readlif

Release 0.6.5

Nov 24, 2021

Contents:

1 Indices and tables 5

Index 7

class readlif.reader.**LifFile**(*filename*)

Given a path or buffer to a lif file, returns objects containing the image and data.

This is based on the java openmicroscopy bioformats lif reading code that is here: https://github.com/openmicroscopy/bioformats/blob/master/components/formats-gpl/src/loci/formats/in/LIFReader.java # noqa

Variables

- **xml_header** (*string*) – The LIF xml header with tons of data
- **xml_root** (*ElementTree*) – ElementTree XML representation
- **offsets** (*list*) – Byte positions of the files
- **num_images** (*int*) – Number of images
- **image_list** (*dict*) – Has the keys: path, folder_name, folder_uuid, name, image_id, frames

Example

```
>>> from readlif.reader import LifFile
>>> new = LifFile('./path/to/file.lif')
```

```
>>> for image in new.get_iter_image():
>>>     for frame in image.get_iter_t():
>>>         frame.image_info['name']
>>>         # do stuff
```

```
>>> # For non-xy imaging experiments
>>> img_0 = new.get_image(0)
>>> for i in range(0, img_0.dims_n[4]):
>>>     plane = img_0.get_plane(requested_dims = {4: i})
```

get_image(*img_n=0*)

Specify the image number, and this returns a LifImage object of that image.

Parameters **img_n** (*int*) – Image number to retrieve

Returns LifImage object with specified image

get_iter_image(*img_n=0*)

Returns an iterator of LifImage objects in the lif file.

Parameters **img_n** (*int*) – Image to start iteration at

Returns Iterator of LifImage objects.

class readlif.reader.**LifImage**(*image_info*, *offsets*, *filename*)

This should not be called directly. This should be generated while calling get_image or get_iter_image from a LifFile object.

Variables

- **path** (*str*) – path / name of the image
- **dims** (*tuple*) – (x, y, z, t, m)
- **display_dims** (*tuple*) – The first two dimensions of the lif file. This is used to decide what dimensions are returned in a 2D plane.

- **dims_n** (*dict*) – {0: length, 1: length, 2: length, n: length}

  For atypical imaging experiments, i.e. those not simple photos of XY frames, this attribute will be more useful than *dims*. This attribute will hold a dictionary with the length of each dimension, in the order it is referenced in the .lif file.

  Currently, only some of the 10 possible dimensions are used / known:

  - 1: x-axis
  - 2: y-axis
  - 3: z-axis
  - 4: time
  - 5: detection wavelength
  - 6-8: Unknown
  - 9: illumination wavelength
  - 10: mosaic tile
- **name** (*str*) – image name
- **offsets** (*list*) – Byte position offsets for each image.
- **filename** (*str, bytes, os.PathLike, io.IOBase*) – The name of the LIF file being read
- **channels** (*int*) – Number of channels in the image
- **nz** (*int*) – number of 'z' frames

  Note, it is recommended to use *dims.z* instead. However, this will be kept for compatibility.
- **nt** (*int*) – number of 't' frames

  Note, it is recommended to use *dims.t* instead. However, this will be kept for compatibility.
- **scale** (*tuple*) – (scale_x, scale_y, scale_z, scale_t).

  Conversion factor: px/µm for x, y and z; images/frame for t. For time, this is the duration for the entire image acquisition.
- **scale_n** (*dict*) – {1: scale_x, 2: scale_y, 3: scale_z, 4: scale_t}.

  Conversion factor: px/µm for x, y and z; images/sec for t. Related to *dims_n* above.
- **bit_depth** (*tuple*) – A tuple of ints that indicates the bit depth of each channel in the image.
- **mosaic_position** (*list*) – If the image is a mosaic (tiled), this contains a list of tuples with four values: *(FieldX, FieldY, PosX, PosY)*. The length of this list is equal to the number of tiles.
- **settings** (*dict*) – ATLConfocalSettingDefinition (if it exists), which contains values like NumericalAperture and Magnification.
- **info** (*dict*) – Direct access to data dict from LifFile, this is most useful for debugging. These are values pulled from the Leica XML.

get_frame (*z=0*, *t=0*, *c=0*, *m=0*)

Gets the specified frame (z, t, c, m) from image.

Parameters

- **z** (*int*) – z position
- **t** (*int*) – time point
- **c** (*int*) – channel
- **m** (*int*) – mosaic image

Returns Pillow Image object

get_iter_c(*z=0*, *t=0*, *m=0*)
Returns an iterator over the channels at time t and position z.

Parameters

- **z** (*int*) – z position
- **t** (*int*) – time point
- **m** (*int*) – mosaic image

Returns Iterator of Pillow Image objects

get_iter_m(*z=0*, *t=0*, *c=0*)
Returns an iterator over the z series of time t and channel c.

Parameters

- **t** (*int*) – time point
- **c** (*int*) – channel
- **z** (*int*) – z position

Returns Iterator of Pillow Image objects

get_iter_t(*z=0*, *c=0*, *m=0*)
Returns an iterator over time t at position z and channel c.

Parameters

- **z** (*int*) – z position
- **c** (*int*) – channel
- **m** (*int*) – mosaic image

Returns Iterator of Pillow Image objects

get_iter_z(*t=0*, *c=0*, *m=0*)
Returns an iterator over the z series of time t and channel c.

Parameters

- **t** (*int*) – time point
- **c** (*int*) – channel
- **m** (*int*) – mosaic image

Returns Iterator of Pillow Image objects

get_plane(*display_dims=None*, *c=0*, *requested_dims=None*)
Gets the specified frame from image.

Known issue: LASX Navigator saves channel as the second channel, this reader will fail in that case.

Parameters

- **display_dims** (*tuple*) – Two value tuple (1, 2) specifying the two dimension plane to return. This will default to the first two dimensions in the LifFile, specified by LifFile.display_dims
- **c** (*int*) – channel
- **requested_dims** (*dict*) – Dictionary indicating the item to be returned, as described by a numerical dictionary, ex: {3: 0, 4: 1}

Returns Pillow Image object

`readlif.utilities.`**`get_xml`**(*filename*)

Given a lif file, returns two values (xml_root, xml_header) where xml_root is an ElementTree root, and xml_header is the text.

This is useful for debugging.

Some private functions are used from readlif.reader.

Parameters **filename** (*string*) – what file to open?

CHAPTER 1

Indices and tables

- genindex
- modindex
- search

Index

G

get_frame() (*readlif.reader.LifImage method*), 2
get_image() (*readlif.reader.LifFile method*), 1
get_iter_c() (*readlif.reader.LifImage method*), 3
get_iter_image() (*readlif.reader.LifFile method*), 1
get_iter_m() (*readlif.reader.LifImage method*), 3
get_iter_t() (*readlif.reader.LifImage method*), 3
get_iter_z() (*readlif.reader.LifImage method*), 3
get_plane() (*readlif.reader.LifImage method*), 3
get_xml() (*in module readlif.utilities*), 4

L

LifFile (*class in readlif.reader*), 1
LifImage (*class in readlif.reader*), 1

R

readlif.reader (*module*), 1
readlif.utilities (*module*), 4