Image Registration

Ma hui

Background

- An automatic registration program **Brain Aligner**
- for Drosophila brains and used it to align 3D laser scanning microscope images of thousands of brains with different neuronal expression patterns

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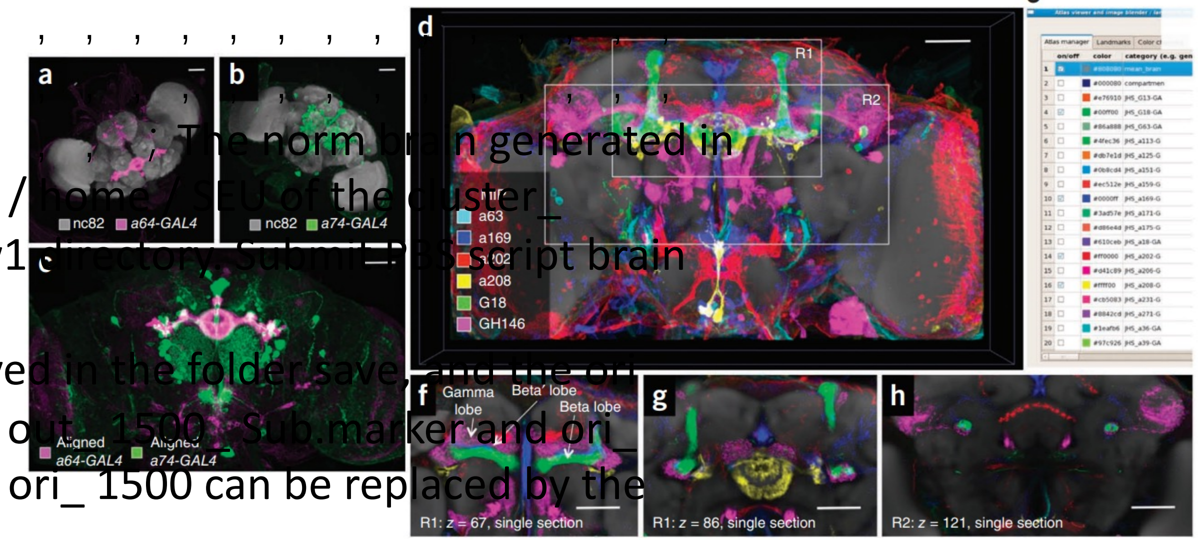
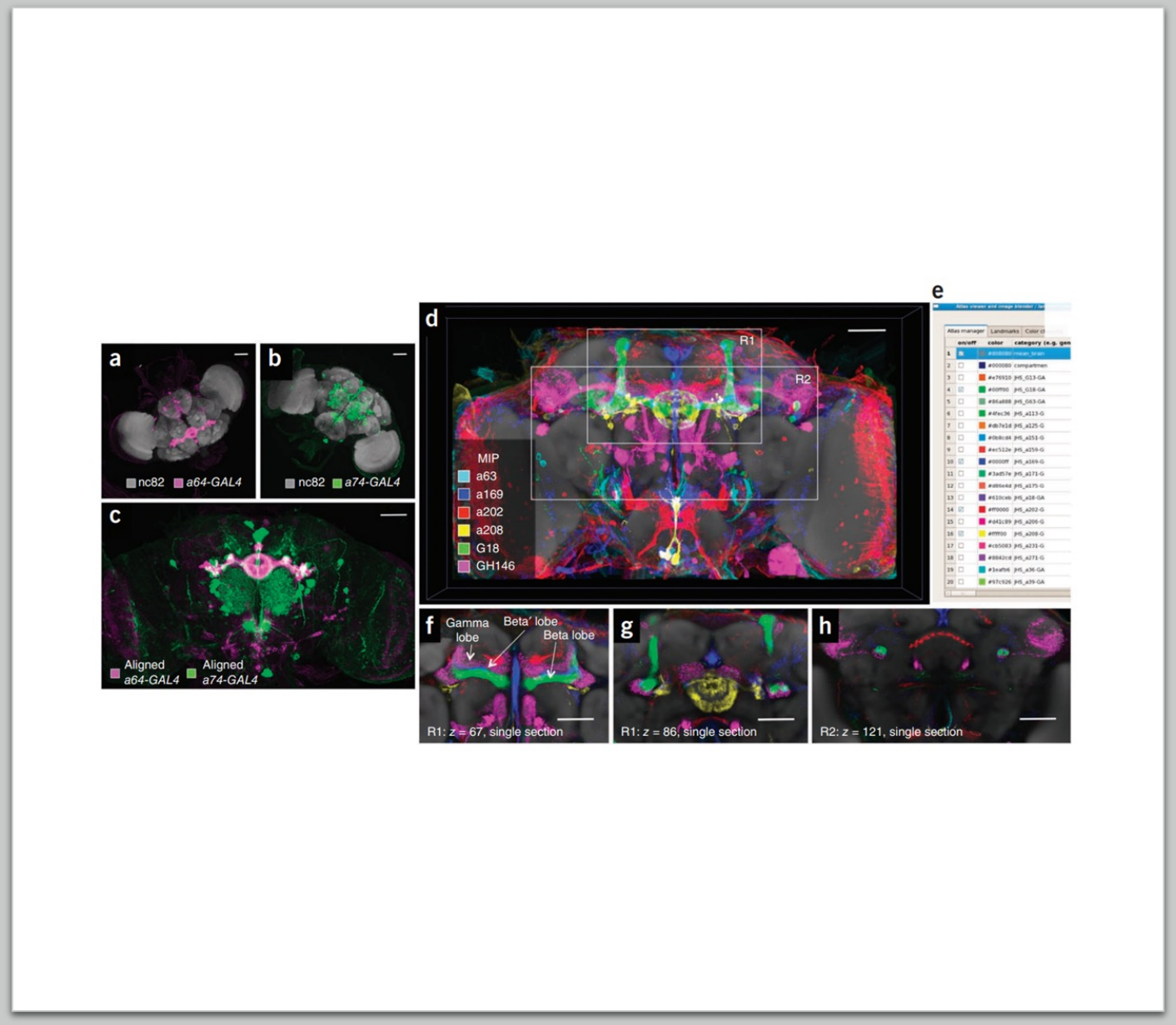
这, , , , , , , , , , , , , , , , , , , ,
, , , , , , , , , , , , , , , , , ; The norm brain generated in the third step is placed in / home / SEU of the cluster_ Registration / brain / new1 directory. Submit PBS script brain directly_ R is enough.
Finally, the results are saved in the folder save, and the ori under each brain is taken out_ 1500_ Sub.marker and ori_ 1500_ Tar.marker and set ori_ 1500 can be replaced by the name of the brain.
For example: 17785 brain, changed to 17785_ Tar.marker and 17785_ The results generated simultaneously by sub.marker will be placed in the corresponding SWC registration folder. See SWC registration for details.



