UNIVERSITÄT LEIPZIG

Extraction of respiratory signal and cardiac movements from seismocardiography (SCG) signals

Seismocardiography (SCG) signals are caused by the respiration and cardiac movements. This signal can be recorded by an accelerometer put on sternum. The chest accelerometer signal contains a low-frequency component corresponding to the motion of the chest wall and a high-frequency component corresponding to vibrations of the chest caused by the heartbeat.

Most SCG studies focus on the cardiovascular aspects of the signal and respiration part is considered as noise. Although this part of the signal could be extracted and studied for detection the apnea sleep for patients. Until now, all methods used for processing this signal depend on electrocardiography (ECG) or respiratory signals. The novelty of this work is to find a method, which would be independent to these signals.

The aim of this project is to separate cardiovascular and respiration parts of the SCG signal by signal processing methods. Three different methods may be used to separate these two signals: FFT Filter, Digital Filter and wavelet. Also, it will be necessary to calculate the breathing rate from the extracted signal and the respiratory signal, which was recorded separately, and to compare these two signals.

Requirements:
- Basic knowledge of signal processing
- Programming experience in R or Matlab

Contact:
Mahsa Raeiati Banadkooki
Paulinum, Raum P518
raeiati@informatik.uni-leipzig.de

Masterarbeit