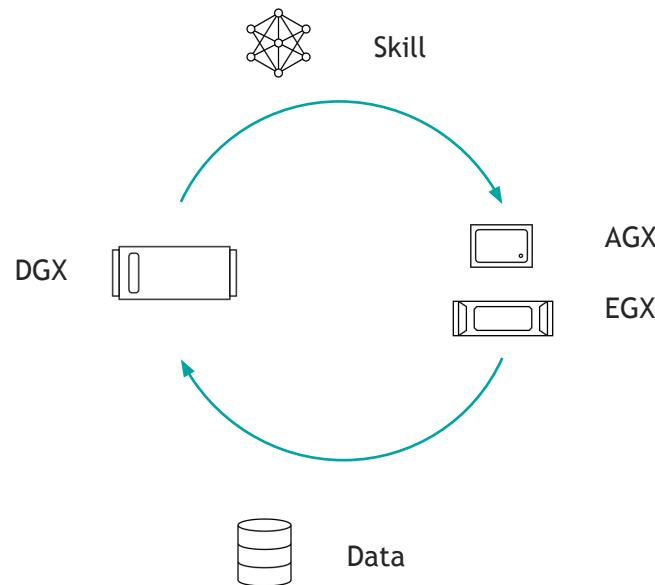


Medical Open Network for AI

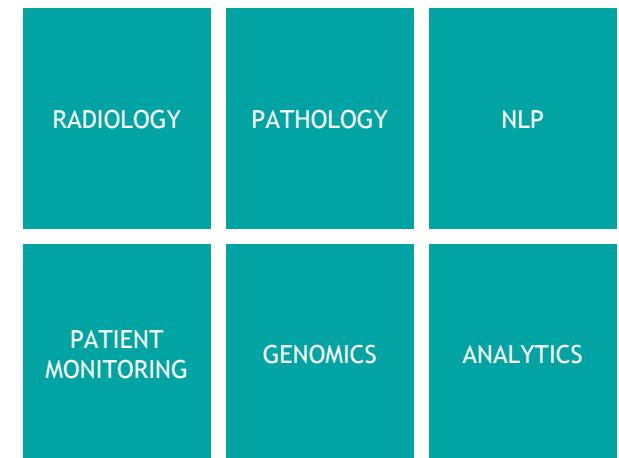
ERA OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE.



Digital Health
Data

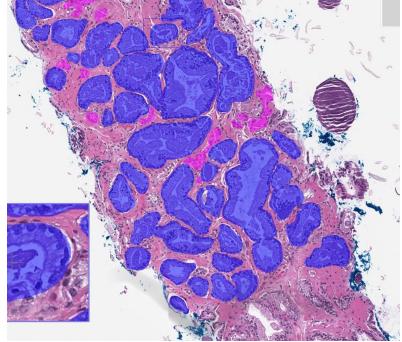


AI Skill Creation
And
Deployment



Automate | Predict | Assist

AI-Powered
Applications
Everywhere



Data in Healthcare

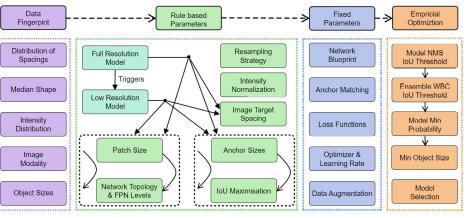
PROMISE OF AI IN IMAGING



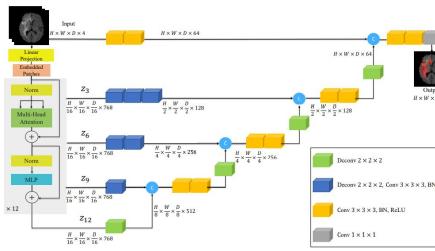
30% of the World's Data is from Healthcare

90% of Healthcare Data is from Medical Imaging

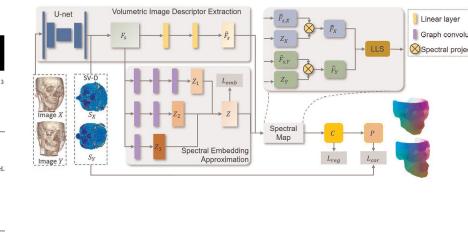
Medical Object Detection nnDetection Localization and Characterization DKFZ



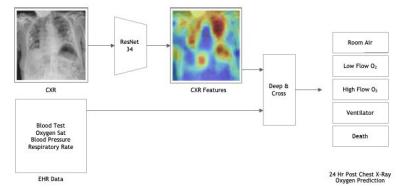
Vision Transformers UNETR Multi-Organ Segmentation NVIDIA, Vanderbilt



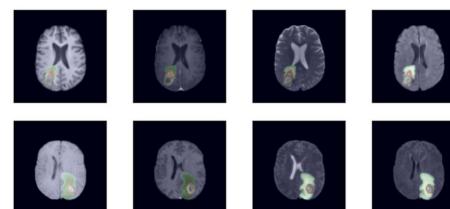
GNNs for Deformable Registration SMNet Peking University



Multi-modal Federated Learning EXAM COVID-19 Oxygen Prediction 20+ Institutions



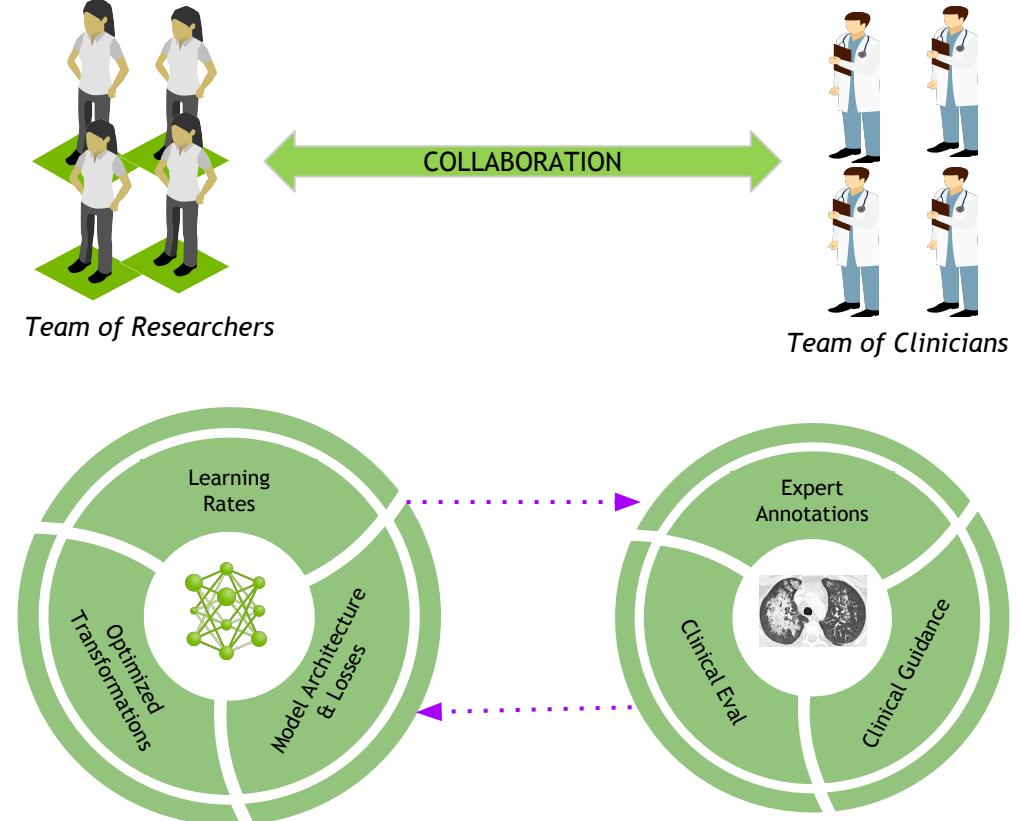
Brain Tumor Segmentation UNET | SegResnet | Swin UNETR NVIDIA

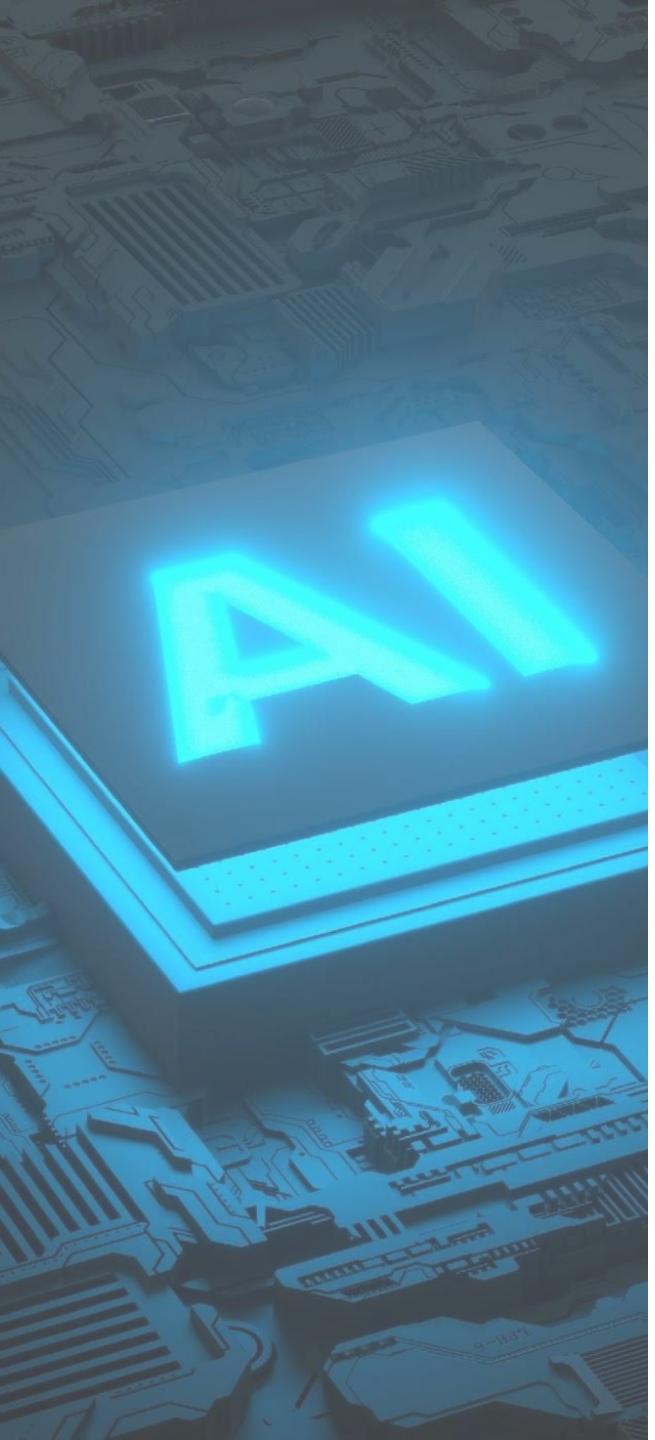


AI IS NOT A HAMMER.

We need to bring together the domain experts to help guide the creation of AI. This means that Researchers and Clinicians need to have a consistent, easy, and reproducible way to bring their expertise to the workflow.

Domain Expertise





What is MONAI?

Project MONAI is a collaborative open-source initiative built by academic and industry leaders for deep learning in healthcare imaging.



Goal of MONAI

Establish an **inclusive community** of AI researchers to develop and **exchange best practices** for AI in **healthcare imaging** across academia and enterprise **researchers** with the goal of accelerating the **pace of innovation**.

**Stephen Aylward**

Chair of the Advisory Board

**Sebastien Ourselin****Klaus Maier-Hein****Jayashree
Kalpathy-Cramer****Jorge Cardoso****Daniel Rubin****Kevin Zhou****Nassir Navab****Andrew Feng****Nasir Rajpoot****Justin Kirby****Keyvan Farahani**

MONAI Advisory Board.

MONAI brings together the effort to build a common and open foundation. It is mission-critical for MONAI's success to be guided by thought leaders in the domain.

MONAI Working Groups.



Imaging I/O

Focus: define how data is read into and written out from memory in MONAI.



Data

Focus: Defining support for bioinformatics, biomarkers, and metadata that are in scope for MONAI.



Transformations

Focus: Topics related to data preprocessing and augmentation modules in MONAI.



Federated Learning

Focus: Unify the disparate methods of Federated Learning in a common MONAI framework.



Evaluation, Reproducibility, and Benchmarking

Focus: Provide the infrastructure and tools for quality-controlled validation and benchmarking of medical image analytics methods.



Research

Focus: Establish MONAI as a catalyst for scientific progress and real-life impact.



Community Development

Focus: Establish MONAI as a common software foundation that the medical imaging research and development community can build upon.



Deploy

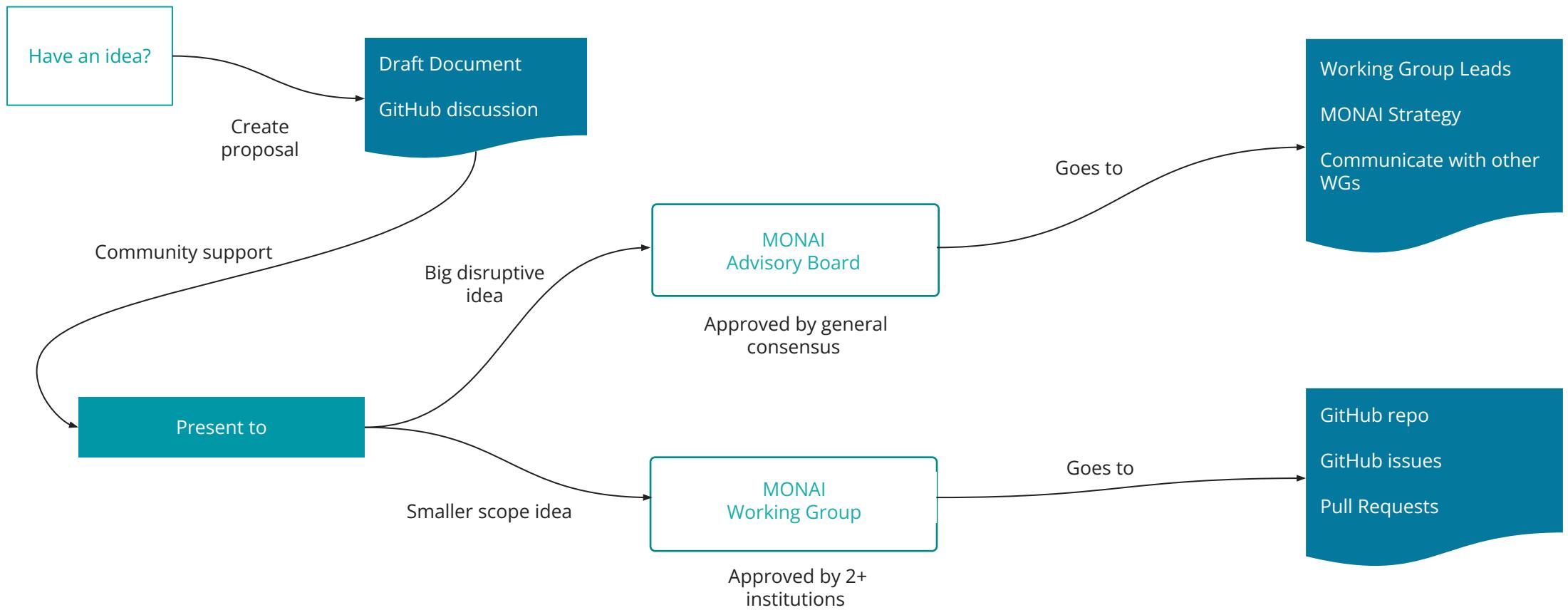
Focus: Close the existing gap from research and development to clinical production environments by bringing AI models into the medical workflow.



