



**ARAMIS
LAB**
BRAIN DATA SCIENCE

www.aramislab.fr
www.clinica.run



Clinica

*Software platform for clinical
neuroimaging studies: Overview
and Advances*



Outline

- Goal and scope of Clinica
- Current state of the project
- Overview of the tool architecture
- Usage
- Roadmap

Goal of Clinica

- Apply advanced **processing** and **data science** methods to clinical studies

Clinical neuroscience studies

- Involving **in-vivo** data from **human** participants (patients and controls)
- Studied with **multimodal** data
 - Neuroimaging
 - Clinical scores
 - Genetic and other omics
- Often with longitudinal follow-up

Motivation

- Stop the waste of resources

Objectives

- Spend less time on data management and processing
- Easily share data and results within institutions and with external collaborators
- Make research more reproducible
- Highlight methods developed in the team

Current state of the project

- Python (85%), MATLAB (14%)
- Website : <https://www.clinica.run>
- Online docs:
<https://aramislab.paris.inria.fr/clinica/docs/public/latest/>
- Sources: <https://github.com/aramis-lab/clinica>
- Dependencies:
 - Core: Nibabel, Nipype, Pandas, Numpy, Scikit-learn, Nilearn, Scipy...
 - Tier (pipeline-specific): ANTs, Convert3D, Freesurfer, FSL, ITK, MATLAB, MRTRIX3, PETPVC, SPM
- Data:
 - Neuro-imaging datasets, semi-public (ADNI, OASIS, UKB...)
 - Data formats: DICOM, CSV, JSON...
- Development:
 - Team of 3-4 engineers (ARAMIS)
 - External contributions are rare
- Modern:
 - PR, code review, issue tracking
 - Frequent releases, semantic versioning
 - Continuous integration, automatic docs generation
 - Unit tests, integration tests
 - Modern packaging (pyproject.toml, poetry, automatic publication on PyPi)



Clinica

Software platform for clinical neuroimaging studies

Clinica is a software platform for clinical research studies involving patients with neurological and psychiatric diseases and the acquisition of multimodal data (neuroimaging, clinical and cognitive evaluations, genetics...), most often with longitudinal follow-up.

Clinica is developed by the [ARAMIS Lab](#) at the [ICM](#) in Paris.

QUICK START



Clinica Documentation

- Home
- Installation ▼
 - Installation**
 - Third-party
- Clinica environment >
- Pipelines >
- Dataset converters >
- I/O tools >
- Presentations & demos >

Installation

You will find below the steps for installing Clinica on Linux or Mac. Please do not hesitate to contact us on the [forum](#) or [GitHub](#) if you encounter any issues.

Prepare your Python environment

You will need a Python environment to run Clinica. We advise you to use [Miniconda](#). Miniconda allows you to install, run, and update Python packages and their dependencies. It can also create environments to isolate your libraries. To install Miniconda, open a new terminal and type the following commands:

- If you are on Linux:

```
curl https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86_64.sh -o /tmp/miniconda-installer.sh
bash /tmp/miniconda-installer.sh
```

- If you are on Mac:

