

aiPatchTracker

aiPatchTracker performs tilt series alignment by tracking patches from one tilt to the other.

It is important for aiPatchTracker to rely on the initial coarse alignments. The more precise image shifts and image rotation are determined before hand, the better are the results of aiPatchTracker. In case that patches in higher tilt angles are not well tracked, check for the image rotation value which should be known +/- 1 degree.

aiPatchTracker can be used without a configuration file and all parameters can be provided by command line arguments. For convenience, parameters can also be given using a configuration file with the **-u** command line argument. Note: If a parameter is passed by file and by command line, the command line overrides the file.

Options are:

CudaDeviceID

The deviceID of the GPU to use.

Argument for command line: **-d** or **--CudaDeviceID**

Type: **int**

Option is mandatory: **false**

Default value if not set: **0**

Input

The file to process.

Argument for command line: **-i** or **--Input**

Type: **string**

Option is mandatory: **true**

AlignBeamDeclination

Align for beam declination.

Argument for command line: **-alignBeamDecl** or **--AlignBeamDeclination**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **true**

AlignInPlaneRotation

Align for in plane rotation.

Argument for command line: **-alignInPlaneRot** or **--AlignInPlaneRotation**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **true**

AlignFixedInPlaneRotation

Align for a fixed / constant in plane rotation.

Argument for command line: **-alignFixedInPlaneRot** or **--AlignFixedInPlaneRotation**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **false**

Only applicable if **AlignInPlaneRotation** = true.

AlignTilt

Align for tilt angles

Argument for command line: **-alignTilt** or **--AlignTilt**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **true**

AlignMagnification

Align for magnification change.

Argument for command line: **-alignMag** or **--AlignMagnification**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **true**

FixMagnificationOnFirstTilt

Ensures that the magnification change on the first recorded tilt is 1.

Argument for command line: **-fixMagInFirstTilt** or **--FixMagnificationOnFirstTilt**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **true**

Only applicable if **AlignMagnification** = true.

AlignMaxIterations

Maximum number of optimization iterations to perform.

Argument for command line: **-alignIter** or **--AlignMaxIterations**

Type: **int**

Option is mandatory: **false**

Default value if not set: **10000**

AlignZShift

Z shift to apply during marker alignment.

Argument for command line: **-alignZ** or **--AlignZShift**

Type: **float**

Option is mandatory: **false**

Default value if not set: **0**

FixLowerTiltAngles

Increases the costs for modifying lower tilt angles and avoids changes in these lower tilts.

Argument for command line: **-fixTilt** or **--FixLowerTiltAngles**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **false**

PatchSize

The patch size the algorithm tries to track.

Argument for command line: **-size** or **--PatchSize**

Type: **int**

Option is mandatory: **true**

PatchDistance

The distance in between two neighboring patches (center-to-center).

Argument for command line: **-dist** or **--PatchDistance**

Type: **int**

Option is mandatory: **false**

Default value if not set: **256**

MaxDistance

The maximum distance a cross-check is allowed to diverge.

Argument for command line: **-maxDist** or **--MaxDistance**

Type: **float**

Option is mandatory: **false**

Default value if not set: **5**

MinTrackLength

The minimum number of tilts on which a patch must have been successfully tracked for being accepted.

Argument for command line: **-trackLength** or **--MinTrackLength**

Type: **int**

Option is mandatory: **false**

Default value if not set: **10**

LowPassLow

The lower low-pass filter limit.

Argument for command line: **-lplow** or **--LowPassLow**

Type: **float**

Option is mandatory: **true**

LowPassHigh

The higher low-pass filter limit.

Argument for command line: **-lphigh** or **--LowPassHigh**

Type: **float**

Option is mandatory: **true**

LowPassSteps

The number of low-pass filter steps in the range [LowPassLow:LowPassHigh].

Argument for command line: **-lpsteps** or **--LowPassSteps**

Type: **int**

Option is mandatory: **false**

Default value if not set: **5**

SeedTilts

Tilt indices that are used as seeds for patch tracking.

Argument for command line: **-seeds** or **--SeedTilts**

Type: **List<int>**, a list of integer values

Option is mandatory: **false**

Default value if not set: **[]**

AlignmentFile

Save the tracked markers in a separate file. If empty, markers are stored directly inside tilt series metadata.

Argument for command line: **-alignFile** or **--AlignmentFile**

Type: **string**

Option is mandatory: **false**

Default value if not set: **'patchAlignment'**

AlignMarkers

Run marker alignment and filtering after marker/patch detection.

Argument for command line: **-align** or **--AlignMarkers**

Type: **bool**

Option is mandatory: **false**

Default value if not set: **false**

FilterLimit

The maximum reprojection error allowed per patch for final alignment.

Argument for command line: **-filter** or **--FilterLimit**

Type: **float**

Option is mandatory: **false**

Default value if not set: **10**