

Compute Infrastructure for UNSW AI Imaging

*Dr Patrick Tung – AI Imaging Scientist
Research Technology Services (ResTech)*

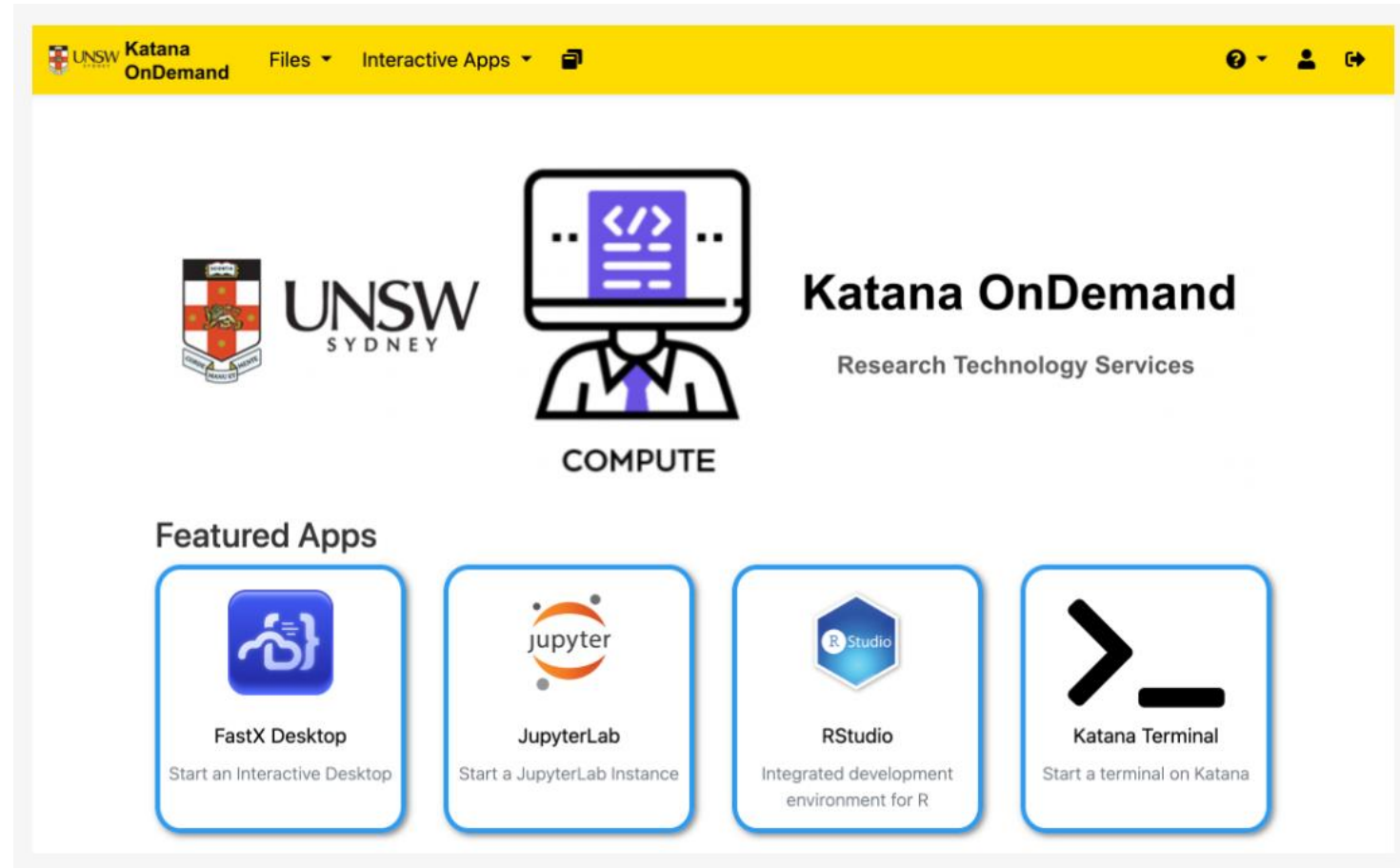
Compute | Community | Data



UNSW
SYDNEY

Katana OnDemand

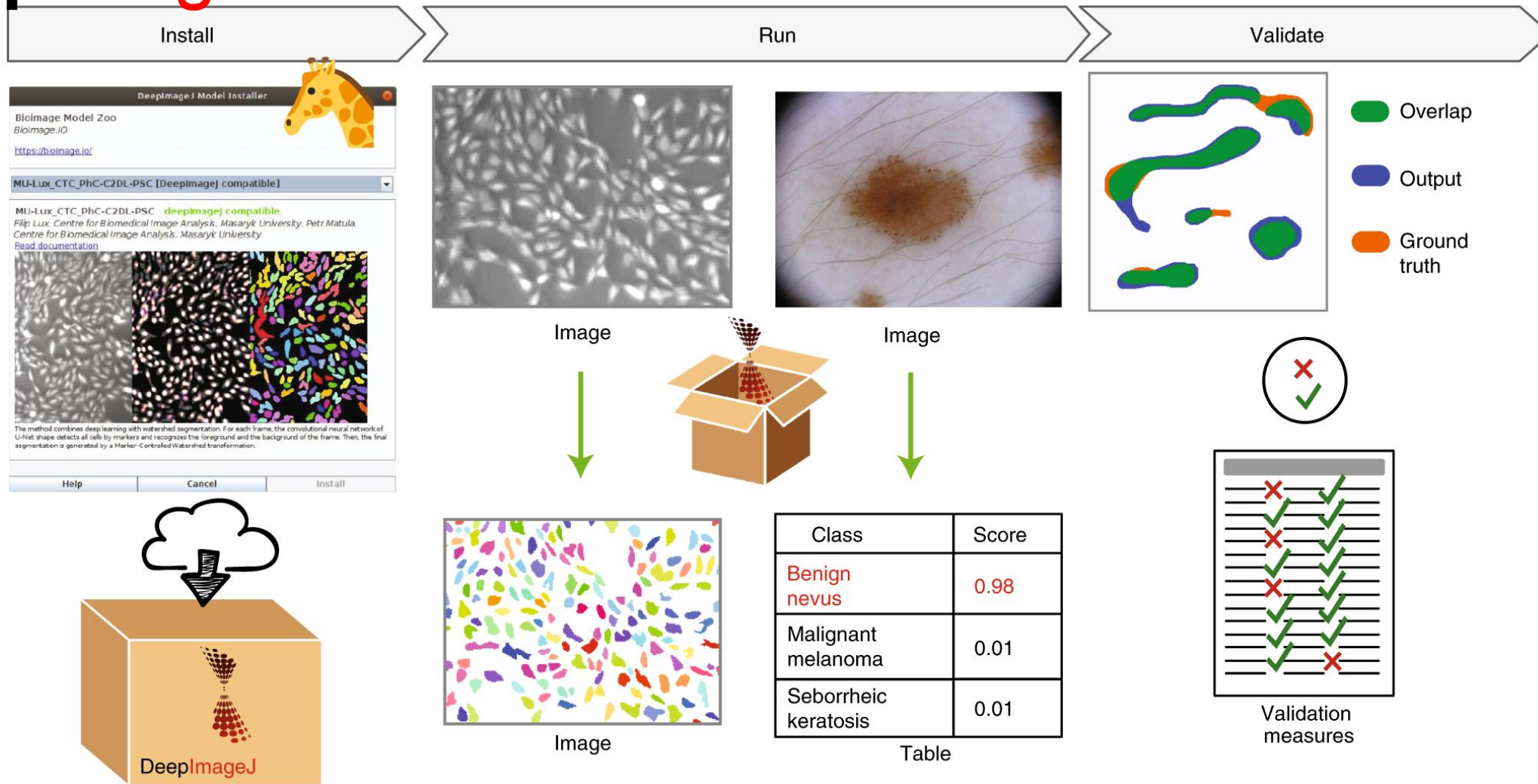
- On-prem high-performance computer
- Open OnDemand
- Browser-based interface
- Virtual desktop for interactive image analysis
- Free to UNSW researchers



The screenshot shows the Katana OnDemand web interface. At the top, there is a yellow navigation bar with the UNSW OnDemand logo, a 'Files' dropdown menu, an 'Interactive Apps' dropdown menu, and user profile icons. The main content area features the UNSW Sydney logo on the left, a central graphic of a person in a suit holding a screen displaying code, and the text 'COMPUTE' below it. To the right of this graphic is the text 'Katana OnDemand' and 'Research Technology Services'. Below this is a 'Featured Apps' section with four buttons: 'FastX Desktop' (Start an Interactive Desktop), 'JupyterLab' (Start a JupyterLab Instance), 'RStudio' (Integrated development environment for R), and 'Katana Terminal' (Start a terminal on Katana).



