

Practical work on deformable models

TADI

This work uses python3 and skimage. Its aim is to understand two segmentation methods based on deformable models:

- parametric active contours, using contour information;
- implicit representation (using level sets), with Chan & Vese method, using region homogeneity.

Experiences will be carried out on medical images (two brain MRI images, one cardiac MRI image, one retina vessel image acquired using adaptive optics). Other images of your choice can be used as well.

To start, a code is available:

```
tp_deformable-models.py
```

You can use Spyder or a Jupyter Notebook for instance.

1 Parameters

For each method, provide detailed explanations on:

- the interpretation of each parameter and its role,
- its influence on the segmentation result when varying its value.

2 Segmentation

For at least one of the four images and another of your choice (either another one among the provided images, or any other), propose a segmentation method, using one of the previous approaches, to segment some of the anatomical structures. Justify your choices, explain the obtained results, and discuss potential ideas to improve the results.