Digital Pathology

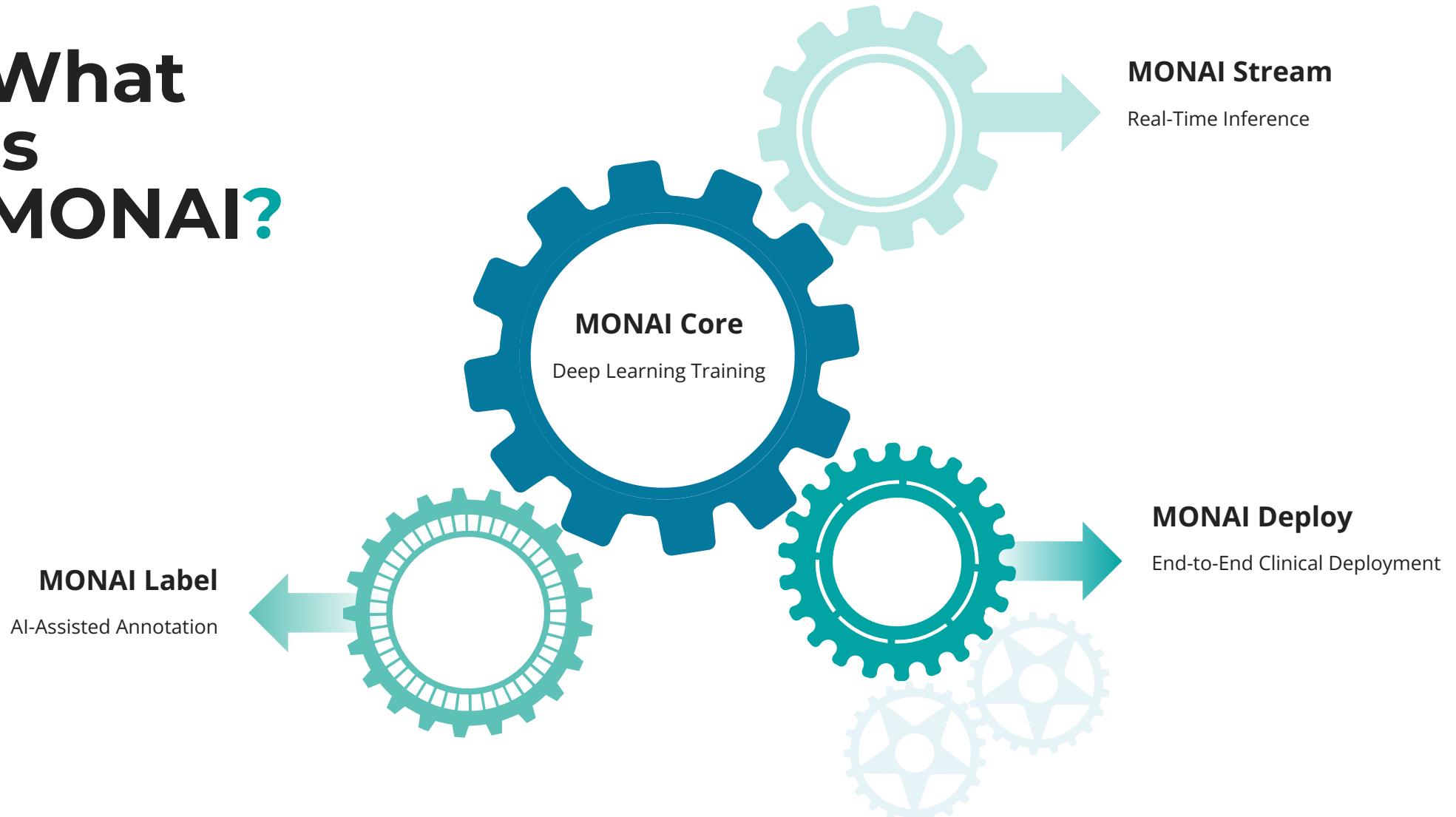
Focus: Creating a standard pipeline for preprocessing, analysis, and visualization of pathology images.

MONAI Decision Process.



Helping guide MONAI's vision and mission, an [Advisory Board](#) and [nine working groups](#), have been created and are led by [thought leaders](#) throughout the [medical research community](#). These focused working groups allow leaders in those fields to [concentrate their efforts](#) and bring the [most impactful contributions to the community](#). These working groups are open for anyone to attend and contribute.

What is MONAI?



MONAI Workflow.

00
Data



Data is the basis for all medical imaging workflows. Whether that's your data or public data, you need a way to get the data into the MONAI as quickly as possible.

MONAI provides easy access to datasets like the Medical Segmentation Decathlon and MedNIST datasets through wrapper APIs. MONAI also provides easy methods to load your data with performant libraries for most common medical image formats.

01

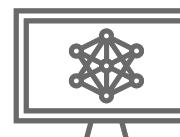


Labeling

MONAI Label is an intelligent open-source image labeling, and learning tool that helps researchers and clinicians collaborate, create annotated datasets and build AI models in a standardized MONAI paradigm.

[MONAI Label v0.4](#)

02

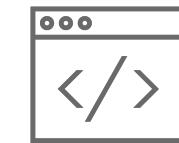


Training

MONAI is the flagship PyTorch-based library for deep learning in healthcare imaging. It provides domain-optimized foundational capabilities for developing healthcare imaging training workflows

[MONAI Core v0.9](#)

03



App Development

MONAI Deploy App SDK enables developers to take an AI model and turn them into AI applications.

[MONAI Deploy App SDK v0.4](#)

04



Deployment

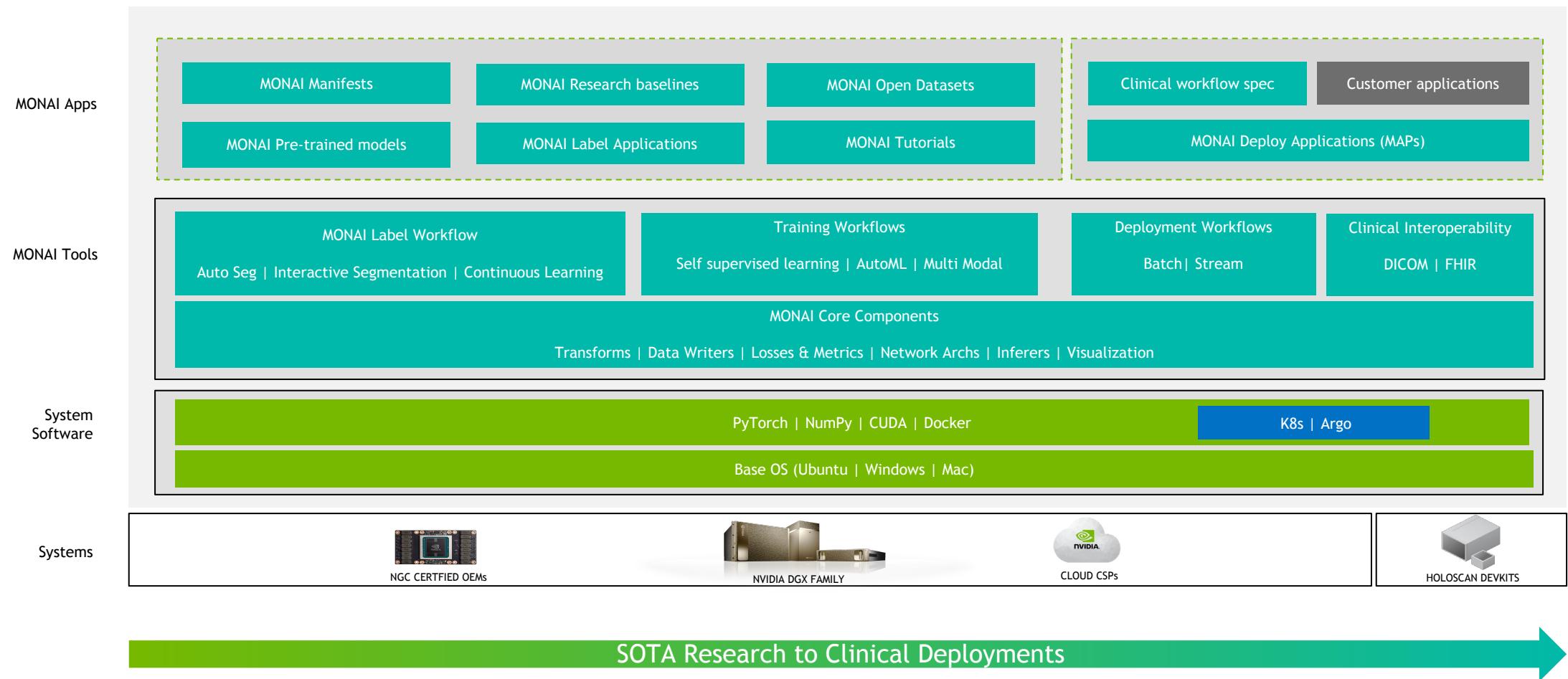
MONAI Deploy is also building open reference implementations of an inference orchestration engine, informatics gateway, and a workflow manager to help drive clinical integration.

[MONAI Inference Service v0.1](#)

[MONAI Workflow Manager v0.2](#)

[MONAI Informatics Gateway v0.2](#)

MONAI Stack.



MONAI Design Goals.



Customizable

Abstracted for customizable design for varying user expertise



Composable

Portable with ease of Integration into existing workflows



Domain Specialized

3D Transformations, Network Architectures, and workflows for Medical Imaging



GPU Optimized

Multi-GPU CUDA accelerated data and model parallel processing



Reproducible

Built for reproducibility and comparison with state of the art



High Quality

Tutorials for getting started, robust validation, and documentation

MONAI Downloads and Contributors.

500k+

MONAI Core

11k+

MONAI Label

7k+

MONAI Deploy

150+

Individual Contributors

30+

Institutions



Frederick National Laboratory
for Cancer Research

A Answer

quantiphi

ACR AI-LAB™

ventuit

MAYO
CLINIC

MONAI⁺



Guy's and St Thomas'
NHS Foundation Trust

AI CENTRE
for Value Based
Healthcare

CH Children's Hospital
of Philadelphia

CHINESE ACADEMY OF SCIENCES

KYUNG HEE UNIVERSITY

Partners and Growth.

ventuit

Methinks

contextflow

VANDERBILT
UNIVERSITY

Stanford
University

What is MONAI Label?

An intelligent image labeling and learning tool that uses AI assistance to reduce the time and effort of annotating new datasets.



NEXT

What is MONAI Label.

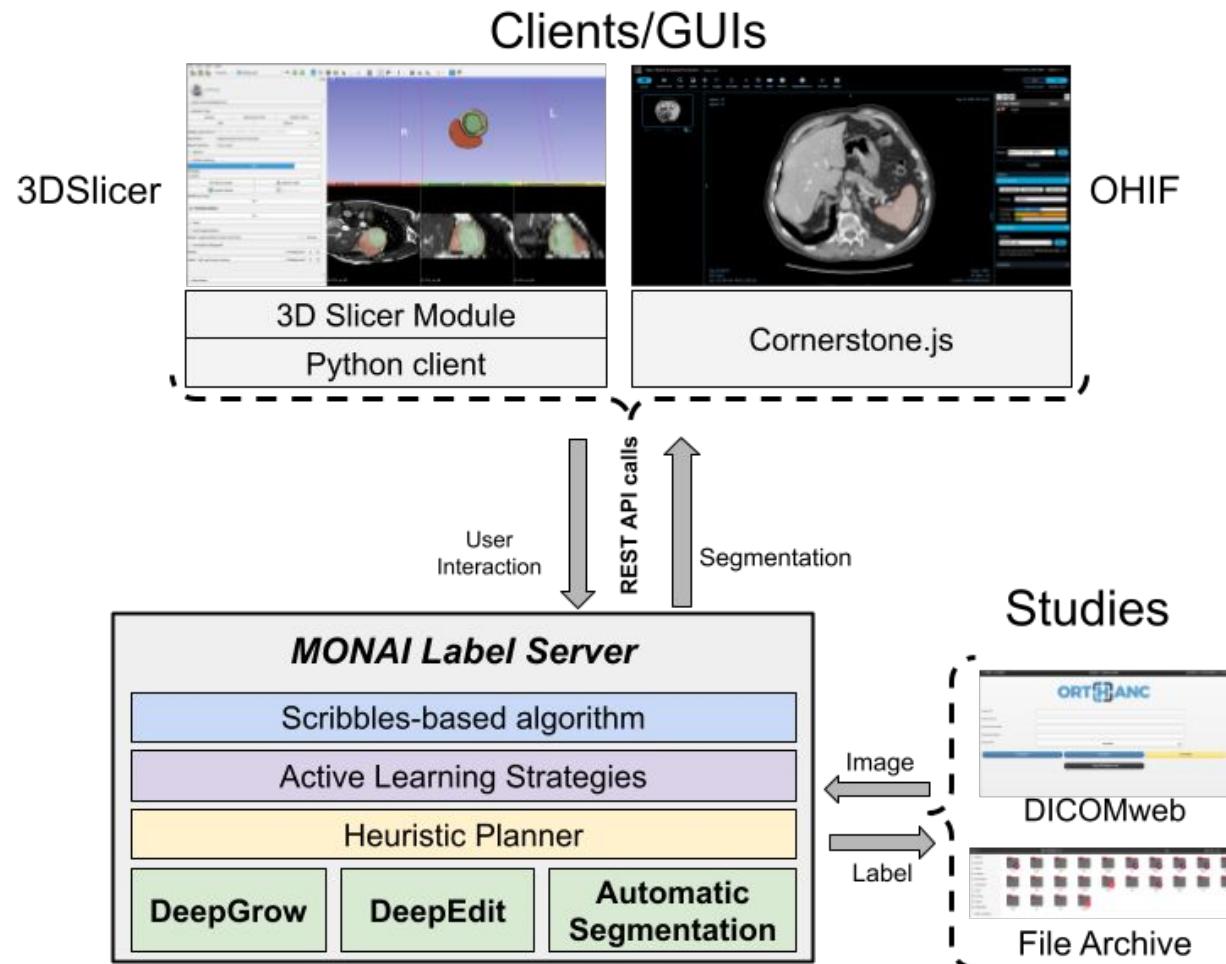
- An intelligent open-source image labeling and learning tool that enables users to [create annotated datasets](#) and [build AI annotation models](#) for clinical evaluation.
- Framework for developing and deploying MONAI Label Apps to [train and do inference](#) using Deep Learning models
- MONAI Label includes [Active learning strategies](#) to improve model performance.
- Getting started is easy: "[pip install monailabel](#)"
- Supported viewers:
 - [Radiology](#):
 - 3D Slicer
 - Open Health Imaging Foundation (OHIF)
 - [Pathology](#):
 - Digital Slide Archive (DSA)
 - QuPath
 - CVAT



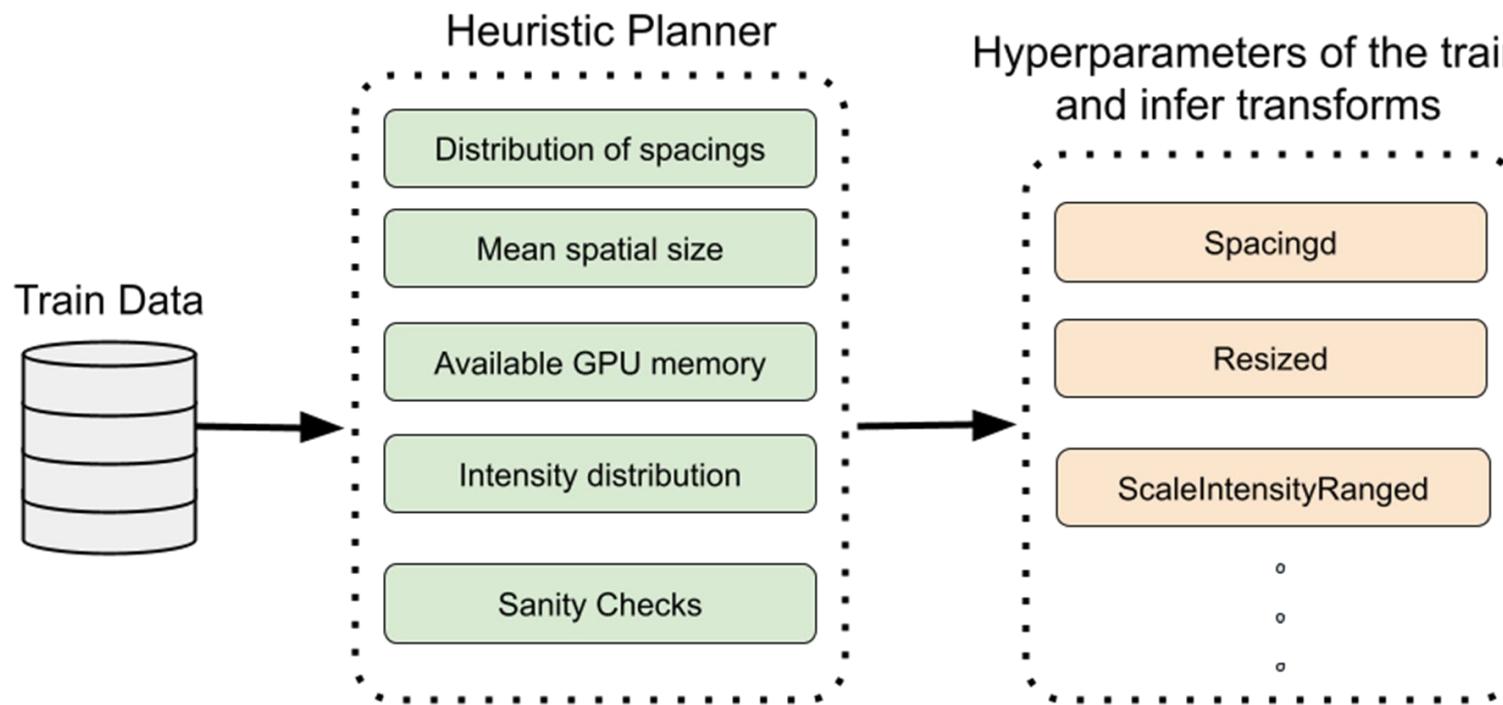
MONAI Label Infrastructure.