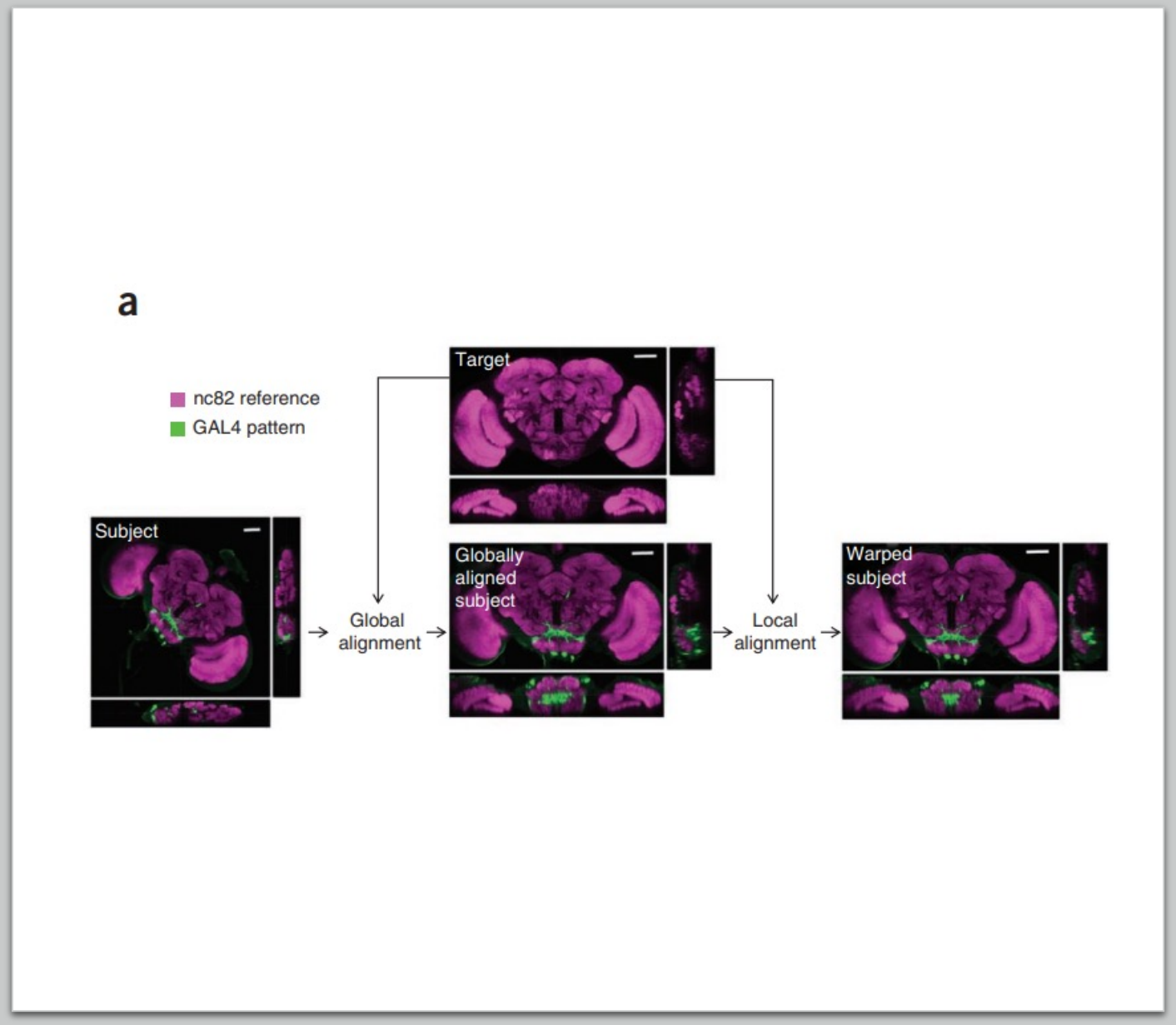
Background

- Registering them into a canonical framework based on a fiducial reference of neuropil morphology.



