Medical Image Analysis Exercises: Session 09

http://physics.medma.uni-heidelberg.de/cms/

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input: `AT3_1m4_02.tif` (as the moving image) and `AT3_1m4_03.tif` (as the fixed image) from MATLAB

a: crop both images to select the second cell from the left

b: registration with different transform types

- select proper optimizer and metric based on the image modality
- register the images with 4 different transform types
- calculate the mean square error between the registered image and the fixed image in the region where the registered image is not zero
- display 5 axes in one figure, including the original image pair, and 4 different outputs of the registration (using `imshowpair()`) with transform type and mean square error in the title

c: registration with different pyramid levels

- select the transform type which returns the best result previously
- register the images with 4 different pyramid levels
- calculate the mean square error between the registered image and the fixed image in the region where the registered image is not zero
- record the elapsed time for each registration
- display 5 axes in one figure, including the original image pair, and 4 different outputs of the registration (using `imshowpair()`) with pyramid levels and mean square error in the title

reference

- http://www.mathworks.com/help/images/registering-multimodal-mri-images.html

43: multimodal image registration

input: `ThoraxPhanCT.dcm` (as the moving image) and `ThoraxPhanCBCT.png` (as the fixed image)

a: spatial referencing information

- create the spatial referencing objects for every image to locate the similar image content near each other
- display 1 axes in one figure, including the original image pair with the spatial referencing information (using `imshowpair()`)

b: registration with affine transformation

- select proper optimizer and metric based on the image modality
- display the properties of the optimizer and the metric in the console
- register the images using an affine transformation with the default parameters
- reduce the InitialRadius by a factor of 5 and perform the registration again
- increase the maximum number of iterations by a factor of 4 in addition and perform the registration again
- display 3 axes in one figure, including 3 different outputs of the registration (using `imshowpair()`) with proper notation in the title

references

- http://www.mathworks.com/help/images/ref/imref2d-class.html
- http://www.mathworks.com/help/images/registering-multimodal-mri-images.html