Pensacola Morning Lecture

Luca Lonini

THE TALK: *Quantifying Rehabilitation Outcomes from Wearables and Smartphones Data*

The use of wearable sensors and smartphones as tools for health monitoring is gaining interest due to their broad diffusion, relative low cost and the possibility to measure a host of physiological and behavioral variables continuously. Machine learning can be used in this context to learn models from the sensors data that can inform clinicians on patients' outcomes or potential health problems in advance. In this talk I will give an overview of our work which exploits the synergy of these fields to quantify rehabilitation outcomes in different patient populations. I will show examples of monitoring physical activities in patients walking with assistive devices, detecting falls from smartphone data in amputees, and discriminating voluntary muscle activity from spastic contractions in stroke patients using stretchable sensors. I will also discuss some of the challenges posed by the application of such technologies to the clinical scenario.

Luca Lonini received his BS in Computer Engineering from the University of Rome "Tor Vergata" in 2003 and his MS in Biomedical Engineering from University Campus Bio-medico of Rome (Italy) in 2006. In 2007 he was visiting fellow at the Newman Lab for Biomechanics and Human Rehabilitation at MIT working on computational models of human motor control to optimize robotic therapy in stroke patients. He then obtained his PhD in Computer Science at the Frankfurt Institute for Advanced Studies (Frankfurt, Germany) in 2013, working on unsupervised learning models to achieve autonomous stereo vision on the humanoid robot iCub. He is currently a postdoctoral fellow at the Rehabilitation Institute of Chicago and Northwestern University (Chicago, USA) in the Max Näder Lab for Rehabilitation Technologies and Outcomes Research. His research interests include the application of machine learning to quantify patient outcomes in clinical scenarios from wearable sensors and smartphones data.

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IHMC Classroom

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