

Week 5: Registration

Materials

MDSC 689.03 - W2017 Students > Image_Datasets

- SawbonesSpine.obj → Surface model of the spine.
- Sawbones→ CT image of a spine model. DICOM format.

Assignment

- Segment the spine in the CT image contained in the Sawbones folder.
- Use the iterative closest point (ICP) algorithm to register the segmented surface to the provided spine surface model (SawbonesSpine.obj).
- Extract the transformation used to register the surfaces.
- Apply the same transformation to the spine CT image.
- Now you have registered the CT image in the coordinate space of the provided spine surface model using surface registration with the ICP algorithm.
- You can either visualize or save the resulting registered image.
- **Due on: Next monday at noon. Python files and screen captures must be uploaded to your Dropbox directory.**

Important considerations

- All vtk classes are allowed.
- Remember to check the python vtk examples online (<http://www.vtk.org/Wiki/VTK/Examples/Python>).
- It is suggested to use a rigid transformation, given that the provided surface and CT image correspond to the same spine model.
- The class `vtkIterativeClosestPointTransform` implements the ICP algorithm.
- The class `vtkImageReslice` should help you to apply the resulting transformation to the spine CT image.

Bonus

- You can convert the provided spine model to a binary image and overlay it on your registered CT spine image, in order to visually check how accurate was the registration.

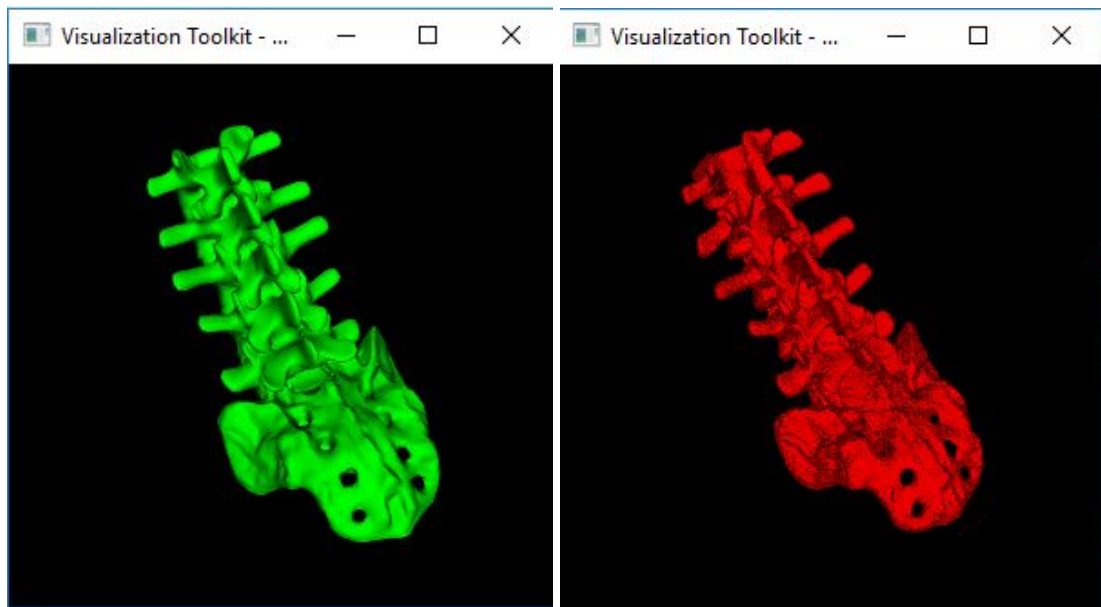


Figure 1. Provided surface (left) and extracted surface (right). Both surfaces have to be registered using the ICP algorithm to find the transformation that is going to be applied to the medical image.

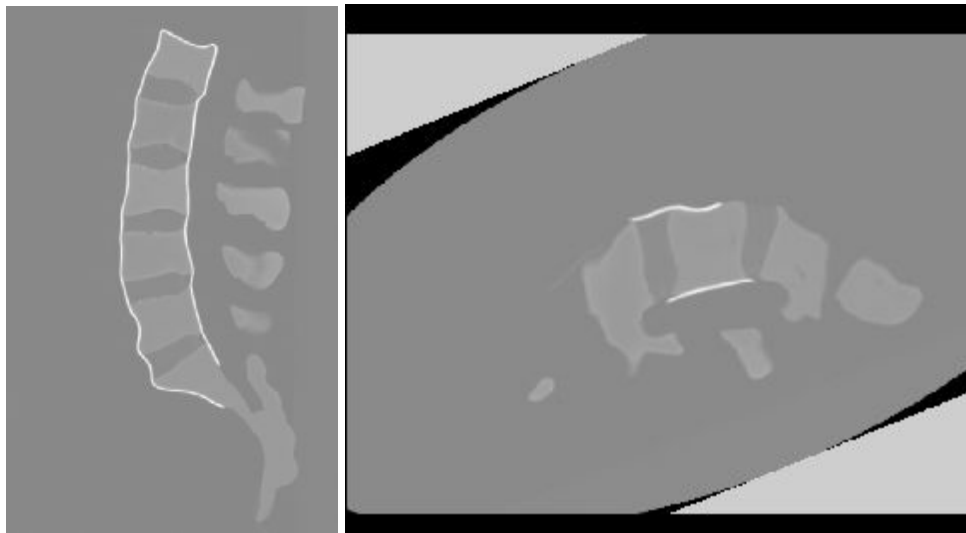


Figure 2. Coronal slices of the image, before (left) and after (right) applying the transformation obtained after applying the ICP algorithm.