2024 9th International Conference on Smart and Sustainable Technologies (SpliTech 2024)

Bol and Split, Croatia 25-28 June 2024

Pages 1-565



IEEE Catalog Number: CFP24F09-POD ISBN:

979-8-3503-9079-7

Copyright © 2024, University of Split, FESB All Rights Reserved

*** 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:
 CFP24F09-POD

 ISBN (Print-On-Demand):
 979-8-3503-9079-7

 ISBN (Online):
 978-953-290-135-1

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



CONTENTS

CONFERENCE TECHNICAL PROGRAM

BD: MITIGATION AND ADAPTATION STRATEGIES FOR DECARBONIZATION OF BUILT ENVIRONMENT

BD1 – MITIGATION STRATEGIES FOR BUILDINGS AND BUILT ENVIRONMENT, THERMAL COMFORT AND INDOOR AIR QUALITY

Indoor air quality, thermal environment and mental health: ventilation with heat recovery to improve

	satisfaction with low energy impacts Giuseppe Aruta (Università degli Studi di Napoli Federico II, Italy); Fabrizio Ascione (Università degli studi di Napoli Federico II, Italy); Giordano Durso and Teresa Iovane (Università degli Studi di Napoli Federico II, Italy); Carla Iuliano (Free Lance, Italy); Giacomo Manniti (University of Naples Federico II, Italy); Margherita Mastellone (Università degli Studi di Napoli Federico II, Italy); Sandro Nizetic (University of Split, FESB, Croatia) Traditional and Bioclimatic Design for the energy retrofit of existing buildings	_
	Giuseppe Aruta (Università degli Studi di Napoli Federico II, Italy); Fabrizio Ascione and Nicola Bianco (Università degli studi di Napoli Federico II, Italy); Teresa Iovane and Margherita Mastellone (Università degli Studi di Napoli Federico II, Italy); Gerardo Maria Mauro (Università degli studi del Sannio, Italy); Francesco Piccirillo (Università Degli Studi di Napoli Federico II, Italy)	7
	Thermal comfort analysis of a bedroom using CFD modelling Antonio Gigante (University of Sannio, Italy); Rosa Francesca De Masi (Università degli Studi del Sannio, Italy); Michele Parrotta and Valentino Festa (University of Sannio, Italy); Giuseppe Peter Vanoli (Università degli studi del Molise, Italy); Alessandro Russo (University of Sannio, Italy)	13
	The challenge of advanced indoor control: a new multi-operative lab with innovative envelope solutions and multiple air conditioning systems Fabrizio Ascione (Università degli studi di Napoli Federico II, Italy); Rosa Francesca De Masi (Università degli Studi del Sannio, Italy); Margherita Mastellone (Università degli Studi di Napoli Federico II, Italy); Silvia Ruggiero (Università degli Studi del Sannio, Italy); Francesco Tariello and Giuseppe Peter Vanoli (Università degli studi del Molise, Italy); Giovanna La Fianza (Università degli Studi del Molise, Italy)	17
L	BD2 – BUILDINGS ENERGY SYSTEMS AND TECHNOLOGIES	
	Optimizing space cooling systems in single-family houses: A neural network-based model predictive control approach for energy efficiency and comfort enhancement Giuseppe Aruta (Università degli Studi di Napoli Federico II, Italy); Fabrizio Ascione and Nicola Bianco (Università degli studi di Napoli Federico II, Italy); Teresa Iovane (Università degli Studi di Napoli Federico II, Italy); Gerardo Maria Mauro (Università degli studi del Sannio, Italy); Francesco Tariello (Università	23
	Optimizing space cooling systems in single-family houses: A neural network-based model predictive control approach for energy efficiency and comfort enhancement Giuseppe Aruta (Università degli Studi di Napoli Federico II, Italy); Fabrizio Ascione and Nicola Bianco (Università degli Studi di Napoli Federico II, Italy); Teresa Iovane (Università degli Studi di Napoli Federico	23 29
	Optimizing space cooling systems in single-family houses: A neural network-based model predictive control approach for energy efficiency and comfort enhancement Giuseppe Aruta (Università degli Studi di Napoli Federico II, Italy); Fabrizio Ascione and Nicola Bianco (Università degli studi di Napoli Federico II, Italy); Teresa Iovane (Università degli Studi di Napoli Federico II, Italy); Gerardo Maria Mauro (Università degli studi del Sannio, Italy); Francesco Tariello (Università degli studi del Molise, Italy) Effectiveness of cool roof materials in limiting future cooling loads and overheating in the office buildings Antonio Gigante (University of Sannio, Italy); Rosa Francesca De Masi and Silvia Ruggiero (Università degli Studi del Sannio, Italy); Alessandro Russo and Valentino Festa (University of Sannio, Italy); Giuseppe Peter Vanoli (Università degli studi del Molise, Italy) Historical preservation and energy efficiency in buildings: The Case Study of a rural house in Italy Margherita Mastellone, Teresa Iovane and Filippo De Rossi (Università degli Studi di Napoli Federico II, Italy); Carlo Testa (Università Degli Studi di Napoli Federico II, Italy); Francesco Tariello (Università degli studi del	
	Optimizing space cooling systems in single-family houses: A neural network-based model predictive control approach for energy efficiency and comfort enhancement Giuseppe Aruta (Università degli Studi di Napoli Federico II, Italy); Fabrizio Ascione and Nicola Bianco (Università degli studi di Napoli Federico II, Italy); Teresa Iovane (Università degli Studi di Napoli Federico II, Italy); Gerardo Maria Mauro (Università degli studi del Sannio, Italy); Francesco Tariello (Università degli studi del Molise, Italy) Effectiveness of cool roof materials in limiting future cooling loads and overheating in the office buildings Antonio Gigante (University of Sannio, Italy); Rosa Francesca De Masi and Silvia Ruggiero (Università degli Studi del Sannio, Italy); Alessandro Russo and Valentino Festa (University of Sannio, Italy); Giuseppe Peter Vanoli (Università degli studi del Molise, Italy) Historical preservation and energy efficiency in buildings: The Case Study of a rural house in Italy Margherita Mastellone, Teresa Iovane and Filippo De Rossi (Università degli Studi di Napoli Federico II, Italy); Carlo Testa (Università Degli Studi Suor Orsola Benincasa, Italy); Bianca Gioia Marino and Iole	29

1

BD3 – RENEWABLE ENERGY TECHNOLOGIES IN BUILDINGS

Architectural design and sustainability of a new rural renewable energy community Giuseppe Aruta (Università degli Studi di Napoli Federico II, Italy); Fabrizio Ascione (Università degli studi di Napoli Federico II, Italy); Bruna Di Palma (Università degli Studi di Napoli Federico II, Italy); Pasquale	42
Notariello (Free Lance, Italy) Building integrated photovoltaics and energy sharing for net-zero energy communities in social house neighborhoods	48
Nikolaos Skandalos and Dimitris Karamanis (University of Patras, Greece)	
BD Printing: A Boon or a Bane for Sustainable Construction Juhi Kamra and Ambica Prakash Mani (Graphic Era Deemed to be University, India); V M Tripathi (Constitution of the University India)	54
(Graphic Era Hill University, India) Parametric Design of an Adaptive Shading Solution for an Overheated Residential High-Rise: a Digital Fabrication Approach	64
José M. Real-Cambas (University of the Basque Country, Spain); Jorge Otaegi and Iñigo Rodríguez-Vidal (University of the Basque Country & CAVIAR Research Group, Spain); Francisco González-Quintial	
(University of the Basque Country, Spain) Balancing Act: Analyzing Risks in Energy and Water Management for a Sustainable Future Anastasia Zafeiriou and Georgios Chantzis (Aristotle University of Thessaloniki, Greece); Merope Manataki (Alma Sistemi, Italy); Konstantinos Chatzikonstantinidis and Agis M. Papadopoulos (Aristotle	70
University of Thessaloniki, Greece) On the challenges by integration of heat pumps in existing buildings Tomasz Cholewa (Lublin University of Technology, Poland)	76
CS: CITIZEN SCIENCE	
CS1 – CITIZEN SCIENCE I	
A Low-Cost Image Sensor for Particulate Matter Detection to Streamline Citizen Science Campaigns on Air Quality Monitoring Syed Mohsin Ali Shah (University of Deusto, Bilbao Spain, Spain); Diego Casado-Mansilla (University of Deusto, Spain); Diego López-de-Ipiña (Deusto Institute of Technology - DeustoTech, University of Deusto, Spain); Eduardo Illueca Fernández (University of Murcia & Libelium, Spain); Amirhossein Hassani (The	79
Climate and Environmental Research Institute NILU, Norway); Alejandro Pujante Pérez (Libelium, Spain) Performance assessment of wearable Atmotube Pro sensor for air quality citizen science applications Alejandro Pujante Pérez (Libelium, Spain); Eduardo Illueca Fernández (University of Murcia & Libelium, Spain); Syed Mohsin Ali Shah (University of Deusto, Bilbao Spain, Spain); Diego Casado-Mansilla (University of Deusto, Spain); Antonio J. Jara (Research and Development Department Libelium Murcia,	85
Spain); Diego López-de-Ipiña (Deusto Institute of Technology - DeustoTech, University of Deusto, Spain) Youth awareness and engagement in green transition - field research in Croatia Vlasta Zanki (University of Zagreb & Geotehnički Fakultet, Croatia); Martina Leskovar (Green Building Council Croatia, Croatia)	91
Empowering citizens for climate adaptation in Norway: leveraging (Al-driven) emerging technologies Nathalie Labonnote (Sintef Community, Norway); Reidar Kind and Luis Caetano (SINTEF Community, Norway); Berit Time (SINTEF, Norway)	96
Designing Interactive Analytics Dashboards for Diverse Target Groups: The Process and Decision-making	101
Milena Vuckovic (VRVis Zentrum Für Virtual Reality Und Visualisierung Forschungs-GmbH, Austria)	
CS2 – CITIZEN SCIENCE II	
Democratizing co-production of thematic co-explorations for Citizen Observatories Diego López-de-Ipiña (Deusto Institute of Technology - DeustoTech, University of Deusto, Spain); Ruben Sanchez-Corcuera, Felipe Vergara and Mikel Emaldi (University of Deusto, Spain); Dawid Wolosiuk (Visual Analytics Group, VRVis Forschungs GmbH, Austria); Diego Casado-Mansilla (University of Deusto, Spain); Alessandra Feliciotti (MindEarth, Switzerland); Jan PetersAnders (AIT Austrian Institute of Technology GmbH, Austria)	105
The right of transparency for citizens in the context of GDPR using Blockchain: a proposed architecture Fredy João Valente (UFSCAR - Universidade Federal de Sao Carlos - Brazil, Brazil); Lucas Paulino Mendes (UFSCar, Brazil)	111
Enhancing Citizen Science Engagement through Gamification: A Case Study of the SOCIO-BEE Project Felipe Vergara (University of Deusto, Spain); Cristian Olivares-Rodríguez (Universidad Alberto Hurtado,	118

