

SaxShirt TFF

SaxShirt is a wearable sensor platform, which houses various types of sensors (heart rate, chest and abdomen respiration, accelerometer, gyroscope, skin and outside temperature). In the development of SaxShirt we have integrated electronics and textile in a manner that it provides both functionality and performance.

Raw sensor measurements achieved by SaxShirt are not understandable to a level that can be used for decision-making. Within this project we are focusing on application areas where SaxShirt can be applied. Within each of these applications we infer various physiological information from sensor measurements. These are the two specific applications, which are focusing on:

Firefighter safety

Various types of hazards such as hypothermia, hyperventilation, and heart failure pose a serious threat on the life of firefighters. Instant decision-making is required to retrieve firefighters in case of health hazards. Raw sensor measurements provided from SaxShirt are not readable enough to support decision making in such sensitive applications. Furthermore, understanding physiological parameters require medical knowledge. We propose using Bayesian networks for providing a decision support system, which can infer the probability of the above-mentioned physiological hazards during mission by observing sensor measurements. This Bayesian network models the knowledge of medical professionals in terms of various physiological, personal, and sensory parameters, as well as their relations. We designed the network by interviewing various medical professionals and fire commanders. The parameters of the model in form of conditional probability tables are extracted partly from medical literature, experts, and available datasets.



TopSport applications

Training load and status are important factors that determine the performance of the top-sporters. On the one hand, an inadequate training load will never result in any physiological improvements. On the other hand, training load over a certain threshold will consequently lead to over training injuries. We look at combination of different internal and external load parameters, as well as subjective measures to determine the training status of the sporters.