Three Main Parts

- MONAI Label Server
- Client / GUIs
- Datastore



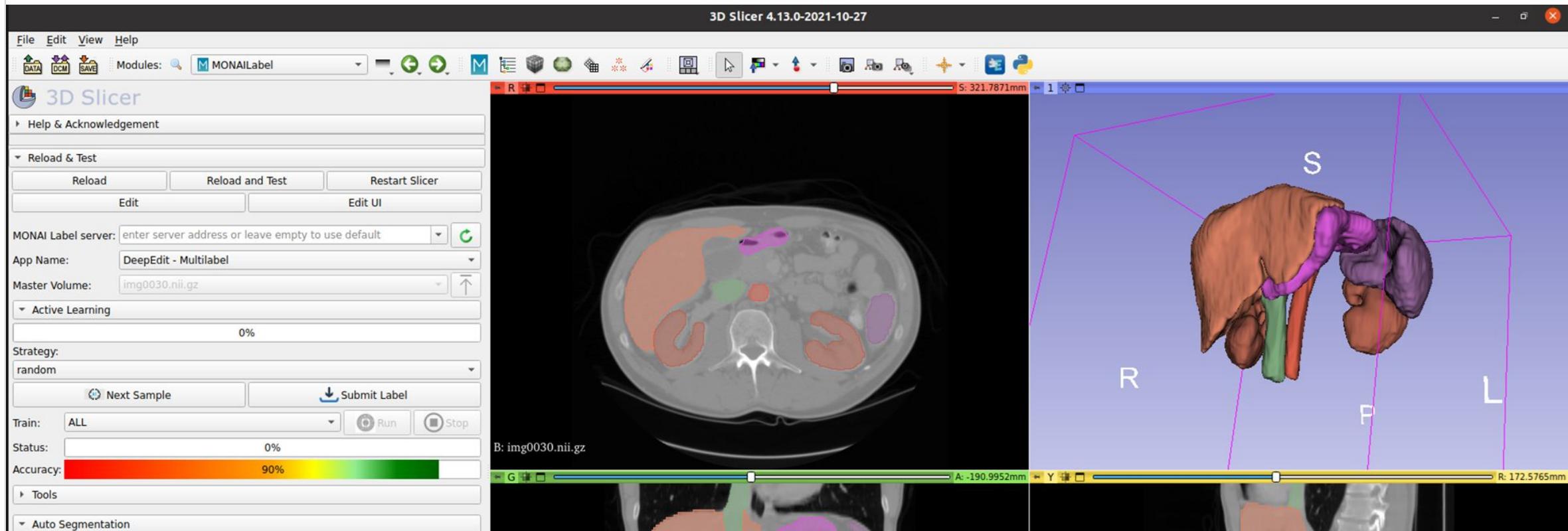
MONAI Label Server.



Heuristic Planner

- Considers available GPU memory to define image spatial size.
- Defines training transforms based on GPU memory, average spatial size and spacing of datastore.
- Performs sanity checks before starting training.
- Shows warning in case images are multimodality or multilabel.

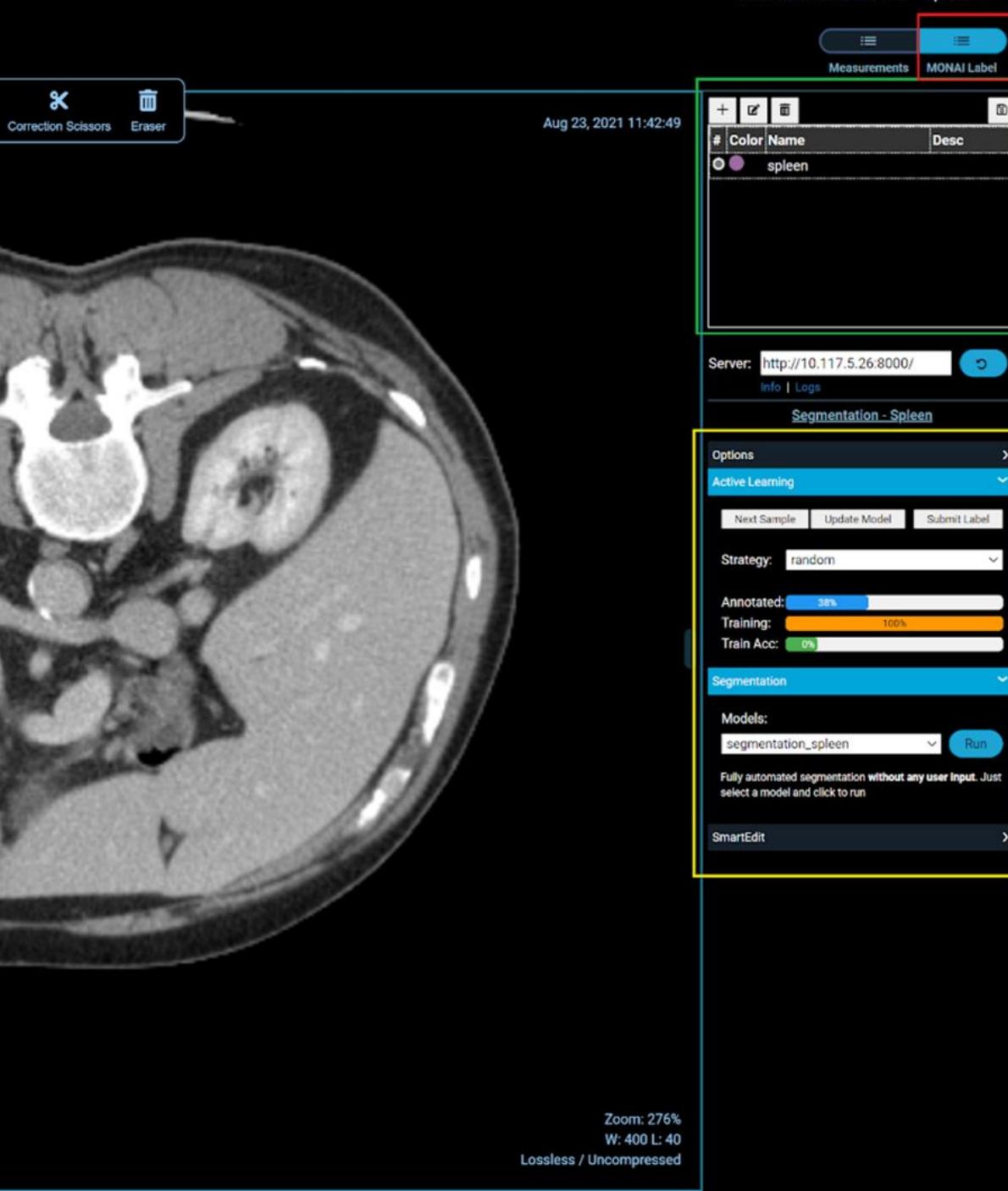
MONAI Label Client.



3D Slicer

A free, open source and multi-platform software package widely used for medical, biomedical, and related imaging research.

- Supportive community
- User-friendly
- Easy to customise
- Many manual annotation tools
- Image Registration



MONAI Label Client.

OHIF

The Open Health Imaging Foundation (OHIF) Viewer is an open source, web-based, medical imaging platform. It aims to provide a core framework for building complex imaging applications.

- Works out-of-the-box with Image Archives that support DICOMWeb.
- <http://127.0.0.1:8000/ohif>
- Web-based viewer.
- Beautiful user interface (UI) designed with extensibility in mind.

MONAI Label Client.

REST API

- Once you start the MONAI Label Server, by default it will be up and serving at <http://127.0.0.1:8000/>.
- Open the serving URL in browser. It will provide you the list of Rest APIs available.

AppService

GET /info/ Get App Info

GET /download/{image} Download Image

Infer

POST /infer/{model} Run Inference for supported model

GET /batch/infer Get Status of Batch Inference Task

DELETE /batch/infer Stop Batch Inference Task

POST /batch/infer/{model} Run Batch Inference Task

Train

GET /train/ Get Status of Training Task

POST /train/ Run Training Task

DELETE /train/ Stop Training Task

Why MONAI Label?

For Clinician

Radiology: X-Ray, CT, and MRI
Pathology: Whole Slide Images



Viewer Integration

Existing viewer integration with common applications in both radiology and pathology workflow including 3D Slicer and DSA.



Multiple Annotation Methods

Start by using traditional annotation methods like Scribbles or use an interactive algorithm like DeepEdit.

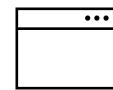


Sample Apps and Pretrained Models

MONAI Label includes sample applications for both radiology and pathology. You can also use the our pretrained models or start from scratch.

For Researcher and Data Scientists

Quickly get started with a common framework



Rapid App Prototyping

Use a sample app to jumpstart the development of your own custom labeling app.



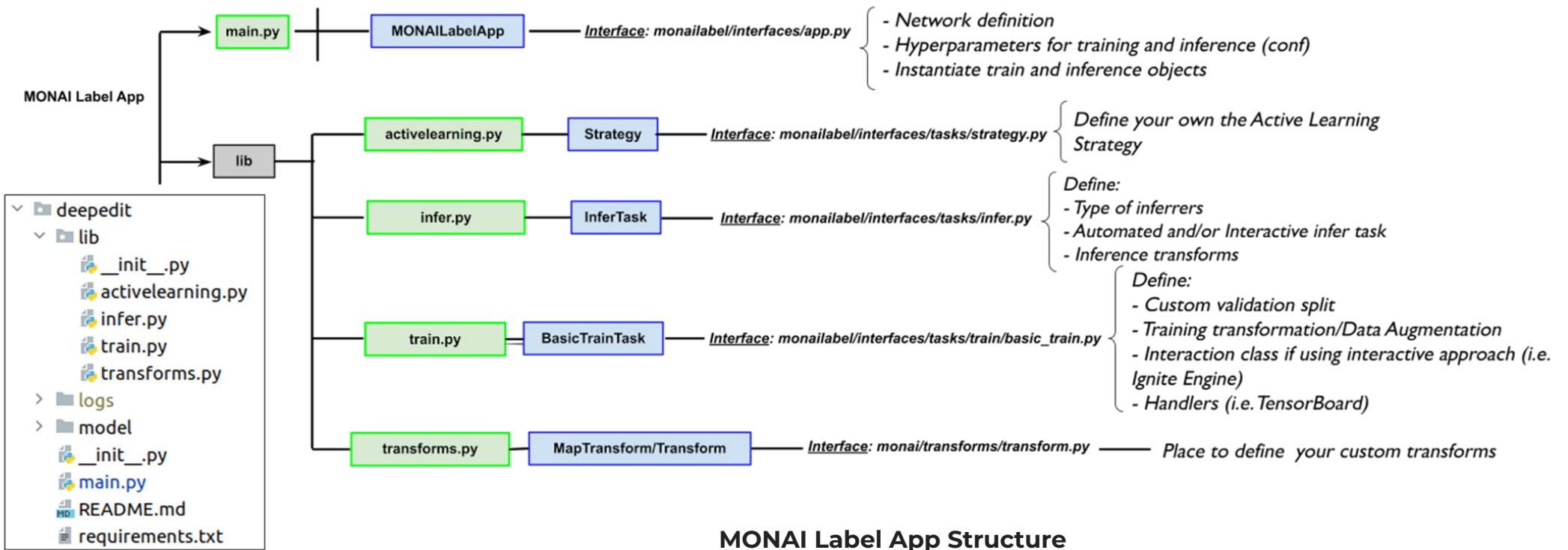
Active Learning Techniques

Use existing Active Learning strategies or implement your own.



Easy Integration

MONAI Label exposes a REST API that you can use to integrate in to your own viewer or workflow.



MONAI Label App Structure

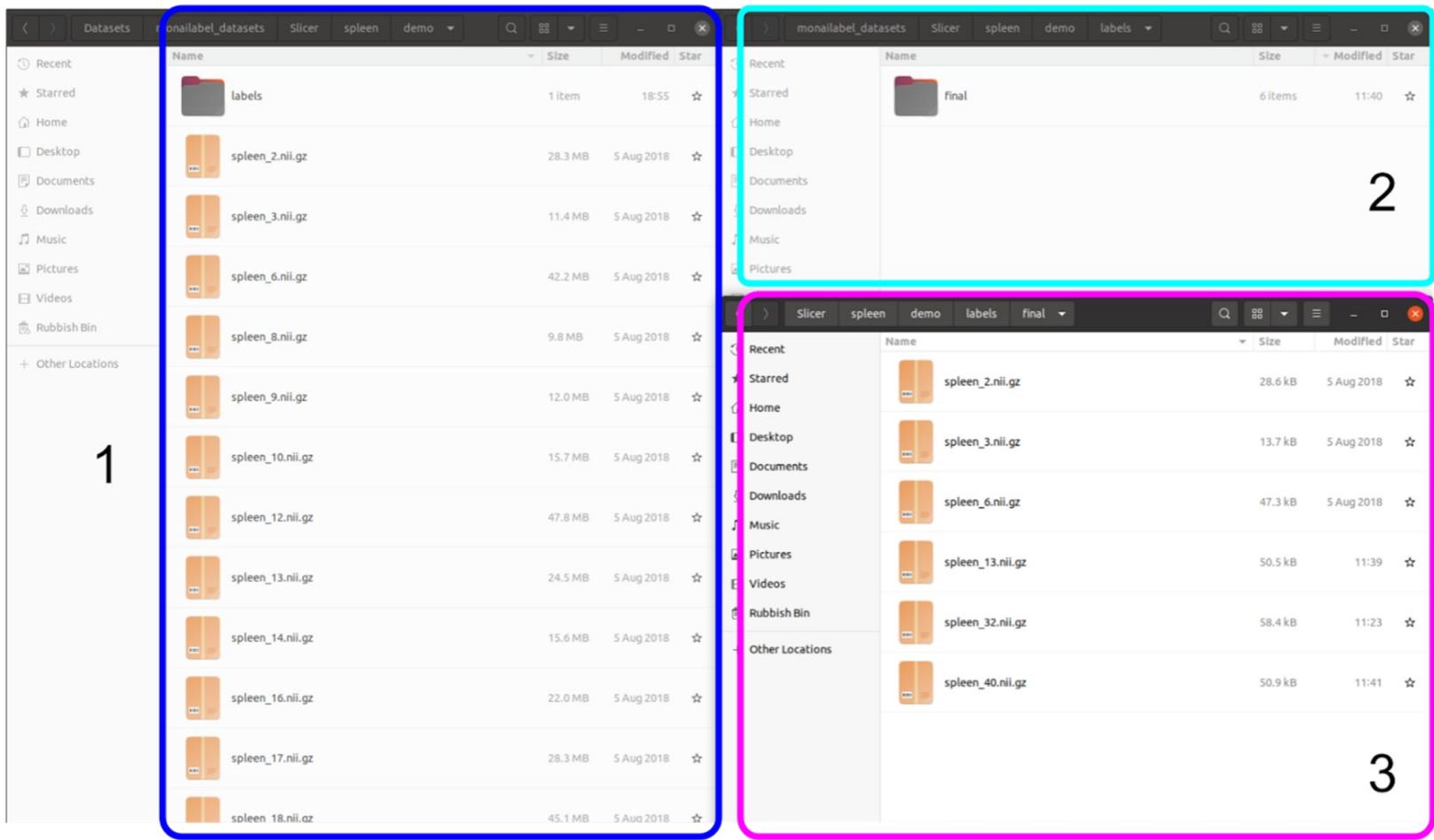
- Prepare the dataset - Labels with the same name as images
- Select the spatial/intensity transforms to preprocess images for training and inference
- Define the active learning technique use in the labeling app
- Define neural network architecture
- Preprocess scribbles, points, ROI, closed curve, or any input sent to the MONAI Label server through the REST API
- Researchers can also use sample apps (i.e. DeepGrow, DeepEdit and Segmentation) to jumpstart the development of their own custom labeling apps

Creating your own MONAI Label App.

