

Enhancing filters for medical application

This project takes place in a larger project in collaboration between LIP6, ISIR and Saint-Antoine Hospital.

The main goal of this project is to improve a medical intervention called Endoscopic Retrograde Cholangio Pancreatography (ERCP). This intervention aims to drain the bile ducts. For this, the endoscopist needs to follow their instruments with 2D X-ray radiography, called cholangiograms. However the guidewire is very thin and low contrasted, which makes its automatic detection very difficult.

Here we propose to use vesselness filters to enhance the guidewire on these X-ray images. Vesselness filters are often used as a pre-processing step in the segmentation of vessels to enhance contrast in angiography images. We expect similar results on the guidewire in cholangiograms.

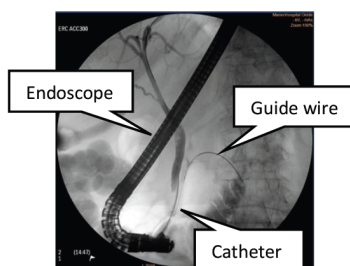


Figure 1: Cholangiogram with endoscope, catheter and guidewire (tool to enhance).

A toy dataset will be provided in order to conduct the experiments.

You will be asked to implement some of the filters described in [1], in Python, evaluate them and compare them on the toy dataset.

Contact: Garance MARTIN, garance.martin@lip6.fr

References

- [1] Jonas Lamy, Odysée Merveille, Bertrand Kerautret, Nicolas Passat, and Antoine Vacavant. Vesselness filters: A survey with benchmarks applied to

liver imaging. In *International Conference on Pattern Recognition (ICPR)*, pages 3528–3535, 2020.