University of Deusto, Spain); Maite Puerta-Beldarrain (Universidad de Deusto, Spain); Ruben Sanchez-Corcuera (University of Deusto, Spain) Intelligent Human-Buildings Interaction Lab as a platform to investigate inhabitants' adaptation towards temperature extreme weather Kailun Feng, Chanachok Chokwitthaya and Weizhuo Lu (Umeå University, Sweden) Food Assistant for Consumer Behaviour Change through Citizen Science and AI Diego Casado-Mansilla, Oihane Gómez-Carmona and Martín Fernández-de-Retana (University of Deusto, Spain); Luca Muzzioli (Sapienza University of Rome, Italy); Anita Kušar (Nutrition Institute, Slovenia); S. Vandevijvere (Division of Cardiology, University of Alberta, Canada, Canada); Diego López-de-Ipiña (Deusto Institute of Technology - DeustoTech, University of Deusto, Spain)	125 130
CyHeMe: CYBERSECURITY IN HEALTHCARE AND MEDICINE	
CyHeMe – SECURITY AND PRIVACY	
A Survey on Advanced Security and Ensured User Privacy for Distributed Systems Andriy Prof. Dr. habil. (Dr. Sci.II) Luntovskyy (BA Dresden University of Cooperative Education & Staatliche Studienakademie BA Dresden, Germany)	136
Secrets in Motion: Privacy-Preserving Video Classification with Built-In Access Control	143
Eugene Frimpong, Tanveer Khan and Antonis Michalas (Tampere University, Finland) Development of a web solution for academic competence certification and verification using blockchain Ander Ruiz de Veye, Mikel Emaldi and Nekane Sainz (University of Deusto, Spain); Teodoro Montanaro, Ilaria Sergi and Luigi Patrono (University of Salento, Italy)	149
Taxonomy and Statistics of Cyber and Physical Vulnerabilities in Medical Devices	155
Francesca Nanni, Francesco Lestini and Gaetano Marrocco (University of Rome Tor Vergata, Italy) Static and Dynamic Fingerprint of RFID devices	161
Francesca Nanni and Gaetano Marrocco (University of Rome Tor Vergata, Italy)	
Enhancing Privacy of Clinical Decision Support Systems with Federated Learnin Zlate Dodevski (Iborn.net Skopje, Macedonia, the former Yugoslav Republic of); Kristina Drusany Starič MD (University Medical Centre Ljubljana & Medical Faculty, University of Ljubljana, Slovenia); Ana Madevska Bogdanova (Ss. Cyril and Methodius University, Macedonia, the former Yugoslav Republic of); Vladimir Trajkovikj (Ss. Cyril and Methodious University, Macedonia, the former Yugoslav Republic of)	164
e-H: e-HEALTH	
E-H: HEALTH - IMAGE PROCESSING	
The Dog Eye Guardian App: From Image to Diagnosis with Al Insights	170
Matija Buric, Božidar Kovačić and Marina Ivasic-Kos (University of Rijeka, Croatia) Adapting YOLOv8 for kidney tumor segmentation in computed tomography	
Ilija Tanasković (The Institute for Artificial Intelligence Research and Development of Serbia & University of Belgrade, Serbia); Savo Ičagić (The Institute for Artificial Intelligence Research and Development of Serbia, Serbia); Ivana Solic (University of Split, Croatia); Branka Rakić (The Institute for Artificial Intelligence Research and Development of Serbia, Serbia)	176
Feature Skeletons-based Model Retrieval for Bolus Shaping in Cancer Care	181
Qingjin Peng (University of Manitoba, Canada) Edge-Intelligence-based Federated Learning in the Internet of Medical Things Suresh Chavhan, Srinitha Beerelly and Sikander Kathat (Indian Institute of Information Technology Raichur, India); Ashit Kumar Dutta (AlMaarefa University, Saudi Arabia); Joel J. P. C. Rodrigues (Senac Fac of Ceará, Brazil & Instituto de Telecomunicações, Portugal)	187
Diffusion Model for Mammography Anomaly Detection Milica Škipina, Nikola Jovišić, Slobodan Ilić, Dubravko Ćulibrk (The Institute for Artificial Intelligence Research and Development of Serbia, Serbia)	193

E: ENERGY

E1 - ENERGY AND BUILDINGS

Requirements for Geometrical Data in Digital Twin for Building Energy Modelling and Interoperability Iryna Osadcha and Andrius Jurelionis (Kaunas University of Technology, Lithuania); Paris Fokaides (Frederick University, Cyprus)	198
An early decision support tool for energy-focused renovation of residential buildings Beñat Arregi, Amaia Castelruiz and Peru Elguezabal (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain); Enrico Prataviera and Angelo Zarrella (University of Padova, Italy); Pierre Bourreau and Hugo Viot (Nobatek-INEF4, France); Müge Yüksel Çetin (One Click LCA, Finland); Massimo Fuccaro and Rubén Alonso (R2M Solution, Italy); Tatiana Armijos-Moya and Thaleia Konstantinou (Delft University of Technology, The Netherlands); Asier Mediavilla (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain); Noelia Vicente Gómez (TECNALIA, Spain); Ruben Mulero (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain)	205
Reducing CO ₂ Emissions of a Primary School: Assessing Solutions in Lighting, Heating, Insulation, and Windows - A Case Study Vladan S. Jovanović, Dušan J. Ranđelović and Marko Ignjatović (University of Niš, Serbia); Aleksandar Andielković (University of Novi Sad. Serbia)	211
Exploring Alternative Experimental Approaches for Wall Heat Transfer Assessment - The Enhanced Thermometric Method Tullio de Rubeis and Arianna Tanfoni (University of L'Aquila, Italy); Annamaria Ciccozzi and Giovanni	217
Pasqualoni (University of LAquila Italy, Italy); Domenica Paoletti and Dario Ambrosini (University of L'Aquila, Italy)	
Air quality for various ventilation solutions in a Norwegian Zero Emission Building office Maria Justo Alonso (Sintef Community, Norway); Hans Martin Mathisen (NTNU, Norway); Thomas Elvrum Lassen (SINTEF Community, Norway)	222
E2 – ENERGY SYSTEMS AND TECHNOLOGIES	
Porous biochar production from microwave-assisted pyrolysis of biomass Tianhao Qiu, Weitao Cao, Ruming Pan, Wenke Zhao and Yaning Zhang (Harbin Institute of Technology, China)	228
Thermodynamic analysis of a transcritical CO2 heat pump for heating applications Wenke Zhao, Kaihan Xie, Yaning Zhang and Bingxi Li (Harbin Institute of Technology, China) Voltage Prediction of Proton Exchange Membrane Fuel Cells in Various Air Stoichiometries Using a Deep	233 238
Learning Model Approach Nikola Franić and Ivan Pivac (University of Split, FESB, Croatia); Ivan Peko (University of Split, PMFST, Croatia); Frano Barbir (University of Split, FESB, Croatia)	
Implementation of expert knowledge in the development of diagnostic systems for high-speed marine diesel engines	243
Petar Vrvilo (PFST, Croatia); Tino Vidović (University of Split, FESB, Croatia); Liane Roldo (PFST, Croatia); Gojmir Radica (University of Split, FESB, Croatia) Experimental assessment of a combined absorption-compression heat pump with ammonia-water	248
working fluid for high temperature application Khalid Hamid. and Trygve M. Eikevik (Norwegian University of Science and Technology, Norway) Matrix-based Product Configurator used in Configuration and Change Management in Cooling Plant	
Design Krešimir Osman (Zagreb University of Applied Sciences, Croatia); Mato Perić (University North Varaždin, Croatia); Trpimir Alajbeg (Zagreb University of Applied Sciences, Croatia)	252
E3 – SMART POWER GRIDS AND INFRASTRUCTURE	
Electricity Demand Forecasting in Future Grid States: A Digital Twin-Based Simulation Study Daniel René Bayer (University of Würzburg, Germany); Felix Haag (University of Bamberg, Germany);	257
Marco Pruckner (University of Würzburg, Germany); Konstantin Hopf (University of Bamberg, Germany) Potential for EV Chargers and PV Power Plant Integration in the Parking Lot Based on the Estimated EV Demand	263
Zvonimir Šimić, Danijel Topić and Marina Dubravac (J. J. Strossmayer University of Osijek, Croatia); Goran Knežević (FERIT Osijek, Croatia); Ilija Beljan (Regional Energy Agency North, Croatia); Nemanja Mišljenović (FERIT Osijek, Croatia)	

