Master graduation project (BSS+RS):

Daily health monitoring using contactless sensing techniques

Student assignment: Master graduation project (40 credits, 28 weeks)

Educational program: Embedded Systems, Electrical Engineering, Biomedical Engineering, or other relevant direction

Supervision team: Dr. Ying Wang (BSS, UTwente) and Dr. Yang Miao (RS, UTwente)

Project background:

Continuous health monitoring plays an essential role in timely and personalized disease prevention. Daily remote monitoring with advanced sensing techniques can help increase individuals' quality of life and release the burden of national health care systems. Currently, two types of sensing techniques—wearable and contactless sensing—have been used for health monitoring. Compared with wearable sensing techniques, contactless sensing can provide users comfort and natural feeling meanwhile reduce the device-management burden of healthcare professionals. However, the technical usage of contactless sensing systems, e.g., radio-based techniques, is still not sufficiently validated in daily health monitoring.

What you can expect from us:

We aim to investigate the technical usage of contactless sensing system in daily health monitoring. Through a radio-based contactless system, vital sign (e.g., heart rate and breath rate) and movement signals will be collected from experiment subjects. Daily health monitoring system will be developed in this project, and the project results will be transferred to clinical applications in future.

In this project, you can expect to obtain the knowledge about:

- Design a polit experiment for healthy subjects to simulate the activities of in-\out-hospital patients.
- Collect multimodal physiological signals from healthy subjects to learn about the potential effects of real-life factors on the quality of signals.
- Develop an algorithm to track the physiological states of individuals:
   - Preprocess different modal signals.
   - Extract clinical-relevant features from the signals.
   - Apply machine learning techniques to classify different physiological states.
- A potential scientific publication can be expected based on the project outcomes.

What we expect from you:

- We are looking for talented and open-minded students who have a background in embedded systems, electrical engineering, biomedical engineering, or other relevant direction.
- Students should have strong interest in signal processing, analysis, and machine learning.
- Students should have strong programming skills in Matlab\Python.
- Experience in physiological signal analysis and\or clinical research is optimal.

Information and application:

Please send your application to (ying.wang@utwente.nl) or/and (y.miao@utwente.nl), and include: