Masters Internship 2015

Sensor development for vital signs monitoring

Supervisor

Dr. Jit Biswas – biswas@i2r.a-star.edu.sg

Presentation of the Internship topic

Unobtrusive monitoring of vital signs is an increasing requirement from the medical community. Such sensors must be versatile and in operation 24/7 in Institutions of Long Term Care - ILTC (eg. nursing homes) and in elderly peoples' homes.

In this research we are designing and developing sensors and software algorithms for remotely collecting vital signs unobtrusively from subjects in their beds. The topic of the research focuses on the design, development and testing of the Piezo-Capacitive Sensor for sensing of continuous heart rate and breathing rate through the BCG signal. It will involve integration of piezo-capacitive sensor into a FSR sensor mat that has been developed and already in operation in the nursing home environment. The system will be tested in the laboratory in Singapore using clinical level validation tools, and subsequently deployed in nursing homes in France for the purpose of studying nocturnal sleep, awakening patterns and sleep apnea.

Expected deliverables

Design and development of combined piezo-capacitive and force sensitive resistor based pressure sensor mat. Data collection, calibration and performance tuning of the mat will be carried out as the next step, to improve the reliability and sensitivity of the mat, and its ability to pick up vital signs. Filters will be designed to produce clean signals under normal conditions. Lab testing and field testing will be done before data collection to study targeted clinical issues.

Keywords

Piezo-Capacitive Resistor based pressure sensor mat, Continuous monitoring, Biomedical Signal Processing, MATLAB

Applicant profile

- Master Degree or Engineer Student (last year of studies).
- Skills in programming, C++, Java, MATLAB.
- Electronics hardware design and module integration
- Familiarity with digital signal processing and analog signal data acquisition are appreciated

Image & Pervasive Access Lab
1 Fusionopolis Way
#21-01 Connexis, South Tower
Singapore 138632

Tel. (65) 6408 2542
Director. (65) 6408 2536
Fax. (65) 6776 1378

secretariat@ipal.cnrs.fr
www.ipal.cnrs.fr

- Strong motivation towards this challenging project.
- Availability for 5 to 6 consecutive months

Gratification: About 800€ net per month (approx. 1,300 Singapore dollars)

Image & Pervasive Access Lab
1 Fusionopolis Way
#21-01 Connexis, South Tower
Singapore 138632

Tel. (65) 6408 2542
Director. (65) 6408 2536
Fax. (65) 6776 1378

secretariat@ipal.cnrs.fr
www.ipal.cnrs.fr