deepImageJ




- Bioimaging model zoo
- Integrates multiple open-source software
- Example appropriate datasets

All models **applications** datasets

🔍 Type a keyword and press enter Tags & Filters ▾ ☰

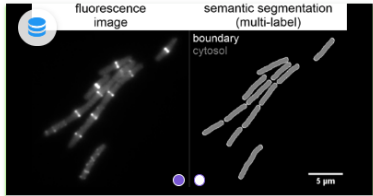
software, notebook, bioengine, workflow, macro



Notebook Preview
Previewing Jupyter notebook without a Jupyter server

injoy notebook jupyter bioengine

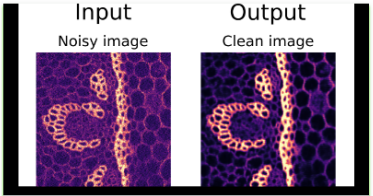
downloads ?



U-Net (2D) multilabel segme...
2D semantic segmentation. U-Net is an encoder-decoder architectu...

colab notebook u-net segmentation ...


downloads ? license MIT model 1
Open in Colab



Denoising (2D) - BiaPy
2D Denoising workflow where the goal is to remove the noise from...

colab workflow pipeline notebook ...

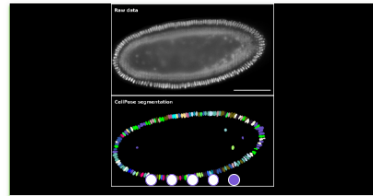
downloads ? license MIT Open in Colab



SplineDist (2D) - ZeroCostDL...
Instance segmentation of 2D images. SplineDist is a neural netwo...

colab notebook splinedist segmentation ...

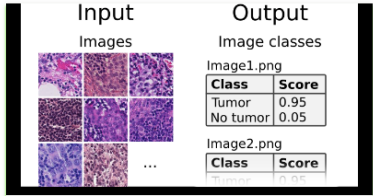
downloads ? Open in Colab



Interactive Segmentation - K...
Interactive instance segmentation using Kaibu and Cellpose.

colab notebook cellpose segmentation ...

downloads ? Open in Colab

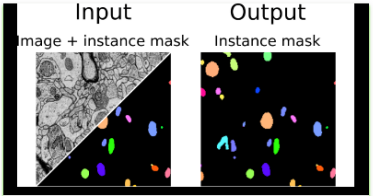


Classification (2D) - BiaPy
2D Classification workflow where full input images are labeled a...

Image	Class	Score
Image1.png	Tumor	0.95
	No tumor	0.05
Image2.png		

colab workflow pipeline notebook ...

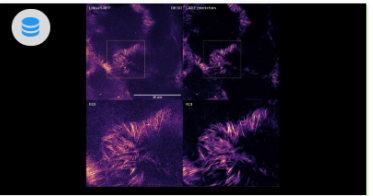
downloads ? license MIT Open in Colab



Instance Segmentation (2D) ...
2D Instance Segmentation workflow where the goal is to detect, s...

colab workflow pipeline notebook ...

downloads ? license MIT Open in Colab



RCAN (3D) - ZeroCostDL4Mic
Supervised restoration of 3D images. RCAN is a neural network ca...

colab notebook 3d-rcan denoising ...

