Tracking framework


Image

ROI / Point

Image sequence

Detection

Particle properties (such as positions and intensities) per frame

Frame-to-frame particle linking

Track segments

Gap closing, merging and splitting

Complete tracks

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Tracking applications (I)

Jaqaman et al. Cell 2011
Tracking examples (II)

Jaqaman et al. JCB 2010
Tracking applications (III)

Applegate et al. JSB 2011
Tracking applications (IV)

Ng et al. JCB 2012

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Tracking interface (I)
Tracking interface (I)
Tracking interface (II)
Tracking interface (II)
Tracking interface (II)
Tracking interface (III)
Tracking interface (III)
Tracking interface (III)
OMERO integration (I)

- Matlab client => OMERO.matlab bindings
- Run the tracking analysis locally
- Interaction with the server:
  1. initialization (metadata, annotation)
  2. image plane loading
  3. results uploading as FileAnnotation: zipped analysis folder
  4. results uploading as ROIs
OMERO integration (II)
OMERO integration (III)

Detection process output:
• single ROI with Point shapes
• grouping of analysis run results
• ROI upload time
• support by OMERO clients (Insight)
OMERO integration (IV)

- Done
  - load & analyze OMERO Images using Matlab client
  - save analysis as annotation & reload analyzed movies
  - export detection output as ROI

- Next phase
  - code reintegration into core components
  - testing plan
  - additional support in the ROI Model
OMERO.matlav

- SVN repository: ~10 OMERO-specific functions

  - at least 30% to be integrated into OMERO.matlab

  - additional Matlab tests (unit & integration)

- https://trac.openmicroscopy.org.uk/ome/ticket/10390

- Matlab projects (Imperial/FLIM project, Michael Porter,...) Test changes & upgrade codes with latest OMERO.matlab (OMERO-merge-stable build)

- Graphical interfaces

- Long-term: cf BlitzGateway
ROI model: track support

Initial discussion: developers meeting of Feb 2012 discussion
ROI model: track support

Initial discussion: developers meeting of Feb 2012 discussion

**Strategy I**: Define event ROIs to handle merge & split events
ROI model: track support

Initial discussion: developers meeting of Feb 2012 discussion

**Strategy I:** Define event ROIs to handle merge & split events

**Strategy II:** Implement graph-based objects (ROI-ROI links)
ROI model: track support

Initial discussion: developers meeting of Feb 2012 discussion

**Strategy I:** Define event ROIs to handle merge & split events

**Strategy II:** Implement graph-based objects (ROI-ROI links)

- Visualization tools need to be rewritten.

- Is there an agreement in the community to start working on a common ROI spec?

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Scaling with analysis size

Fluorescent Speckle Microscopy

~1K-5K speckles detected per frame

~1K-10K tracks
Testing phase

- AQLM’13
demo using Dundee resources
build and uyse local server for detection/tracking labs?

- CLS @ Dundee (Nathke, StanleyWall, Dickerson)
Development server ome-ubuntu104
may need development in terms of analysis

- IDAC @ HMS
Deployment of tracking tools
Local OMERO server? (lincs.med.harvard.edu)

- Jaqaman-Welburn joint project
Technology from mammalian kinetochore project
Data upload in Edinburgh vs analysis in Dallas