Traffic-based Validation of Virtualized Communication Networks Dennis Rösch (Fraunhofer IOSB-AST, Germany); Zhenqian Li (Ilmenau University of Technology, Germany); Steffen Nicolai (Fraunhofer IOSB-AST, Germany); Jochen Seitz (Ilmenau University of	269
Technology, Germany)	
Simulation-based Flexibility Calculation of Electric Vehicle Fleets for Offering Vehicle-to-Grid Services	277
based on Statistical Distributions Andreas Freymann (Fraunhofer Institute for Industrial Engineering IAO, Germany); Gian Truöl (Esslingen	
University of Applied Sciences, Germany); Ingo Trautwein (Fraunhofer IAO, Germany); Thomas Schrodi	
(Fraunhofer Institute for Industrial Engineering IAO, Germany); Daniel Stetter (Fraunhofer Institute for	
Industrial Engineering IAO)	
Data Driven Cost Analyses of Residential Electric Vehicle Charging Infrastructure	283
Marián Tomašov (University of Žilina, Slovakia); Milan Straka and Ľuboš Buzna (University of Zilina,	
Slovakia); Peter Braciník (University of Žilina, Slovakia)	
Stochastic Analysis of Transformer Loading Due to Single-Phase Distributed Energy Resources Justice Chihota and Bernard Bekker (Stellenbosch University, South Africa)	289
Justice Chinota and Dernard Derker (Stellerbosch Chiversity, South Arriva)	
E4 – ENERGY TECHNOLOGIES AND APPLICATIONS	
Feasibility of waste materials from metal industry for thermal energy storage applications	
Jorge Salgado-Beceiro (SINTEF & SINTEF Energy Research, Norway); Hanne Kauko (SINTEF Energy	295
Research, Norway); Vegard Bakkene Aasen (Norwegian University of Science and Technology, Norway)	
Implementation of Non-Cooperative Games in Decision Making Process during Group Product Design	299
Krešimir Osman (Zagreb University of Applied Sciences, Croatia); Mato Perić (University North Varaždin,	
Croatia)	
Catalytic CO2 gasification of coal char with Ca/K compounds Puizhi Li, Hui Liu, Voning Zhong, Koihon Vio, Vilo Zou, Chongo Wu, Jing Liu, and Vingebon Von (Harbin	304
Ruizhi Li, Hui Liu, Yaning Zhang, Kaihan Xie, Yile Zou, Chenyao Wu, Jing Liu and Xingchen Yan (Harbin Institute of Technology, China)	
Molecular dynamics simulation investigation of the solubility parameter of supercritical carbon dioxide-	309
cosolvent	303
Junying Wang (Xi'an Jiaotong University, China); Hui Jin (Xian Jiaotong University China, China)	
UI/UX Sustainable Design: Best Practices for Applications CO2 Emissions Reduction	314
Athanasios Kiourtis, Argyro Mavrogiorgou, Nikolaos Zafeiropoulos, Konstantinos Mavrogiorgos, Andreas	
Karabetian and Dimosthenis Kyriazis (University of Piraeus, Greece) Competitiveness of alternative fuels production based on Slovak Hydrogen Strategy	
Dominika Kraviarová (Slovak University of Technology, Slovakia); Ján Janošovský (Slovak Society of	320
Chemical Engineering, Slovakia); Miroslav Variny (Slovak University of Technology, Slovakia)	
EM: ENGINEERING MODELLING	
EM1 – MODELING, SIMULATIONS AND PERFORMANCE ANALYSIS	
Modelling and control simulation of car braking system	325
Krešimir Osman and Dominik Premuš (Zagreb University of Applied Sciences, Croatia); Mato Perić	0_0
(University North Varaždin, Croatia)	
Performance analysis of hybrid marine energy systems	330
Vedran Hinić (University of Split, Croatia); Gojmir Radica (University of Split, FESB, Croatia) Investigation of energy partnering between industry and district heating by improved process integration	
with pinch approach	336
Stanislav Boldyryev and Goran Krajačić (University of Zagreb, Croatia)	
Magnetotherapy Modeling using a Simplified and Anatomical Human Body Models	342
Mario Cvetković and Ante Totić (University of Split, Croatia)	
Residual stresses in the welded valve body	348
Ivica Galić (University of Zagreb, Croatia); Mato Perić (University North Varaždin, Croatia); Zdenko Tonković (Zagreb, Croatia); Krešimir Vučković and Ivan Čular (University of Zagreb, Croatia); Zoran Busija	
(University North Varaždin, Croatia)	
Comparison results of residual stress in the whole model of the generator shield and the model part with	351
introduced symmetries	30
Ivica Galić (University of Zagreb, Croatia); Mato Perić (University North Varaždin, Croatia); Luka Zadro	
(University of Zagreb, Croatia); Tomasz Kik (Silesian University of Technology & Faculty of Mechanical	
Engineering Poland): Dragan Žeželi and Robert Mašović (University of Zagreb, Croatia))	

EM2 – MODELLING IN POWER ENGINEERING

Predicting Charging Times for Mobile Charging Service: Shared Fleet of Electric Vehicles Lubos Buzna and Milan Straka (University of Zilina, Slovakia)	354
Impact of Different Voltage Source Models on Absorbed Power Density within the Boundary Element Method Formalism	360
Anna Šušnjara (University of Split & FESB, Croatia); Dragan Poljak (University of Split, FESB, Croatia) Step Voltage Calculation Above the Horizontal Grounding Electrode Vicko Doric and Dragan Poljak (University of Split, FESB, Croatia); Ljubomir Hrboka (CARNET, Croatia)	366
Predicting charging duration for on-demand electric vehicle mobile charging service Milan Straka and L'uboš Buzna (University of Zilina, Slovakia); Theo Blanchonnet (Telecom SudParis, France)	371
EM3 – ENGINEERING MODELLING - I	
Buffer Overflow Duration in a Processing System with a Flexible Server Vacation	377
Wojciech M. Kempa (Silesian University of Technology, Poland)	0
A Review of Numerical Methods for Solving Grad-Shafranov Equation in Magnetohydrodynamics	382
Dragan Poljak (University of Split, Croatia); Margot Descamps (Polytech Clermont, France); Thomas Raynaud (University Clermont Auvergne, France)	
Shielded Metal Arc Welding (SMAW): determining the thermal fields with FEM and RSM	388
Ruben Lostado-Lorza (University of La Rioja, Spain); Sergio Ruiz González (University of La Rioja (Spain), Spain); Celia Sabando Fraile and Marina Corral-Bobadilla (University of La Rioja, Spain)	
EM4 – ENGINEERING MODELLING - II	
Analytical versus Numerical Approach to the Analysis of the Wireless Power Transmitter Human Exposure over Real Ground	394
Petra Rasic, Zoran Blažević, Dragan Poljak and Maja Škiljo (University of Split, Croatia)	
IFC properties validation using deep graph neural network Wojciech Teclaw and Reidar Kind (SINTEF Community, Norway); Nathalie Labonnote (Sintef Community, Norway)	400
Full-scale CFD Analysis of Oil and Chemical Tanker Advancing in Open Water and Comparison with Measured Mile Trial Data	406
Ivan Tramontana (FESB, University of Split, Croatia); Željko Penga (University of Split, Croatia); Jure Penga and Gojmir Radica (University of Split, FESB, Croatia)	
Influence of Different Types of Materials on Characteristics of Electrodynamic Levitation System Mirza Batalović (Faculty of Electrical Engineering, Bosnia and Herzegovina); Mirza Matoruga (Elektroprenos - Elektroprijenos BiH, Bosnia and Herzegovina); Senad Smaka (University of Sarajevo, Faculty of Electrical Engineering, Bosnia and Herzegovina); Fuad Pasalic (INT BH Sarajevo, Bosnia and Herzegovina)	411
Cooling approaches for silicon based photovoltaic panels by implementation of phase change materials: An overview	416
Ivan Čorić and Mišo Jurčević (University of Split, FESB, Croatia); Jelena Bošnjak Hordov (University of Split & FESB, Croatia); Duje Čoko (University of Split, FESB, Croatia); Muslum Arici (Kocaeli University, Turkey); Sandro Nizetic (University of Split, FESB, Croatia)	
EM5 – ENGINEERING MODELLING - III	
Design and Experimental Measurement of RF Power Splitter Based on Cohn Topology	421
Sarah Rahayu (Institut Teknologi Bandung, Indonesia); Zulfi Zulfi (Telkom University, Indonesia); Rheyuniarto Sahlendar Asthan (Institut Teknologi Sumatera, Indonesia & Institut Teknologi Bandung,	
Indonesia); Achmad Munir (Institut Teknologi Bandung, Indonesia) Development of Semi-Conformal Antennas for Telemetry and GPS Applications on Experimental	426
Rocket	720
Rezki Benedikto Renwarin (Institut Teknologi Bandung, Indonesia); Agus D. Prasetyo (Telkom University, Indonesia & Institut Teknologi Bandung, Indonesia); Anita Pascawati (BRIN, Indonesia); Achmad Munir	
(Institut Teknologi Bandung, Indonesia)	
Electromagnetic field-induced electrotaxis as a mechanism for reducing the neuroanatomical gap	431
in cochlear implants Boris Delipetar (University of Split, Croatia); Tina Borić (Friedrich Alexander University, Germany); Jelena	

Žarković (University of Split, Croatia); Viktorija Radotić (School of Medicine - University of Split, Croatia); Ana Bedalov (The Doctoral Study of Biophysics - Faculty of Science, Croatia); Damir Kovačić (University of Split, Croatia)	
Thermophysical properties of organic waste-based phase change composites: an overview Jelena Bošnjak Hordov (University of Split & FESB, Croatia); Sandro Nizetic, Mišo Jurčević, Ivan Čorić and Duje Čoko (University of Split, FESB, Croatia); Muslum Arici (Kocaeli University, Turkey); Miće Jakić and Marija Ćosić (University of Split, Croatia)	436
EM6 – MODELLING IN ENERGY SYSTEMS	
Influence of Graded Platinum Loading on the Performance of Proton Exchange Membrane Fuel Cell Nikola Udovč (FESB, University of Split, Croatia); Željko Penga (University of Split, Croatia); Lei Xing (University of Surrey, United Kingdom (Great Britain)); Qian Xu (Jiangsu University, China)	441
Application of Secondary Channels for Improved Water Removal and Oxygen Concentration in Proton Exchange Membrane Fuel Cell	446
Ivana Hrabar (FESB, University of Split, Croatia); Željko Penga (University of Split, Croatia)	454
Virtual and Experimental Testing of Novel Screw Hydro Turbine for Micro-Grid Systems Željko Penga (University of Split, Croatia)	451
Calibrating Temperature Profiles on Current Collectors for Realistic Modelling of Proton Exchange Membrane Fuel Cells	457
Jure Penga (University of Split, FESB, Croatia); Luka Mihanović (NAVAL STUDIES, Croatia); Željko Penga (University of Split, Croatia)	
Effects of the flow field on the performance of PEM fuel cells for automotive applications Tomislav Vukoja and Željko Penga (University of Split, Croatia); Jure Penga (University of Split, FESB, Croatia)	463
IOT: INTERNET OF THINGS	
IOT1 – SPECIAL SESSION ON INNOVATIVE SOLUTIONS BASED ON IOT AND AI TO IM	DDOVE
HEALTHY AND ACTIVE AGING	NOVL
PCG Signal Acquisition and Classification for Heart Failure Detection: Recent Advances and Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device	470
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University	470
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device	
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi	470 476
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition	
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework	
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy)	476
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the	476
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and	476 482
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and Paola Di Giulio (University of Torino, Italy); Valerio Dimonte (Università degli Studi di Torino, Italy)	476 482 488
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and Paola Di Giulio (University of Torino, Italy); Valerio Dimonte (Università degli Studi di Torino, Italy) A Digital Twin Architecture for Minimizing Injuries Risks with Personalized Regimens via IoT and Machine Learning	476 482
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and Paola Di Giulio (University of Torino, Italy); Valerio Dimonte (Università degli Studi di Torino, Italy) A Digital Twin Architecture for Minimizing Injuries Risks with Personalized Regimens via IoT	476 482 488
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and Paola Di Giulio (University of Torino, Italy); Valerio Dimonte (Università degli Studi di Torino, Italy) A Digital Twin Architecture for Minimizing Injuries Risks with Personalized Regimens via IoT and Machine Learning Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Abdelkarim	476 482 488
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and Paola Di Giulio (University of Torino, Italy); Valerio Dimonte (Università degli Studi di Torino, Italy) A Digital Twin Architecture for Minimizing Injuries Risks with Personalized Regimens via IoT and Machine Learning Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Abdelkarim Mamen, Sara Kovaci, Teodoro Montanaro, Ilaria Sergi and Luigi Patrono (University of Salento, Italy) IOT2 – SPECIAL SESSION ON IOT - PART 1 Large Language Model Operations (LLMOps): Definition, Challenges, and Lifecycle Management	476 482 488
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and Paola Di Giulio (University of Torino, Italy); Valerio Dimonte (Università degli Studi di Torino, Italy) A Digital Twin Architecture for Minimizing Injuries Risks with Personalized Regimens via IoT and Machine Learning Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Abdelkarim Mamen, Sara Kovaci, Teodoro Montanaro, Ilaria Sergi and Luigi Patrono (University of Salento, Italy)	476 482 488 494
Implementation of Memory Efficient Classifiers for Edge Computing-Based Wearable Device Lorenzo Spongano, Roberto de Fazio, Massimo De Vittorio, Luigi Patrono and Paolo Visconti (University of Salento, Italy) A sensorized face mask to monitor sleep and health of the astronauts: architecture definition, sensing section development and biosignals' acquisition Roberto de Fazio and Lorenzo Spongano (University of Salento, Italy); Vincenzo Mariano Mastronardi (Istituto Italiano di Tecnologia, Italy); Luca Fachechi (IIT, Italy); Massimo De Vittorio and Francesco Rizzi (Istituto Italiano di Tecnologia, Italy); Paolo Visconti (University of Salento, Italy) An Innovative Approach for Predictive Maintenance of Home Boilers: ECOSMART Framework Ans Muhammad, Teodoro Montanaro and Ilaria Sergi (University of Salento, Italy); Miriam Pezzuto (Parsec326, Italy); Luigi Patrono (University of Salento, Italy) The implementation of an optical sensor integrated with artificial intelligence in a nursing home: the experience of Ancelia Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Riva-Rovedda and Paola Di Giulio (University of Torino, Italy); Valerio Dimonte (Università degli Studi di Torino, Italy) A Digital Twin Architecture for Minimizing Injuries Risks with Personalized Regimens via IoT and Machine Learning Elena Casabona (University of Turin, Italy); Beatrice Albanesi, Alessio Conti, Federica Abdelkarim Mamen, Sara Kovaci, Teodoro Montanaro, Ilaria Sergi and Luigi Patrono (University of Salento, Italy) IOT2 — SPECIAL SESSION ON IOT - PART 1 Large Language Model Operations (LLMOps): Definition, Challenges, and Lifecycle Management Josu Diaz-de-Arcaya (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain); Juan	476 482 488 494

Conceptualising a Benchmarking Platform for Embedded Devices	503
Asier Garcia-Perez (TECNALIA, Basque Research & Technology Alliance (BRTA), Spain); Raúl Miñón, Ana Isabel Torre-Bastida and Josu Diaz-de-Arcaya (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain); Ekaitz Zulueta-Guerrero (University of the Basque Country, Spain)	
Impact of Topology Manipulation on Digital Thread Functionality: A Case Study on Aerospace Engineering	507
Hamid Zargariasl and Christian Herglotz (Brandenburg University of Technology, Germany)	
An Innovative Approach based on Anomaly Detection to Evaluate Elderly Health	512
Ilaria Sergi, Teodoro Montanaro and Amir Ali (University of Salento, Italy); Giovanni Barone, Simone Carrisi and Daniele Galli (Gematica, Italy); Leonardo Bencivenga and Giuseppe Rengo (University of Naples, Italy); Gianluca Lerose (CUBIT, Italy); Cosimo Distante (CNR, Italy); Luigi Patrono (University of Salento, Italy)	
Agile Al and Firmware Management in IoT: DevOps for Low-Power Microcontroller-based Platforms	517
Mohammad Alselek (University of the West of Scotland, United Kingdom (Great Britain)); Jose Maria Alcaraz Calero (University of the West of Scotland & School of Engineering and Computing, United Kingdom (Great Britain)); Qi Wang (University of the West of Scotland, United Kingdom (Great Britain)) Design and Development of Drone Seed Dispersal Mechanism using Novel Narcondam Hornbill	500
Algorithm in Barren Lands	523
Suresh Chavhan, Srinitha Beerelly and Sikander Kathat (Indian Institute of Information Technology Raichur, India); Ashit Kumar Dutta (AlMaarefa University, Saudi Arabia); Joel J. P. C. Rodrigues (Senac Fac of Ceará, Brazil & Instituto de Telecomunicações, Portugal)	
IOT3 – SPECIAL SESSION ON IOT - PART 2	
Benchmarking of Cellular IoT Technology Based on Coverage, Mobility, Latency & Message Repetition	529
Radheshyam Singh (Technical University of Denmark, Ørsteds Plads, Kgs. Lyngby Denmark, Denmark); Kalpit Ballal (Danmarks Tekniske Universitet, Denmark); Christian Kloch (FORCE Technology, Denmark); Michael S. Berger and Lars Dittmann (Technical University of Denmark, Denmark)	329
Innovative Approaches to Chronic Heart Failure Monitoring: A Critical Analysis of Wearable Devices	536
llaria Sergi, Teodoro Montanaro, Roberto de Fazio, Angela-Tafadzwa Shumba and Paolo Visconti (University of Salento, Italy); Massimo De Vittorio (Istituto Italiano di Tecnologia, Italy); Luigi Patrono (University of Salento, Italy)	
Impact of Network Resource Management On The Quality of Pick and Place Processes	542
Géza Szabó (Ericsson Research, Hungary); Marcell Balogh (Budapest University of Technology and Economics & Ericsson Research Hungary, Hungary); Attila Vidács (Budapest University of Technology and Economics, Hungary)	
Acquisition and processing of ECG and PPG signals using face-worn sensors for extracting the cardio- respiratory parameters	547
Roberto de Fazio, Lorenzo Spongano and Massimo De Vittorio (University of Salento, Italy); Bassam Alnaami (The Hashemite University, Jordan); Paolo Visconti (University of Salento, Italy	
A Quantum Annealing Approach to Fluid Dynamics Problems Solving Navier-Stokes Equations	553
Juan de Dios Rodríguez (Libelium Lab S. L., Spain); Alejandro Pujante Pérez (Libelium, Spain); Eduardo Illueca Fernández (University of Murcia & Libelium, Spain); Antonio Jesus Jara Valera (Research and Development Libelium LAB S. L Ceuti, Spain)	
IOT4 – SPECIAL SESSION ON BLOCKCHAIN APPLICATIONS AND CYBERSECURITY	
SOLUTIONS FOR IOT SYSTEMS - PART 1	
Blockchain Technology Supported Education Kristian Balint (Óbuda University, Hungary)	559
Towards an European Open Continuum Reference Stack and Architecture Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Lara López (Atos Spain, SA, Spain)	566
Detecting Cryptomining Traffic in IoT Networks	571
Luca Mannella (Politecnico di Torino, Italy); Daniele Canavese (CNRS, Italy); Leonardo Regano (University of Cagliari, Italy)	371

