scikit-surgery-sphere-fitting Documentation

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scikit-surgery-sphere-fitting is part of the SNAPPY software project, developed at the Wellcome EPSRC Centre for Interventional and Surgical Sciences, part of University College London (UCL).

scikit-surgery-sphere-fitting supports Python 3.6.

scikit-surgery-sphere-fitting fits a sphere to a set of 3D points. It includes a user interface that will read data from a vtk polydata file create an output polydata file showing the fitted sphere. Example usage:

```
python sksurgeryspherefitting.py polydata_in.vtp --output polydatata_out.vtp --config␣
↪conf.json
```

It was created in part to provide a simple demonstration of algorithm development as part of a program of SNAPPY Tutorials, but also provides a useful service should you want to fit a sphere to some data.

CHAPTER 1

Developing

1.1 Cloning

You can clone the repository using the following command:

```
git clone https://weisslab.cs.ucl.ac.uk/StephenThompson/scikit-surgery-sphere-fitting
```

1.2 Running tests

Pytest is used for running unit tests:

```
pip install pytest
python -m pytest
```

1.3 Linting

This code conforms to the PEP8 standard. Pylint can be used to analyse the code:

```
pip install pylint
pylint --rcfile=tests/pylintrc sksurgeryspherefitting
```

CHAPTER 2

Installing

You can pip install directly from the repository as follows:

```
pip install git+https://weisslab.cs.ucl.ac.uk/StephenThompson/scikit-surgery-sphere-
↪fitting
```

or directly from pypi

```
pip install scikit-surgery-sphere-fitting
```

2.1 Contributing

Please see the contributing guidelines.

2.2 Useful links

- Source code repository
- Documentation

CHAPTER 3

Licensing and copyright

Copyright 2019 University College London. scikit-surgery-sphere-fitting is released under the BSD-3 license. Please see the license file for details.

CHAPTER 4

Acknowledgements

Supported by Wellcome and EPSRC.

4.1 Requirements for scikit-surgery-sphere-fitting

This is the software requirements file for scikit-surgery-sphere-fitting, part of the SNAPPY project. The requirements listed below should define what scikit-surgery-sphere-fitting does. Each requirement can be matched to a unit test that checks whether the requirement is met.

4.1.1 Requirements

ID	Description	Test
0000	Module has a help page	pylint, see tests/pylint.rc and tox.ini
0001	Functions are documented	pylint, see tests/pylint.rc and tox.ini
0002	Package has a version number	No test yet, handled by git.
0003	Provides a function to fit a sphere to a list of 3 dimensional points	
0004	Allows for configuration via a python dictionary	
0005	Provides a command line application	
0006	What else ??	

4.2 latest

4.2.1 sksurgeryspherefitting package

Subpackages

sksurgeryspherefitting.algorithms package

Submodules

sksurgeryspherefitting.algorithms.sphere_fitting module

Module for fitting a sphere to a list of 3D points

sksurgeryspherefitting.algorithms.sphere_fitting.**fit_sphere_least_squares**(*x_values*, *y_values*, *z_values*, *initial_parameters*, *bounds=((-inf, -inf, -inf, -inf), (inf, inf, inf, inf))*)

Uses scipy's least squares optimisor to fit a sphere to a set of 3D Points

Returns x: an array containing the four fitted parameters

Returns ier: int An integer flag. If it is equal to 1, 2, 3 or 4, the solution was found.

Param (x,y,z) three arrays of equal length containing the x, y, and z coordinates.

Param an array containing four initial values (centre, and radius)

Module contents

sksurgeryspherefitting.ui package

Submodules

sksurgeryspherefitting.ui.sksurgeryspherefitting_command_line module

Command line processing

sksurgeryspherefitting.ui.sksurgeryspherefitting_command_line.**main**(*args=None*)

Entry point for scikit-surgery-sphere-fitting application

sksurgeryspherefitting.ui.sksurgeryspherefitting_demo module

Uses sphere fitting to fit to vtk model

sksurgeryspherefitting.ui.sksurgeryspherefitting_demo.**run_demo**(*model_file_name*, *output=''*, *configfile=False*)

Run the application

Module contents

scikit-surgery-sphere-fitting

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sksurgeryspherefitting

- modindex
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