



The SPINE Project: From Modeling to Implementation of Wearable Computing Systems based on Body Sensor Networks

at the

14th International Conference on Wearable and Implantable Body Sensor Networks

BSN2017, Eindhoven, The Netherlands

Date & Venue

Tuesday, 9 May, 2017, 9:00 – 13:00

Auditorium Einstein, Conference Center, The High Tech Campus, Eindhoven, The Netherlands

Organizers

Prof. Giancarlo Fortino, Dr. Raffaele Gravina – Department of Informatics, Modelling, Electronics, and Systems (DIMES), University of Calabria, Italy

Abstract

Wearable computing is a relatively new area of research and development that aims at supporting people in different application domains: health-care (monitoring assisted livings), fitness (monitoring athletes), social interactions (enabling multi-user activity recognition, e.g. handshake), videogames (enabling joystick-less interactions), factory (monitoring employees in their activity), etc. Wearable computing is based on wearable computing devices such as sensor nodes (e.g. to measure heart rate, temperature, blood oxygen, etc.), common life objects (e.g. watch, belt, etc.), smartphones/PDA. Wearable computing has been recently boosted by the introduction of body sensor networks (BSNs), i.e. networks of wireless wearable sensor nodes coordinated by more capable coordinators (smartphones, tablets, PCs). Although the basic elements (sensors, protocols, coordinators) of a BSN are available (already from a commercial point of view), developing BSN systems/applications is a complex task that requires design methods based on effective and efficient programming frameworks. In this tutorial, we will introduce programming approaches and methods to effectively develop (model, implement and deploy) efficient BSN systems/applications. Moreover, we also provide new techniques to integrate BSN-based wearable systems with more general Wireless Sensor Network systems and with Cloud computing as well as Platform-based Design Methodology for BSNs. From the practical viewpoint, the tutorial will be based on the SPINE project (<http://spine.deis.unical.it>), currently led by Prof. Fortino's research group. Specifically, the tutorial will use the SPINE open-source framework to provide practical knowledge of HW/SW tools for the development of wearable computing systems (e.g. activity recognition systems, fall detection systems, mobile ECG processing systems, elbow/knee rehabilitation systems, etc.).

Speakers

Giancarlo **Fortino**, Ph.D. DIMES, University of Calabria, Italy

Raffaele **Gravina**, Ph.D. DIMES, University of Calabria, Italy

Introduction

9:00 – 9:05

Giancarlo Fortino

SPINE: Signal Processing In Node Environment

9:05 – 9:45

Giancarlo Fortino

| | |
|--|--------------|
| SPINE Extensions and Variants: C-SPINE, A-SPINE, and SPINE-* | 9:45 – 10:15 |
|--|--------------|

Giancarlo Fortino

| | |
|----------------------------------|---------------|
| BodyCloud: BSN-Cloud integration | 10:15 – 10:45 |
|----------------------------------|---------------|

Giancarlo Fortino

| | |
|-------|---------------|
| Break | 10:45 – 11:00 |
|-------|---------------|

| | |
|----------------------------|---------------|
| SPINE Live and Video Demos | 11:00 – 11:15 |
|----------------------------|---------------|

Raffaele Gravina

| | |
|--|---------------|
| SPINE Programming Tutorial – How to configure, customize and extend the SPINE framework – Running a simple SPINE-based application | 11:15 – 12:30 |
|--|---------------|

Raffaele Gravina

| | |
|----------------------------------|---------------|
| Projecting* and Joint Discussion | 12:30 – 13:00 |
|----------------------------------|---------------|

All

* *Exchange of Experiences and Lesson Learned in BSN-oriented Projects: How to use SPINE in such projects?*