Image data and naming conventions

The objective of this document is to describe the format and naming conventions of individual frames of each video and the corresponding ground truths.

Each dataset has the following structure:

Dataset_name ------ 0N (original image data of the N-th sequence)

------ 0N_GT (ground truth for the N-th sequence)

------ SEG (ground truth for the SEG measure)

------ TRA (ground truth for the DET and TRA measures)

------ 0N_RES (results produced by a competing algorithm)

Original image data

tTTT.tif - Multi-page tiff file that contains the original image data (i.e., either 8-bit or 16-bit image data depending on the dataset) of a given frame. TTT is a zero-based index.

Manual tracking

man_trackTTT.tif - 16-bit multi-page tiff file (markers have unique positive labels propagated over time, background has zero label). It contains markers for the corresponding original image tTTT.tif. The man_trackTTT.tif file is provided for every challenge tTTT.tif file. However, note that the man_trackTTT.tif file does not have to be provided for every training tTTT.tif file. Only the frames with non-empty manual tracking annotation are released.

man_track.txt - A text file representing an acyclic graph for the whole video. Every line corresponds to a single track that is encoded by four numbers separated by a space:

L B E P where

L - a unique label of the track (label of markers, 16-bit positive value)
B - a zero-based index of the frame in which the track begins
E - a zero-based index of the frame in which the track ends
P - label of the parent track (0 is used when no parent is defined)

Example: Imagine a sequence of five frames. An object with label 1 exists in the first three frames. Then, a mitotic event occurs in the fourth frame and daughter objects (with labels 2 and 3) exist till the end of the sequence. The track file will contain the following three lines:

1 0 2 0
2 3 4 1
3 3 4 1

Manual segmentation (2D real datasets)

man_segTTT.tif - 16-bit multi-page tiff file (segmented objects have unique positive labels that are not necessarily propagated over time, background has zero label). It contains manual segmentation

for the corresponding original image tTTT.tif. Not all objects have to be segmented. The man_segTTT.tif file does not have to be provided for every tTTT.tif file. Only the frames with non-empty manual segmentation are released.

Manual segmentation (3D real datasets)

man_seg_TTT_ZZZ.tif - 16-bit multi-page tiff file (segmented objects have unique positive labels that are not necessarily propagated over time, background has zero label). It contains manual segmentation for the ZZZ-th slice (ZZZ is a zero-based index) from the corresponding original image tTTT.tif. Not all objects have to be segmented. The man_seg_TTT_ZZZ.tif file does not have to be provided for every slice of each tTTT.tif file. Only the selected slices with non-empty manual segmentation are released.

Generated tracking (simulated datasets)

man_trackTTT.tif - 16-bit multi-page tiff file (markers have unique positive labels propagated over time, background has zero label). It contains markers for the corresponding original image tTTT.tif. The man_trackTTT.tif file is provided for every tTTT.tif file.

man_track.txt - A text file representing an acyclic graph for the whole video. Every line corresponds to a single track that is encoded by four numbers separated by a space (see Manual tracking for further details).

Generated segmentation (simulated datasets)

man_segTTT.tif - 16-bit multi-page tiff file (segmented objects have unique positive labels that are not necessarily propagated over time, background has zero label). It contains generated segmentation for the corresponding original image tTTT.tif. All objects are segmented. The man_segTTT.tif file is provided for every tTTT.tif file.

Participant's results for the Cell Tracking Benchmark

maskTTT.tif - 16-bit multi-page tiff file (segmented and tracked objects have unique positive labels propagated over time, background has zero label). It contains segmented and tracked objects for the corresponding original image tTTT.tif. The maskTTT.tif file is provided for every tTTT.tif file.

res_track.txt - A text file representing an acyclic graph for the whole video. Every line corresponds to a single track that is encoded by four numbers separated by a space (see Manual tracking for further details).

It is the responsibility of each participant to provide results only for those objects that lie at least partly within a field of interest (FOI) for a particular dataset. The FOI specification is described in detail in the annotation procedure instructions.

In the case of Fluo-N3DL-DRO, it is the responsibility of each participant to provide results only for those lineages of objects that are uniquely determined by tracking markers available in man_track000.tif under particular Fluo-N3DL-DRO/0N_GT/TRA folder.

Participant's results for the Cell Segmentation Benchmark

maskTTT.tif - 16-bit multi-page tiff file (segmented objects have unique positive labels within individual frames, background has zero label). It contains segmented objects for the corresponding original image tTTT.tif. The maskTTT.tif file is provided for every tTTT.tif file.

It is the responsibility of each participant to provide results only for those objects that lie at least partly within a field of interest (FOI) for a particular dataset. The FOI specification is described in detail in the annotation procedure instructions.

In the case of Fluo-N3DL-DRO, it is the responsibility of each participant to provide results only for those lineages of objects that are uniquely determined by tracking markers available in man_track000.tif under particular Fluo-N3DL-DRO/0N_GT/TRA folder.