2018 Workshop on Metrology for Industry 4.0 and IoT

Brescia, Italy
16-18 April 2018

IEEE Catalog Number: CFP18N49-POD
ISBN: 978-1-5386-2498-2

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number: CFP18N49-POD
ISBN (Print-On-Demand): 978-1-5386-2498-2
ISBN (Online): 978-1-5386-2497-5

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

WORKSHOP PROGRAM

Monday, April 16th

Special Session on Perception Methods to Enhance the role of the Man in the Loop

Room: "Sala Consiliare" Hall, University of Brescia
Chairs: *Mariolino De Cecco, University of Trento, Italy*
Hirokazu Kato, Nara Institute of Science and Technology, Japan

1 **Kinect-based micro-behavior sensing system for learning the smart assistance with human subjects inside their homes**
Teruhiro Mizumoto, Nara Institute of Science and Technology, Japan
Alberto Fornaser, University of Trento, Italy
Hirohiko Suwa, Nara Institute of Science and Technology, Japan
Keiichi Yasumoto, Nara Institute of Science and Technology, Japan
Mariolino De Cecco, University of Trento, Italy

7 **Efficient In-Situ Creation of Augmented Reality Tutorials**
Alexander Plopski, Nara Institute of Science and Technology, Japan
Varunyu Fuvattanasilp, Nara Institute of Science and Technology, Japan
Jarkko Poldi, Nara Institute of Science and Technology, Japan
Takafumi Taketomi, Nara Institute of Science and Technology, Japan
Christian Sandor, Nara Institute of Science and Technology, Japan
Hirokazu Kato, Nara Institute of Science and Technology, Japan

12 **An Augmented Reality virtual assistant to help mild cognitive impaired users in cooking**
J. D'Agostini, University of Trento, Italy
L. Bonetti, University of Trento, Italy
A. Salem, University of Trento, Italy
L. Passerini, University of Trento, Italy
G. Fiacco, University of Trento, Italy
P. Lavanda, University of Trento, Italy
E. Motti, University of Trento, Italy
M. Stocco, University of Trento, Italy
K. T. Gashay, University of Trento, Italy
E. G. Abebe, University of Trento, Italy
S. M. Alemu, University of Trento, Italy
R. Haghani, University of Trento, Italy
A. Voltolini, University of Trento, Italy
C. Strobbe, University of Trento, Italy
N. Covre, University of Trento, Italy
G. Santolini, University of Trento, Italy
M. Armellini, University of Trento, Italy
T. Sacchi, University of Trento, Italy
D. Ronchese, University of Trento, Italy
C. Furlan, University of Trento, Italy
F. Facchinato, University of Trento, Italy
L. Maule, University of Trento, Italy
P. Tomasin, University of Trento, Italy
A. Fornaser, University of Trento, Italy
M. De Cecco, University of Trento, Italy

18 **Multimodal computer vision framework for human assistive robotics**
Eugenio Ivorra, Universitat Politècnica de València, Spain
Mario Ortega, Universitat Politècnica de València, Spain
Mariano Alcaniz, Universitat Politècnica de València, Spain
Nicolas Garcia-Aracil, Universidad Miguel Hernàndez de Elche, Spain

---

Special Session on Embedded vision methods and systems for edge-computing and IoT applications

Room: "Aula N. 8" Hall, University of Brescia
Chairs: *Giovanna Sansoni, University of Brescia, Italy*
Diego R. C. Silva, Universidade Federal do Rio Grande do Norte, Brazil

23 **Academic FabLab at University of Naples Federico II: New Research and Development Opportunities in the Fields of IoT and Industry 4.0**
Leopoldo Angrisani, University of Naples Federico II, Italy
Pasquale Arpaia, University of Naples Federico II, Italy
Francesco Bonavolontà, University of Naples Federico II, Italy
Rosario Schiano Lo Moriello, University of Naples Federico II, Italy

28 **Deep Learning based Machine Vision: first steps towards a hand gesture recognition set up for Collaborative Robots**
Cristina Nuzzi, University of Brescia, Italy
Simone Pasinetti, University of Brescia, Italy
Matteo Lancini, University of Brescia, Italy
Franco Docchio, University of Brescia, Italy
Giovanna Sansoni, University of Brescia, Italy

34 **Development and characterization of a safety system for robotic cells based on multiple Time of Flight (TOF) cameras and point cloud analysis**
Simone Pasinetti, University of Brescia, Italy
Cristina Nuzzi, University of Brescia, Italy
Matteo Lancini, University of Brescia, Italy
Giovanna Sansoni, University of Brescia, Italy
Franco Docchio, University of Brescia, Italy
Alberto Fornaser, University of Trento, Italy

40 **IoT enabling measurement applications in Industry 4.0: platform for remote programming ATEs**
Leopoldo Angrisani, University of Naples Federico II, Italy
Umberto Cesaro, University of Naples Federico II, Italy
Mauro D'Arco, University of Naples Federico II, Italy
Domenicantonio Grillo, University of Naples Federico II, Italy
Alessandro Tocchi, University of Naples Federico II, Italy

