

PRELIMINARY RESULTS WITH A NEW ANNOTATION TOOL FOR LIVER VOLUME AND INNER VESSELS FROM DCE-MRI DATA

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ANR R-Vessel-X Project

<http://tgi.ip.uca.fr/r-vessel-x/>



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■ Annotation

- Plays a key role in the creation of reference datasets
 - For benchmarking image analysis algorithms
 - For training machine learning systems
- Relevance of the dataset depends on the interface ergonomics

■ Liver cancer

- DCE-MRI - Dynamic contrast enhanced MRI
 - A popular modality for diagnosis
 - E.g. HCC - Hepatocellular carcinoma
- But **no public database** for hepatic DCE-MRI

OUR CONTRIBUTION



VPH2020



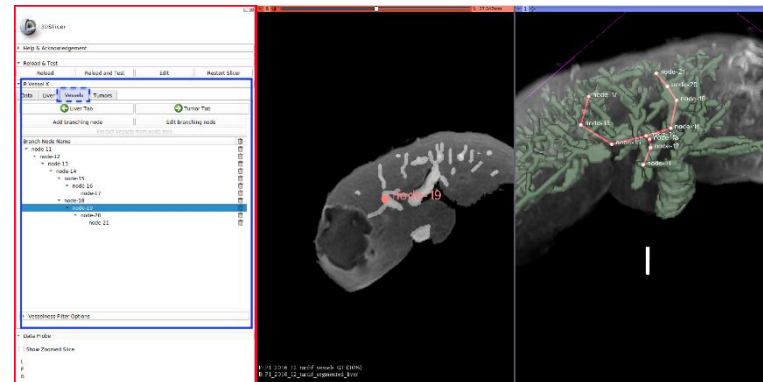
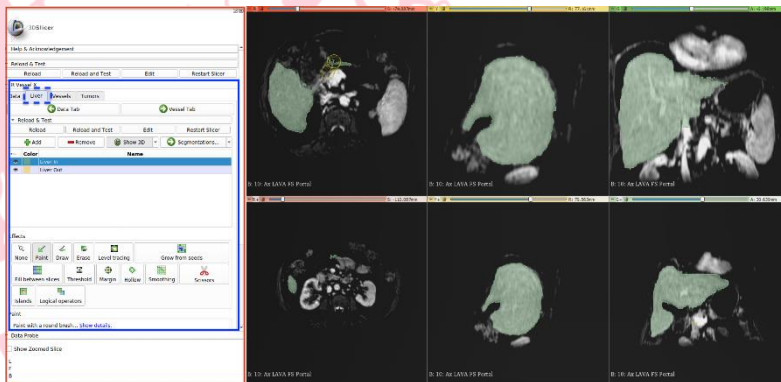
A 3D Slicer plug-in

– Divided into 4 steps

- Loading and managing medical imaging data
- Liver segmentation
- Vessels annotation
- Tumor segmentation

– Integration of already existing 3D Slicer tools

- Segmentation for liver/tumors: Paint, eraser, level-set tracing, etc.
- VMTK centerline annotation for vessels



EXPERIMENTAL RESULTS



VPH2020

Material and methods

- **G1**: 6 patients not suffering from hepatic disease
- **G2**: 4 patients with liver cancer and cirrhosis
- DCE-MRI exams performed on 1.5T SIGNA Artist (GE)
- Our plug-in vs. General Electric AW solution (Server 3.2)

Results

| Segmentations | GE AW | Our plug-in |
|---------------|-------------|-------------|
| Liver | 10 ± 5 min | 3 ± 2 min |
| Vessels | 30 ± 10 min | 5 ± 3 min |
| Total | 40 ± 15 min | 8 ± 5 min |

G1

| Segmentations | GE AW | Our plug-in |
|---------------|-------------|-------------|
| Liver | 15 ± 10 min | 4 ± 2 min |
| Vessels | 35 ± 15 min | 7 ± 4 min |
| Total | 50 ± 25 min | 11 ± 6 min |

G2

EXPERIMENTAL RESULTS



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■ Material and methods

- **G1:** 6 patients not suffering from hepatic disease
- **G2:** 4 patients with liver cancer and hepatic disease
- DCE-MRI exams performed on a GNA Artist (GE)
- Our plug-in vs. General Electric Vascular Solution (Server 3.2)

■ Results

| Segmentations | GE AW | Our plug-in | Segmentations | GE AW | Our plug-in |
|---------------|-------------|-------------|---------------|-------------|-------------|
| Liver | 10 ± 5 min | 4 ± 2 min | Liver | 15 ± 10 min | 4 ± 2 min |
| Vessels | 30 ± 10 min | 7 ± 4 min | Vessels | 35 ± 15 min | 7 ± 4 min |
| Total | 40 ± 15 min | 11 ± 6 min | Total | 50 ± 25 min | 11 ± 6 min |

G1

G2

Plug-in publicly available in the Slicer store by Fall 2020

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Thanks for your attention!

Demo time



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