

Medical Imaging Analysis :
Lab 2. MevisLab

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VIBOT MSc

1 Introduction

The aim of this lab is to learn the basic structure and use of the MevisLab framework for quick prototyping of medical imaging applications. In this lab you will learn:

- Basic MevisLab filters and structure.
- How to develop medical image analysis prototypes
- Develop a breast boundary segmentation framework.

2 MeVislab

2.1 Installation

MeVisLab is an environment developed by MeVis Medical Solutions AG and Fraunhofer MEVIS in Germany. You can download and install the software at <http://www.mevislab.de/download/>. Although this is beyond the interest of the lab, MevisLab allows to program your own filters and modules in different programming languages. Documentation is at <http://www.mevislab.de/docs/2.5/MeVisLab/Resources/Documentation/Publish/SDK/GettingStarted/>. You can check the main modules and the help and examples linked to those (see next section).

2.2 Common MeVisLab Blocks

MeVisLab is used by joining blocks, you can look for them and place them using the Search Modules on top right of the screen (Fig. 1). You can get information on the blocks use by using the **Show Example Network** and **Help** options.

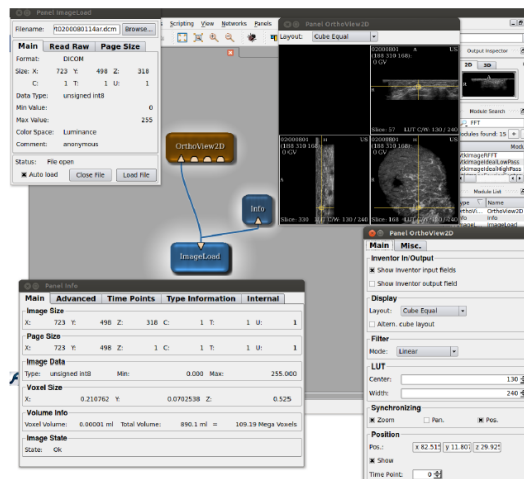


Figure 1: Main MeviLab window

The following list enumerate the most basic blocks.

- **ImageLoad/ImageSave** used to load and save dicom images.
- **itkImageFileReader/itkImageFileWriter** used to load and save .nii images. If you use it to load dicom images, the pixel dimension will not be understood correctly.

- **Info** used to get access to the image information.
- **OrthoView2D** Visualize 3D images with the axial, coronal and sagittal view.
- **View2D** Visualize data from one view. Useful for 2D images.
- **GVROrthoOverlay** Permit to show on one visualizer some specified regions as overlay.
- **ImageStatistics** Calculate several image parameters. You can specify a mask image.
- **Arithmetic** Used to do any arithmetic operations on images.
- **SubImage** Extracts subimages from an input image based on either voxel start/size, voxel start/end or world start/end. Can also be used to create a region larger than the input image.
- **AnonymizeMacro**: allows to anonymize patient contained in the Dicom
- **Threshold**: Threshold an image.
- **Connected Components**: Obtain the connected components of an image.
- **Morphology**: Perform morphological operations.

3 Breast Boundary segmentation

Open MevisLab and follow the Getting Started Tutorial that introduce you to MevisLab. Given the five mammographic images given, the aim is to develop a breast boundary segmentation algorithm in order to separate the breast area from the background, as shown in the following figure.

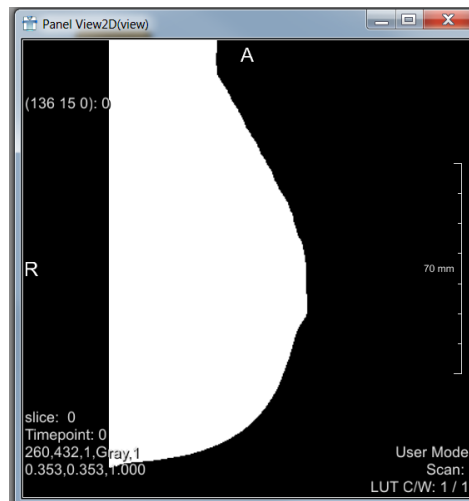


Figure 2: Example of breast segmentation

You can use any existing modules, but you should aim at a **fully automatic algorithm**: minimal (or no) user intervention, and the parameters must be the same for segmenting all images (no parameter tweaking for each image).

Questions (to be included in the report)

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- The MeVislab script (file) that implements the image segmentation
 - Report indicating:
 - The steps followed to segment the breast. There is no need to describe the algorithms, but you should explain why you apply them.
 - All segmentation results.
 - Limitations of your approach (if any).
 - Encountered problems found in the assignment and/or suggestions