

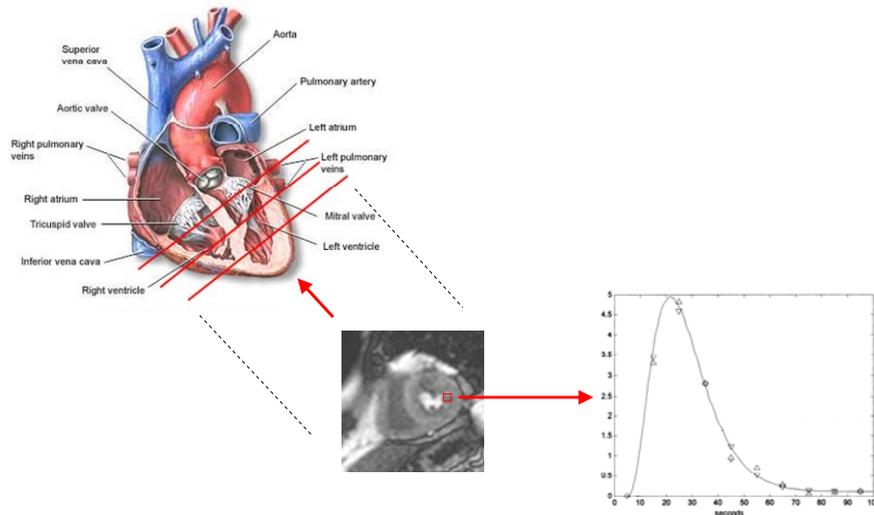
Master Thesis

Calculation of signal intensity-time curves from MR images of the beating heart

Introduction

In order to assess whether a patient with a narrowing of a coronary artery has an increased risk for a heart attack, one is interested in quantitative parameters of the blood supply to the heart muscle.

Currently those parameters could be judged only semi quantitative by visual analysis of a sequence of MRI images: For that approximately 300 consecutive dynamic images are acquired by a MRI (magnetic resonance imaging) scanner. During the acquisition an intravasal CM (contrast medium) is injected and the distribution of the signal intensity increase caused by the CM is visually observed by a radiologist. The higher the increase of the observed signal intensity, the lower the risk of the patient is to suffer a hard attack in the future.



To derive reliable statistical data from these measurements, the increase of the signal intensity must be measured quantitatively in each pixel of the image. That means that the signal intensity-time curves must be derived automatically for each pixel for a time period of approximately 1 minute. Due to the breathing and small movements of the patients during the acquisition period, the measured images could not be evaluated directly.

Problem

The main objective of this work is to develop a mathematical method to “freeze” the movement of the heart. The second object should be to calculate the signal intensity-time curve in each pixel of the frozen sequence and visualize the result as a parameter image of the signal intensity peak.

The clinical partner will provide the MRI data and will supervise the student in all medical questions. The industry partner will provide a part time job as well as an apartment for the master student.

Clinical Partner

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VISUS is a leading supplier of comprehensive image management solutions for hospitals and imaging centers. The range of application of the product family JiveX varies from PACS department solutions for miscellaneous medical disciplines to inter - divisional Enterprise PACS with teleradiology to the intricate cross - site network solution with data processing service center operations.