downloads ? license MIT Open in Colab

DEVELOPERS

Easy to deploy,
share, showcase,
benchmark

USERS

Easy-to-use interface to
train, evaluate and
use DL models

Local / HPC / Cloud

Reproducible

Transferable

Transparent

FAIR

STANDARDS

DL4MicEverywhere

Models



Biolmage.IO

DL container images

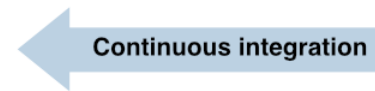


COMMUNITY

DL4MicEverywhere notebooks



DL4MicEverywhere



Continuous integration



#ZeroCostDL4Mic

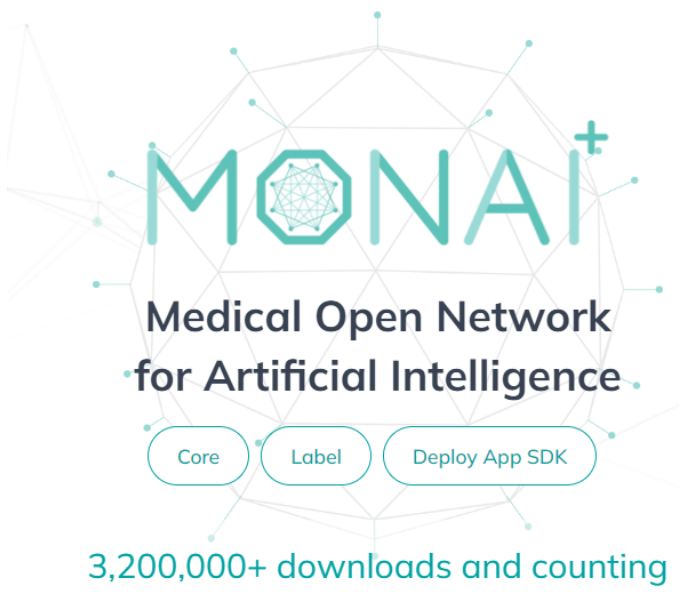
Automatic testing

Bespoke notebooks

Hosted in DL4MicEverywhere
Inspired by ZeroCostDL4Mic

External notebooks

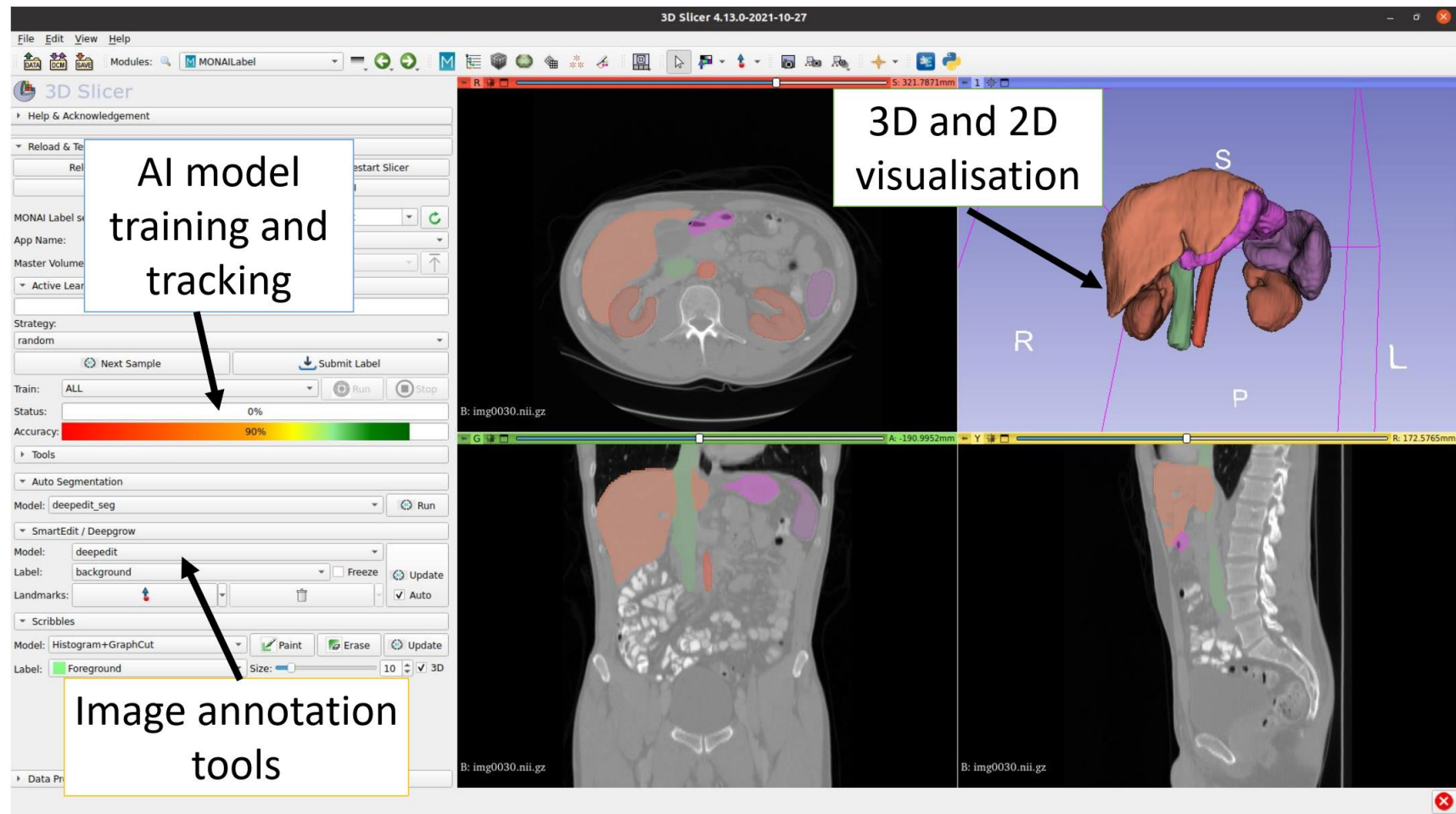
DL4MicEverywhere-compatible



MONAI+
 Medical Open Network
 for Artificial Intelligence.

Core Label Deploy App SDK

3,200,000+ downloads and counting



3D Slicer 4.13.0-2021-10-27

File Edit View Help

Modules: MONAILabel

3D Slicer

Help & Acknowledgement

Reload & Test

Relo... Start Slicer

MONAI Label s...

App Name:

Master Volume

Active Lear...

Strategy: random

Next Sample Submit Label

Train: ALL Run Stop

Status: 0%

Accuracy: 90%

Tools

Auto Segmentation

Model: deepedit_seg Run

SmartEdit / Deepgrow

Model: deepedit

Label: background Freeze Update

Landmarks: Auto

Scribbles

Model: Histogram+GraphCut Paint Erase Update

Label: Foreground Size: 10 3D

AI model training and tracking

3D and 2D visualisation

R S P L

B: img0030.nii.gz

B: img0030.nii.gz

B: img0030.nii.gz

