8th international workshop on
APPLications in Electronics Pervading Industry,
Environment and Society
APPLEPIES 2020
19-20 November 2020, on-line on TEAMS, www.applepies.eu
(Free) registration required

DAY 1 Thursday 19 November
9.00-9.15 Opening and Introduction (chairs: S. Saponara, A. De Gloria)
Break 9.45-9.50
9.50-10.20 Scientific Keynote 2 (J. Davis, Barcelona Super Computing, “RISC-V, Enabling a Wide Open Future of HPC”)
Break 10.20-10.30
10.30-11.45 SessionS1 AI and ML Techniques (chair: R. Berta)
Break 11.45-11.50
11.50-12.50 SessionS2 Environmental Monitoring and E-health (chair: R. Seepold)
12.50-13.20 Instrumentation & Measurement GIAKOVA Keynote (L. Poli)
Lunch break 13.20-14.30
14.30-15.30 SessionSS1 Mechatronics, Energies and Industry 4.0 (chair: F. Bellotti)
Break 15.30-15.40
15.40-16.40 Session SS2 IoT, AI and ICT applications (chair: N. Martinez Madrid)
16.40-16.45 Closing Day1 (chairs: S. Saponara, A. De Gloria)
DAY 2 Friday 20 November

9.00-9.10 Intro of Day2 and of Industrial Keynotes (chairs: S. Saponara, A. De Gloria)

9.10-9.40 LEONARDO Industrial Keynote (A. Massa, “Surveillance by sensors, drones and satellites”)
Break 9.40-9.45

9.45-10.15 HUAWEI Industrial Keynote (P. Gai, “Towards intelligent fully-connected automotive systems”)
Break 10.15-10.25

10.25-11.40 Session S3 Electronics for Health and Assisted living (chair: D. De Venuto)
Break 11.40-1145

11.45-13.00 Session S4 Digital Techniques for Mechatronics, Energy and Critical Systems
(chairs: M. Grammatikakis, C. Giaconia)
Break 13.00-14.30

14.30-15.45 Session S5 Photonic Circuits and IoT for Communications (chairs: M. Ruo Roch, D. Brunelli)

15.45-16.00 Closing Conference (chairs: S. Saponara, A. De Gloria)
SESSIONS WITH REGULAR PAPERS

S1 AI and ML Techniques
Chair: Riccardo Berta, Università di Genova
Session S1 10.30-11.45 Thursday 19 November 2020 5 papers
Romina Molina, Valeria Gonzalez, Jesica Benito, Stefano Marsi, Giovanni Ramponi and Ricardo Petrino, Implementation of Particle image velocimetry for silo discharge and food industry seeds
Alessio Gagliardi, Marco Villella, Luca Picciolini and Sergio Saponara, Analysis and Design of a Yolo like DNN for Smoke/Fire Detection for Low-cost Embedded Systems
Edoardo Ragusa, Christian Gianoglio, Filippo Dalmonte and Paolo Gastaldo, Video Grasping Classification Enhanced with Automatic Annotations
Abdussalam Elhanashi, Sergio Saponara, and Alessio Gagliardi, Enabling YOLOv2 Models to Monitor Fire and Smoke Detection Remotely in Smart Infrastructures
Francesco Bellotti, Riccardo Berta, Alessandro De Gloria, Joseph Doyle and Fouad Sakr. Exploring Unsupervised Learning on Mainstream Microcontrollers

S2 Environmental Monitoring and E-health
Chair: Ralf Seepold, HTWG Konstanz
Session S2 11.50-12.50 19 November 2020 4 papers
Yurii Shkilniuk, Maksym Gaiduk and Ralf Seepold, Unobtrusive accelerometer-based heart rate detection
Marco Carminati, Davide Di Vita, Luca Buonanno, Giovanni Montagnani and Carlo Fiorini. A Lightweight SiPM-Based Gamma-Ray Spectrometer for Environmental Monitoring with Drones
Patrick Locatelli, Asad Hussain, Andrea Pedrana, Matteo Pezzoli, Gianluca Traversi and Valerio Re Winter: A Novel Low Power Modular Platform for Wearable and IoT Applications
Federica Zonzini, Matteo Zauli, Antonio Carbone, Francesca Romano, Nicola Testoni and Luca Demarchi, Hardware-oriented Data Recovery Algorithms for CS-based Vibration Diagnostics

S3 Electronics for Health and Assisted living
Chair: Daniela De Venuto, Politecnico di Bari
Session S3 10.25-11.40 20 November 2020 5 papers
Francesco de Gioia, Massimiliano Donati, Luca Fanucci, Automatic generation of 3D printable tactile paintings for the visually impaired
Miltos Grammatikakis, Anastasios Koumarelis, Efstratios Ntallaris, Validation of Soft Real-Time in Remote ECG Analysis
Miltos Grammatikakis, Anastasios Koumarelis and Angelos Mouzakitis, Software Architecture of a User-Level GNU/Linux Driver for a Complex E-Health Biosensor
S4 Digital Techniques for Mechatronics, Energy and Critical Systems
Chair: Miltos Grammatikakis, Hellenic Mediterranean University and Costantino Giaconia, Università di Palermo