Tuesday, April 17th

Special Session on Smart Measurement Systems for on-line Quality Control

Room: "Sala Consiliare" Hall, University of Brescia
Chairs: *Nicola Paone, Università Politecnica delle Marche , Italy*
Mahsa Mohammadikaji, Karlsruhe Institute of Technology, Germany

---

Special Session on Synchronization for Internet of Things

Room: "Aula N. 8" Hall, University of Brescia
Chairs: *Francesco Lamonaca, University of Sannio, Italy*
Paolo Francesco Sciammarella, University of Calabria, Italy

78 **Low-cost Implementation of an Active Phasor Data Concentrator for Smart Grid**
Paolo Castello, University of Cagliari, Italy
Carlo Muscas, University of Cagliari, Italy
Paolo Attilio Pegoraro, University of Cagliari, Italy
Sara Sulis, University of Cagliari, Italy

83 **Time Synchronization Based on CMTS: a Performance Analysis in Industry Scenarios**
Domenico Capriglione, University of Salerno, Italy
Gianni Cerro, University of Cassino and Southern Lazio, Italy
Luigi Ferrigno, University of Cassino and Southern Lazio, Italy
Vincenzo Paciello, University of Cassino and Southern Lazio, Italy

89 **Synchronization of IoT layers for Structural Health Monitoring**
Francesco Lamonaca, University of Sannio, Italy
Paolo Francesco Sciammarella, University of Calabria, Italy
Carmelo Scuro, University of Calabria, Italy
Domenico Luca Carnì, University of Calabria, Italy
Renato Olivito, University of Calabria, Italy

95 **Internet of Things for Structural Health Monitoring**
Francesco Lamonaca, University of Sannio, Italy
Carmelo Scuro, University of Calabria, Italy
Paolo Francesco Sciammarella, University of Calabria, Italy
Domenico Luca Carnì, University of Calabria, Italy
Renato Olivito, University of Calabria, Italy

Special Session on Measurement Systems and Approaches for Smart Manufacturing

Room: "Sala Consiliare" Hall, University of Brescia
Chairs: *Giulio D'Emilia, L'Aquila University, Italy*
Khurram Shahzad, Mid Sweden University, Sweden

101 **Condition Monitoring in Industry 4.0 - Design Challenges and Possibilities: A Case Study**
Khurram Shahzad, Mid Sweden University, Sweden
Mattias O'Nils, Mid Sweden University, Sweden

107 **Measurements for Smart Manufacturing in an Industry 4.0 scenario**
Giulio D'Emilia, University of L'Aquila, Italy
Antonella Gaspari, University of L'Aquila, Italy
Emanuela Natale, University of L'Aquila, Italy

112 **Data validation techniques for measurements systems operating in a Industry 4.0 scenario**
Giulio D'Emilia, University of L'Aquila, Italy
Antonella Gaspari, University of L'Aquila, Italy

117 **Additive manufacturing as a reshoring enabler**
Luciano Fratocchi, University of L'Aquila, Italy

123 **On the use of IoT Sensors for Indoor Conditions Assessment and Tuning of Occupancy Rates Models**
Stefano Rinaldi, University of Brescia, Italy
Alessandra Flammini, University of Brescia, Italy
Lavinia Chiara Tagliabue, University of Brescia, Italy
Angelo Luigi Camillo Ciribini, University of Brescia, Italy

Poster Session

Room: University of Brescia
Chairs:

129 **"Smart Street" Pilot Site: a RAMS Analysys for a Scale-up Configuration**
Enrico Petritoli, Università degli Studi "Roma Tre", Italy
Fabio Leccese, Università degli Studi "Roma Tre", Italy
Martina Botticelli, Università Politecnica delle Marche, Italy
Stefano Pizzuti, ENEA, Italy
Francesco Pieroni, ENEA, Italy

134 **In-line monitoring of laser welding using a smart vision system**
Simone Pasinetti, University of Brescia, Italy
Giovanna Sansoni, University of Brescia, Italy
Franco Docchio, University of Brescia, Italy

140 **Innovative methodology for detecting of possible harmful compounds for wastewater treatment**
Massimo Blonda, CNR-IRSA, Italy
Angelantonio Calabrese, CNR-IRSA, Italy
Angelo Cardellicchio, Politecnico di Bari, Italy
Barbara Casale, CNR-IRSA, Italy
Giuseppe Dentamaro, Politecnico di Bari, Italy
Vincenzo Di Lecce, Politecnico di Bari, Italy
Antonietta Dimucci, Omnitech Srl, Italy
Cataldo Guaragnella, Politecnico di Bari, Italy
Diego Matrino, Secure to Future Srl, Italy
Dian Palagachev, Politecnico di Bari, Italy
Domenico Petruzzelli, Politecnico di Bari, Italy
Tiziano Politi, Politecnico di Bari, Italy
Maria Rizzi, Politecnico di Bari, Italy
Vincenzo Sarcina, Omnitech Srl, Italy
Vito Felice Uricchio, CNR-IRSA, Italy