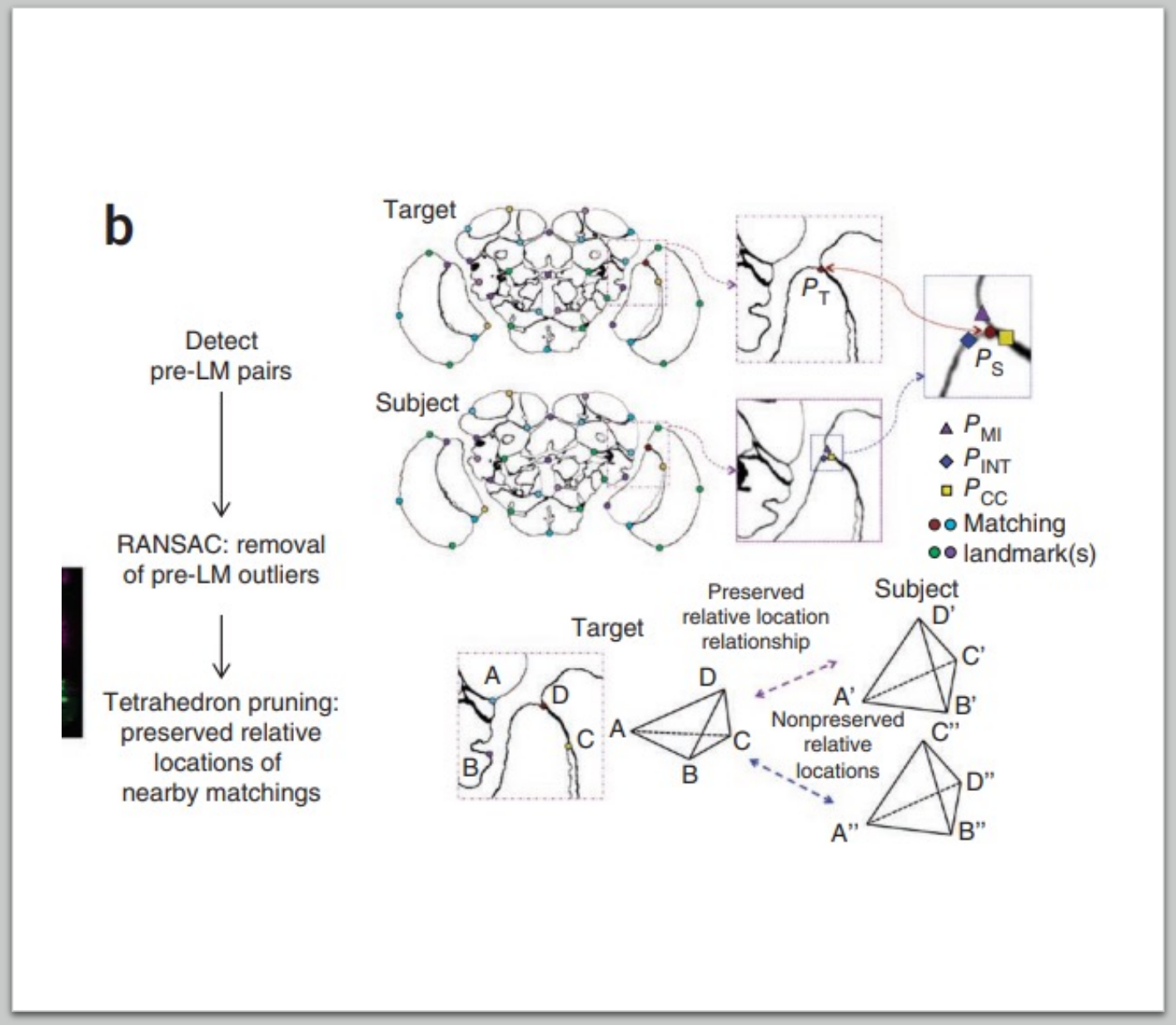
Background

- 3D image registration



Background

- 3D image registration



Brain Image Registration

- Definition

Transformation of coordinate system between individual brain and standard brain

❑Green Brain

It is used to label neurons and emphasize the structure of neurons rather than the specific structure of the brain