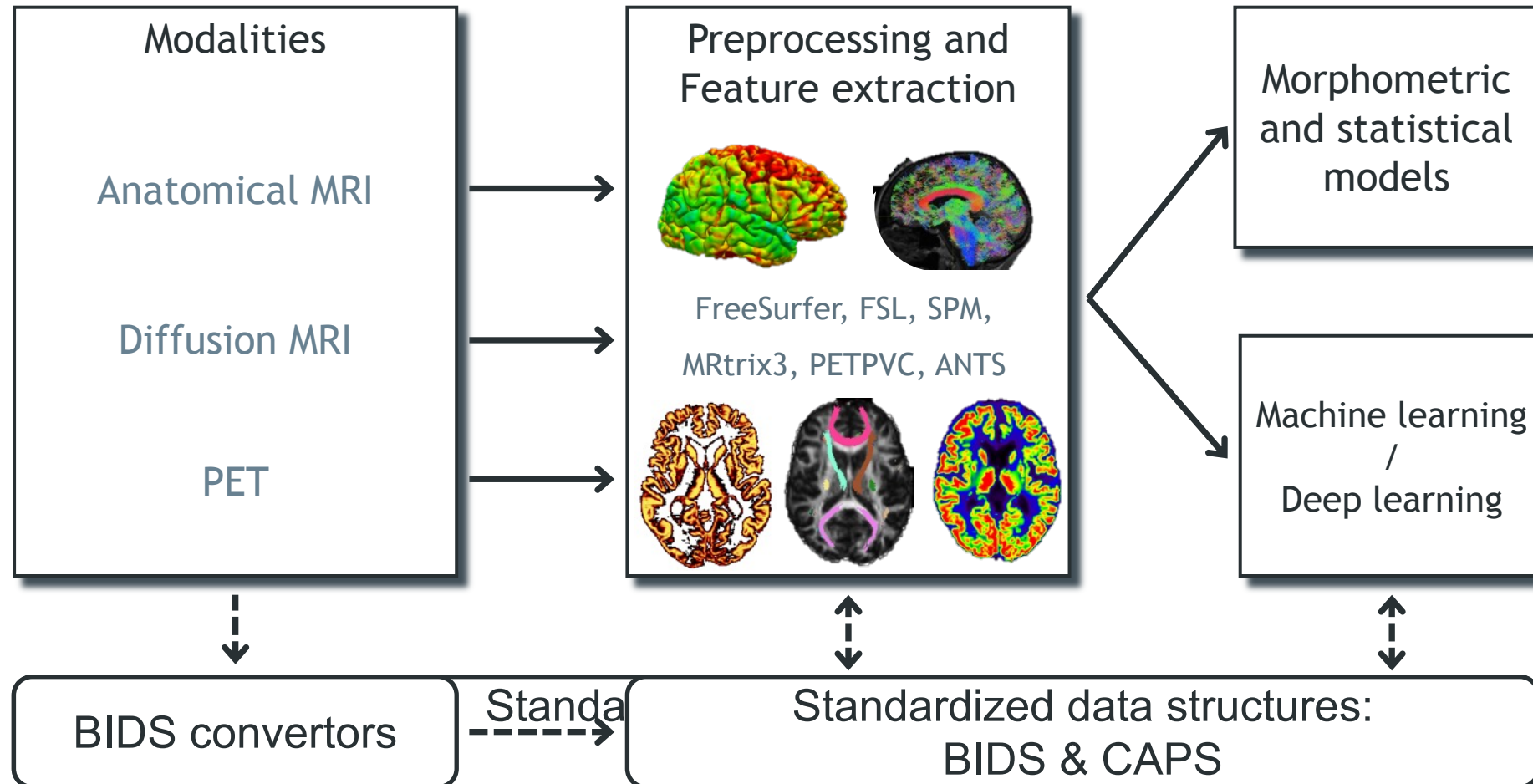
```
curl https://repo.anaconda.com/miniconda/Miniconda3-latest-MacOSX-x86_64.sh -o /tmp/miniconda-installer.sh
bash /tmp/miniconda-installer.sh
```

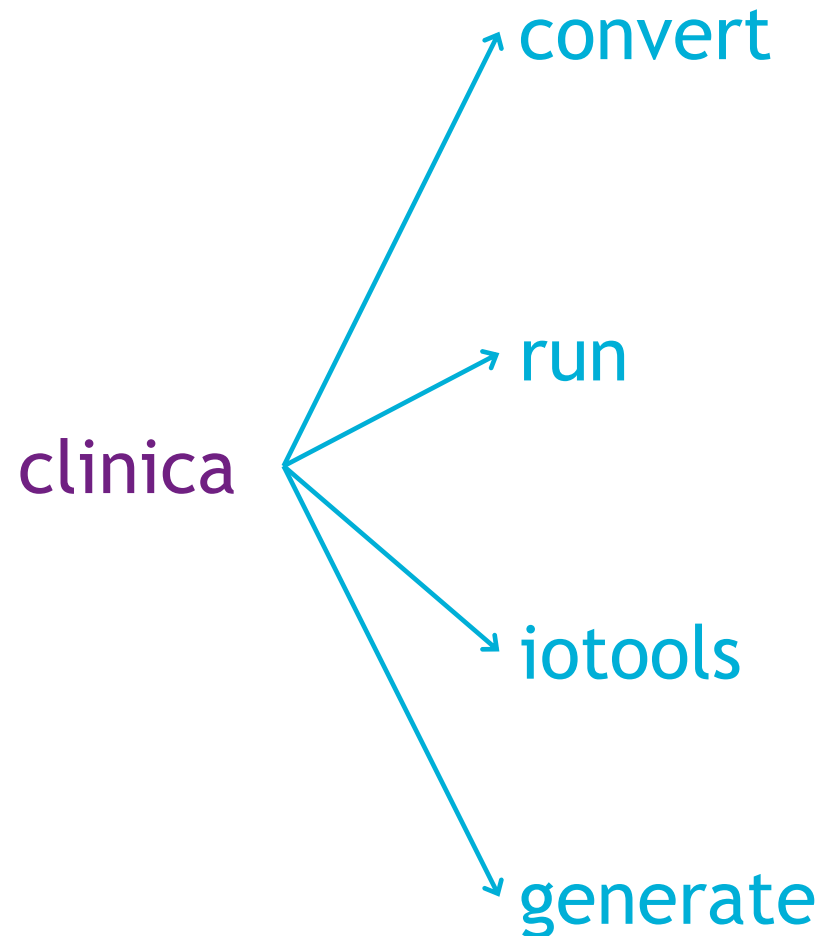
Miniconda will ask you where to install it. Do not forget to copy the `export PATH` given at the end of the installation. If everything went fine, open a new terminal and type `conda info`, it will

