1 Articles intéressants

1. Xiuyuan Yang and Wenjuan Sun and Claudiu L. Giusca. **"An automated surface determination approach for computed tomography"**, NDT & E International, 2022.

   - doi : `https://doi.org/10.1016/j.ndteint.2022.102697`
   - url : `https://www.sciencedirect.com/science/article/pii/S0963869522000962`
   - Highlights :
     - Global threshold methods : ISO50 and Otsu.
     - Local threshold methods : Canny, Steinbess, Heinzl
     - Article suggests an algorithm with automatic threshold optimisation, as opposed to manually chosen (e.g. Canny). This algorithm is called **marker-control watershed (MCW)**.
     - Used successfully in the medical field to extract features of interest such as organs, but there are few studies related to MCW applied in the CT inspection of components of higher density.
     - **Step 1 :** determine markers for foreground and background. Done by using an opening-closing reconstruction algorithm. **Step 2 :** Apply spline interpolation with chosen p, the ratio between the length of the side of the pixel before and after interpolation. Subsequently, apply the Sobel gradient operator. **Step 3 :** Geodesic transformation to reduce the number of minima, as shown on Fig. 9. **Step 4 :** Apply traditional watershed algorithm.
     - 6 times slower than ISO50, and twice as slow as Canny, but the results can be seen on Fig. 21, 22, 23. Fig 23 shows that the algorithm managed to get rid of some beam hardening artifact.
     - **Drawback :** the Article only considered 2D implementation of MCW. If we want to implement this in 3D we'll probably have to do it ourselves.

2. Matthias Busch and Tino Hausotte. **"Application of an edge detection algorithm for surface determination in industrial X-ray computed tomography"**

   - doi : `https://doi.org/10.1007/s11740-021-01100-z`
   - url : `https://rdcu.be/dW3Co`
   - highlights :
     - This paper focuses on the Prewitt filter, which is implemented in matlab.
     - In this paper they use the median filtering AFTER the edge detection, in order not to lose edge information, so that it will close the edge contour between the voxels and will slightly reduce the artifacts, as well as a reduction of computing time.
     - Comparison between the 3DPM (3D Prewitt filter with median filtering) and the local adaptive threshold method can be seen on fig 9.
     - Conclusion : Better than Canny in terms of image artefacts. It also shows an improvement in the detectability of intermediate surfaces, as showcased on Fig. 11