



Thesis Project Form

Title (tentative): An image processing framework for evaluation of cardiac compression due to PE using MRI.

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Description

Motivation and application domain

Pectus Excavatum (PE) is the most common congenital chest-wall deformity in children. It is characterized by a sunken deformity of the anterior chest wall, involving both sternum and costal cartilages with a varying degree of compression of the heart, which may lead to disabling cardiopulmonary manifestations in worst cases.

General objectives and main activities

In clinical assessment of PE, the indication to surgery is based not only on symptoms but also on Indices calculated from Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) scans.

The Indices proposed by various authors to quantify the severity of PE do not consider cardiac compression, but only thoracic deformation.

The primary aim of our work is to develop an image processing framework for evaluation of cardiac compression due to PE using MRI. The secondary aim is to compare the new marker with the existing Indices to evaluate how chest deformity correlates with cardiac compression.

Training Objectives (technical/analytical tools, experimental methodologies)

Image processing and statistical analysis of clinical data of pediatric patients affected by different degrees of PE
Extraction of quantitative markers from MRI scans implies development of ad-hoc image processing pipelines (e.g. in Matlab) specifically adapted to the age range under analysis.

Place(s) where the thesis work will be carried out: DIBRIS - GASLINI

Additional information

Maximum number of students: 1