Datastore in file archive



```
. 
  labels
    final
      spleen_13.nii.gz
      spleen_2.nii.gz
      spleen_32.nii.gz
      spleen_3.nii.gz
      spleen_40.nii.gz
      spleen_6.nii.gz
    spleen_10.nii.gz
    spleen_12.nii.gz
    spleen_13.nii.gz
    spleen_14.nii.gz
    spleen_16.nii.gz
    spleen_17.nii.gz
    spleen_18.nii.gz
    spleen_19.nii.gz
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    spleen_44.nii.gz
    spleen_45.nii.gz
    spleen_46.nii.gz
    spleen_47.nii.gz
    spleen_6.nii.gz
    spleen_8.nii.gz
    spleen_9.nii.gz
```

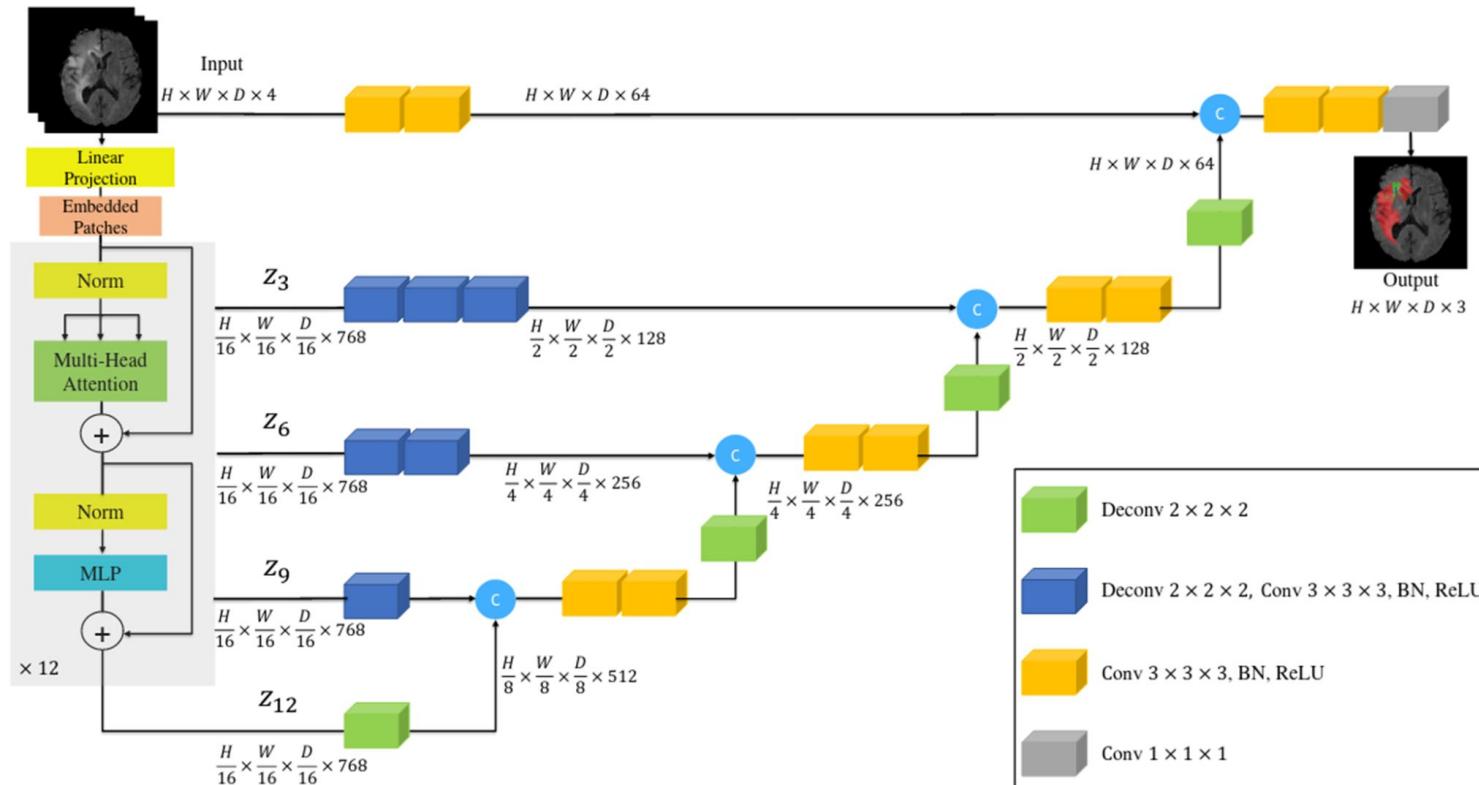


Creating your own MONAI Label App.

Backbone Network Architectures

A free, open source and multi-platform software package widely used for medical, biomedical, and related imaging research.

- UNET
- UNETR
- DynUNet
- Any PyTorch CNN





MultiLabel DeepEdit.

Defining Label Names and Numbers

Label name and number associated to each segment:

- (1) spleen
- (2) right kidney
- (3) left kidney
- (4) gallbladder
- (5) esophagus
- (6) liver
- (7) stomach
- (8) aorta
- (9) inferior vena cava
- (10) portal vein and splenic vein
- (11) pancreas
- (12) right adrenal gland
- (13) left adrenal gland

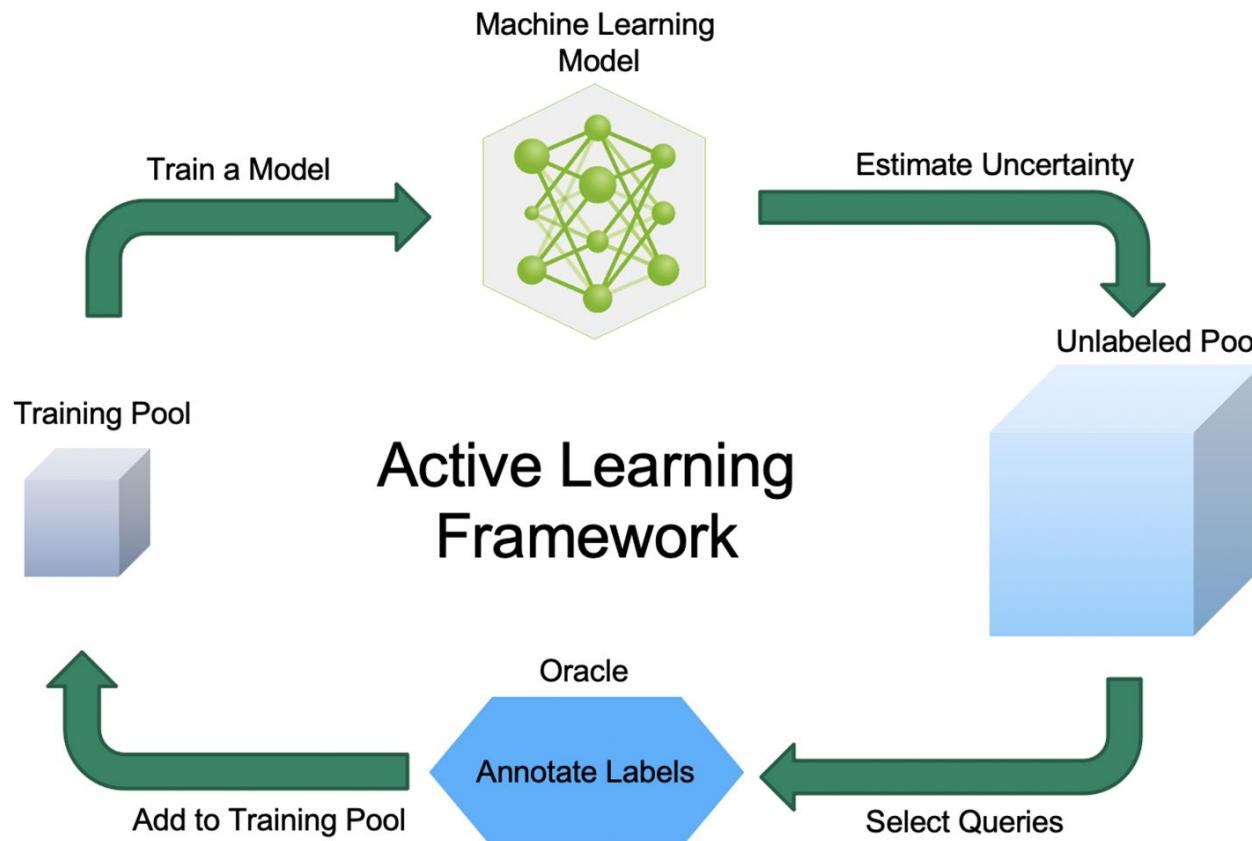


```
self.label_names = {
    "spleen": 1,
    "right kidney": 2,
    "left kidney": 3,
    "liver": 6,
    "stomach": 7,
    "aorta": 8,
    "inferior vena cava": 9,
    "background": 0,
}
```

MONAI Label and Active Learning.

Active Learning Strategies

- Active learning is a semi-supervised machine learning approach where the algorithm can choose which data it wants to learn from
- Available in MONAI Label: Aleatoric (Test Time Augmentation) and Epistemic (using Dropout) Uncertainty
- After having a pretrained model, uncertainty of each image can be computed. Unlabeled samples that need more attention from the clinician will be selected
- Selection of harder samples or samples that need more attention



MONAI Label Walkthrough

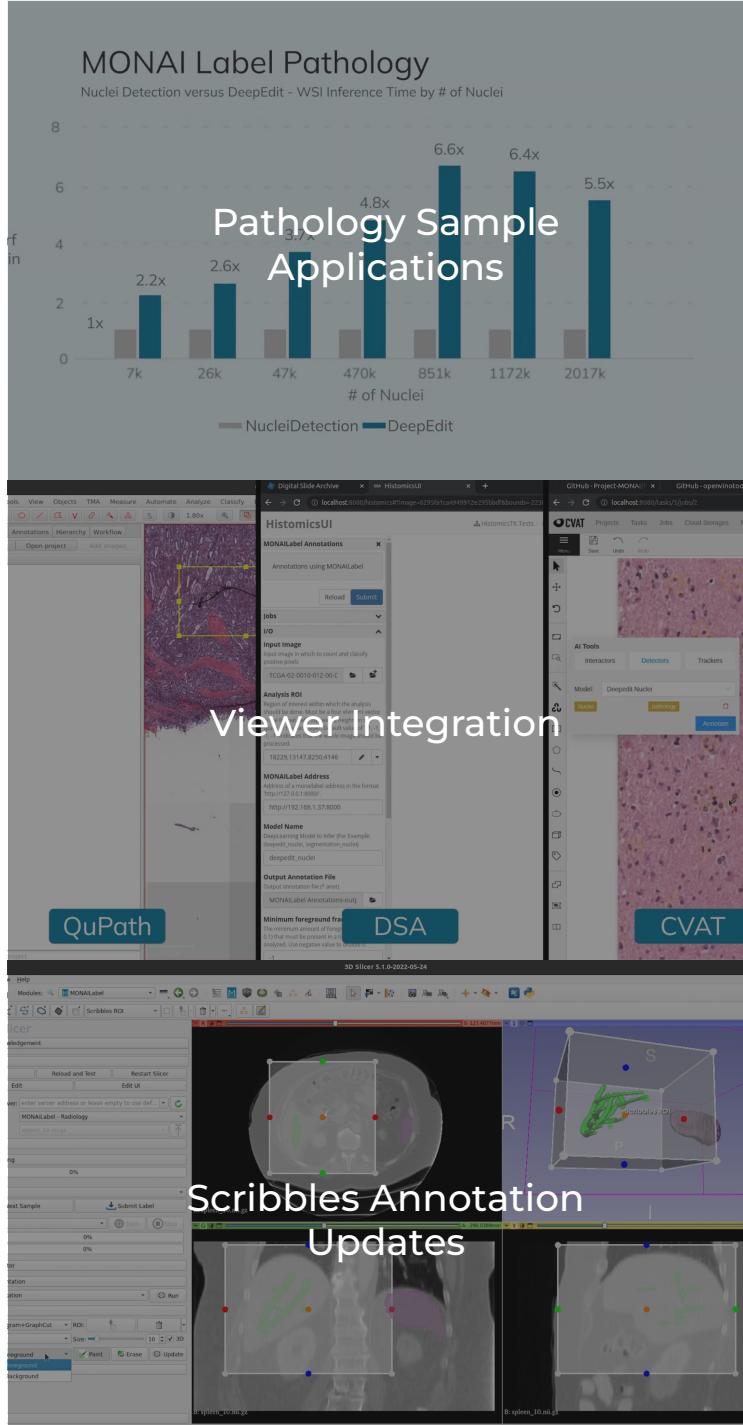
We'll walk through:

- Installation and Starting MONAI Label Server
- Annotating images
- Training your first model



MONAI Label v0.4.

Latest Release



Pathology Sample Applications

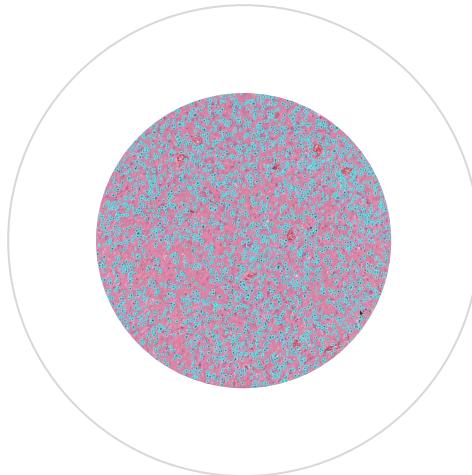
- Segmentation Nuclei
- DeepEdit Nuclei
- NuClick
- Up to 6x speedup in inference

Viewer Integration

- Digital Slide Archive
- QuPath
- CVAT

Scribbles Annotation Updates

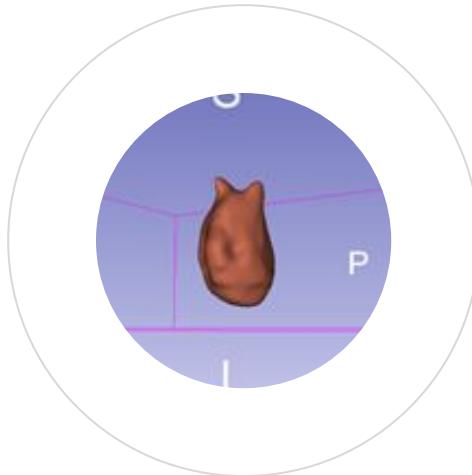
- Histogram-based GraphCut
- Gaussian Mixture Model



Lee A.D. Cooper, PhD

Associate Professor of Pathology, Director, Computational Pathology, Director,
Center for Computational Imaging and Signal Analytics, @ Northwestern
University Feinberg School of Medicine

“MONAI Label will enable pathologists and scientists to build accurate models without knowing anything about AI. This is an important step in making AI a universal tool for pathology research.”



Matthew A. Jolley, MD

Attending anesthesiologist and the Associate Chief for Research with the Division of Cardiothoracic Anesthesiology at Children's Hospital of Philadelphia.

“Open-source frameworks like Project MONAI provide a **standardized, transparent, and reproducible template for the creation of, and deployment of medical imaged-focused machine learning models, potentiating efforts such as ours. They **allow us to focus on investigating novel algorithms and their application**, rather than developing and maintaining software infrastructure. This in turn has **accelerated research progress** which we are actively translating into tools of practical relevance to the pediatric community we serve.”**

MONAI Label Roadmap.