Session S4 11.45-13.00 Friday 20 November 2020 5 papers

- Marica Poce, Giovanni Casiello, Lorenzo Ferrari, Lorenzo Flaccomio Nardi Dei and Sergio Saponara, Creation of a Digital Twin Model, Redesign of Plant Structure and New Fuzzy Logic Controller for the Cooling System of a Railway Locomotive
- Mattia Stighezza, Valentina Bianchi and Ilaria De Munari, HDL code generation from SIMULINK environment for Li-Ion cells State of Charge and parameter estimation
- Hariom Dhungana, Francesco Bellotti, Riccardo Berta and Alessandro De Gloria, Performance Comparison of Imputation Methods in Building Energy Data sets
- Giuseppe Galioto, Antonino Sferlazza and G Costantino Giaconia, Design and validation of a FPGA-based HIL simulator for minimum losses control of a PMSM
- Nikos Mouzakitis, Michele Paolino, Miltos Grammatikakis and Daniel Raho, x86 System Management Mode (SMM) evaluation for Mixed Critical Systems

S5 RF, Photonic Circuits and IoT for Communications
Chair: Massimo Ruo Roch, Politecnico di Torino; Davide Brunelli, Università di Trento

Session S5 14.30-15.45 20 November 2020 5 papers

- Yonas Muanenda, Stefano Faralli, Philippe Velha, Claudio Oton and Fabrizio Di Pasquale, A Novel Pulse Compression Scheme in Coherent OTDR using Direct Digital Synthesis and Nonlinear Frequency Modulation
- Francesco Cosimi, Gabriele Ciarpi, Sergio Saponara, Design and Analysis of RF/High-speed SERDES in 28nm CMOS technology for Aerospace Applications
- Alessandro Torrisi, Kasım Sinan Yıldırım and Davide Brunelli, Enabling Transiently-Powered Communication via Backscattering Energy State Information
- Paolo Prosperi, Gabriele Ciarpi and Sergio Saponara, Analysis and Design of Integrated VCO in 28nm CMOS Technology for Aerospace Applications
- Massimo Ruo Roch, Maurizio Martina, vrLab: A Virtual and Remote low cost electronics lab platform
SESSIONS WITH SHORT PAPERS

SS1 - Mechatronics, Energies and Industry 4.0
Chair: F. Bellotti, Università di Genova

Session SS1 14.30-15.30 19 November 2020 6 papers short


Matteo Petrelli, Sandro Giannetti, Francesco Cosimi, Pierpaolo Dini, and Sergio Saponara Analysis and Design of a Non-linear MPC Algorithm for Vehicle Trajectory Tracking and Obstacle Avoidance


Andrea Carloni, Federico Baronti, Roberto Di Rienzo, Roberto Roncella and Roberto Saletti. Preliminary study of a novel Lithium-ion battery low-cost maintenance system

Roberto Di Rienzo, Federico Baronti, Daniele Bellucci, Andrea Carloni, Roberto Roncella, Marco Zeni and Roberto Saletti. Low cost and flexible battery framework for micro-grid applications

Luca Fronda, Francesco Bellotti, Riccardo Berta, Alessandro De Gloria and Paolo Cesario Survey of positioning technologies for in-tunnel railway maintenance

SS2 - IoT, AI and ICT applications
Chair Natividad Martinez Madrid, Reutlingen University

Session SS2 15.40-16.40 19 November 2020 6 papers short

Riccardo Berta, Andrea Mazzara, Francesco Bellotti, Alessandro De Gloria and Luca Lazzaroni Edgine, a Runtime System for IoT Edge Applications

Gian Carlo Cardarilli, Luca Di Nunzio, Rocco Fazzolari, Daniele Giardino, Marco Matta, Marco Re and Sergio Spanò, An Action-Selection Policy Generator for Reinforcement Learning Hardware Accelerators

Ali Daher, Hussein Chible, Marco Muselli, Ali Rizik and Daniele D. Caviglia Porting Rulex Machine Learning Software to the Raspberry Pi as an Edge Computing Device

Luis Guillermo García Ordóñez, Maria Liz Crespo, Sergio Carrato, Andres Cicuttin, Werner Florian, Romina Molina, Bruno Valinoti and Stefano Levorato High Voltage Isolated Bidirectional Network Interface for SoC-FPGA Based Devices

Maksym Gaiduk, Ralf Seepold, Natividad Martinez Madrid, Juan Antonio Ortega, Massimo Conti, Simone Orcioni, Thomas Penzel, Wilhelm Daniel Scherz, Juan José Perea, Ángel Serrano Alarcón and Gerald Weiss A comparison of objective and subjective sleep quality measurement in a group of elderly persons in a home environment

Michela Borghetti, Tiziano Fapanni, Nicola Francesco Lopomo, Emilio Sardini and Mauro Serpelloni. A Preliminary Study on Aerosol Jet-Printed Stretchable Dry Electrode for Electromyography