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ObeSense RTD 2013

FNSNF

Monitoring the Consequences of Obesity

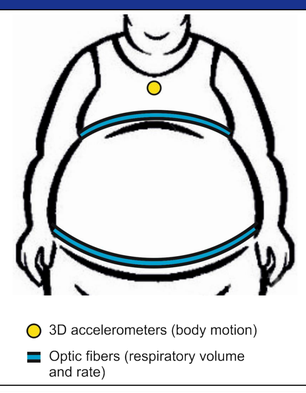
M. Lemay[1], O. Deriaz[2], E. Pruvot[3], U. Mäder[4], L. Scherer[5], J.-M. Vesin[6], J. Solà[1], N. Stergiopulos[7], D. Atienza[8], M. Wolf[9], J.-P. Thiran[10]

[1] CSEM, Neuchâtel; [2] IRR-SUVA, Sion; [3] CHUV, Lausanne; [4] SFISM-BASPO, Magglingen; [5] EMPA, St. Gallen; [6] EPFL-ASPG, Lausanne; [7] EPFL-LTHC, Lausanne; [8] EPFL-ESL, Lausanne; [9] USZ, Zürich; [10] EPFL-LTS5, Lausanne

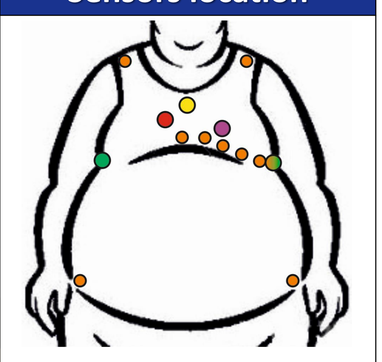
- Summary -

The goal of the ObeSense project is to combine **innovative and non-invasive sensors** into **single monitoring systems** dedicated to the **management of obese patients**. The proposed **advanced multi-parametric diagnostic tools** are adapted for clinical as well as ambulatory environments in order to improve **patient life quality** and **reduce important health costs** related to late prognostics.

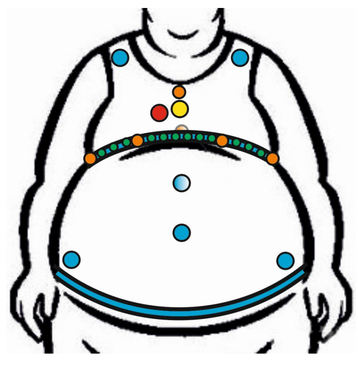
SCENARIO 1 - Lifestyle intervention

Measurements	Proposed techniques	Added values versus SOTA	Sensors location
Respiratory rate and volume	Pressure sensors (plastic optical fibers)	- Comfortable over long periods - Low-cost	
Body motion	3D accelerometers	- Non-occlusive long-term monitoring	
Analysis		**Added values versus SOTA**	
Body metabolism		- Provides accurate and embedded energy expenditure estimates (MET) - Innovative approach for body metabolism studies (ex.: anaerobic threshold detection)	

SCENARIO 2 - Hospitalization monitoring

Measurements	Proposed techniques	Added values versus SOTA	Sensors location
Clinical ECG	10 textile electrodes	- Allergy-free - Reduce motion artifacts - Washable	
	Designed embedded system	- Long-term monitoring (ultra-low-power consumption, local on-board processing, wireless communications)	
	3D accelerometers	- Produce ECG quality index	
Blood pressure	Central pulse wave velocity approach	- Non-invasive and non-occlusive continuous monitoring	
Analysis		**Added values versus SOTA**	
Heart rate and rhythm		- Automatic arrhythmia detector	
Cardiovascular autonomic neuropathy		- Non-invasive detection based on ECG signals	
Blood pressure variability		- Accurate continuous blood pressure estimates	

SCENARIO 3 - Ambulatory monitoring

Measurements	Proposed techniques	Added values versus SOTA	Sensors location
Ambulatory ECG	6 textile electrodes	- Allergy-free - Reduce motion artifacts - Washable	
	Designed embedded system	- Long-term monitoring (ultra-low-power consumption, local on-board processing, wireless communications)	
	3D accelerometers	- Produce ECG quality index	
Cardiac output	Electrical impedance tomography	- Non-invasive continuous monitoring	
	Pulse contour	- Non-invasive low-cost continuous monitoring	
Respiratory rate and volume	Pressure sensors (plastic optimal fibers)	- Comfortable over long periods - Low-cost	
Energy expenditure	Oxygen consumption (pulse oximeter and NIR spectroscopy)	- Non-invasive continuous monitoring - Equals the gold standard method	
Analysis		**Added values versus SOTA**	
Heart rate and rhythm		- Automatic arrhythmia detector - Automatic detection of ischemic and congestive heart failure events - Correlation between dyspnea and low cardiac output, arrhythmias or ischemic events	
Body metabolism		- Provide accurate energy expenditure estimate (Fick-based) and provide innovative approach for body metabolism studies	

- Technological novelties -

“Smart” wireless body area network platforms with **ultra-low power** consumption, wearable and washable **clinical ECG** systems, innovative embedded **detectors of cardiac arrhythmias**, **blood pressure** monitoring integrated in a smart-textile t-shirt, pioneering **non-invasive cardiac output** monitoring, **long-term energy expenditure** estimates via **Fick-based approaches** or **low-cost accurate optical fibers** and subsequent.