

Exercise 1: Computer vision

#1 [algo pseudo code] Can you suggest an algorithm to register the two images below?
One is LWIR and the other visible light. Any idea/suggestion of an interesting map we could generate from that?



#2 [actual compiling code, C++ 11 or later] Can you please:

- create a 2D image class that derives (in the object oriented definition of the term) into 3D volume class (voxels).
- write up a 3d connected component analysis for this class
- write functions to compute cartesian coordinates from polar coordinates and back - in 3D.

Exercise 2: Audio coughing detection

You are presented with a balance dataset made of 10,000 audio samples, similar to those:

https://research.google.com/audioset/unbalanced_train/cough.html

<https://research.google.com/audioset/ontology/breathing.html>

The goal is to build a classifier.

Please explain how you would address the problem, describe the tools you would be using, and provide pseudo-code when relevant.