❑Red Brain

Registration by brain structure

Brain Image Registration

1. • Down Sample
2. • Striping
3. • Computing norm brain

Brain Image Registration

Brain Registration

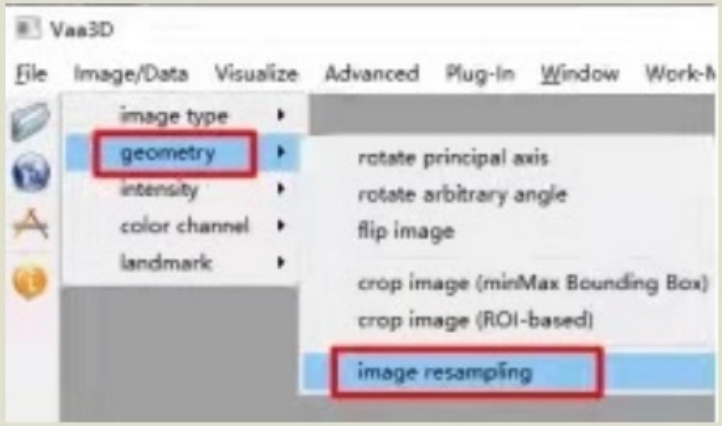
Down Sample

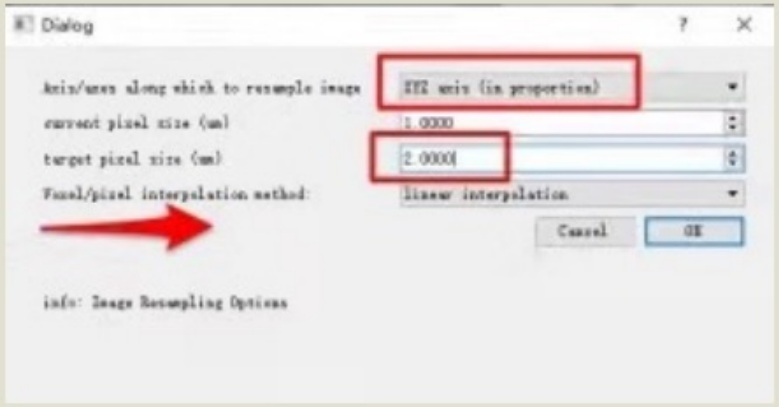
File：.v3draw

