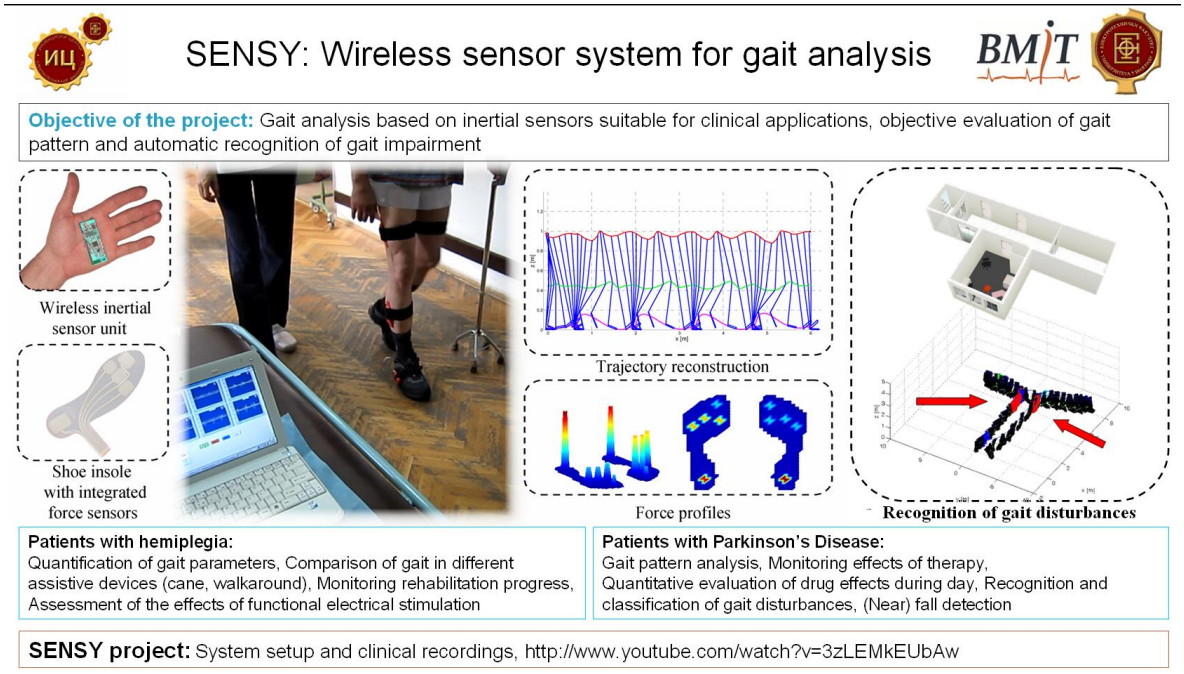
Séminaire ISIR

Milica Djuric-Jovicic et Nenad Jovivic

Jeudi 20 juin 2013 à 11h00

Campus Jussieu, 4 place Jussieu, Paris
Salle de réunion 304



Gait analysis has become a widely used clinical tool which provides objective evaluation of the gait pattern, the effects of surgical interventions, recovery or therapy progress, and more and more clinicians are choosing therapy treatments based on gait kinematics and kinetics. Measuring gait parameters is an important requirement in the orthopedic and rehabilitation fields, but also in sports and fitness, and development of technologies for elderly population.

In order to provide objective evaluation of the gait pattern, we have developed sensor system with light and small wireless sensor units, which can be easily mounted on body. These sensor units comprise inertial sensors and force sensing resistors. By using our signal processing algorithms inertial sensors allow objective assessment of the quality of the gait pattern, which is especially important for assessment of the motor deficit,

progress of the disease and therapy effectiveness, and effectiveness of performed motor control (functional electrical stimulation).

The system, called SENSY, is used in several clinical centers in Belgrade, for assessment of various gait pathologies provoked by stroke, Parkinson's disease, hidrocefalus, cerebral palsy, multiple sclerosis, brain injuries after motor accidents, and other injuries that result in impaired walking abilities.

A novel modification of this sensor system, which is now being validated at ISIR, uses miniature inertial sensors for quantification of finger and foot tapping performances, with a goal to facilitate diagnostic methods for neurologists. More precisely, the aim is to differentiate different types of Pakinsonism forms (MSA, PSP, CBD) from typical Parkinson's disease and healthy subjects through these specific motor tests.

Milica Djuric–Jovicic & Nenad Jovicic
University of Belgrade, School of Electrical Engineering, Belgrade, Serbia
milica.djuric@etf.rs , nenad@etf.rs

Milica Djurić-Jovičić received PhD in Biomedical engineering at the Department for Signal processing and control systems, University of Belgrade, School of Electrical Engineering, Belgrade, Serbia, in 2012. She graduated at the same school and received Dipl. Eng. in telecommunications engineering, in 2007. From 2007 to 2012 she worked as associate researcher at department of Biomedical Engineering, School of Electrical Engineering, University of Belgrade, Serbia. From 2008 to 2012 she was partly employed by Tecnalia Serbia Ltd as project manager for wireless gait analysis systems. In 2013, she became deputy director of the Innovation center, founded by the same University where she colaborates with 21 PhD students from many engineering areas.

Within her PhD thesis she has developed system for advanced gait analysis for pathological gait that provides classification of gait disturbances with detail description of level of the impairment.

Her research interests include signal processing, movement analysis, rehabilitation of movement, and medical instrumentation.

Nenad Jovičić received PhD in Electrical engineering from the University of Belgrade, School of Electrical Engineering, Belgrade, Serbia, in 2013.

He is a Teaching and Research Assistant on several courses at Department of Electronics at the School of Electrical Engineering, University of Belgrade, such as Fundamentals of Electronics, Integrated Embedded Systems, 32-bit Microcontrollers and Applications, Embedded Real-Time Programming etc.

His research interests include embedded system design, wireless sensor and actuator networks and medical instrumentation, but also many others areas of electronics and image processing.

His current work which was also the focus of his thesis is development of sensor and actuator networks that integrate inertial or other sensors with sensory driven functional electrical stimulation, for both upper and lower extremities.

Their team work is based on the following organization: Milica is in charge for design of new applications, clinical recordings and development of the software for motor assessment, while Nenad is in charge for hardware development and system design.