Fall 2022'

MONAI Label v0.5



Winter 2022'

MONAI Label v0.6



Spring 2023'

MONAI Label v0.7



MONAI Label for Production

- System Performance
- Interactive Inference Performance
- High Availability
- Secure Provision of MONAI Label Server

MONAI Label for Radiologists

- Multi-user deployment for n-nodes
- Integrations into Radiologists workflows
- Integration with IDC/GCP

TBD

- TBD

What is MONAI Core?

A framework that provides domain-specific capabilities for training AI models for healthcare imaging.



What is MONAI Core.

MONAI Core Component Basics

- Transformations
- Dataset APIs
- Sliding Window Methods
- Other (differentiable) modules

MONAI RESEARCH: Implementations of state-of-the-art research outcomes

Unconstrained and optimized models
 Model parallelism, neural architecture search

End-to-end research lifecycle
 DICOM/HL7 FHIR/model exchange and deploy

State-of-the-art models and workflows
 Dynamic UNet, COVID-19 pneumonia lesion seg.

MONAI TUTORIALS: to demonstrate the capabilities and integration with OSS packages

Segmentation

Classification

Registration

GAN & AutoEncoder

Interactive Seg.

Module demo

MONAI WORKFLOWS: for ease of robust training & evaluation of research experiments

Workflow engines
 Supervised trainer, evaluator

Workflow event handlers
 Model checkpoint saving/loading, validation pipelines, LR scheduling, metrics report generation, network output saving, transform inverter

Iteration, epoch-based metrics stats. trackers
 as event handlers of the engines

FOUNDATIONAL COMPONENTS: independent domain-specialised APIs compatible with PyTorch programs

Data
 Cache-based datasets, patch-based datasets, enhanced data loader

Readers & writers
 Support of various formats: NIFTI, PNG, NPY, CSV,....

Loss functions
 Segmentation, regression, classification, registration

Networks, differentiable modules
 Network with 2D/3D, ND filtering, CRF, squeeze & excitation, warping

Transforms
 Spatial, intensity, IO, utilities, compose with 3rd party libs

CSRC
 C++/CUDA extensions, PyTorch JIT ext.

Inference modules
 Sliding windows, saliency inferer, slice inferer

Visualisations
 Tensorboard integration, Jupyter Notebook integration

Metrics
 MeanDice, ROCAUC, FROC, Hausdorff, confusion matrix

Optimizers
 LR finder, layerwise LR, Novograd

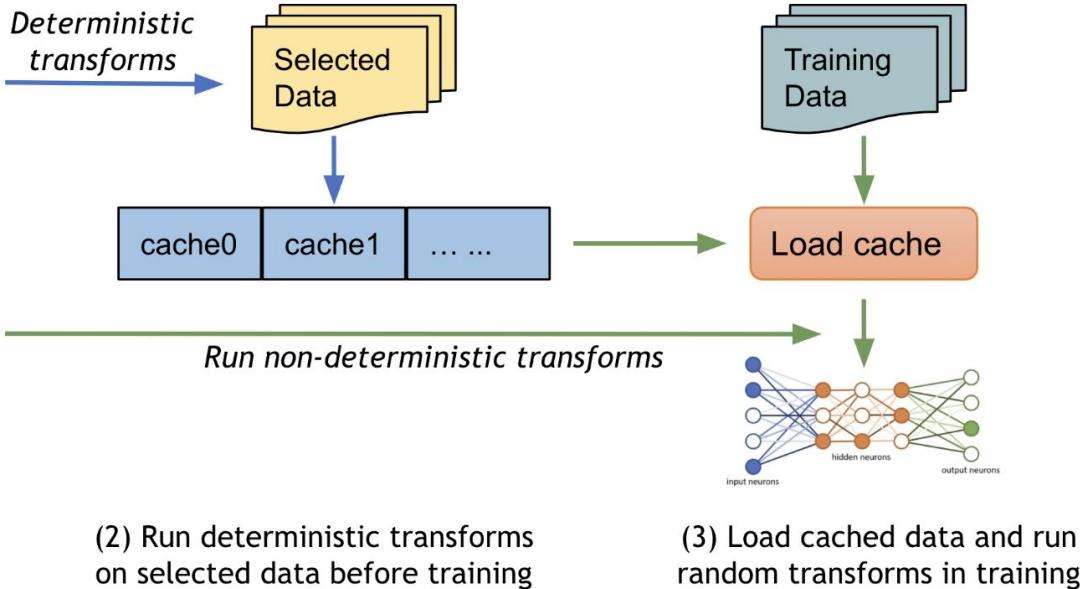
`Train_transforms = Compose([`

`LoadNiftid(),
 AddChanneld(),
 Spacingd(),
 Orientationd(),
 ScaleIntensityRanged(),`

`RandCropByPosNegLabeld(),
 ToTensord()`

`])`

(1) Define a chain of transforms



(2) Run deterministic transforms on selected data before training

(3) Load cached data and run random transforms in training

MONAI Core Transformations.

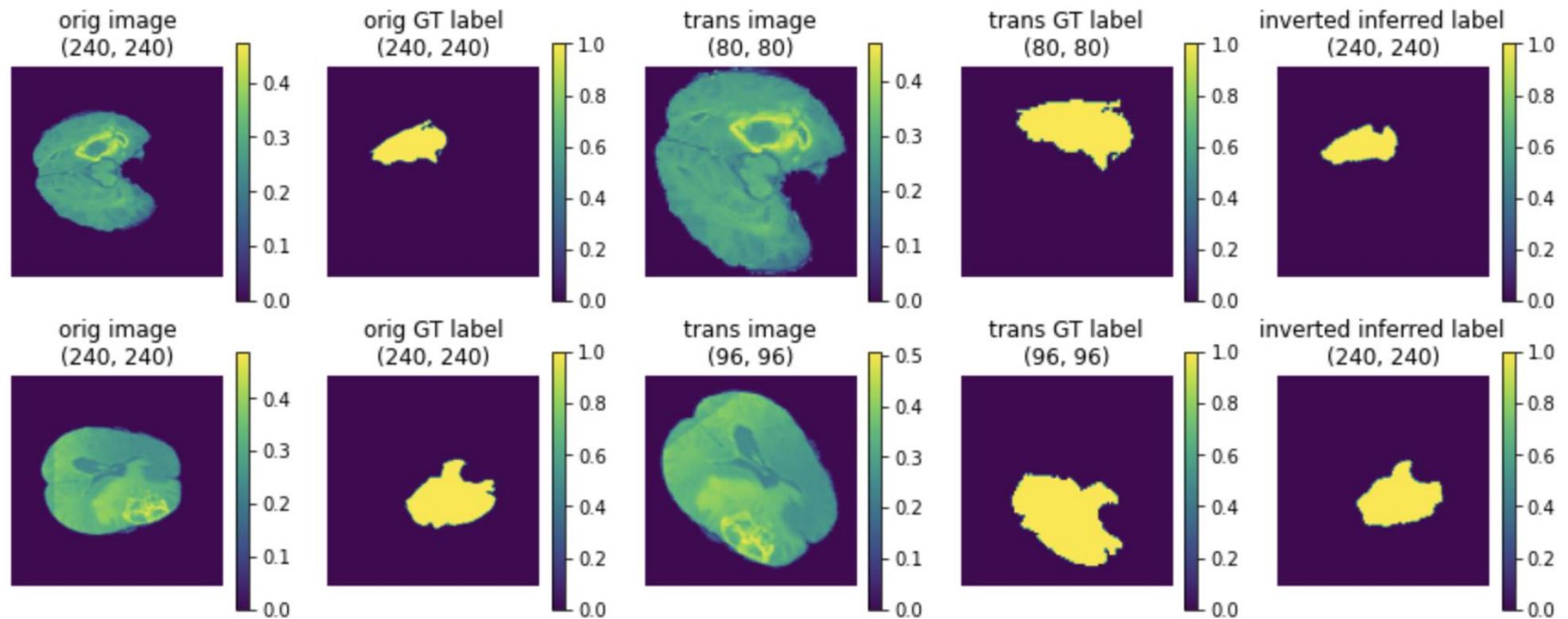
Types of Transforms

- Medical domain specific
 - LoadImage | Spacing | Orientation
 - Intensity-based data augmentation
- Image/patch transforms and GPU optimization
 - Spatial transforms
 - Patch-based sampling
 - Deterministic training
- Composable pipelines
 - CopyItem, ConcatItem, DeleteItem
 - De-collate, post-processing

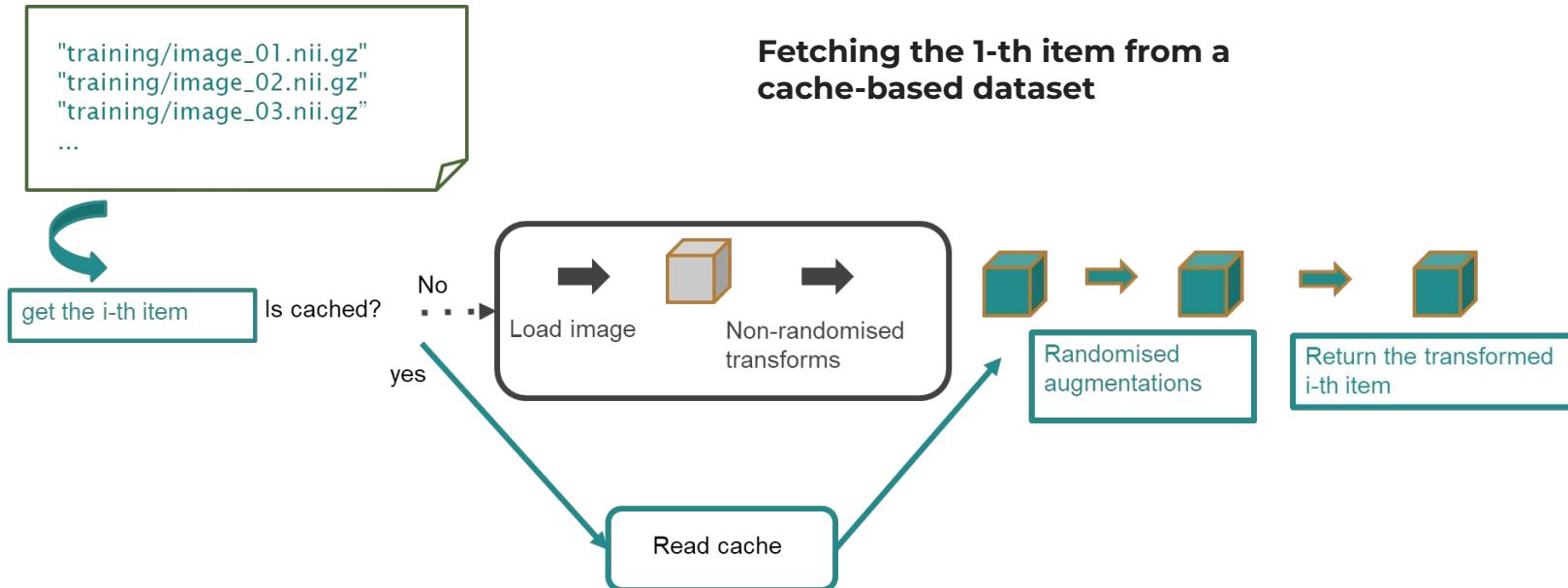
Invertible Transforms.

Why Invertible Transforms?

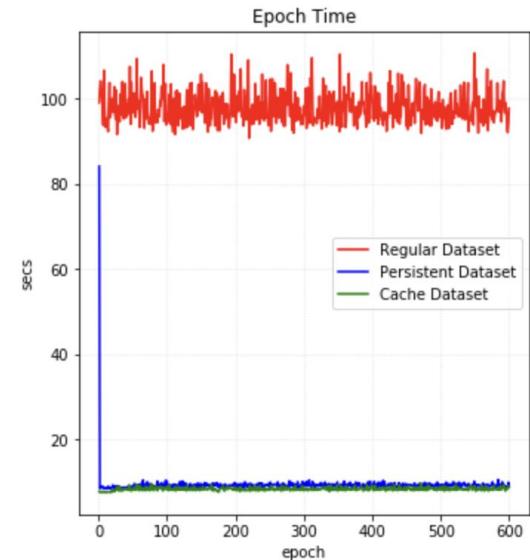
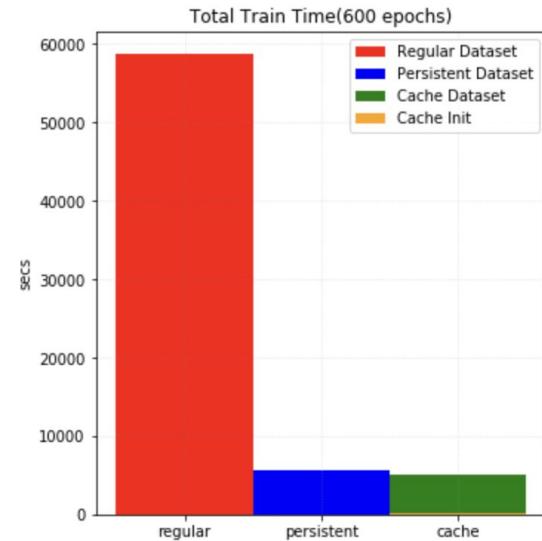
- Randomly augment the test case
- Track the transform parameters
- Run model inferences (segmentation)
- Resume to the original image space
- Compute ensemble/uncertainties

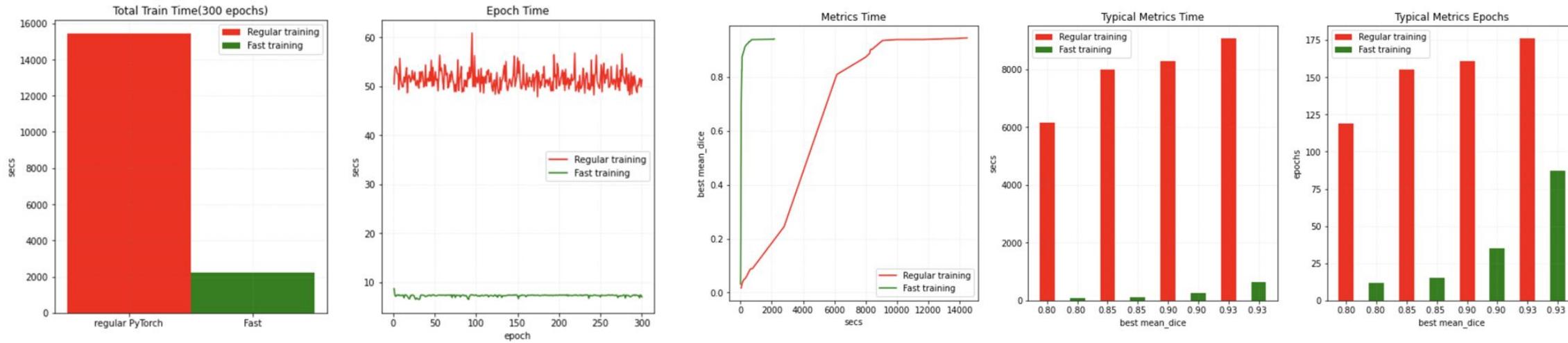


Dataset and Caching APIs.



Caching Performance



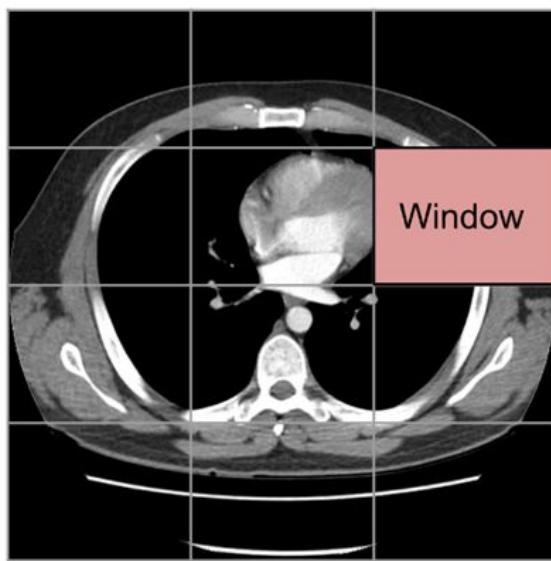


Efficient Training in MONAI.

