Sensors for Health Recording and Physical Activity Monitoring
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**SHERPAM**

**Sensors for Health Recording and Physical Activity Monitoring**

**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**

**GLOBAL DESIGN OF THE STUDY**

- **Conception**
- **Prototyping**
- **Deployment**

**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

   1) A plug-and-play design for both sensors and embedded algorithms to personalize the platform for each patient and his/her condition
   2) Evaluation of EC of various transmission technologies

**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 model 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**