Software：vaa3d

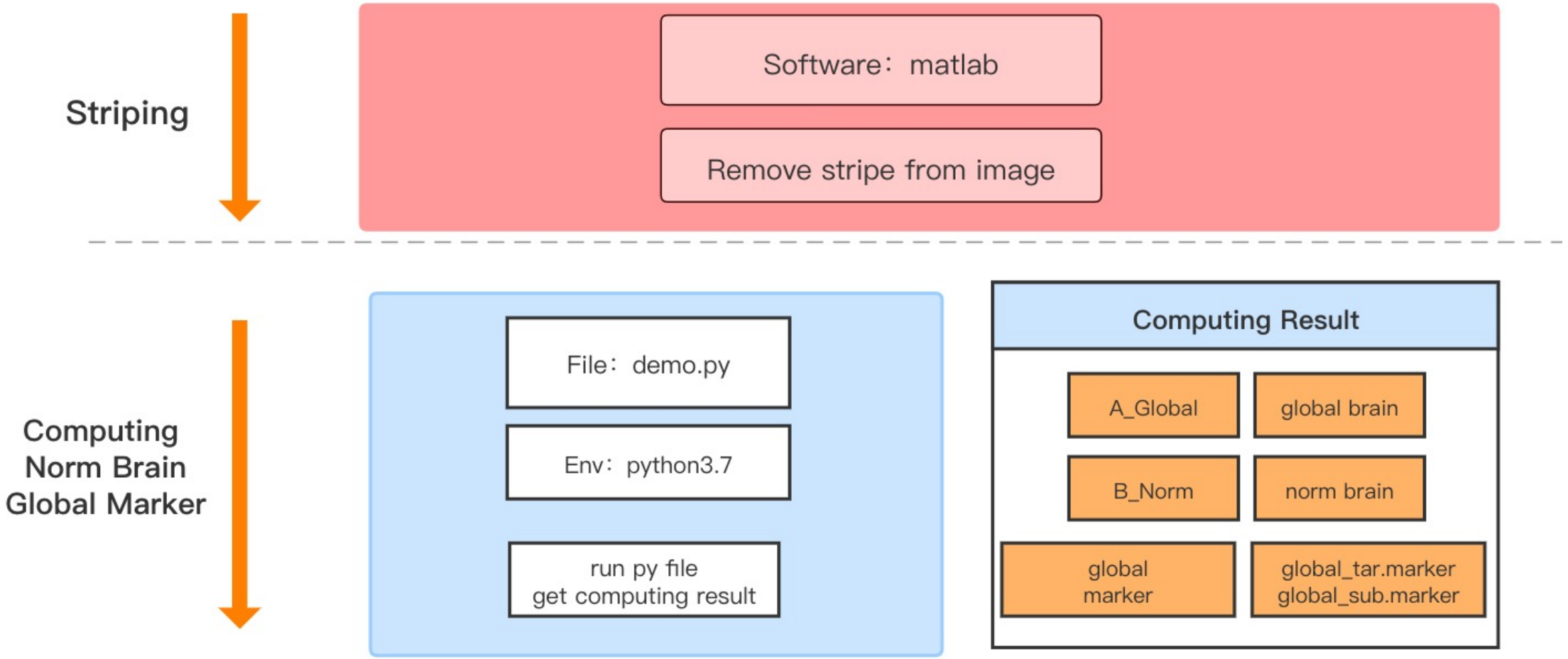
Down sample：image size to xy64z16

Brain Image Registration

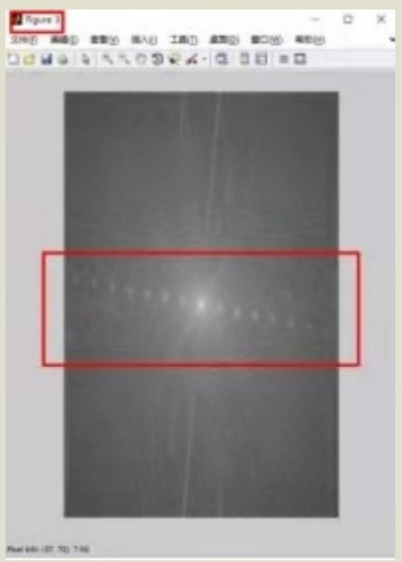


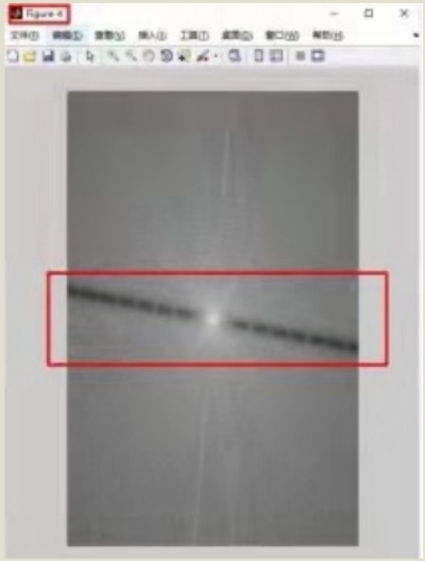


Brain Image Registration



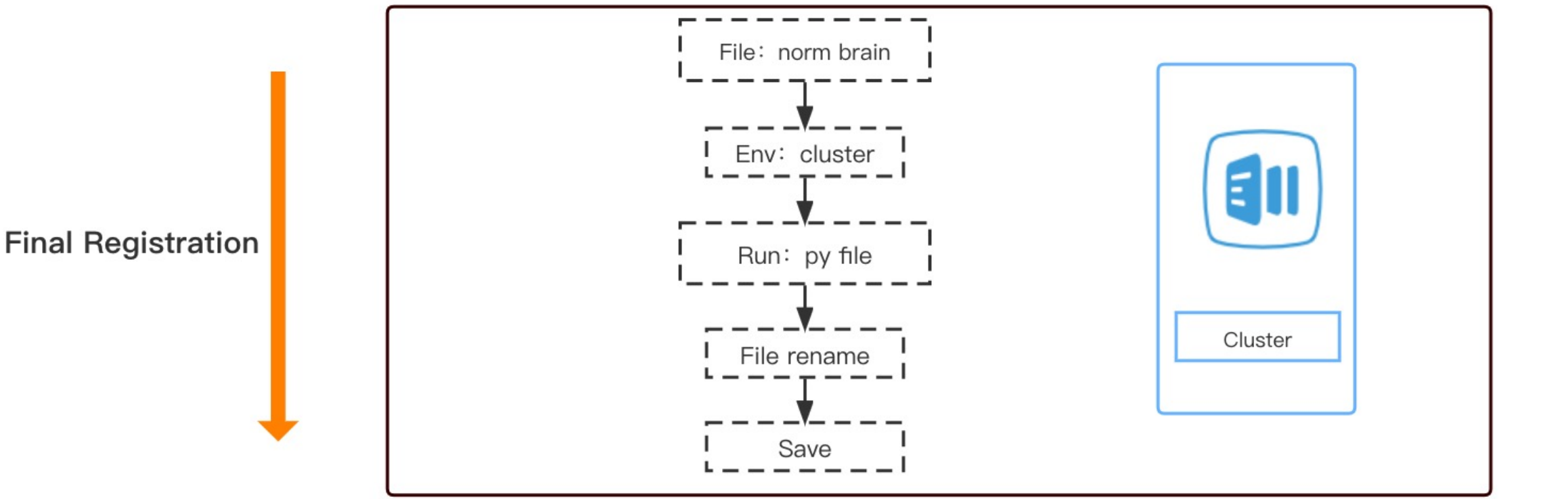