Table of contents

- Prepare your Python environment
- Install Clinica
- Installation of the third-party software packages
- Shell completion (optional)
- Run the Clinica environment
 - Activation of the Clinica environment
 - Deactivation of the Clinica environment
- Developer instructions

Software platform for clinical neuroimaging studies





Datasets

Processing pipelines

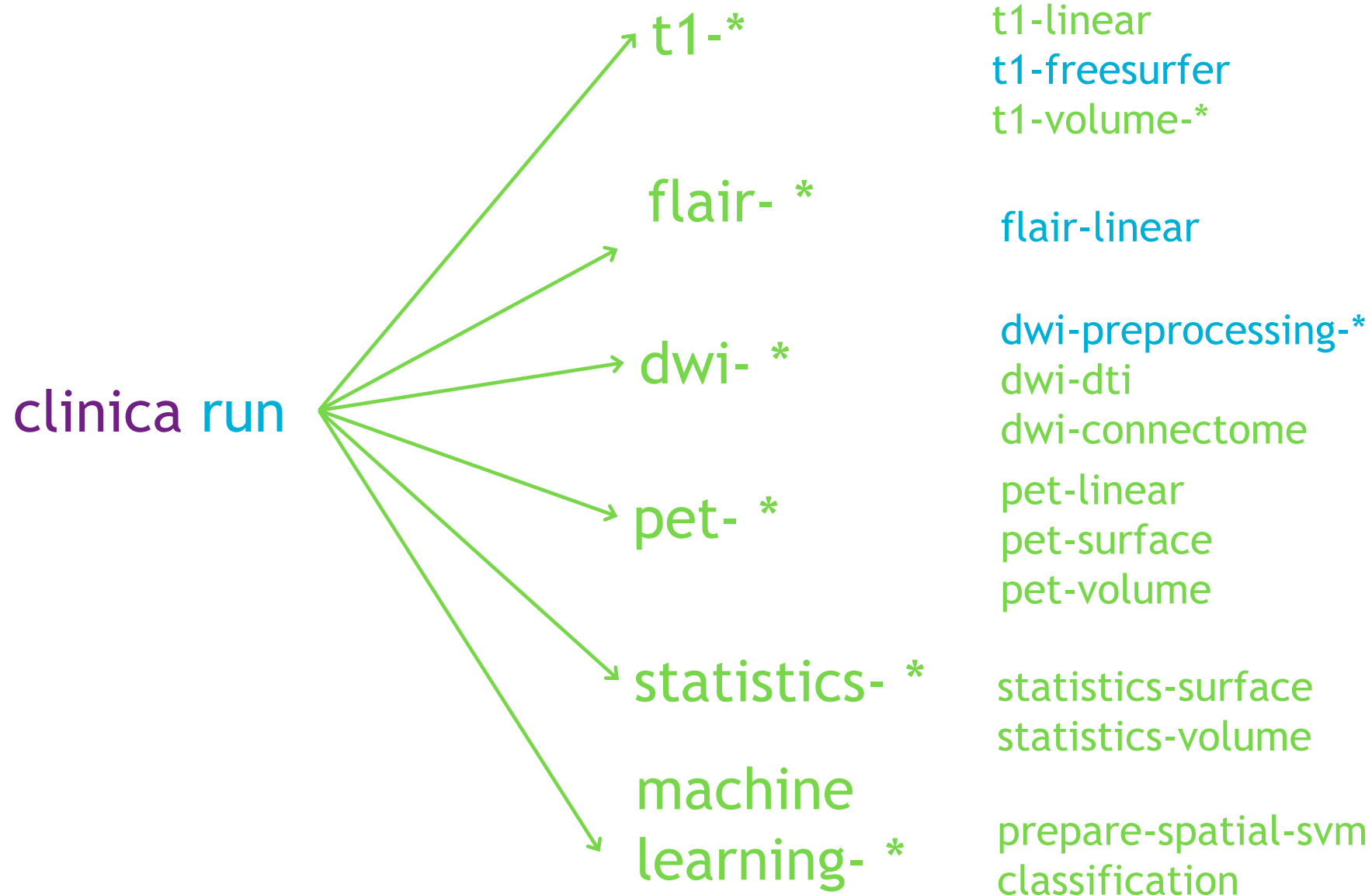
BIDS / CAPS management

Templates for developers

Converters available for (Compliance with BIDS v1.7):

- ADNI (Alzheimer's Disease Neuroimaging initiative)
- AIBL (Australian Imaging Biomarker & Lifestyle Flagship Study of Ageing)
- OASIS (Alzheimer's Disease and age-related dementia)
