3D Image **R**econstruction for **C**omparison of **A**lgorithm **D**ata**b**ase :
A patient-specific anatomical and medical image database

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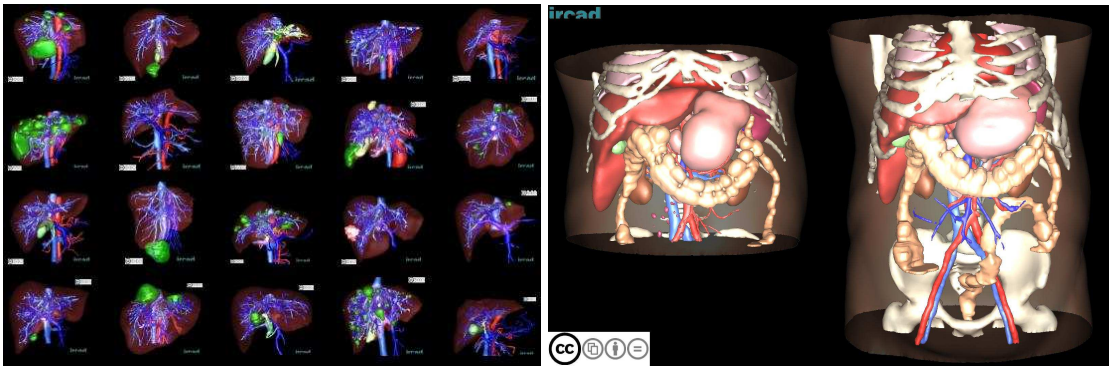
The medical world has known at the end of the last century a real revolution translated by several Nobel Prizes in physics or medicine: 3D medical imaging. By extracting the medical information contained in images into a set of 3D models, it is today possible to obtain a pre-operative 3D model of the patient, a kind of digital clone of the real patient. The visible human project initially limited to cadaveric model can thus be replaced by a visible patient with medical images of living patients. Such data can be used preoperatively to plan surgery, intraoperatively to guide the surgeon or postoperatively within the framework of anatomical education or medical simulation. It can also be used to compare various segmentations, mesh generations or simulation algorithms.

In this aim, we have developed an open database called 3D-IRCADb (3D Image Reconstruction for Comparison of Algorithm Database) that includes several sets of anonymized medical images of patients and the manual segmentation of the various structures of interest performed by clinical experts. The 3D medical images and masks of segmented structures of interest are available as DICOM files. The representation of segmented zones is also provided as surface meshes in VTK format. Each model can be visualized using known freeware such as Osirix or 3D Slicer, or our freeware VR-Render combining DICOM image 2D slice viewer, Direct volume rendering and 3D mesh surface rendering visualisation techniques.

The first two databases have been created within the framework of the European project PASSPORT. The 3D-IRCADb-01 database is composed of the enhanced 3D CT-scans of 10 women and 10 men with hepatic tumours in 75% of cases. The 3D-IRCADb-02 database is composed of two anonymized thoraco-abdominal enhanced 3D CT-scans. The first one has been realized during the arterial phase in inhaled position, whereas the second one has been realized during the portal phase in exhaled position. The patient has a hepatic focal nodular hyperplasia in segment VII according to Couinaud's description.

The first benefit of this work was to validate a new anatomical segmentation of the liver modifying the current anatomical segmentation of Couinaud by removing its topological mistake. In the future, this database will be completed by many other cases including databases dedicated to adrenal tumours, parathyroid tumours and paediatric cases. We also plan to increase the current first two databases with new clinical cases.



The two first 3D IRCADb offer 3D models of 20 livers and 2 abdominal breath position