# Pipeline user manual

va.3 updated by Mingrui Wang 6/20/2022

There are several stages of the whole pipeline:

**First step**

1. realign (Nshift = 3),
2. Video realign (Nshift = 1),

**Second step**

1. multiscale detrending for HSLT (High spatial low temporal resolution) video,
2. registration for HSLT video,
3. reconstruction,
4. multiscale detrending for HTLS (High spatial low temporal resolution) video,
5. registration for HTLS video,
6. neuron segmentation,
7. sparse SID extraction

**Third step**

1. stitch

## First step

**Run *main\_global.m* after setting the rawdata path and output path (refer as *mypath*)**

This file realign the global rawdata in two ways: realign (Nshift = 3) and video realign (Nshift = 1). Thus, we can get two file dirs: *mypath/realign* and *mypath/video\_realign*.

You can set all the parameters in the *main\_global.m* file and automatically save the parameters in the *mypath/param\_main.mat.* and main parameters in *./param.mat* which will be used in the next step.

Global images are also devided in several patches. The vertices of all the patches (both high resolution and low resolution ) and other properties are saved in *mypath/patch\_info.mat*.

Parameters which need to be set manually are listed as below

* main\_param

main\_param.outdir

main\_param.rawdata\_path

main\_param.first\_file\_name: before dot ‘.0’

main\_param.Nnum

main\_param.Nshift: equal to realign Nshift = 3

main\_param.num\_rawdata: total frame number

main\_param.view\_range: less than floor(Nnum/2)

main\_param.overlap­­­: overlap between each patch

main\_param.patch\_block: divide into [x,y] patches

main\_param.side: cut the side of [x1, x2, x3, x4] corresponding to [top, left, bottom, right]

* realign\_param

realign\_param.num\_rawdata: smaller than total frame number

realign\_param.start\_frame: from 0 to N-1

realign\_param.frame\_interval

realign\_param.auto\_center\_mode

realign\_param.conf\_name

realign\_param.center\_X

realign\_param.center\_Y: coordinates in c++ of center, needs to check

realign\_param.Nx: half number of micro lens in x direction

realign\_param.Ny: half number of micro lens in y direction

realign\_param.group\_mode: 0 (no slide) or 1 (slide mode)

realign\_param.slight\_resize

realign\_param.slight\_rotation

realign\_param.rotation set to 0

realign\_param.upsampling\_resize 0 (used for realign), 1 is (vid realign)

realign\_param.realign\_mode ‘LZ’ no need to change

realign\_param.bright\_scale\_normalize

realign\_param.skip\_zero\_frame

realign\_param.Nnum: equal to main\_param.Nnum;

realign\_param.Nshift: equal to main\_param.Nshift

* debg\_param

debg\_param.mul\_ds\_psf: no need to change; ds rate equal to 30

debg\_param.PSF\_broader:

debg\_param.psf\_end: total z plane number

debg\_param.z\_select: 0 (auto choose focus plane)

debg\_param.view\_range:

debg\_param.writemode: 0 (no output) 2 (output last iteration) 1 (output all result)

debg\_param.dispmode: 0 (no disp) 1 （disp verbosely）

debg\_param.Nbx

debg\_param.Nby: block apart pieces when DAO

debg\_param.maxIter: max iteration times in RL reconstruction

debg\_param.Aostar: 1 (old DAO) 2(DAO with restart) 0 (no DAO)

debg\_param.defocus: 1 (remove defocus) 0 (no defocus)

debg\_param.threshhold: shift should not be allowed to exceed the threshold

debg\_param.margin

debg\_param.first\_index: start slice of focus plane

debg\_param.second\_index: end slice of focus plane

debg\_param.angle\_range

debg\_param.restart: restart RL reconstruction with shift map

debg\_param.maxframe: max frame number of each stack

* reg\_param
* recon\_param
* seed\_param
* demix\_param
* video\_realign\_param
* viddebg\_param
* vidreg\_param
* psf\_param