A Blockchain-Based System with Anomaly Exclusion Method to Enhance Transparency and Fairness in Italian Public Procurement Mohamed Abdelhai Bouaicha and Teodoro Montanaro (University of Salento, Italy); Noureddine Lasla (Hamda Bin Khalifa University (HBKU), Qatar); Valeria Vergine, Luigi Patrono and Ilaria Sergi (University of Salento, Italy) LPM: A Lightweight Privacy-aware Model for IoT Data Fusion in Smart Connected Homes Kayode Sakaniyah Adewole (Malmö University, Sweden); Andreas Jacobson (Malmo University, USA) IOT5 – SPECIAL SESSION ON BLOCKCHAIN APPLICATIONS AND CYBERSECURITY SOLUTIONS FOR IOT SYSTEMS - PART 2 Towards a Federated Intrusion Detection System based on Neuromorphic Computing Domenico Lofu, Paolo Sorino, Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy) Understanding the Security Landscape of Control-data and Non-control-data Attacks Against IoT Systems Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On POT Hybrid Veriflable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe Gribh, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions Landscape Montanera (Acts, Italy); Artemis Voulkidis (Synelixis Solutions S.A. & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Bolano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrivoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing	577 583 590 595 601 607
Hamda Bin Khalifa University (HBKU), Qatar); Valeria Vergine, Luigi Patrono and Itaria Sergi (University of Salento, Italy) LPM: A Lightweight Privacy-aware Model for IoT Data Fusion in Smart Connected Homes Kayode Sakariyah Adewole (Malmo University, Sweden); Andreas Jacobson (Malmo University, USA) IOT5 — SPECIAL SESSION ON BLOCKCHAIN APPLICATIONS AND CYBERSECURITY SOLUTIONS FOR IOT SYSTEMS - PART 2 Towards a Federated Intrusion Detection System based on Neuromorphic Computing Domenico Lofù, Paolo Sorino, Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy) Understanding the Security Landscape of Control-data and Non-control-data Attacks Against IoT Systems Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On PQT Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in Next generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dinitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions S.A. & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Bonio, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia). RFID: RFID AND ELECTROMIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, Well-NESS, INDUSTRY, AND SAFETY" Design and development of a full	590 595
LPM: A Lightweight Privacy-aware Model for IoT Data Fusion in Smart Connected Homes Kayode Sakariyah Adewole (Malmö University, Sweden): Andreas Jacobson (Malmo University, USA) IOT5 — SPECIAL SESSION ON BLOCKCHAIN APPLICATIONS AND CYBERSECURITY SOLUTIONS FOR IOT SYSTEMS - PART 2 Towards a Federated Intrusion Detection System based on Neuromorphic Computing Domenico Lofú, Paolo Sorino, Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy) Understanding the Security Landscape of Control-data and Non-control-data Attacks Against IoT Systems Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On PQT Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GrabH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artenis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) MTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Bolano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrveje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio	590 595 601
Towards a Federated Intrusion Detection System based on Neuromorphic Computing Domenico Lofu, Paolo Sorino, Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy) Understanding the Security Landscape of Control-data and Non-control-data Attacks Against IoT Systems Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On POT Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronical sensors operation and readout for salivary diagnostics applications RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Ricardo Goldoni (P	595 601
Towards a Federated Intrusion Detection System based on Neuromorphic Computing Domenico Lofù, Paolo Sorino, Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy) Understanding the Security Landscape of Control-data and Non-control-data Attacks Against IoT Systems Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On POLT Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Anniaturized ECG system based on a v	595 601
Domenico Lofù, Paolo Sorino, Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy) Understanding the Security Landscape of Control-data and Non-control-data Attacks Against IoT Systems Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On POT Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia). Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia). **RFID1 - SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" **Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University	595 601
Domenico Lofù, Paolo Sorino, Tommaso Di Noia and Eugenio Di Sciascio (Polytechnic University of Bari, Italy) Understanding the Security Landscape of Control-data and Non-control-data Attacks Against IoT Systems Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On POT Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia). Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia). **RFID1 - SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" **Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University	595 601
Irene Diez-Franco and Pablo Garcia Bringas (University of Deusto, Spain); Xabier Ugarte-Pedrero (Cisco Systems, Inc., Spain) On PQ/T Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Groatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Groatia), Petar Solić (Electronics and Computing University of Split, FESB Split, Groatia), Petar Solić (Electronics and Computing University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	601
Systems, Inc., Spain) On PQ/T Hybrid Verifiable Credentials and Presentations to Build Trust in IoT Systems Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	
Alessandro Pino, Davide Margaria and Andrea Vesco (LINKS Foundation, Italy) Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy)	
Open Source in NExt generation Meta Operating systems (NEMO) Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	607
Rosaria Rossini (Eclipse Foundation Europe GmbH, Italy); Terpsichori-Helen Velivassaki (Synelixis Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	007
Solutions S.A., Greece); Theodore Zahariadis (University of Athens & Synelixis Solutions S.A., Greece); Panagiotis Karkazis (University of West Attika, Greece); Dimitrios Skias (Netcompany, Italy); Enric Pere Pages Montanera (Atos, Italy); Artemis Voulkidis (Synelixis Solutions SA & Power Operations Limited, United Kingdom (Great Britain)) eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	
eMTC vs. NB-IoT: An Empirical Comparison of Uplink Performance Antonio Boiano, Milica Spasic and Alessandro E. C. Redondi (Politecnico di Milano, Italy) The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 — SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	
The European Union Cybersecurity Legislation for the Health Sector: A Croatian Experience Report Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 – SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	612
Hrvoje Belani (Directorate for e-Health Ministry of Health Zagreb, Croatia), Toni Perković (Electronics and Computing University of Split, FESB Split, Croatia), Petar Šolić (Electronics and Computing University of Split, FESB Split, Croatia) RFID: RFID AND ELECTROMAGNETICS FOR IOT RFID1 – SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	
RFID1 – SPECIAL SESSION: "SMART ELECTRONIC AND ELECTROMAGNETIC DEVICES SYSTEMS FOR ENVIRONMENT, WELLNESS, INDUSTRY, AND SAFETY" Design and development of a fully wireless board enabling multiple electrochemical sensors operation and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	618
and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	ANE
and readout for salivary diagnostics applications Riccardo Goldoni (Politecnico di Milano & CNR-IEIIT, Italy); Filippo Goldoni (University of Parma, Italy); Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	624
Andrea Ria (University of Pisa, Italy); Gianluca M. Tartaglia (University of Milan, Italy); Lucanos Strambini (Consiglio Nazionale delle Ricerche, Italy) A miniaturized ECG system based on a versatile single chip sensor interface	024
Andrea Ria (University of Pisa, Italy); Simone Contardi (University of Pisa, Italy & Sensichips Srl, Italy); Massimo Piotto and Paolo Bruschi (University of Pisa, Italy)	628
Design of an RFID-Based Wireless Programmable Smart-Shield for Implantable Medical Devices Francesco Lestini, Alessio Marino and Gaetano Marrocco (University of Rome Tor Vergata, Italy); Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy))	632
Obstacle-avoidance through RFID Near-Field detectors for Robot-based Localization and Sensing Systems	
Glauco Cecchi, Andrea Motroni, Andrea Ria and Paolo Nepa (University of Pisa, Italy)	636
SENSIBUS: a Novel One Wire Protocol for Smart Sensors	636
Michele Vitelli (University of Cassino and Southern Lazio & Sensichips Srl, Italy); Leonardo Balocchi (University of Perugia, Italy); Mario Molinara (University of Cassino and Southern Lazio, Italy); Stefania Bonafoni and Luca Roselli (University of Perugia, Italy); Simone Contardi (University of Pisa, Italy & Sensichips Srl, Italy); Iacopo Nannipieri (Sensichips Srl, Italy)	636 641

Towards Everyday Physiological Monitoring: A Sock Prototype for Electrodermal Activity Measurements S M Musfequr Rahman, Henna Mattila, Lotta Eerola, Annika Maenpaa, Terhi Helminen, Pasi Raumonen, Anneli Kylliainen and Johanna Virkki (Tampere University, Finland)	646
RFID2 – SPECIAL SESSION: "EXPLOITING MATERIALS AND FABRICATION STRATEGIE ANTENNAS AND RF DEVICES"	S FOR
RFID-Based Temperature Integrity Seal For "Cold Chain" Monitoring Giovanni Andrea Casula (Università di Cagliari, Italy); Giuseppe Sforazzini, Piero Cosseddu, Giorgio Montisci and Giacomo Muntoni (University of Cagliari, Italy)	652
3D Printed Digital Materials for Antenna Applications Anil Bastola (Swansea University, United Kingdom (Great Britain)); Aakash Bansal (Loughborough University, United Kingdom (Great Britain)); Chris Tuck (Centre for Additive Manufacturing, United Kingdom (Great Britain)); William Whittow (Loughborough University, United Kingdom (Great Britain))	655
Wearable Waveguide Antennas Davor Bonefačić, Davorin Mikulic, Juraj Bartolić and Zvonimir Sipus (University of Zagreb, Croatia)	659
Enhancing Ku Band Antenna Performance Through Supershaped Design Elements Domenico Caggiano (IAMAtek Srl, Italy); Angela Ferraris (IAMAtek srl, Italy); Claudio Maria Lamacchia (IAMAtek Srl, Italy); Gaetano Chimenti (IAMAtek srl, Italy); Luciano Mescia (Polytechnic University of Bari, Italy)	665
A Millimeter-wave H-plane Printed-Horn Antenna with Multi-layered Substrate Hafiz Usman Tahseen (Politecnico di Bari, Italy); Luciano Mescia (Polytechnic University of Bari, Italy); Luca Catarinucci (University of Salento, Italy)	669
A Model for Performance Evaluation of Low-Frequency 3D-Printed Electronic filters Paolo Esposito (University of L Aquila, Italy); Gianluca Barile, Vincenzo Stornelli and Giuseppe Ferri (University of L'Aquila, Italy)	673
RFID3 – SPECIAL SESSION: "INNOVATIVE WIRELESS DEVICES AND ANTENNAS FOR RFID/IOT MODERN APPLICATIONS"	
A Prototype of an RFID-Based Command Sleeve With Changeable Microcircuits Tiina Vuohijoki (Tampere University, Finland); Sari Merilampi (Satakunta University of Applied Sciences, Finland); Tiina Ihalainen and Johanna Virkki (Tampere University, Finland)	678
Optically Transparent Ultra-High Frequency (UHF) RFID Tag Antennas	683
Aakash Bansal and William Whittow (Loughborough University, United Kingdom (Great Britain)) A Platform-Tolerant RFID Tag Designed on an AMC Supporting Structure	686
Giovanni Andrea Casula (Università di Cagliari, Italy); Giorgio Montisci and Giacomo Muntoni (University of Cagliari, Italy); Paolo Maxia (INAF, Italy)	000
Autonomous probe for underwater karstic topology reconstruction	690
Nicolas Troesch (Université de Montpellier, France); Arnaud Vena (University of Montpellier & Institut d'Electronique Et Des Systèmes (IES), France); Séverin Pistre (Université de Montpellier & CNRS, France); Philippe Combette (Université de Montpellier, France)	
Digital Twin of Retail Stores with RFID Tags Localization	664
Junwei Ma, Xiangyu Wang and Caleb Powell (Auburn University, USA); Jian Zhang (Kennesaw State University, Marietta, GA, USA); Shiwen Mao, Senthilkumar Periaswamy and Justin Patton (Auburn University, USA)	
RFID4 – SPECIAL SESSION: "MODELING AND DESIGN OF ELECTRIC CIRCUITS, ELECT COMPONENTS, AND RF SYSTEMS"	RONIC
Experimental Evaluation of RFID-based Thermal Monitoring Sheet (R-TMS) for Superficial Hyperthermia Treatment	700
Francesco Lestini (University of Rome Tor Vergata, Italy); Alessandro Di Carlofelice and Piero Tognolatti (University of L'Aquila, Italy); Gaetano Marrocco (University of Rome Tor Vergata, Italy); Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy)	
Adaptive Beamsteering Architecture based on AoA Estimation with Phase Shift on LO-Path for 5G NR	704
Antonello Florio and Giuseppe Coviello (Politecnico di Bari, Italy); Claudio Talarico (Gonzaga University, USA); Gianfranco Avitabile (Politecnico di Bari, Italy) Wideband OFDM Backscatter with Limited-Bandwidth Antennas for WiFi-6 and Future High-Data-Rate	709
Backscatter Systems James Rosenthal (CSEM, Switzerland); Matthew Reynolds (University of Washington, USA)	

