

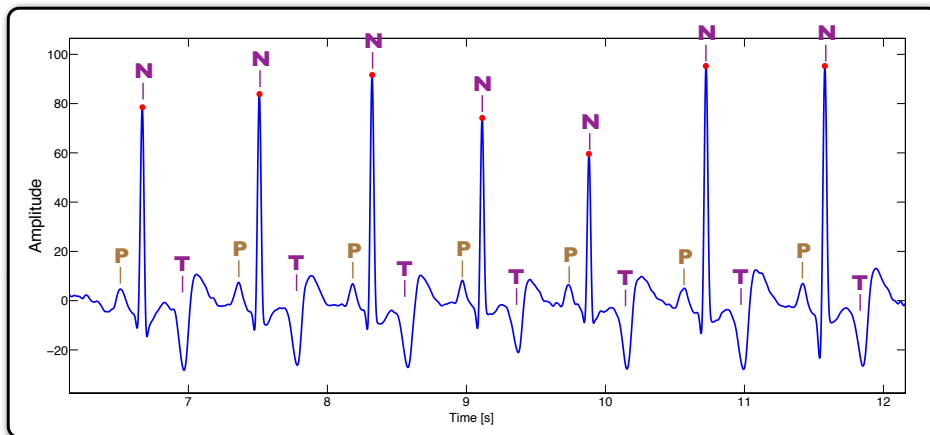
Bachelor Thesis

Developing a robust method to detect and characterize the P wave in the electrocardiogram

Motivation

The normal rhythm of the heart is the sinus rhythm. It is characterized by regular P waves in the ECG. A normal configured P wave followed by a QRS complex is the electrocardiographic criterion that proves the healthy state of the sine node and the electrical conduction in the atria. Affliction of the atria such as sinoatrial blocks, atrial fibrillation or atrial tachychardia play an important role in cardiology. They can cause pain in the chest, fainting, mental afflictions or even stroke.

Specially interesting for this research project are supraventricular ectopic beats. Such ectopic beats can trigger supraventricular fibrillation. They also generate short time fluctuations in the normal sinus rhythm of the heart. Supraventricular ectopic beats are characterized by a missing P wave. This criterion could be used to accurately classify such ectopic beats.



Tasks

In this project, an algorithm for the detection of the P wave in the ECG should be developed. Different methods presented in the literature should be implemented and evaluated. The possibility of building P wave templates and gaining rhythmical and morphological features should be also considered. In the end a robust method should accurately detect P waves in good quality ECGs.

Requirements

- Literature research
- Programming skills in MATLAB
- Strong 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

April 2013

Contact

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