

# Assignment 1: Registration of fluorescein angiography retinal images

Sabanci University  
Computer Science and Engineering Program  
CS419 - Digital Image and Analysis  
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## 1 Context

Retinal images are very often acquired across multiple patient visits and the images need to be registered (i.e. aligned) perfectly for the medical professionals to be able to make accurate assessments.

You are provided with a python notebook that loads 2 pairs of reference-test images (FLORI21 dataset). You are also given several control points (provided by medical professionals).

Your task is to continue coding this notebook, and

1. calculate the affine transform (registration) matrix between each pair of images (50 points)
2. apply the matrix to perform registration and visualize the results (25 points)
3. calculate the mean squared error of this operation. For this you'll have to transform an image  $I$  into  $I'$ , and then  $I'$  back into  $I$  and check how well the pixels match each other. Discuss your results. (25 points)

## 2 What to submit and evaluation

You are expected to submit your notebook, and your code will be tested with other images from the dataset. You will also submit a latex report detailing the mathematical steps you have taken and your comments on the error.

Good luck.