Circuit Model of NFC-Powered Systems for Monitoring Cracks in Built Cultural Herita	715
Mohamed Emara (ISPC-CNR, Italy); Riccardo Colella (National Research Council (CNR), Italy); Alberto Bucciero (CNR, Italy); Luca Catarinucci and Giuseppe Grassi (University of Salento, Italy)	
Characterization of A Monopulse Antenna Made of Substrate-Integrated-Waveguide Structure	720
Achmad Munir (Institut Teknologi Bandung, Indonesia); Dwi Andi Nurmantris (Telkom University - Jl. Telekomunikasi Terusan Buah Batu Bandung 40257 Indonesia, Indonesia); Muhammad Farhan Maulana (Institut Teknologi Bandung & Universitas Sangga Buana, Indonesia); Ebin Novendra (Universitas Islam Negeri Bandung, Indonesia)	
Utilization of PIN Diode for Polarization Reconfigurability of 3D Printed RFID Antenna	724
Elmi Cahyaningsih (Institut Teknologi Bandung, Indonesia); Trasma Yunita (Telkom University, Indonesia); Sulistyaningsih Sulistyaningsih (National Research and Innovation Agency, Indonesia); Achmad Munir (Institut Teknologi Bandung, Indonesia)	
RFID5 – SPECIAL SESSION: "NEXT-GENERATION IOT-BASED EMERGENCY MANAGEN ENVIRONMENTAL, STRUCTURAL, ENERGY, AND BIOMEDICAL APPLICATIONS"	MENT IN
Al-Based Methodologies for Next-Generation Biomedical Imaging: Recent Advances and Future Trends	728
Marco Salucci and Samantha Lusa (ELEDIA Research Center, Italy); Lorenzo Poli (ELEDIA Research Center, University of Trento, Italy); Alessandro Polo (University of Trento & ELEDIA Research Center, Italy); Luca Tosi (ELEDIA Research Center, Italy); Andrea Massa (University of Trento, Italy)	
Backscatter-based wireless sensing system for multi-channel complex impedance measurements	731
Arnaud Vena (University of Montpellier & Institut d'Electronique Et Des Systèmes (IES), France); Jean Podlecki (University of Montpellier, France); Brice Sorli (University of Montpellier & IES, France)	
Decision Support for Resilient Emergency Response through IoT-driven Environmental Monitoring	735
Alessandro Polo and Paolo Rocca (University of Trento & ELEDIA Research Center, Italy); Marco Salucci (ELEDIA Research Center, Italy); Giorgio Gottardi (ELEDIA Research Center, University of Trento, Italy); Andrea Massa (University of Trento, Italy)	
Low-cost antenna integrated within flexible solar panels for IoT sensor nodes	739
Marco Simone and Olga Basile (University of Catania, Italy); Alessandro Polo (University of Trento & ELEDIA Research Center, Italy); Antonio Iacchetti (RibesTech, Italy); Roberto La Rosa (STMicroelectronics, Italy); Santi Concetto Pavone (Università degli Studi di Catania, Italy); Gino Sorbello (University of Catania, Italy); Mohammad Abdul Hannan (University of Catania & ELEDIA Research Center, University of Trento, Italy); Marco Salucci (ELEDIA Research Center, Italy)	
Integrating Environmental Monitoring and Structural Health: A IoT-based and Mobile-Oriented Decision Support System for Early Alerting	743
Alessandro Polo and Paolo Rocca (University of Trento & ELEDIA Research Center, Italy); Marco Salucci (ELEDIA Research Center, Italy); Maria Rosaria Gallipoli, Angela Perrone and Vincenzo Serlenga (National Research Council of Italy, Italy); Andrea Massa (University of Trento, Italy)	
RFID6 – SMART DEVICES FOR WATER AND ENVIRONMENTAL MONITORING	
Estimating Bathing Water Quality from Meteorological Measurements	748
Jelena Culic Gambiroza (University of Split, Croatia); Ivana Nizetic Kosovic (Ericsson Nikola Tesla, Croatia); Marin Ordulj and Nikolina Baumgartner (University of Split, Croatia); Ana Vrdoljak Tomaš and Slaven Jozić (Institute of Oceanography and Fisheries, Croatia)	
Localization of Personnel in Industrial Environments Using Passive RFID Tags	754
Massimo Scarsella, Mattia Ragnoli, Marianna Rotilio, Federica Cucchiella, Giuseppe Ferri and Vincenzo Stornelli (University of L'Aquila, Italy)	
Deriving Sea Surface Currents from Satellite Measurements	<i>7</i> 58
Ljiljana Šerić (University of Split, FESB, Croatia); Ivana Barišin (Terra Motus Ltd., Croatia); Antonia Ivanda (University of Split - Faculty of El. Eng., Mech. Eng. and Naval Arch. Croatia, Croatia); Maja Braović (University of Split - FESB, Croatia); Damir Krstinic (University of Split, Croatia); Selena Knežić Buhovac (University of Mostar & University of Split, Bosnia and Herzegovina); Hrvoje Mihanović (Institute of Oceanography and Fisheries, Croatia)	
Enhancing Precision in Artificial Intelligence - based Water Quality Prediction: The Advantages of Hybrid Modeling Approaches - review*	764
Ivana Krtolica (The Institute for Artificial Intelligence Research and Development of Serbia, Serbia); Milovan Medojevic (The Institute for Artificial Intelligence Research and Development of Serbia & EnergyPulse DOO, Serbia)	

SC: SMART CITY

SC1 – SMART CITY - DIGITALIZATION

Digitalization in the Norwegian fishing industry - Effects on the reporting frequency of fixed fishing gear	769
Bård Johan Hanssen (SINTEF, Norway); Tore Syversen (SINTEF Nord AS, Norway)	
Navigating Digital Transformation in Facilities Management: A Bibliometric Study	774
Mohammed Yaqot (Hamad Bin Khalifa University, Qatar); Baqer Al-Ramadan (King Fahad University of Petroleum and Minerals, Saudi Arabia)	
Embracing Unified Communication and Collaboration: Business and Technological Trends	781
Solange Rito Lima and Vasco Mota de Oliveira (Centro Algoritmi, University of Minho, Portugal); José Manuel Ribeiro (Platforms Services Department, Altice Labs, Porto, Portugal)	
Blind Image Quality Assessment Score for Humanities Online Digital Repositories	787
Zeljka Tomasovic and Neven Pintarić (University of Zadar, Croatia); Nicoletta Saulig (University of Pula, Croatia)	
SC2 – SMART CITY - ENERGY AND AI APPLICATIONS	
Application of dynamic and Al approaches for predictive maintenance	793
Maria Giovanna Pacifico and Giulia Marchiano (University of Naples Federico II, Italy); Stefania De Medici (University of Catania, Italy); Antonio Novellino (ETT Spa, Italy)	
A Cross-dimensional Attention Discriminating Masked Method For Building Energy Time-series Data Imputation	799
Jialong Pei, Jieming Ma and Ka-Lok Man (Xi'an Jiaotong-Liverpool University, China); Chun Zhao (XJTL University, China); Zhongbei Tian (University of Birmingham, United Kingdom (Great Britain))	
Energy efficiency improvement through MPC-based management of EWHs in collective dwellings	805
Laguili Oumaima (University of Perpignan & PROMES Laboratory, France); Julien Eynard (University of Perpignan, France); Stéphane Grieu (University Perpignan via Domitia, France)	
Al and Energy Consumption: Social Aspects Ljubiša Bojić, Karlo Bala, Milovan Medojević, Max Talanov (The Institute for Artificial Intelligence Research and Development of Serbia, Serbia)	811
SC3 – SMART CITY - AI AND IMAGE PROCESSING	
UAV detection and identification using a convolutional neural network	815
Ivo Stancic (University of Split, Croatia); Toni Juric (FESB- University of Split, Croatia)	
ForestML: A Real-Time Solution Proposal for UAV acquired Multispectral Imagery Analisys using Machine Learning	820
Mário Cruz (Polytechnic University of Leiria, Portugal); António Pereira (Polytechnic Institute of Leiria, Portugal); Rolabdo Miragaia (Polytechnic of Leiria, Portugal); João Ramos (Polytechnic University of Leiria, Portugal)	
Empowering Non-Experts: A Web-Based Solution for Collaborative Image Annotation in Machine Learning Models for Computer Vision	826
Pedro Félix Couto (Polytechnic University of Leiria, Portugal); António Pereira (Polytechnic Institute of Leiria, Portugal); Rolabdo Miragaia (Polytechnic of Leiria, Portugal); João Ramos (Polytechnic University of Leiria, Portugal)	
Autonomous Driving with a Deep Dual-Model Solution for Steering and Braking Control	831
Ana P Jukić, Ana Šelek, Marija Seder and Ivana Podnar Zarko (University of Zagreb, Croatia	
Increasing the model classification accuracy of thermal images	867
Ivo Stancic (University of Split, Croatia); Emilija Saric (FESB- University of Split, Croatia)	
Filtered Tensor Ring-based Algorithm for Low-rank Image Completion	843
Rafal Zdunek (Wrocław University of Science and Technology, Poland)	

