

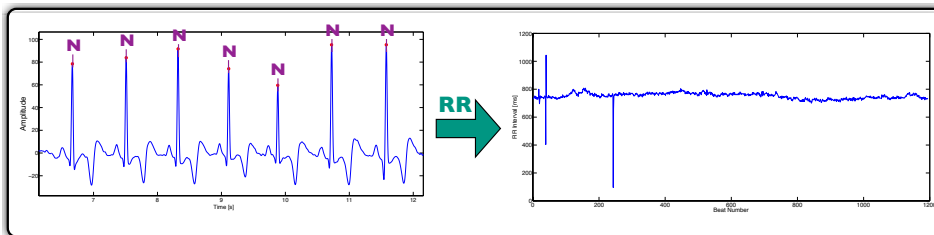
## Bachelor Thesis

# Comparing the standard parameters of heart rate variability and deceleration capacity with the ARMA modeled time series of RR intervals obtained from the electrocardiogram

### Motivation

The heart rate variability (HRV) is an accurate way of measuring the great amount of physiological and pathological processes that modulate the normal rhythm of the heart. It is represented by the time depending duration of consecutive heart beats and it is regulated by the opposed effects of the sympathetic and parasympathetic nervous systems. HRV is used to estimate the overall health condition of the heart and the current status of the nervous system. It is thought to be a consequence of the ability of the heart to adapt to different situations or external stimulations that can occur to the human body.

It has been shown that patients presenting pathological states including diabetes, renal failure, myocardial infarction and cardiac arrhythmias among others tend to have a modified HRV. Specially interesting for this research project are time and frequency domain methods used to measure HRV. Furthermore, two other methods (deceleration capacity and the time series analysis using ARMA models) applied to assess cardiac health seem to be delivery complementary information and can be used for risk stratification.



### Tasks

In this project, the parameters used to measure HRV in the time and frequency domain together with the deceleration capacity and the ARMA modeled time series should be compared. The new information gained by ARMA models should be evaluated.

### Requirements

- Literature research
- Programming skills in MATLAB
- Basic fundamentals of signal processing
- Data mining
- Ideally some fundamentals of cardiac physiology

### Field of Research

Signal processing of the ECG

### Project

Supported by the german state of Baden-Württemberg

### Areas

Signal processing  
Software programming  
Algorithmic

### Field of Studies

Electrical engineering  
Computer science

### Starting Date

May 2013

### Contact

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