Sensors for Health Recording and Physical Activity Monitoring
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OBJECTIVES
Conceive, implement, and validate experimentally devices allowing biophysical data of mobile subjects to be gathered and exploited in a continuous flow.

Focused application domains:
- Heart failure patient’s monitoring (HF).
- Outdoor assessment of functional limitations and community-based walking programs for rehabilitation in patients with peripheral artery disease.
- Physical activity recognition and energy expenditure estimation.

GENERAL ARCHITECTURE OF THE PROJECT

MAIN RESULTS

IRISA-CASA
1) An open platform dedicated to mobile monitoring built around four criteria:
   - Versatility: to accommodate to a large variety of off-the-shelf sensors
   - Extensibility: to add new sensors and embedded processing easily
   - Confidentiality: to ensure the privacy and the non-disclosure of the data
   - Dependability: to work everywhere by limiting the energy consumption (EC) and by providing a resilience to network disruption
2) A plugin approach for both sensors and embedded technologies
3) Measures of the energy consumption and by easily

LTSI/M2S
1) Develop signal processing tools to:
   - Recognize and classify five ambulatory and sedentary activities (cycling, walking, running, sitting, car-riding) using heart rate and acceleration data fusion.
2) Develop a new experimental protocol for daily-life activities recognition and energy expenditure estimation:
   - Experimental Phase 1
     → Develop mathematical models for activity recognition and energy expenditure estimation
   - Experimental Phase 2
     → Test the strength of developed models in Phase 1 on the basis of semi-standardized activities
     → Ameliorate the recognition models if necessary.
   - Experimental Phase 3
     → Test the strength of developed models in Phase 1 and ameliorated in phase 2 on daily-life activities situation.
3) ECG-Ventilation Extraction

LAUREPS-CIC-IT
1) Context of Sherpam use understanding
2) User’s profiles and requirements
3) Authentication of primary functions and risks of sensors/gateway/mobile app, /web site use
4) Review wearable sensor acceptance and usability

Publications
Biomedical Signal Processing and Control (Journals, 2016) - MobileHealth’16 - 6th EAI International Conference on Wireless Mobile Communication and Healthcare (November 2016) - Healthcom’16 - 18th International Conference on e-Health Networking, Applications and Services (September 2016) - AICST Conference - Advances in Biomedical Engineering (CABME’15) International Conference and were published in IEEE Conference proceedings.