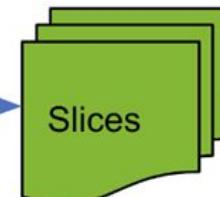
Fast Training

- **Parameters:**
 - Auto Mixed Precision (AMP)
 - CacheDataset
 - Novograd Optimizers
- Takes **fewer epochs** to achieve a typical model quality
- About **12x speedup** compared with native PyTorch implementation
- **Fast Training Tutorial** Available on GitHub
 - https://github.com/Project-MONAI/tutorials/blob/master/acceleration/fast_training_tutorial.ipynb

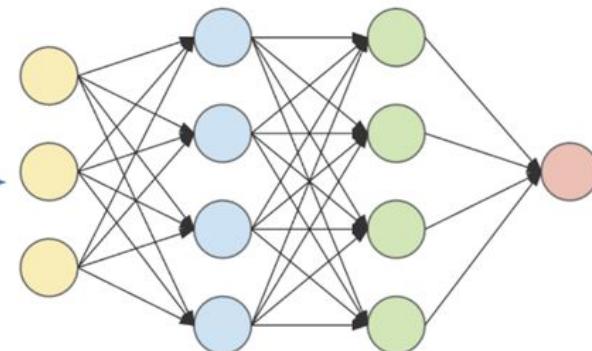
Sliding Window Inference and Evaluation.



(1) Generate slices from window



(2) Construct batches



(3) Execute on network

Output0	Output1	Output2
Output3	Output4	Output5
Output6	Output7	Output8
Output8	Output9

(4) Connect all outputs

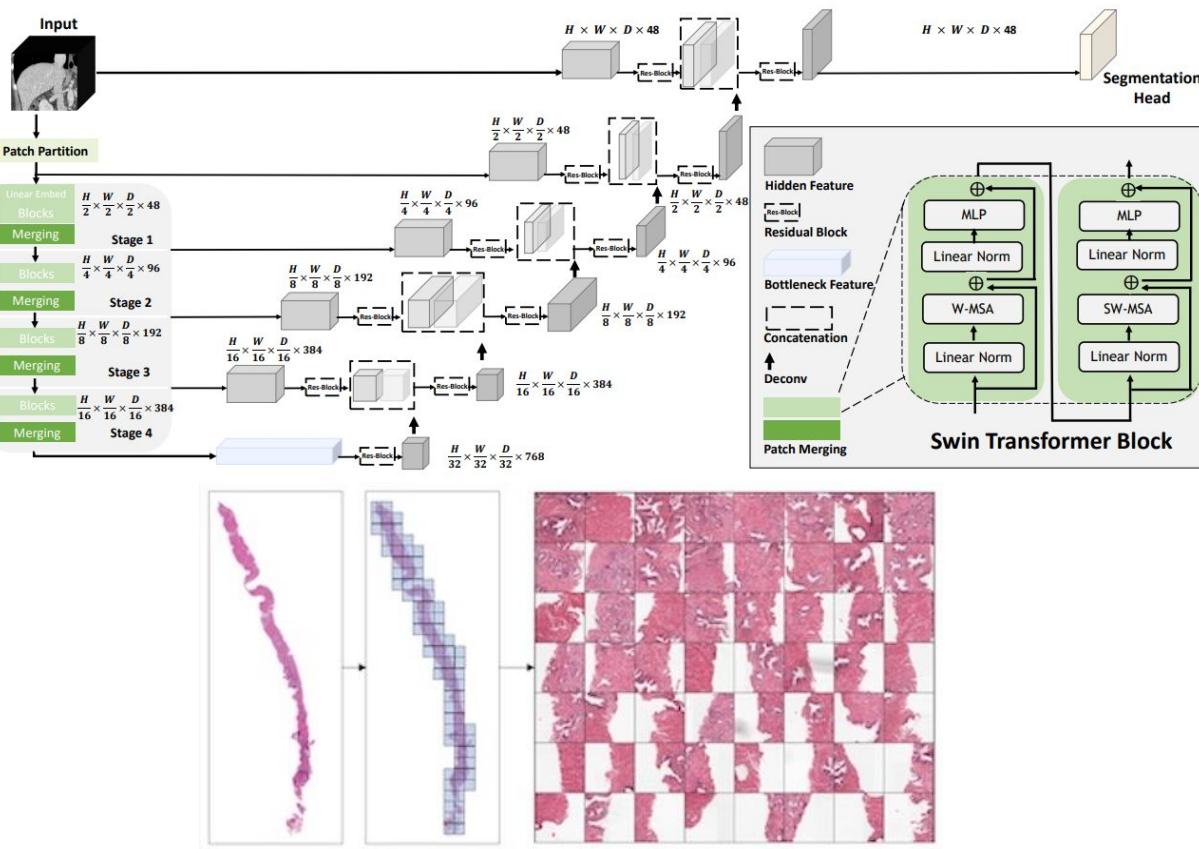
Metrics

- Mean Dice
- Area under the ROC curve
- Confusion matrix
- Hausdorff distance
- Average surface distance
- Peak signal to noise ratio
- ...

Metrics APIs

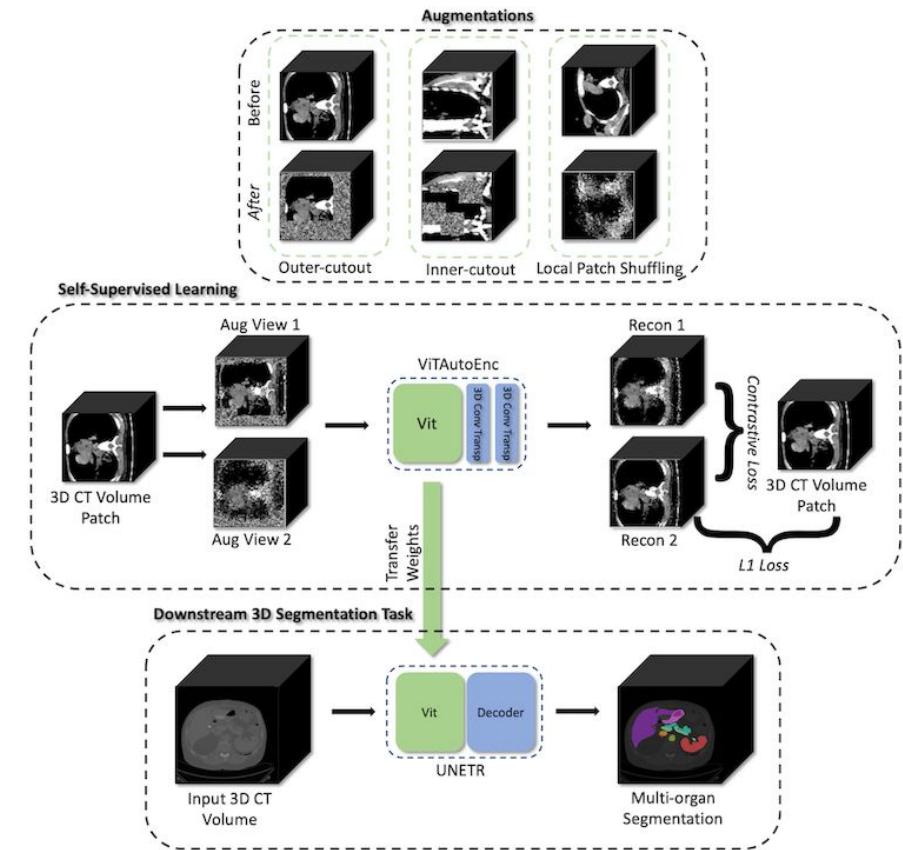
- Iterative Metric
- Cumulative
- Cumulative Average
- ...

Network Architecture and Building Blocks.



Using MONAI Networks

- Predefined [Layers](#) and [Blocks](#)
- Implementation of generic 2D and 3D networks
- Network adapter to [finetune](#) final layers
- SoTA Architectures like: [DiNTS](#), [SSL](#), and [Swin UNETR](#)



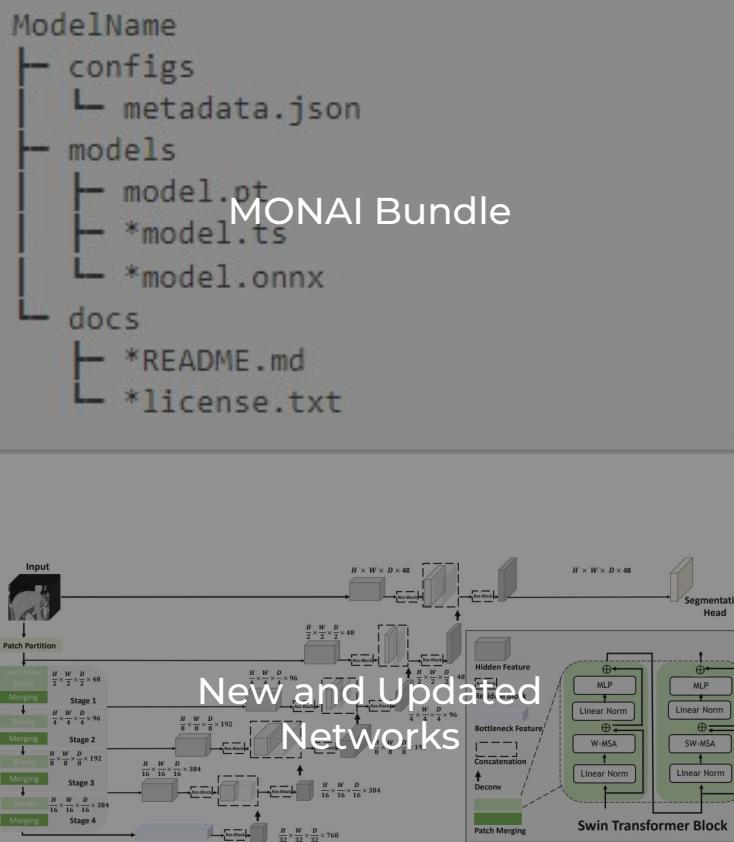
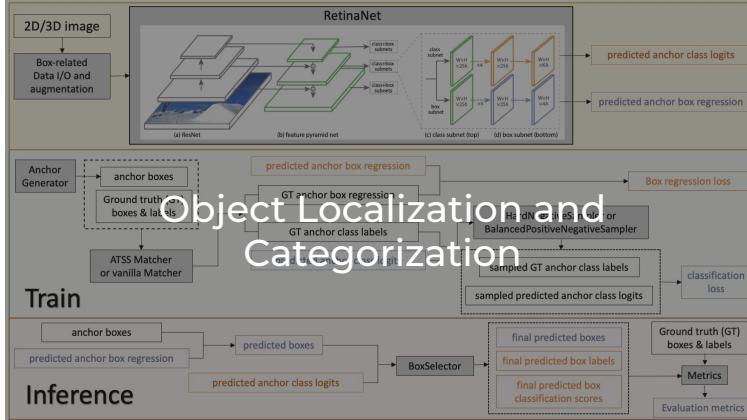
MONAI Core Walkthrough

We'll walk through:

- MONAI Transforms, Datasets, Caching
- Training your first network with MONAI Core

MONAI Core v0.9.

Latest Release



MONAI Bundle

- All information necessary for model development
- Easy-to-use API
- Separates deep learning hyperparameters from code

New and Updated Networks

- Swin Transformers
- Swin UNETR
- DeepEdit
- NuClick (Pathology)

Object Localization and Categorization

- 2D and 3D Bounding Boxes
- Network blocks and Arch of RetinaNet
- Common Utility modules for Boxes

MONAI Core Roadmap.

Fall 2022'

MONAI Core v1.0



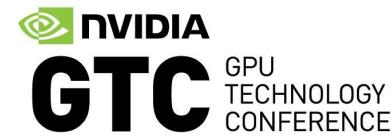
Winter 2022'

MONAI Core v1.1



Spring 2023'

MONAI Core v1.2



MONAI Solutions

- Reproducible SOTA MIC Pipelines
- AutoML and Self-Supervised as a software solution
- Model Zoo for MONAI Ecosystem

MONAI for Enterprise Scale

- Integrations for enterprise infrastructure solutions
 - GCP, AWS, NVIDIA
- Turnkey AutoML with Experiment Management
- New research modules: Reconstruction

TBD

- TBD

What is MONAI Deploy?

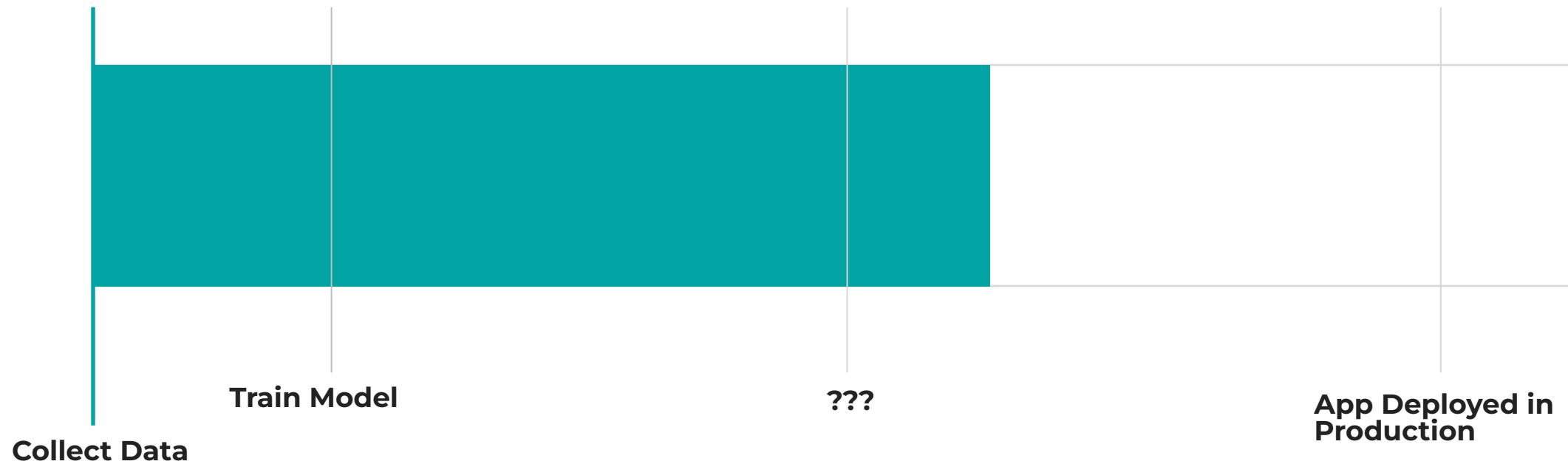
A framework for developing, packaging, testing, deploying, and running medical AI applications in clinical production.



Medical Imaging: Gap Between Model and Deployable App.



Why is it hard?



More than **87%** of data science projects never make it to production.

Why?

- Selecting the right DICOM datasets
- Loading DICOM Datasets
- Pre / Post processing Input Images
- Performing Inference
- Exporting AI results to DICOM
- Visualizing inference results
- Performance Optimization
- Resource Utilization
- Monitoring

What is MONAI Deploy?