SDEN: SMART DISTRIBUTED ELECTRICAL NETWORK

SDEN1 - SMART DISTRIBUTED ELECTRICAL NETWORK I

Interactive Model Transformations from the Common Information Model (CIM) to Modelica	849
Glen K. Halley (City Utilities of Springfield, USA); Luigi Vanfretti (Rensselaer Polytechnic Institute, USA) Marcelo de Castro (Mitsubishi Electric Power Products, USA)	SA);
Design of a Generic Energy Management System (EMS) Platform for Microgrids	854
Mateo Beus (FER, Croatia); Renato Sirovina (Sintaksa Ltd., Croatia)	
Power Hardware-in-the-Loop Smart Inverter Testing	860
Hao Chang and Luigi Vanfretti (Rensselaer Polytechnic Institute, USA)	
A Power Hardware-in-the-Loop Smart Inverter Testing Facility	866
Hao Chang and Luigi Vanfretti (Rensselaer Polytechnic Institute, USA)	
Analysis of Single Phase to Ground Fault in Synchronous Generator using ANSYS Co-Simulation	872
Amrit Chapagain (Kathmandu University, Nepal); Nils Jakob Johannesen (University of South-Eastel Norway); Bishal Silwal (Kathmandu University, Nepal)	rn
SDEN2 – SMART DISTRIBUTED ELECTRICAL NETWORK II Leveraging the Delphi method for Demand Response Aggregation in the energy market	878
Oleksandra Ishchenko and Nils Jakob Johannesen (University of South-Eastern Norway, Norway)	676
Time Series Modelling for Risk Analysis in Frequency Containment Reserves Market	884
Svein Olav G Nyberg (University of Agder, Norway); Nils Jakob Johannesen (University of South-Eas Norway, Norway	
Comparison of Dimensional Reduction Methods for Predictive Analysis of Railway System Data	890
Alf-Kristian Fladby and Nils Jakob Johannesen (University of South-Eastern Norway, Norway)	
Energy management strategy for grid-connected charging station systems with predefined grid eneconsumption levels	ergy 896
Matej Tkac (University of Zllina, Slovakia); Martina Kajanova (University of Zilina, Slovakia); Peter Bi (University of Zilina, Faculty of Electrical Engineering, Slovakia)	racinik
Semi-systematic review of the feasibility for predictive analysis of railway power supply and electric trains	cal 901
Alf-Kristian Fladby and Nils Jakob Johannesen (University of South-Eastern Norway, Norway)	

SML: STATISTICS AND MACHINE LEARNING IN ELECTRONICS

SML1 – AI APPLICATIONS

	Deep Learning Approaches for Stock Price Prediction: A Comparative Study of LSTM, RNN, and GRU Models	908
	Suresh Chavhan (Indian Institute of Information Technology Raichur, India); Praveen Raj and Prayas Raj (IIIT Raichur, India); Ashit Kumar Dutta (AlMaarefa University, Saudi Arabia); Joel J. P. C. Rodrigues (Senac Fac of Ceará, Brazil & Instituto de Telecomunicações, Portugal)	
	Smart Recipe Recommendation for a Healthy Diet Based on Nutrient Density and Macronutrient Balance	914
	Darko Stipaničev (University of Split - Faculty of Electr. Eng., Mech. Eng. and Naval Arch., Croatia); Ivan Radmilo, Marin Leventić and Željka Krivo (FESB University of Split - Alumnus, Croatia); Mirta Stipaničev (Versuni, Austria); Maja Braović (University of Split - FESB, Croatia)	
	Breakthroughts in Al Chatbots and their potential in mental health services	920
	Tin Galijašević (School of Medicine University of Zagreb, Croatia); Maja Škarić (Neuropsychiatric Hospital Popovača, Croatia); Eva Podolski (School of Medicine, University of Zagreb, Croatia); Martina Matovinović, Filip Mustac and Darko Marčinko (University Hospital Centre Zagreb, Croatia)	
	Data Based Framework for Sleep Medicine	924
	Kristina Zovko University of Split, FESB, Croatia, Petar Solic University of Split & FESB, Croatia, Toni Perkovic University of Split, FESB, Croatia, Ivana Pavlinac Dodig University of Split, Croatia, Linda Lušić Kalcina University of Split, Croatia, Renata Pecotić University of Split, Croatia, Zoran Đogaš University of Split, Croatia	
3	SML2 – ML IN ELECTRONICS	
	Detection and Classification of Defects on Printed Circuit Board Assembly through Deep Learning Nikolay Petkov and Malinka Ivanova (Technical University of Sofia, Bulgaria)	930
	Recognition of Hand-Drawn Designs of Electronic Analog Circuits	935
	Malinka Ivanova (Technical University of Sofia, Bulgaria)	
	Improving Technology for Creating Metal-Glass Systems Using Statistics and Machine Learning	940
	Valentin Petrov Tsenev, Prof. and Teodor Draganov (Technical University of Sofia, Bulgaria)	
	Photovoltaic I-V Curve Tracer for Hotspot Detection Applications	945
	Duje Čoko (University of Split, FESB, Croatia); Filip Grubišić Čabo (University of Split, Croatia); Mišo Jurčević (University of Split, FESB, Croatia); Ivo Marinić-Kragić (University of Split, Croatia); Sandro Nizetic (University of Split, FESB, Croatia)	
F	RFID AND IOT RESEARCH PROJECTS: WHAT THEY TEACH US AND WHERE THEY TA	KE US
	Smart Antenna System for Electronic Toll Collection with Vehicle Localization and Tracking using End Users' Smartphones with BLE	949
	Jose-Luis Gómez-Tornero (Polytechnic University of Cartagena, Spain); Alejandro Rabadan Parra (Technical University of Cartagena, Spain); Víctor Cavero-Herranz (INDRA Sistemas, Spain); Alejandro Gil Martinez (Technical University of Cartagena Cartagena, Spain); David Cañete Rebenaque (Polytechnic University of Cartagena, Spain); Javier Rojo-Fernandez (INDRA Sistemas, Spain)	
	Design of a Low-Cost Wireless Communication System for Driving Precision Agriculture Through RTK Integration	955
	Francesco P. Chietera (University of Salento, Italy); Pierluigi Rossi and Leonardo Assettati (University of Tuscia, Italy); Leonardo Vita, Davide Gattamelata and Daniele Puri (Italian Institute for Insurance Against Accidents at Work - INAIL, Italy); Danilo Monarca (University of Tuscia, Italy); Luca Catarinucci (University of Salento, Italy)	

HerMeS: A New Approach to Enjoy Tangible and Intangible Point of Interests of Culture Heritage	960
Alberto Bucciero, Alessandra Chirivì, Chiara Florise Amadei and Mohamed Ali Jaziri (CNR, Italy); Irene Muci (CNR - ISPC, Italy); B Luigi Nuzzo (University of Salento, Italy); Andrea Pandurino (National Research Council, Italy)	
H2IOSC Project: The Italian Federated Cluster for IoT-based Monitoring and Digital Twinning of Cultural Heritage	966
Alberto Bucciero, Alessandra Chirivì, Riccardo Colella, Mohamed Emara and Matteo Greco (ISPC-CNR Lecce, Italy); Daniela M Palamà (National Research Council of Italy, Italy); Andrea Pandurino, Francesco Taurino and Davide Zecca (ISPC-CNR Lecce, Italy)	
Towards Sensorized Glasses: a Smart Wearable System for Head Movement Monitoring	972
Igor Bisio, Chiara Garibotto, Mehrnaz Hamedani, Fabio Lavagetto, Angelo Schenone, Andrea Sciarrone and Muhammad Shahid (University of Genoa, Italy)	
An Innovative Monitoring System based on UAV and Unmanned Surface Vessel	978
Valeria Vergine (University of Salento, Italy); Fabrizio Benvenuto (Commedia srl,	
Italy); Sergio De Giuseppe and Marco Spedicato (Commedia, Italy); Alessandro Largo (RINA Consulting, Italy)	
New project for a surface penetrating radar	984
Alberto Bucciero (CNR, Italy); Riccardo Colella (National Research Council (CNR), Italy); Lara De Giorgi (CNR-ISPC, Italy); Dora Francesca Barbolla (CNR, Italy); Giuseppe Cannazza (ISPC-CNR, Italy); Chiara Torre (University of Catania, Italy); Giovanni Leucci (National Research Council of Italy, Italy)	