Brain Image Registration



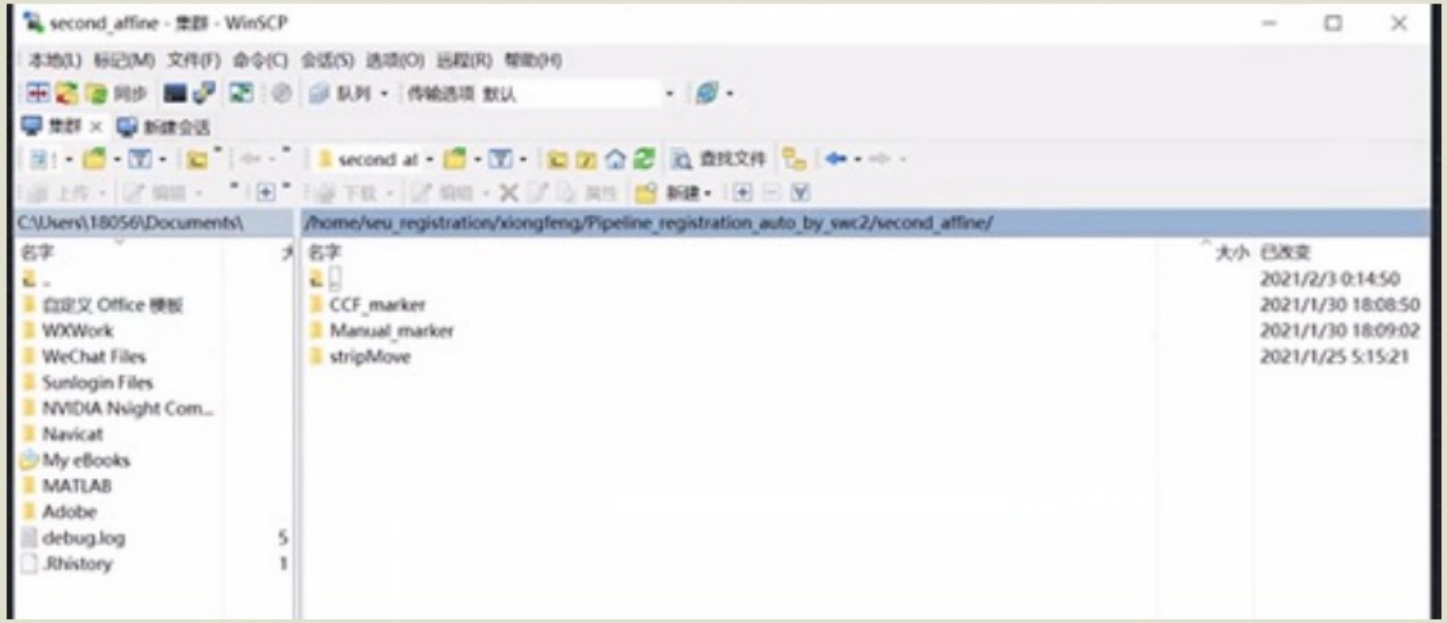


```
58      %构建带状限波滤波器
59 -    filter_axis_dir=168.7;%滤波器方向同横轴夹角(应按照条纹方向手工选择合适的角度)
60 -    filter_cutoff=12;%截止频率太高将导致低频条纹不能完全消除，太低则会出现虚假纹理!
61 -    filter_radius=12;%滤波器宽度半径(该值较大时某些高亮区域周围会出现虚假低频纹理!)
```

