SEMINARIO

# Università degli Studi di Pavia

## Dipartimento di Meccanica Strutturale

**in collaborazione con**

**Centro di Simulazione Numerica Avanzata – CeSNA**

**Istituto Universitario di Studi Superiori**

# Dataset Segmentation in Surgical Planning - the Pancreas experience


BACKGROUND: *Image segmentation is an important part of computer based medical applications for diagnosis and planning of interventions. Segmentation in medical imaging is generally considered a difficult problem, especially when it has to be carried on abdominal anatomical structures.*

*MATERIALS AND METHOD: At the EndoCAS center, a research center located in PISA within Cisanello Hospital, a plug-in built on the top of an open-source platform (ITK-Snap 1.5) to perform semiautomatic segmentation of CT dataset has been developed. The tool is tailored to extract abdominal structures but it showed itself useful for thoracic and orthopaedic application too. Within last year we started on interesting in pancreas segmentation for surgical planning of tumors surgical treatment. The segmentation pipeline required some add-ons and furthermore the introduction of some manual steps.*

*RESULTS: We arranged a new pipeline that include some compulsory manual steps reliant on radiologist's experience to refine segmentation around lesion borders. We also defined a "colorcode" to quantify in a probabilistic way the involvements of other structures (vessels or whetever) in the lesion in order to obtain a complete 3D model for an efficientplanning of surgery even in borderline cases.*

*CONCLUSIONS: On the base of our experience in the using of patient specific 3D models to plan critical pancreas surgical interventions we obtained useful feedbacks from clinicians. Planning the intervention using a segmented dataset allows the surgeon to afford critical interventions with a major awareness of the specific patient anatomy and can in some cases choose a more efficient surgical approach. It has to be underlined that further development have still to include some manual steps that could not be avoided depending too strongly on "radiologist's eye" in detecting lesion borders.*


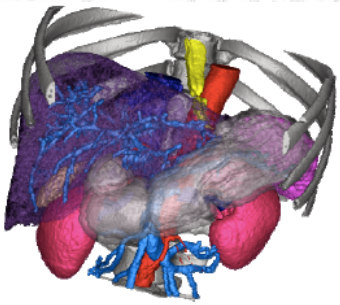

*Figure 1: Example of a complete upper abdomen segmentation*

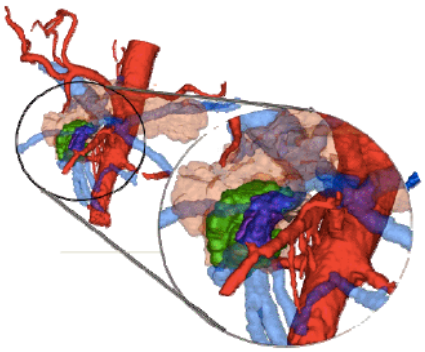

*Figure 2: A pancreas segmentation where a lesion in the head is underlined (green) and its relationship with portal vein is showed too (purple)*


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*Divisione di Chirurgia Generale e Trapianti*

*Università di Pisa*


*Venerdì 17 Dicembre*

*Aula MS1, 9.00 – 10.30*

*Dipartimento di Meccanica Strutturale*

*Via Ferrata,1 – Pavia*