SRI: SMART READINESS INDICATOR

SRI1: ADVANCEMENTS IN ASSESSING THE SMARTNESS OF BUILDINGS IN EUROPE: THE SRI SCHEME AND BEYOND

Innovative SRI Evaluation Through BIM: Developing a Unique Rule-Checking Methodology Utilizing the IFC Schema	988
Pablo Carnero Melero (REHVA. Federation of European Heating, Ventilation and Air Conditioning Associations, Belgium & Universitat Politècnica de València, Spain); Stavros Koltsios (Center for Research and Technology Hellas (CERTH), Greece); Aggeliki Veliskaki and Nikolaos Katsaros (Centre for Research and Technology Hellas, Greece); Paris Fokaides (Frederick University, Cyprus); Dimosthenis Ioannidis (Information Technologies Institute, Greece); Dimitrios Tzovaras (Centre for Research and Technology Hellas, Greece)	
Simplifying Smart Readiness: A Novel Tool for Rapid SRI Assessment in European Buildings	994
Nicholas Afxentiou (Frederick University, Cyprus); Ourania Douni and Nicholas Paraskakis (Euphyia-Tech Ltd, Cyprus); Paris Fokaides (Frederick University, Cyprus)	
From Buildings to Neighbourhoods: Upscaling Smartness Assessment for Enhanced Sustainability	1001
Afroditi Zamanidou (University of Western Macedonia & IsZEB DIH, Greece); Antonello Magliozzi (Arcadis Italia Srl, Italy); Paris Fokaides (Frederick University, Cyprus)	
Smart Readiness, a tool for Green Building Certification Schemes towards carbon neutrality in the built environment	1006
Effrosyni Giama, Konstantinos Chatzikonstantinidis and Georgios Chantzis (Aristotle University of Thessaloniki, Greece); Merope Manataki (Alma Sistemi, Italy); Paris Fokaides (Frederick University, Cyprus); Agis M. Papadopoulos (Aristotle University of Thessaloniki, Greece)	
Smart Buildings and Water Management in Crises: The case of COVID-19 Lockdown	1011
Konstantinos Chatzikonstantinidis, Effrosyni Giama, Georgios Chantzis and Anastasia Zafeiriou (Aristotle University of Thessaloniki, Greece); Paris Fokaides (Frederick University, Cyprus); Agis M. Papadopoulos (Aristotle University of Thessaloniki, Greece)	
Bridging the Gap: A Comprehensive Review of EPC and SRI Calculation Tools in Europe	1017
Theoklitos Klitou (Euphyia-Tech Ltd); Nicky Pavlou (Euphyia-Tech Ltd, Cyprus); Cécile Barrère (R2M Solution SAS, France); Sophie Dourlens-Quaranta (R2M SOLUTION FRANCE, France); Sara Momi (R2M R2M Solution SRL, Italy); Thomas Messervey (R2M Solution, Italy); Aleksi Vuorenmaa and Siiri Lapila (Caverion, Finland); Despina Elisabeth Filippidou (OPSIS Research, Romania); Paris Fokaides (Euphyia-Tech Ltd)	

Pavlos Papadopoulos (Frederick University (Cyprus), Cyprus); Paraskevas Koukaras (Centre for Research and Technology Hellas, Greece); Effrosyni Giama (Aristotle University of Thessaloniki, Greece); Dimosthenis Ioannidis (Information Technologies Institute, Greece); Agis M. Papadopoulos (Aristotle University of Thessaloniki, Greece); Paris Fokaides (Frederick University, Cyprus)

TTO: TOOLS TO OPTIMIZE ENERGY USE, COMFORT, AND INDOOR AIR QUALITY IN BUILDINGS IN PRACTICE

TTO1 - SMART TECHNOLOGIES IN BUILDINGS

Data-Driven Model For Heat Load Prediction In Buildings Connected To District Heating Networks	1027
Alaeddine Hajri (Mediterranean Institute of Technology, Tunisia); Roberto Garay-Martinez (Universidad de Deusto, Spain); Ana M. Macarulla (University of Deusto, Spain); Mohamed Amin Ben Sassi (Mediterranean Institute of Technology, Tunisia)	
A smart IoT system for real-time monitoring of indoor and outdoor air quality using low-cost sensors	1033
Ainhoa Osa-Sanchez (eVIDA Research Group, University of Deusto, Spain); Begoña García Zapirain (University of Deusto, Spain)	
Using Extraction, Transformation and Loading procedures for digitalisation of buildings	1039
José L. Hernández and David Arévalo (Fundación CARTIF, Spain); Susana Martín (CARTIF, Spain); Kyriakos Katsigarakis, Georgios N Lilis and Dimitrios Rovas (University College London, United Kingdom (Great Britain)); Ignacio de Miguel (Universidad de Valladolid, Spain)	
Methodological Approach for Optimizing Demand Response in Building Energy Management through Al- Enhanced Comfort-Based Flexibility Models	1045
Riccardo Naccarelli (UNIVPM, Italy); Serena Serroni, Sara Casaccia and Gian Marco Revel (Università Politecnica delle Marche, Italy); Susana Gutiérrez (Fundación CARTIF, Spain); Diego Arnone (Engineering SPA, Italy)	
Simplified geometric processing of solar radiation for improved data-driven modelling of short-term energy & comfort performance in buildings	1051
Roberto Garay-Martinez (Universidad de Deusto, Spain); Iñigo Garcia De Eulate (University of Deusto, Spain); Beñat Arregi (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain); Olaia Eguiarte (TECNALIA, Spain); Ana M. Macarulla (University of Deusto, Spain)	
Comparing Passivhaus and Spanish Ventilation Models: a Study with Three Apartments in Northern Spain	1057
Jorge Otaegi, Rufino J. Hernández-Minguillón and Iñigo Rodríguez-Vidal (University of the Basque Country & CAVIAR Research Group, Spain)	

TTO2 - ENERGY EFFICIENCY IN BUILDINGS

Insights from the field: implementing schedule-based control strategies for load shifting in educational buildings	1063
John Clauß and Johannes Brozovsky (SINTEF Community, Norway)	
A Research to Determine the Energy Efficiency of Tea Brewing	1069
Umit Unver, Adem Aydın, Yiğit Can Güneş, Ferhat Başer and Mertcan Uzun (Yalova University, Turkey); Emre Korkmaz and Batuhan Göçen (Korkmaz Kitchener, Turkey)	
A Review for Comparison of Unconventional Insulation Materials	1075
Umit Unver, Ece Karakütük, Zahid Esad Çinka, Yusuf Kaçar and Mertcan Uzun (Yalova University, Turkey); Selman Çağman (Kocaeli ÜniversitesiUniversity, Turkey)	
Building with an active thermal protection in combination with high share of renewable energy sources use	1079
Mato Perić (University North Varaždin, Croatia); Simon Muhič (University of Novo Mesto, Slovenia); Ante Čikić (University North Varaždin, Croatia)	
Design strategies for an effective implementation of solar harvesting façades into pre-existing HVAC systems in buildings renovation	1083
Antonio Garrido Marijuan, Noelia Vicente Gómez, Peru Elguezabal, Izaskun Álvarez Álava and Asier Sanz Martínez (TECNALIA, Spain)	
Towards automated energy flexibility deployment in buildings: a solution at the ZEB Laboratory	1090
John Clauß, Luis Caetano, Kristian Stenerud Skeie and Thomas Elvrum Lassen (SINTEF Community, Norway)	
TTO3 – SMART TECHNOLOGIES AND APPLICATIONS	
IoT – The Value Stream 4.0 model for SCM	1095
Hubertus Cornelius Franke (Ostfalia- University of Applied Sciences & Karl Scharfenberg, Germany)	
Opportunities and limitations for integration of the Green Building Certification System in the BIM environment	1100
Sanja Dubljević and Bojan Tepavčević (University of Novi Sad, Serbia); Aleksandra Stefanović (NET ZERO DOO, Serbia); Kristina Jezdić (TEHNA DOO, Serbia); Aleksandar Andjelkovic (University of Novi Sad, Serbia)	
Implementing AI in advanced recycling of perovskite solar cells	1104
Christopher Iliffe Sprague (Science for Life Laboratory, Stockholm University, Sweden); Víctor de la Asunción-Nadal (KTH-Royal Institute of Technology, Sweden); Alberto García-Fernández (Uppsala University & KTH-Royal Institute of Technology, Sweden)	
Development of an IoT-Based Real-Time Psychrometric Data Acquisition and Visualization System	1108
Milovan Medojević (The Institute for Artificial Intelligence Research and Development of Serbia, EnergyPulse D.O.O., Serbia); Dušan Simić (University of Novi Sad, Serbia); Milana Medojević (University of Novi Sad, Serbia)	
TTO4 – ENERGY ENGINEERING	
Control system of a pilot scale Dual Bubbling Fluidized Bed Gasifier using PC-based equipment	1113
Mattia Ragnoli, Alfiero Leoni, Vincenzo Stornelli, Andrea Di Carlo, Alessandro Antonio Papa and Armando Vitale (University of L'Aquila, Italy)	
Energy model for solar thermal collectors system	1118
Gabriela Sadowska (Politechnika Lubelska, Poland); Tomasz Cholewa (Lublin University of Technology, Poland)	
Enhancing Critical Raw Material Management in Construction: The Role of Building Information Modelling and Life Cycle Assessment	1121
Nikolaos Kekatos (DRAXIS Environmental S.A., Greece); Evangelos Genitsaris (Q-PLAN International Advisors, Greece); Artemis Lavasa (DRAXIS Environmental S.A.); Katerina Valta (DRAXIS Environmental SA, Greece); Apostolos C. Tsolakis (Q-PLAN International Advisors PC); Anastasios Karakostas (Centre for Research and Technology Hellas, Greece)	