

LV function from cardiac CTA

OsiriX Foundation

September 7, 2009

1 General Conditions

Please refer to <http://www.osirixfoundation.com/awards.html> for General Conditions.

2 Category

This document describes a **Category 2** Plugin Award Project.

3 Description

Latest generations of multidetector CT (MDCT) scanners allow the acquisition of dynamic cardiac images obtained after injection of iodinated contrast media. These images provide high spacial and temporal 4D data-sets of the heart. From these images, delineation of the left ventricle can be obtained automatically using different segmentation algorithms. From the segmentation of all images across the heart at different phases of the cardiac cycle it is possible to extract and measure the left ventricular volume at each point in time. A time-line curve can be drawn showing emptying and filling of the heart in systole and diastole. Several quantitative parameters can be derived from these measurements with a significant value for clinical evaluation of cardiac function. Among these parameters, end-diastolic and end systolic volumes are relevant and can be used for the calculation of left ventricular ejection fraction (LVEF).

4 Requirements

The goal of this plug-in is to provide a simple automatic segmentation of the left ventricle in all cardiac phases and generate the corresponding LV volumes. From these volumes several parameters can be derived, and in particular the left ventricular ejection fraction. The tool should provide physicians with a fast and simple way to derive these data from any dynamic (4D) CTA data-sets with the following requirements:

- Fast automatic segmentation of LV in all phases from a single seed point
- Identification of valve planes (manual or semi-automatic)

- Calculation and display of volume changes over time
- 3D display of segmented VOI of the left ventricle in standard 3D ROI format of OsiriX allowing these VOI to be superimposed to anatomical volume rendering of the original data

5 Deliverable

1. A fully functional plug-in that can be called upon when a set of 4D cardiac CT images are displayed.
2. A simple step-by-step workflow guidance that walk the user through different steps needed to perform image segmentation
 - assign a seed-point
 - select or confirm valve planes
 - edit contours if needed
3. Launch an automatic generation of labelled ROIs on all planes corresponding to the LV volume VOI in different phases of the cardiac cycle
4. Generation of a summary dashboard display of the results (volume curve, contours, ejection fraction etc... That can also be export in PDF or DICOM format
5. Export of the data in standard OsiriX ROIs that can be displayed in 3D volume rendering tools of OsiriX

6 Contact

Contact the OsiriX Foundation using: osirix@osirixfoundation.com