- NIFD (frontotemporal lobar degeneration neuroimaging initiative)
- ✓ [New] HABS (Harvard Ageing Brain Study)
- ✓ [New] OASIS-3
- ✓ [New] UKBiobank

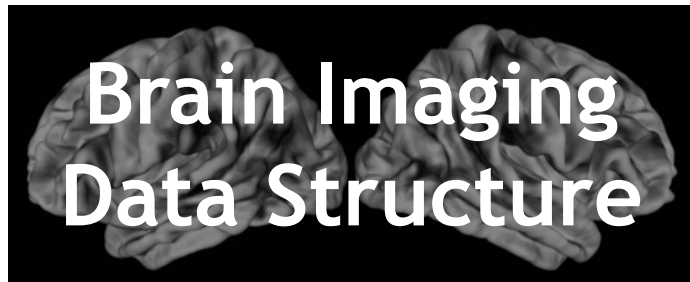




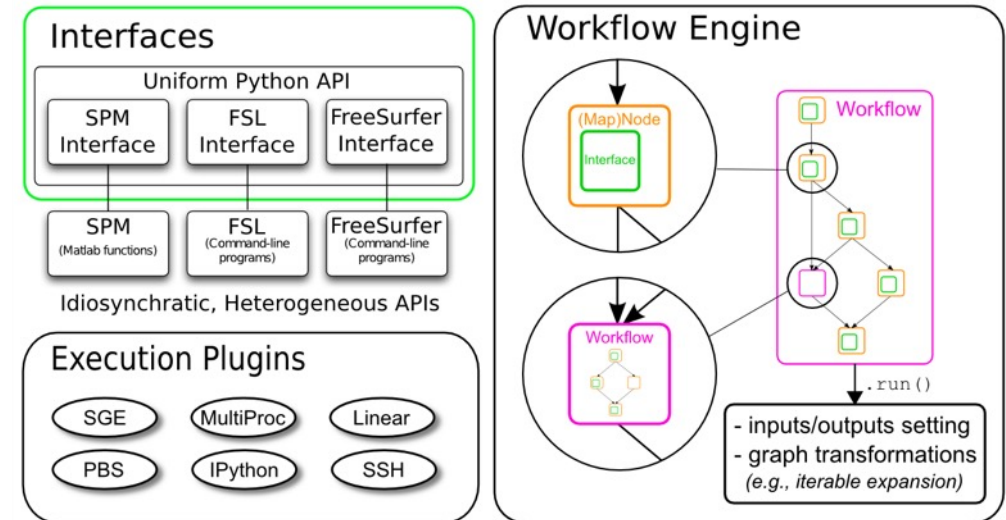


Neuroimaging in Python: Pipelines and Interfaces

- <http://nipype.org/nipype>
- Features:

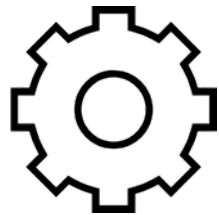


- Interfaces
- Workflows
- Parallel processing





- Continuous Integration
- Improving coverage of unit tests
- Package Management upgrade for reproducible environments



- Engine Upgrade to Pydra
- BIDS compliance
- BIDS provenance support



- Clinica Cloud
- Longitudinal Pipelines



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