TissueMAPS Toolbox Documentation

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INTRODUCTION

tmt is a Python package that bundles image processing and data analysis tools for TissueMAPS.

1.1 Subpackages

align - Alignment of images between different acquisition cycles.

corilla - Correction of illumination artifacts.

dafu - Data fusion for Jterator projects.

illuminati - Creation of image pyramids.

visi - Conversion of Visitron's STK files to PNG images with optional renaming.

1.2 Configuration settings

Configurations are defined in *.config* YAML files to specify the experiment layout, such as the directory structure on disk.

Paths and filenames are described with Python format strings. The **replacement fields** surrounded by curly braces `{}` are then automatically replaced with experiment specific variables.

To this end, you can use the following *replacement fields*:

- *experiment_dir*: absolute path to the experiment directory
- *experiment*: name of the experiment folder
- *subexperiment*: name of a subexperiment folder, i.e. a subfolder of the experiment folder
- *cycle*: number of a subexperiment
- *channel*: number of a channel of intensity images (layers)
- *objects*: name of objects in segmentation images (masks)

```
SUBEXPERIMENTS_EXIST: Yes

# Path format strings
IMAGE_FOLDER_LOCATION: '{experiment_dir}/{subexperiment}/images'
SHIFT_FOLDER_LOCATION: '{experiment_dir}/{subexperiment}/shift'
STATS_FOLDER_LOCATION: '{experiment_dir}/{subexperiment}/stats'
SEGMENTATION_FOLDER_LOCATION: '{experiment_dir}/{subexperiment}/segmentations'
LAYERS_FOLDER_LOCATION: '{experiment_dir}/layers'
DATA_FILE_LOCATION: '{experiment_dir}/data.h5'
```

```
# Filename format strings
SUBEXPERIMENT_FOLDER_FORMAT: '{experiment}_{cycle:0>2}'
SUBEXPERIMENT_FILE_FORMAT: '{experiment}_{cycle}'
STATS_FILE_FORMAT: 'illumstats_channel{channel:0>3}.h5'
SHIFT_FILE_FORMAT: 'shiftDescriptor.json'

# Regular expression patterns to extract information encoded in filenames
EXPERIMENT_FROM_FILENAME: '^([^_]+)'
CYCLE_FROM_FILENAME: '_(\d+)_'
COORDINATES_FROM_FILENAME: '_r(\d+)_c(\d+)_'
COORDINATES_IN_FILENAME_ONE_BASED: Yes
SITE_FROM_FILENAME: '_s(\d+)_'
CHANNEL_FROM_FILENAME: 'C(\d+)\.png$'
OBJECTS_FROM_FILENAME: '_segmented(\w+).png$'

# Should Vips image processing library be used? Required for pyramid creation!
USE_VIPS_LIBRARY: Yes

# These settings are hard-coded in TissueMAPS, so don't change them!
LAYERS_FOLDER_LOCATION: '{experiment_dir}/layers'
ID_TABLES_FOLDER_LOCATION: '{experiment_dir}/id_tables'
ID_PYRAMIDS_FOLDER_LOCATION: '{experiment_dir}/id_pyramids'
DATA_FILE_LOCATION: '{experiment_dir}/data.h5'
```

NOTE: Quotes are generally not required around strings in YAML syntax, but are necessary here because of the curly braces in the format strings!

1.3 Documentation

Sphinx is used for the documentation of source code in combination with the Napoleon extension to support the reStructuredText NumPy style.

Documentation is located under *docs* and will ultimately be hosted on Read the Docs.

To update the documentation upon changes in the source code, do

```
sphinx-apidoc -o ./docs ./tmt
```

To build HTML, do

```
cd docs
make html
```

The generated HTML files are located at *docs/_build/html*.

CHAPTER

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INDICES AND TABLES

- genindex
- modindex
- search