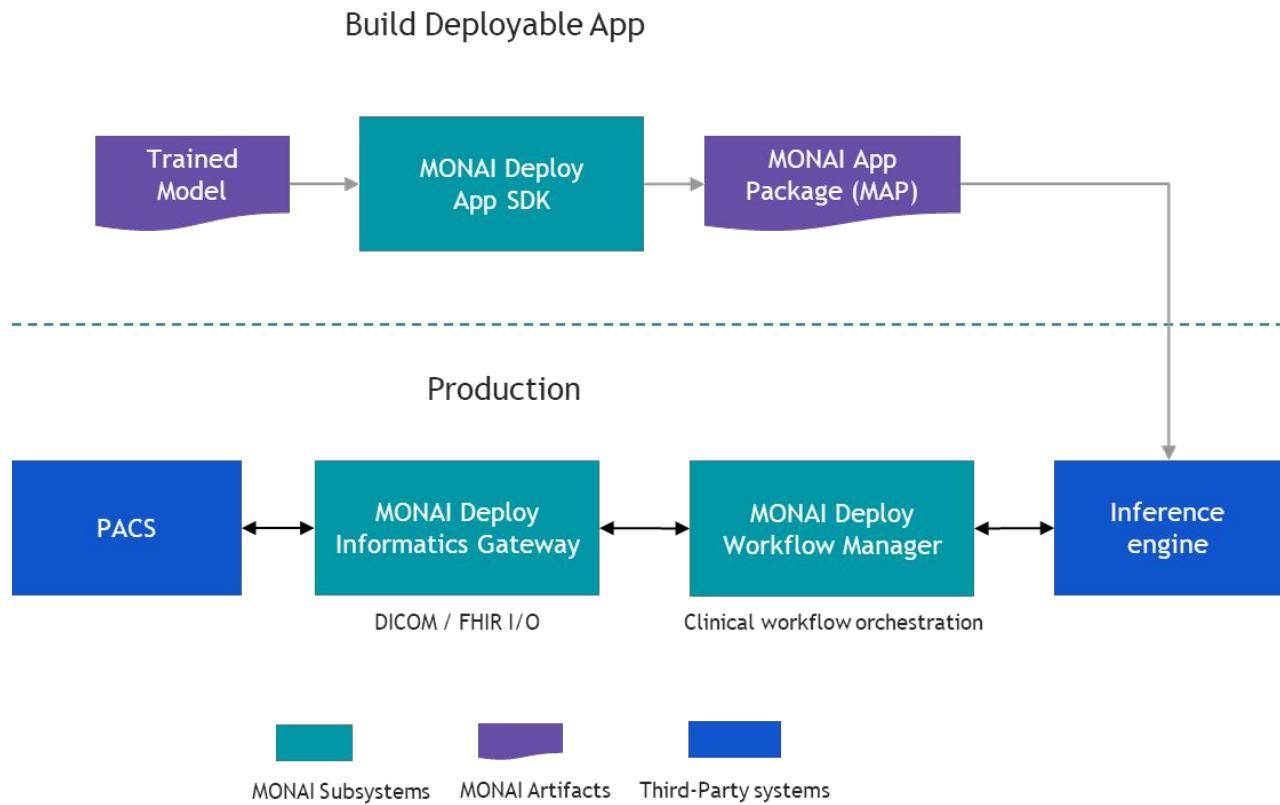
For Researchers and Developers

MONAI Deploy provides an easy way to develop MONAI Deploy Application Packages (MAPs).

For Hospital Operations

MONAI Deploy will define what a clinical infrastructure to run AI should look like, and how to interoperate with medical imaging systems over standards like DICOM and FHIR.

MONAI Deploy Architecture



MONAI Deploy Subsystems.



MONAI Deploy App SDK

[What is it?](#)

A Pythonic SDK to build
deploy-ready AI Apps in
Healthcare

**Developing, Packaging
and Testing**

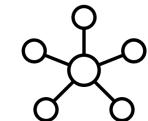


MONAI Deploy Informatics Gateway

[What is it?](#)

Connects AI Applications to
Healthcare Information Systems

Deploying and Running



MONAI Deploy Workflow Manager

[What is it?](#)

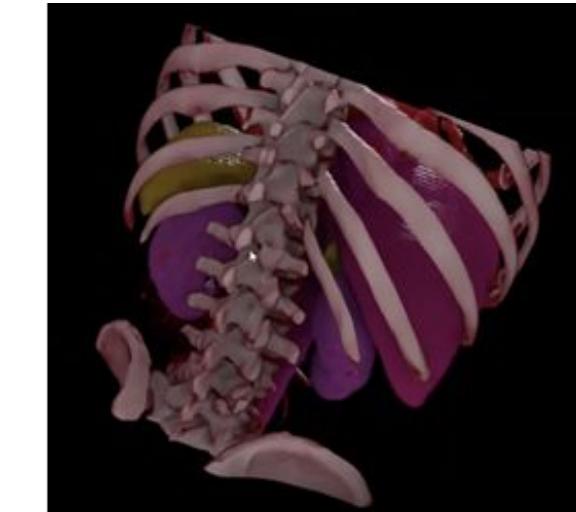
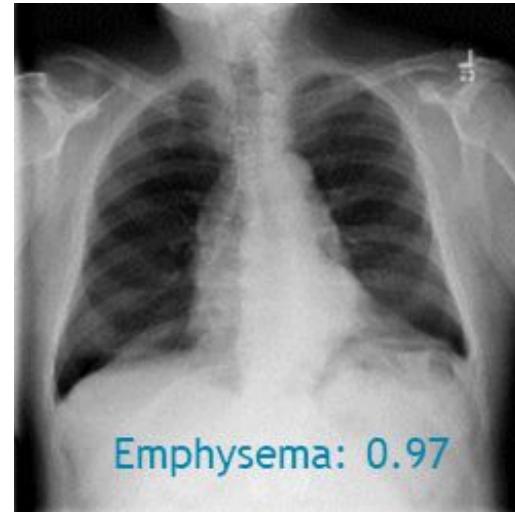
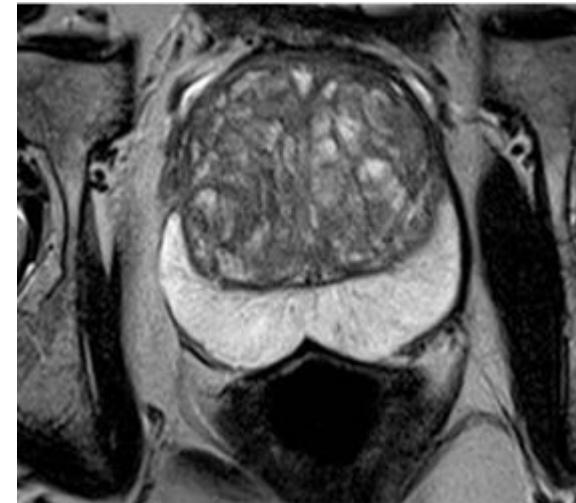
Central hub for the MONAI Deploy
Platform

Deploying and Running

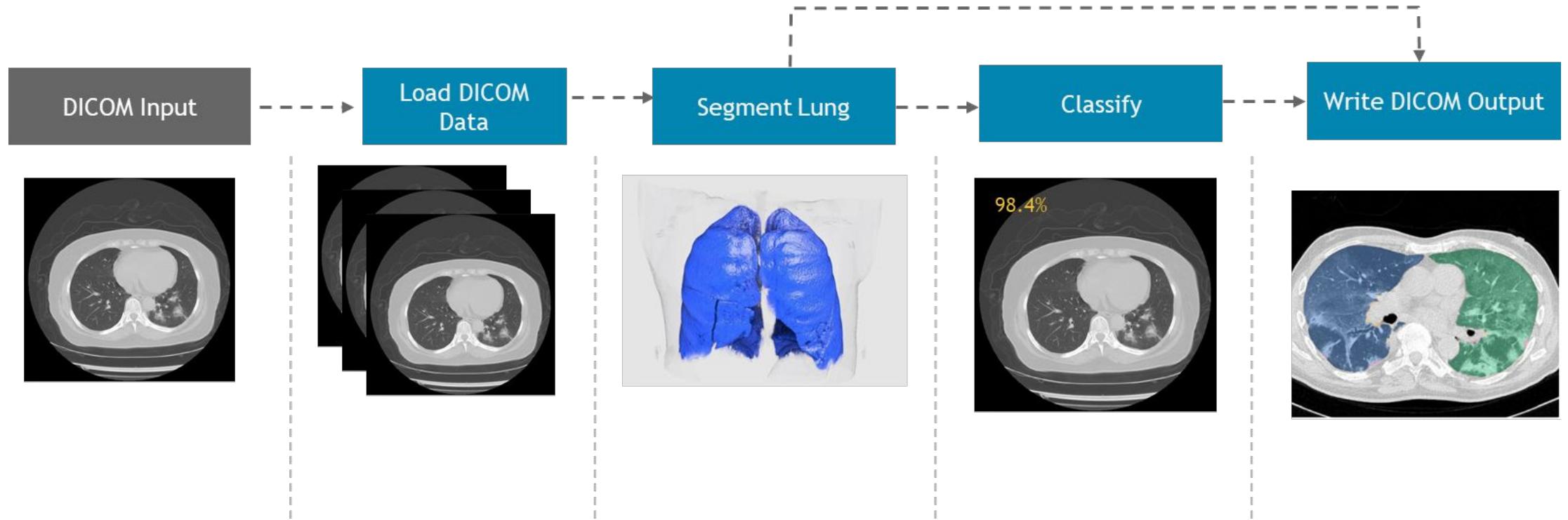
What is MONAI Deploy App SDK?

Design Goals:

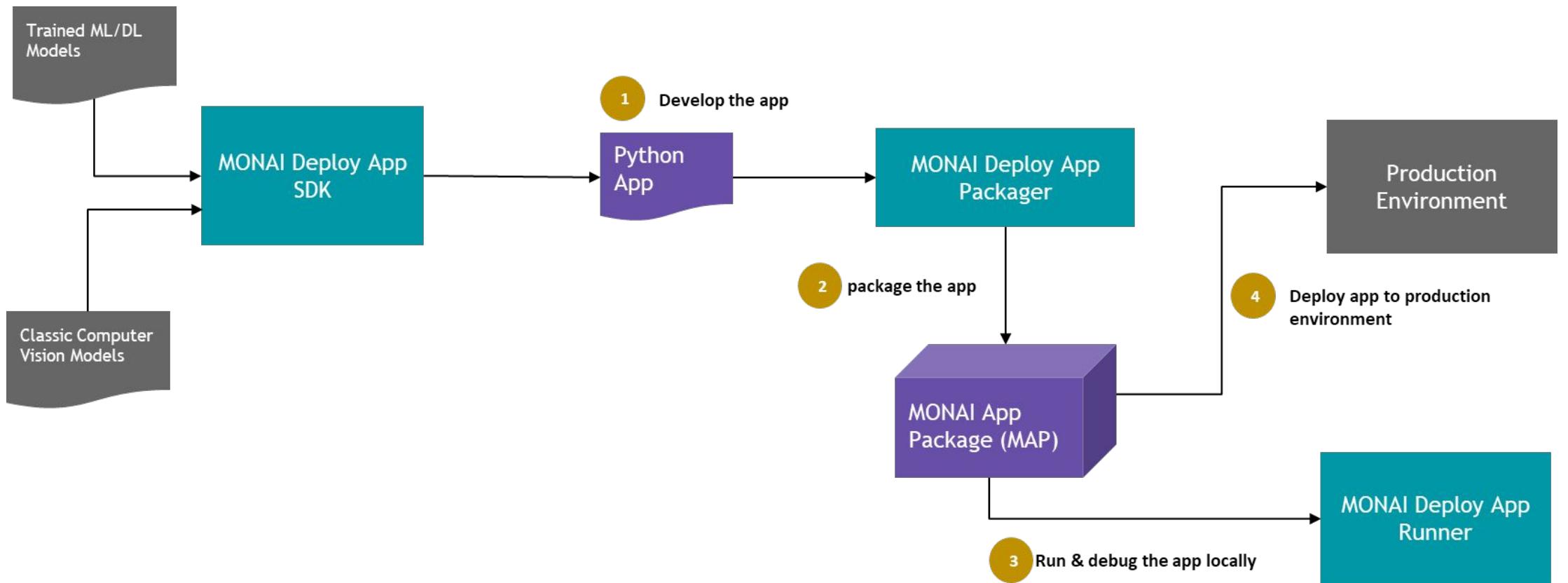
- Focus on [usability](#)
- Enables [composability](#)
- Facilitates [portability](#)
- Ready for [production](#)



Typical Application in Medical Imaging AI.

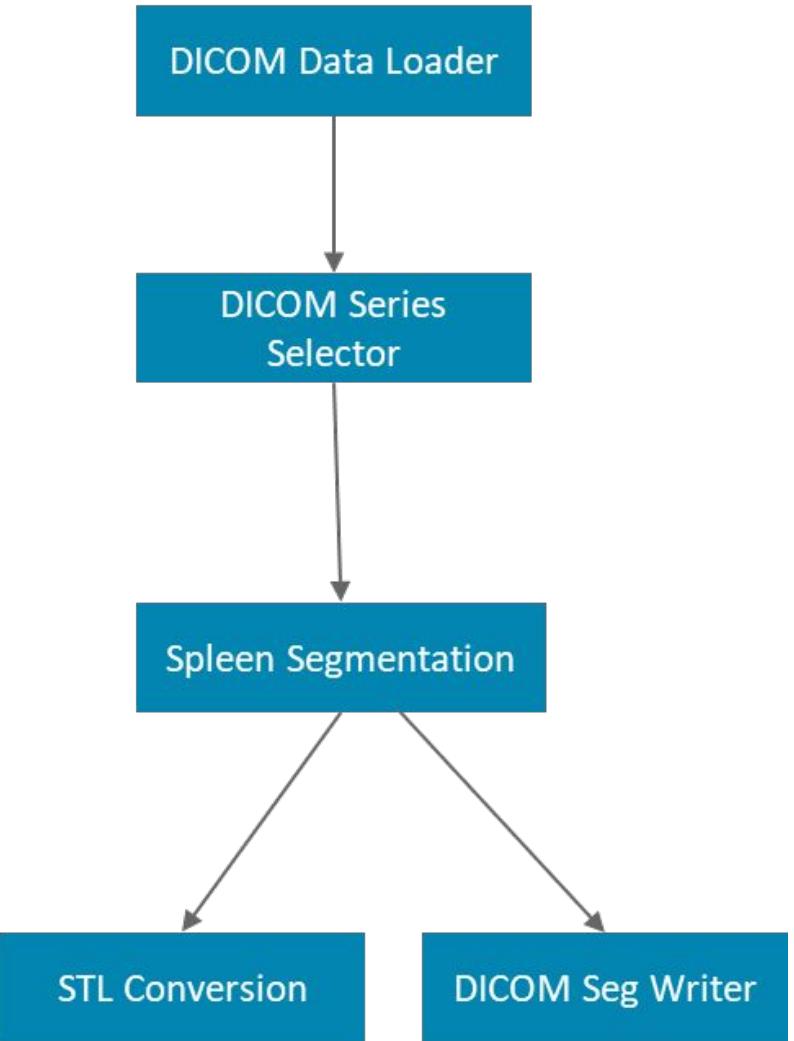


How does it work?



How to compose an AI App.