Brain Image Registration



Brain Image Registration



SWC Registration

- Definition

❑Transformation between individual brain interior point and standard brain interior point coordinate system.

❑SWC registration is a fully automated process. You can run the corresponding py file.

❑The files generated by brain registration will be used in the second and third links of SWC registration.

SWC Image Registration

SWC Registration

SWC Registration Process

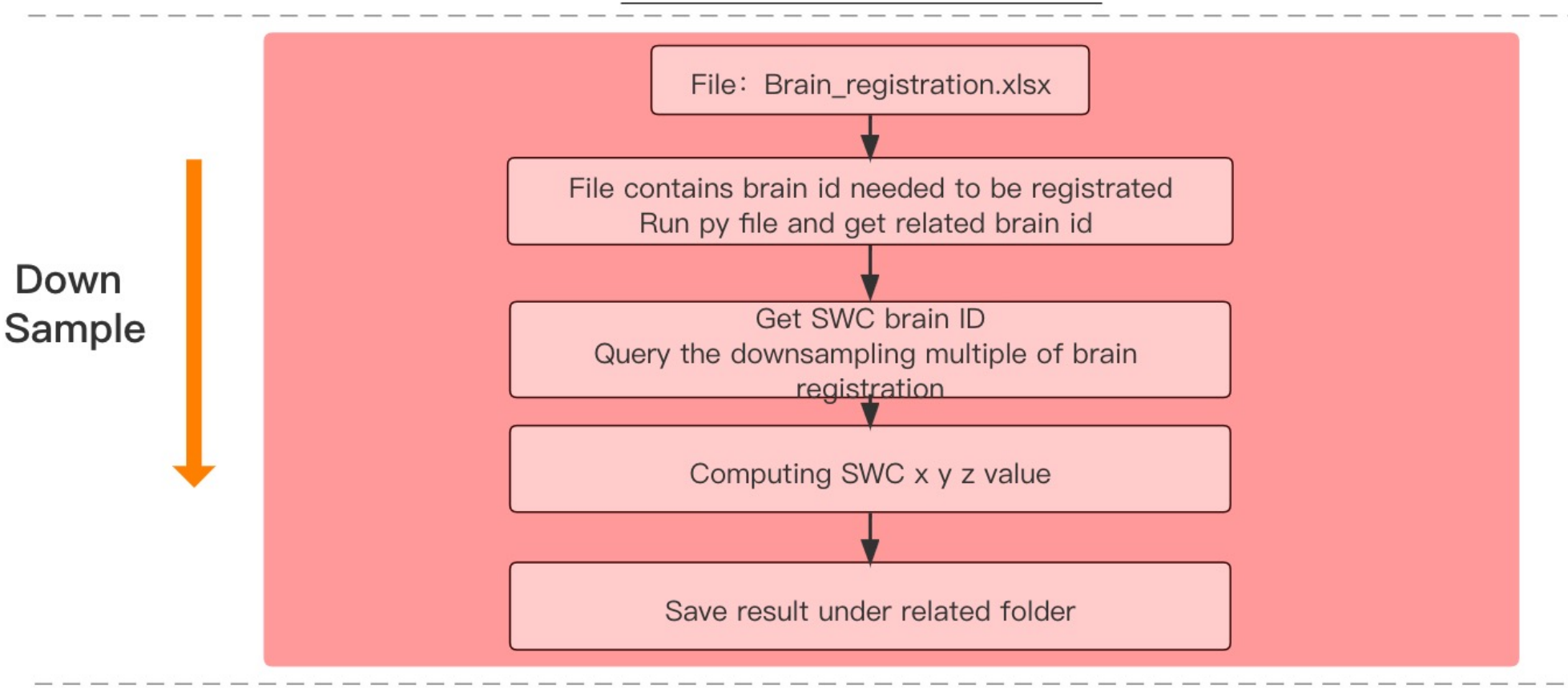
File：Final_swc_wrap.py

Env：python3.7

Put swc into related brain file folder

Run file and get registration result under related folder

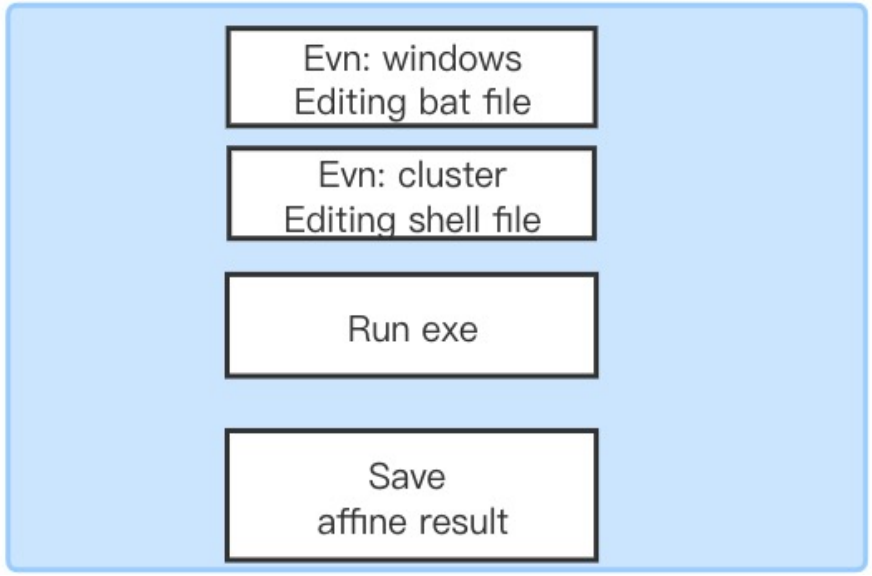
Brain Image Registration

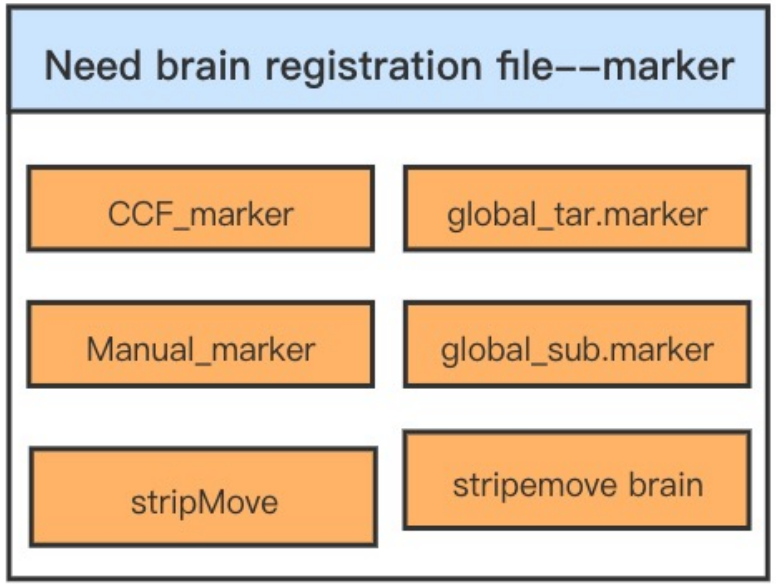


Brain Image Registration

Affine

Use brain registration striping data





Brain Image Registration

Calculate deformation field of two coordinate systems

Use the marker data generated by brain matching