All Models

Brats mri axial slices generative diffusion

MONAI team

A generative model for creating 2D brain MRI axial slices from Gaussian noise based on BraTS dataset

[Model Details](#)

Brats mri generative diffusion

MONAI team

A generative model for creating 3D brain MRI from Gaussian noise based on BraTS dataset

[Model Details](#)

Brats mri segmentation

MONAI team

A pre-trained model for volumetric (3D) segmentation of brain tumor subregions from multimodal MRIs based on BraTS 2018 data

[Model Details](#)

Breast density classification

Center for Augmented Intelligence in Imaging, Mayo Clinic Florida

A pre-trained model for classifying breast images (mammograms)

[Model Details](#)

Endoscopic inbody classification

NVIDIA DLMED team

A pre-trained binary classification model for endoscopic inbody classification task

[Model Details](#)

Endoscopic tool segmentation

NVIDIA DLMED team

A pre-trained binary segmentation model for endoscopic tool segmentation

[Model Details](#)

Lung nodule ct detection

MONAI team

A pre-trained model for volumetric (3D) detection of the lung lesion from CT image on LUNA16 dataset

[Model Details](#)

Mednist gan

MONAI Team

This example of a GAN generator produces hand xray images like those in the MedNIST dataset

[Model Details](#)

Mednist reg

MONAI team

This is an example of a ResNet and spatial transformer for hand xray image registration

[Model Details](#)