146 **Indoor localization for evacuation management in emergency scenarios**
Alessandro Depari, University of Brescia, Italy
Alessandra Flammini, University of Brescia, Italy
Daniela Fogli, University of Brescia, Italy
Paola Magrino, University of Brescia, Italy

151 **Evaluation of Open Data Models for the Exchange of Sensor Data in Cognitive Building**
Markus Scheffer, Ruhr Universitat Bochum, Germany
Markus Konig, Ruhr Universitat Bochum, Germany
Tabea Engelmann, Ruhr Universitat Bochum, Germany
Lavinia Chiara Tagliabue, University of Brescia, Italy
Angelo Luigi Camillo Ciribini, University of Brescia, Italy
Stefano Rinaldi, University of Brescia, Italy
Marco Pasetti, University of Brescia, Italy

157 **A Survey of Measurement Applications based on IoT**
Pasquale Daponte, University of Sannio, Italy
Luca De Vito, University of Sannio, Italy
Francesco Lamonaca, University of Sannio, Italy
Gianluca Mazzilli, University of Sannio, Italy
Francesco Picariello, University of Sannio, Italy
Ioan Tudosa, University of Sannio, Italy

Wednesday, April 18th

Special Session on Measurement Systems in the Industrial IoT Era - PART I

Room: "Sala Consiliare" Hall, University of Brescia
Chairs: *Emiliano Sisinni, University of Brescia, Italy*

Special Session on Standards and Technologies for CyberSecurity of IoT and Industry 4.0 (SecStandards)

Room: "Aula N. 8" Hall, University of Brescia
Chairs: *Raphael Machado, Inmetro, Brazil*
Francesco Gringoli, University of Brescia, Italy

203 **Evaluation on Passive System Identification and Covert Misappropriation attacks in Large Pressurized Heavy Water Reactors**
Alan Oliveira de Sá, Brazilian Navy, Federal University of Rio de Janeiro, Brazil
Luiz F. R. da C. Carmo, National Institute of Metrology, Quality and Technology, Federal University of Rio de Janeiro, Brazil
Raphael C. S. Machado, National Institute of Metrology, Quality and Technology, Federal University of Rio de Janeiro, Brazil

209 **Implementation of cybersecurity procedures in remote calibration for PNT services**
Leonardo C. Ribeiro, Inmetro, Brazil
Luiz V. G. Tarelho, Inmetro, Brazil
Giovanni D. Rovera, Observatoire de Paris, France
Luiz P. Damaceno, University of São Paulo, Brazil
Daniel V. Magalhães, University of São Paulo, Brazil
Guilherme A. Garcia, Inmetro, Brazil
Raphael C. S. Machado, Inmetro, Brazil

213 **True random number generators for batch control sampling in Smart Factories**
Leonardo Costa Ribeiro, Inmetro, Brazil
Desiree S. Gonçalves, Inmetro, Brazil
Wladmir A. Chapetta, Inmetro, Brazil
Ana C. O. Marcelino, Inmetro, Brazil
Luiz V. G. Tarelho, Inmetro, Brazil
Raphael C. S. Machado, Inmetro, PPCIC-CEFET/RJ, Brazil
Leandro P. Correa, Inmetro, Brazil
Guilherme A. Garcia, Inmetro, Brazil
Alan Oliveira de Sá, UFRJ, Brazil

Special Session on Measurement Systems in the Industrial IoT Era - PART II

Room: "Sala Consiliare" Hall, University of Brescia
Chairs: *Emiliano Sisinni, University of Brescia, Italy*
Dennis Brandão, Universidade de São Paulo, Brazil

218 **Challenges of Securing the Industrial Internet of Things Value Chain**
Stefan Forsstrom, Mid Sweden University, Sweden
Ismail Butun, Mid Sweden University, Sweden
Mohamed Eldefrawy, Mid Sweden University, Sweden
Ulf Jennehag, Mid Sweden University, Sweden
Mikael Gidlund, Mid Sweden University, Sweden

224 **Evaluation of communication delay in IoT applications based on OPC UA**
Paolo Ferrari, University of Brescia, Italy
Alessandra Flammini, University of Brescia, Italy
Stefano Rinaldi, University of Brescia, Italy
Emiliano Sisinni, University of Brescia, Italy
Davide Maffei, Siemens Spa
Matteo Malara, Siemens Spa

230 **A Flexible Framework for Debugging IoT Wireless Applications**
Francesco Gringoli, University of Brescia, Italy
Nahla Ali, University of Brescia, Italy
Fabrizio Guerrini, University of Brescia, Italy
Paul Patras, University of Edinburgh, Scotland

General Session

Room: "Aula N. 8" Hall, University of Brescia
Chairs: *Mauro Serpelloni, University of Brescia, Italy*
Alessandro Pozzebon, University of Siena, Italy