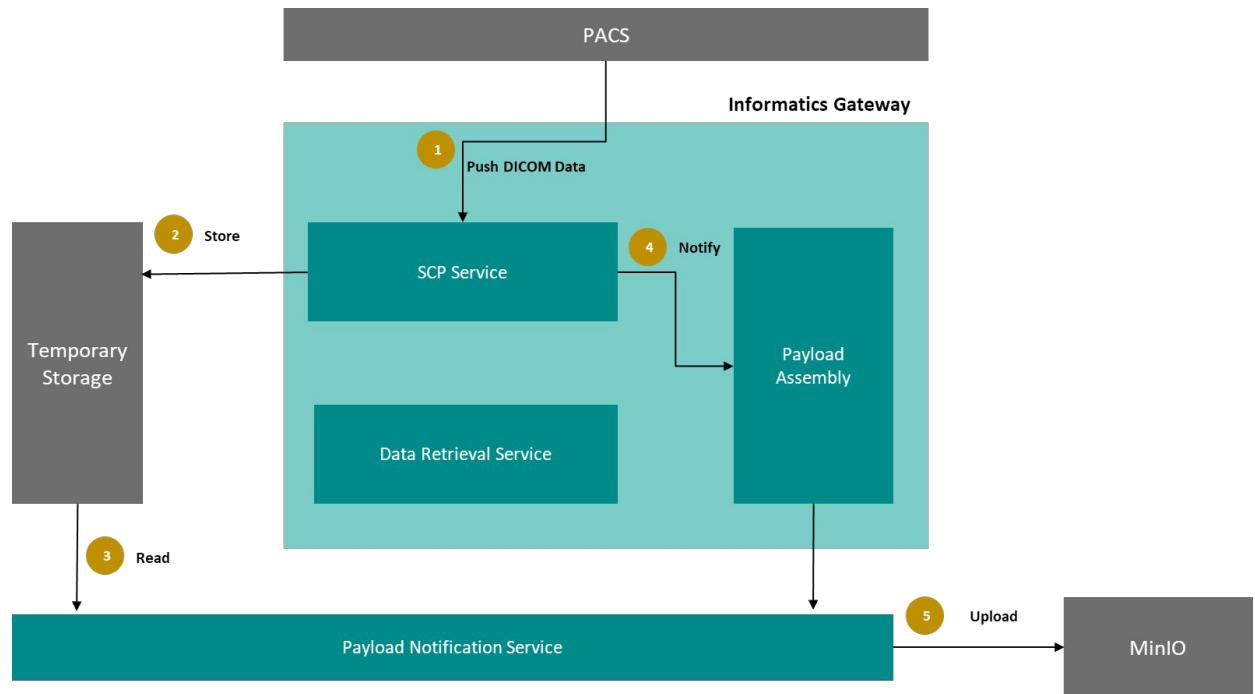
```
39     def compose(self):
40         """Creates the app specific operators and chain them up in the processing DAG."""
41
42         self._logger.debug(f"Begin {self.compose.__name__}")
43
44         # Creates the custom operator(s) as well as SDK built-in operator(s).
45         study_loader_op = DICOMDataLoaderOperator()
46         series_selector_op = DICOMSeriesSelectorOperator(Sample_Rules_Text)
47         series_to_vol_op = DICOMSeriesToVolumeOperator()
48         # Model specific inference operator, supporting MONAI transforms.
49         spleen_seg_op = SpleenSegOperator()
50         # Create DICOM Seg writer with segment label name in a string list
51         dicom_seg_writer = DICOMSegmentationWriterOperator(seg_labels=["Spleen"])
52         # Create the surface mesh STL conversion operator
53         stl_conversion_op = STLConversionOperator(output_file="stl/spleen.stl")
54
55         # Create the processing pipeline, by specifying the upstream and downstream operators, and
56         # ensuring the output from the former matches the input of the latter, in both name and type.
57         self.add_flow(study_loader_op, series_selector_op, {"dicom_study_list": "dicom_study_list"})
58         self.add_flow(
59             series_selector_op, series_to_vol_op, {"study_selected_series_list": "study_selected_series_list"}
60         )
61         self.add_flow(series_to_vol_op, spleen_seg_op, {"image": "image"})
62         # Note below the dicom_seg_writer requires two inputs, each coming from a upstream operator.
63         self.add_flow(
64             series_selector_op, dicom_seg_writer, {"study_selected_series_list": "study_selected_series_list"}
65         )
66         self.add_flow(spleen_seg_op, dicom_seg_writer, {"seg_image": "seg_image"})
67         # Add the STL conversion operator as another leaf operator taking as input the seg image.
68         self.add_flow(spleen_seg_op, stl_conversion_op, {"seg_image": "image"})
69
70         self._logger.debug(f"End {self.compose.__name__}")
--
```

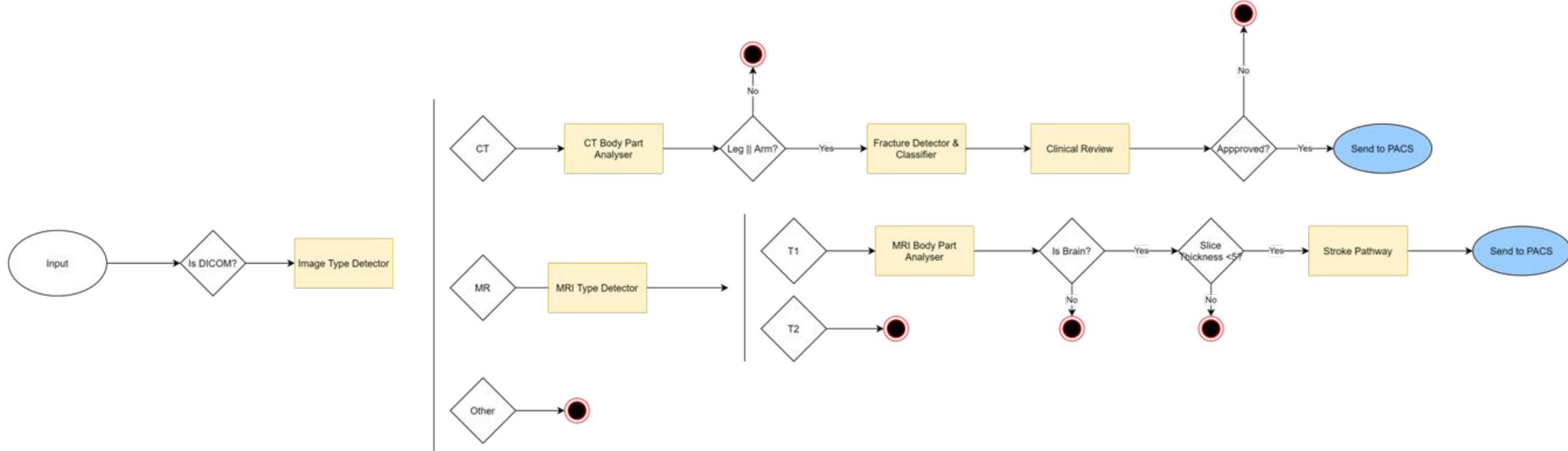


What is MONAI Deploy Informatics Gateway?

Connects AI Applications to Healthcare Information Systems

- **DICOM**
 - SCP to listen for incoming verification and store requests.
 - SCU to export DICOM dataset to designated DICOM devices.
- **DICOM Web**
 - DICOMweb Client to query, retrieve, store DICOM dataset against configured DICOMweb servers.
- **FHIR**
 - FHIR Client to interact with an FHIR server and its available FHIR resources.
- **Others**
 - ACR-DSI API provides a standard for AI model inference in a clinical workflow.
 - Management APIs provide functionalities of configuring MIG during runtime.



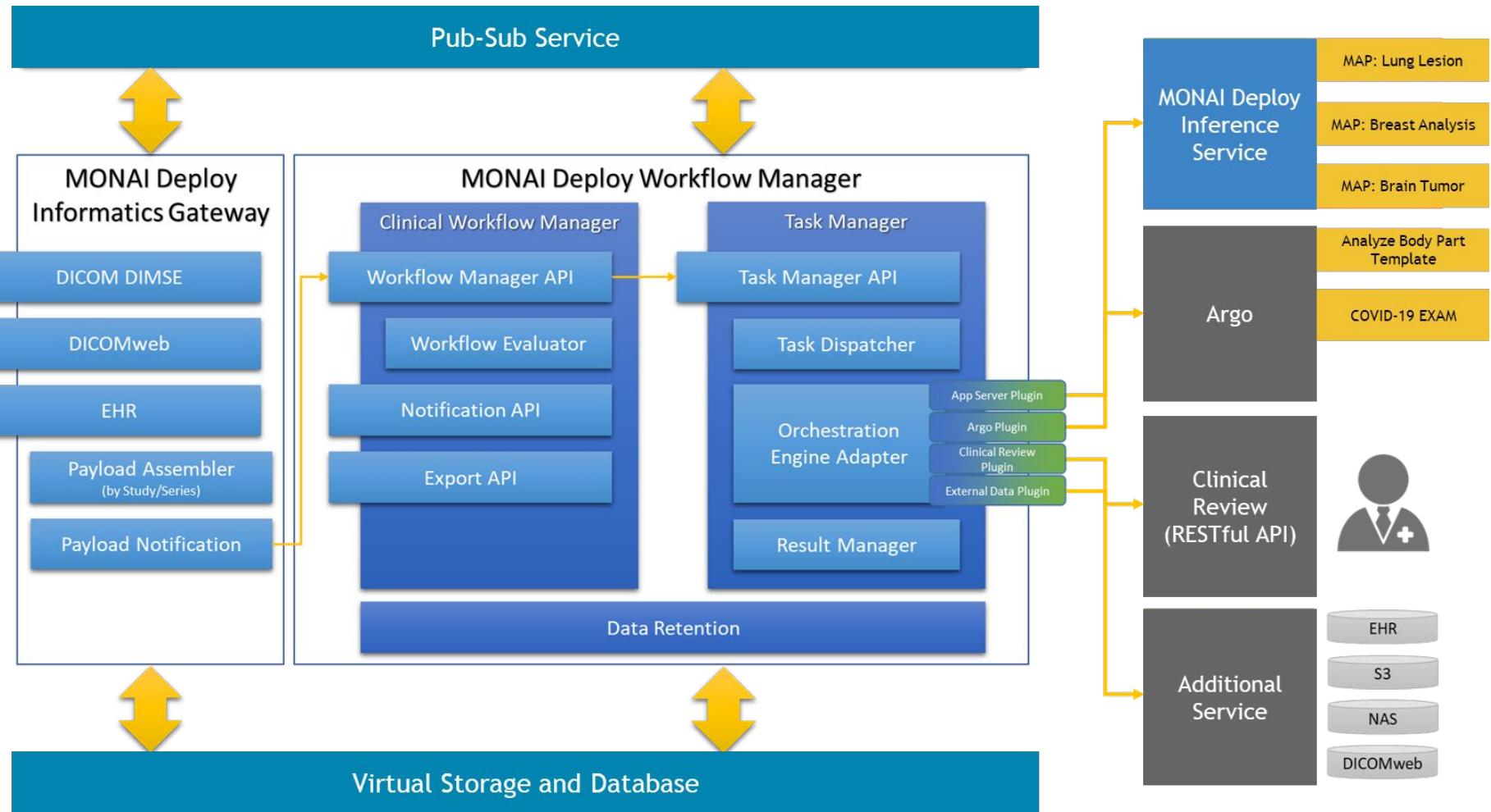


What is MONAI Deploy Workflow Manager?

Central Hub for the MONAI Deploy Platform

- **Define Clinical Workflow:** Define a clinical workflow using a declarative specification language
- **Routing input image data:** Route imaging data to the applications based on user defined clinical workflows
- **Status:** Monitor application execution statuses
- **Routing Outputs:** Route results produced by the applications back to the PACS

MONAI Deploy Flow.



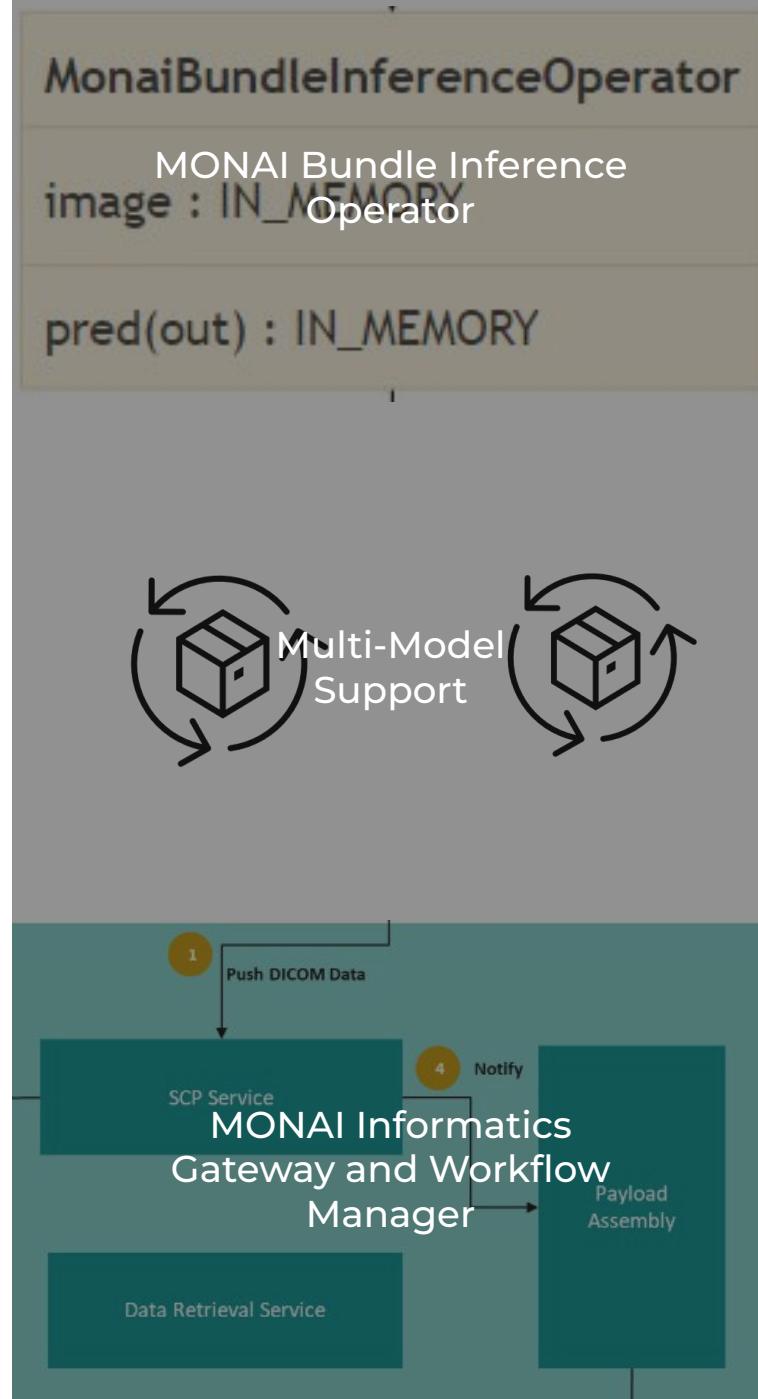
MONAI Deploy Walkthrough

We'll walk through:

- Write your first operator
- DAG structure and connecting your operators
- Build your first MAP
- Using Docker for MAPs

MONAI Deploy v0.4.

Latest Release



MONAI Bundle Inference Operator

- Quickly create your own AI Applications
- In-memory and file I/O
- Minimal or no coding
- Jupyter Notebook Examples

Multi-Model Support

- Support for multiple models
- Each bundle operator is a single model
- MAP can have multiple bundles
- Each bundle is named uniquely

MONAI Informatics Gateway and Workflow

Manager (Development of MVP)

- Enable Execution of multi-staged medical imaging workflows with pluggable orchestration engine and services
- Facilitates integration of MONAI Deploy with DICOM and FHIR compliant systems.

MONAI Deploy Roadmap.

Fall 2022'

MONAI App SDK v0.5
MONAI IG v0.3
MONAI WM v0.3

Winter 2022'

MONAI App SDK v0.6
MONAI IG v0.3
MONAI WG v0.3

Spring 2023'

MONAI App SDK v0.7



Open Deployment Platform

- Informatics Gateway (IG)
- Workflow Manager (WM)
- Argo-Based pipeline Orchestration

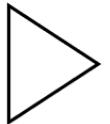
1st Clinical Deployment in Action

- AIDE deploying clinical workflows
- 10 trusts powered by MONAI Deploy
- Full Multi-modal support

TBD

- TBD

Getting involved in the MONAI Community.



Start using MONAI!

How?

Start with tutorials in whichever piece of MONAI fits your current workflow.

[Get started with MONAI](#)

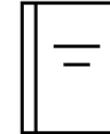


Submit Issues or Bugs

How?

You've been using MONAI and found an issue or think we could write a tutorial? Tell us!

[Contribute to MONAI](#)



Contribute code, features, or research

How?

You've submitted a paper or trained a model? Start a discuss to integrate it into MONAI

[Commit to MONAI](#)

MONAI Resources.

- MONAI Website: <https://monai.io/>
- MONAI Slack: <https://forms.gle/QTxIq3hFictp31UM9>
- MONAI Docs:
 - MONAI Core: <https://docs.monai.io/en/stable/>
 - MONAI Label: <https://docs.monai.io/projects/label/en/latest/index.html>
 - MONAI Deploy App SDK: <https://docs.monai.io/projects/monai-deploy-app-sdk/en/latest/>
- MONAI Github: <https://github.com/Project-MONAI>
 - MONAI Core: <https://github.com/Project-MONAI/MONAI>
 - MONAI Label: <https://github.com/Project-MONAI/MONAILabel>
 - MONAI Deploy: <https://github.com/Project-MONAI/monai-deploy>
- MONAI YouTube: <https://www.youtube.com/c/Project-MONAI>
 - Overview Videos, Deep Dive Series, Bootcamp and other event recordings
- MONAI Twitter: <https://twitter.com/ProjectMONAI>
 - Follow for the latest announcements
- MONAI Medium: <https://monai.medium.com/>
 - Read about our latest releases and our upcoming research interview series



Q/A