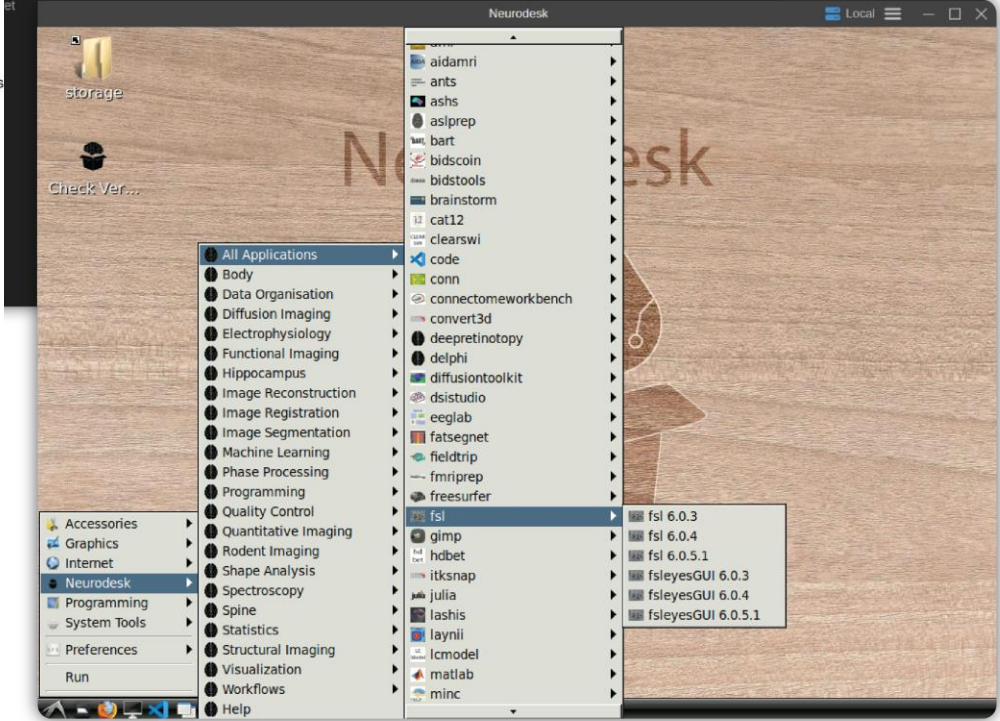
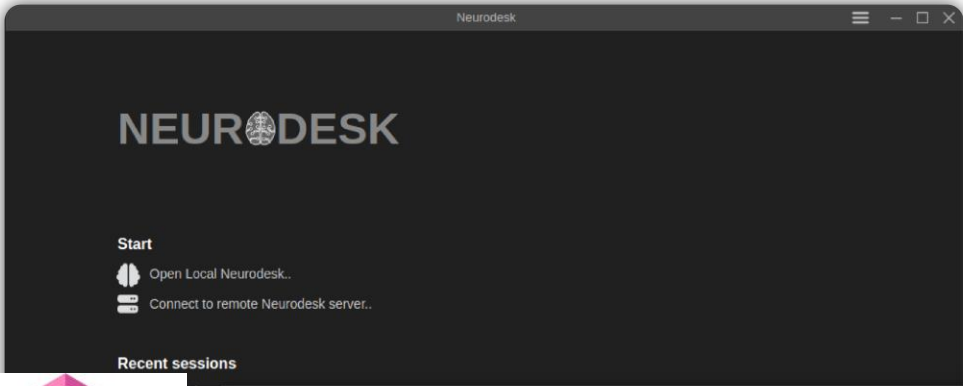
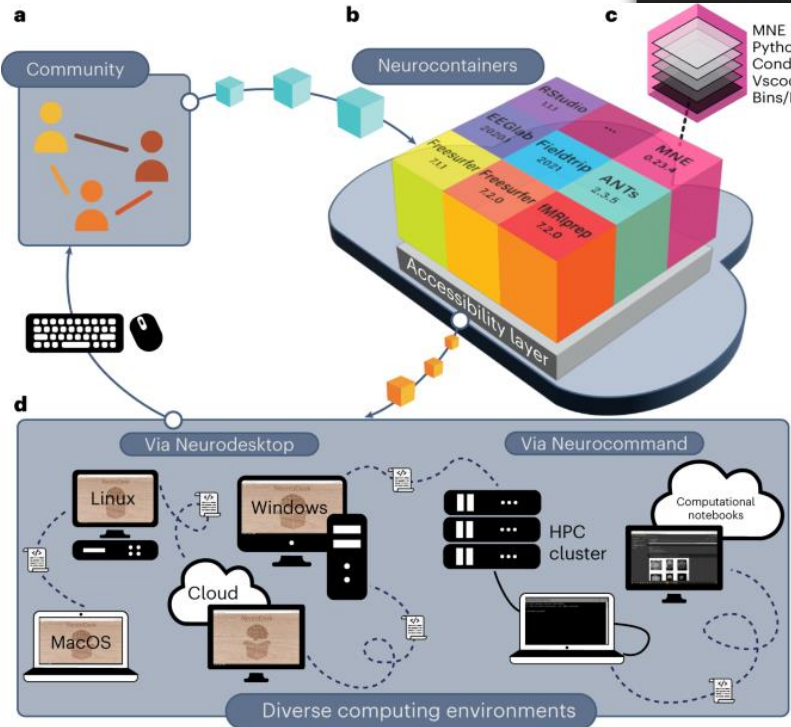
NEURODESK

