KIT
Karlsruher Institut für Technologie

Institut für Biomedizinische Technik
Fachhochschule Schmalkalden: Adaptive Signalanalyse

Research Project

FH SCHMALKALDEN
HOCHSCHULE FÜR ANGEWANDTE WISSENSCHAFTEN

Developing a robust method to detect and characterize the effect of micro-sleep episodes on the electrocardiogram

Motivation

Sleepiness while driving a car has been strongly related to episodes of micro-sleep and subsequently accidents. Thy are strongly correlated to an increasing fatigue of the subject and a monotonous driving environment. The micro-sleep events can be investigated measuring the electrocardiogram (ECG).

In order to investigate and quantify how micro-sleep episodes can affect the normal heart rate and the ECG morphology, an experiment was developed by a group of scientist in Schmalkalden in cooperation with the company Caterpillar. 15 students participated in the experiment where a driving simulator was used while their ECG is being recorded.

Tasks

In this project, a robust algorithm for the detection and characterization of micro-sleep episodes based only on ECG parameters should be developed. Different methods presented in the literature together with new techniques should be implemented and evaluated. Accurate features for the assessment micro-sleep events is the final goal.

Requirements

- Literature research
- Programming skills in MATLAB
- Strong fundamentals of signal processing
- Statistics and data mining
- Ideally some fundamentals of cardiac physiology

Field of Research
Signal processing of the ECG

Project
Supported by the german state of Baden-Würtemberg

Areas
Signal processing
Software programming
Algorithmic

Field of Studies
Engineering
Computer science

Starting Date
November 2013

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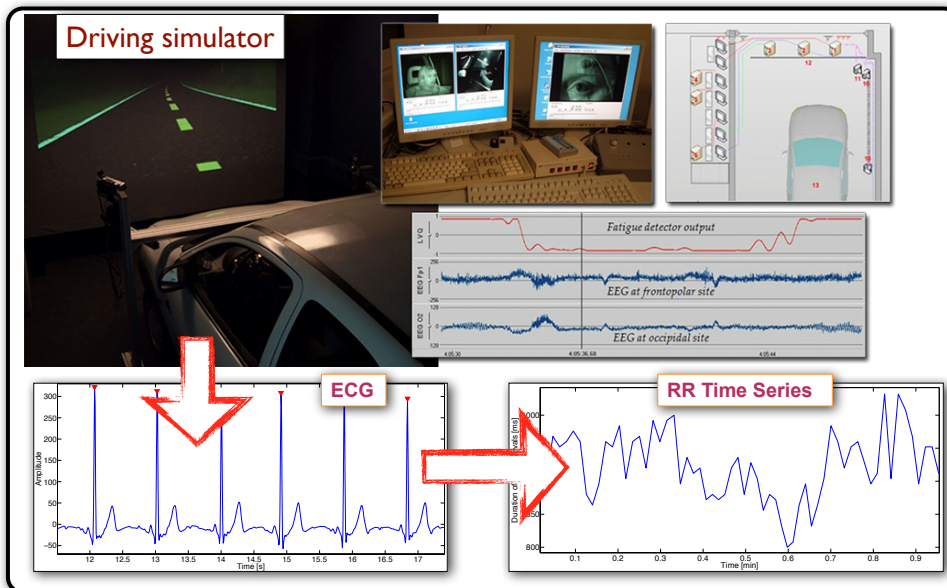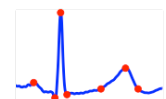Fritz-Haber-Weg 1
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