Advantages:

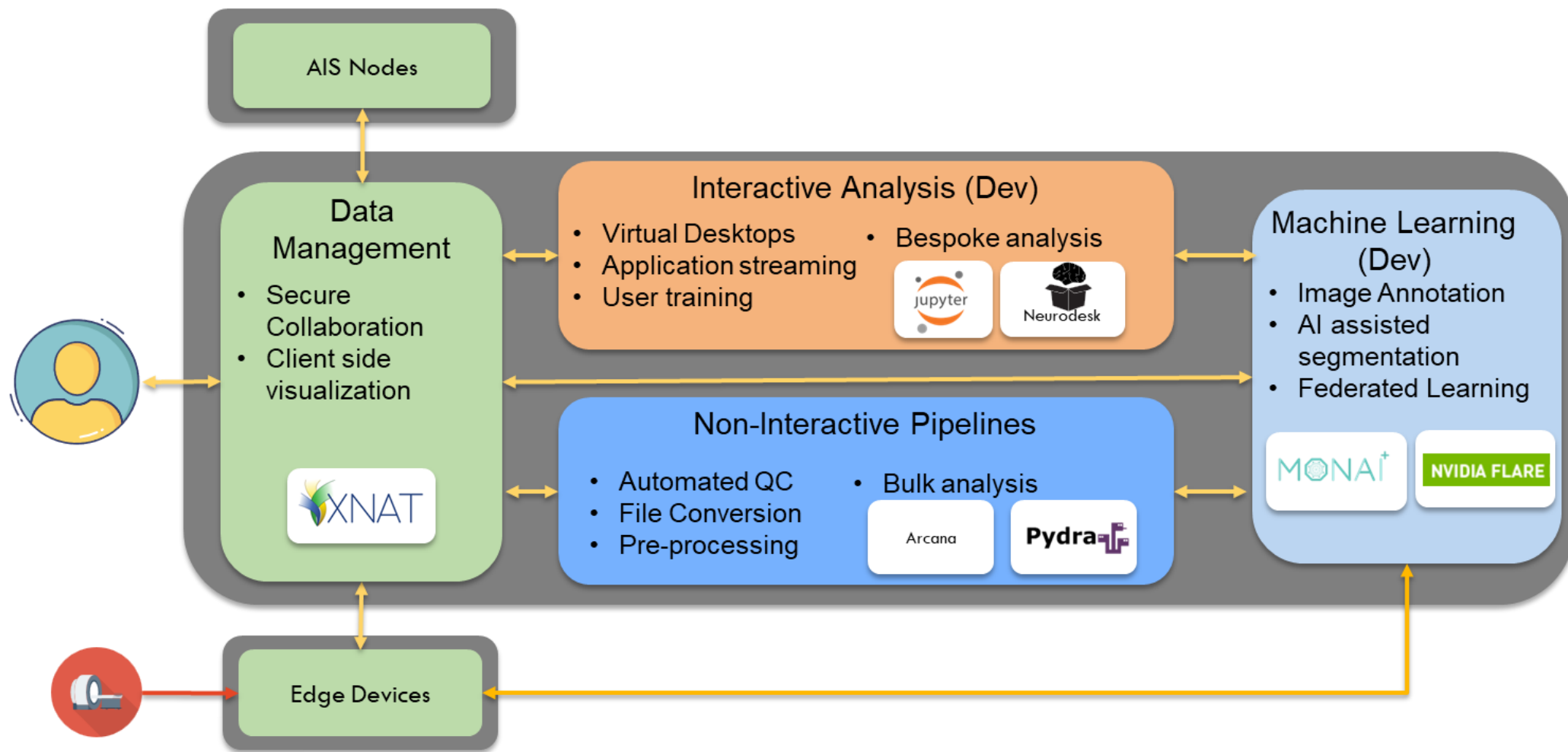
- Reproducibility
- Flexibility
- Scalability

Features:

- Containerized Environment
- User-Friendly Interface
- Comprehensive Toolset



Australian Imaging Service – UNSW node



Stay in touch for the latest news and events!

Contact us:

Website: <https://unsw.sharepoint.com/sites/Restech>

Email: restech@unsw.edu.au

Located: Level 3, June Griffith Building (F10)



Join our ResTech Microsoft Teams group:

http://unsw.to/restech_teams



**Collaborative AI projects possible -
Find us at the booth**

