2024 IEEE 8th Forum on Research and Technologies for Society and Industry Innovation (RTSI 2024)

Milano, Italy
18-20 September 2024

IEEE Catalog Number: CFP24C29-POD
ISBN: 979-8-3503-6214-5

Copyright © 2024 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP24C29-POD
ISBN (Print-On-Demand):	979-8-3503-6214-5
ISBN (Online):	979-8-3503-6213-8
ISSN:	2687-6809

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

CONFERENCE PROGRAM

Wednesday, September 18

Technical Session 1 - Track 1.1 - Methods and Technologies for AI

Room: Room A1.1

1 **AI vs. AI: The Detection Game**
Mauro Coccoli (University of Genoa, Italy); Gabriella Patanè (Freelancer, Italy)

7 **A Threat Assessment Framework for Screening the Integrity of University Assessments in the Era of Large Language Models**
Alan Hickey, Cathal Ó Faoláin, John Healy, Kevin Nolan, Emer Doheny and Paul Cuffe (University College Dublin, Ireland)

13 **Experimental Evaluation of End-To-End Security Protocols for the Internet of Everything**
Marco Esposito, Monica Marconi Sciarroni, Tommaso Fava, Alberto Belli, Lorenzo Palma, Emanuele Storti and Paola Pierleoni (Università Politecnica delle Marche, Italy)

19 **Dynamic Hashtag Assignment: Leveraging Graph Convolutional Networks With Class Incremental Learning**
Matteo Kolyszko, Marco Buzzelli and Simone Bianco (University of Milano-Bicocca, Italy)

25 **Potentialities of AI-Based Models for Lagrangian CFD**
Vito Zago, Eleonora Amato and Ciro Del Negro (Istituto Nazionale di Geofisica e Vulcanologia, Italy)

Technical Session 2 - Track 2.1 - AI Applications to Energy and Transportation Systems

Room: Room B0.4

31 **Improve Load Forecasting in Energy Communities Through Transfer Learning Using Open-Access Synthetic Profiles**
Lukas Moosbrugger, Valentin Seiler, Gerhard Huber and Peter Kepplinger (Vorarlberg University of Applied Sciences, Austria)

36 **Long Short Term Memory Neural Network and Energy Applications in the Smart Grid Framework**
Silvia Licciardi, Guido Ala, Elisa Francomano, Pietro Catrini, Maurizio La Villetta, Rossano Musca, Antonio Piacentino, Eleonora Riva Sanseverino and Hamid Samadi (University of Palermo, Italy)

42 **The Value of Forecasting: The Effect of Building Load Forecast Errors on the Performance of an Optimal Energy Management System**
Michael Wood, Emanuele Ogliari and Sonia Leva (Politecnico di Milano, Italy)

48 **Application of an LSTM-Based Forecaster in a Model Predictive Controller of a Microgrid**
Federico Rossi, Giancarlo Storti Gajani and Giambattista Gruosso (Politecnico di Milano, Italy)

54 **Time Series Forecasting to Detect Anomalous Behavior in Multiphase Flow Meters**
Tommaso Barbariol, Davide Masiero, Mattia Fanan and Gian Antonio Susto (University of Padova, Italy); Enrico Feltresi (Pietro Fiorentini SpA, Italy)

Technical Session 3 - Track 3.1 - AI Applications to Health and Smart Living

Room: Room B0.1

60 **Augmented Reality Visualisation for ECG Classification and Heart Disease Diagnosis**
Kahina Amara, Mohamed Amine Guerroudji, Nadia Zenati (Development Centre of Advanced Technology, Algeria); Oussama Kerdjidj, Shadi Atalla, Wathiq Mansoor (University Of Dubai, United Arab Emirates); Naeem Ramzan (University of West of Scotland, United Kingdom)

66 **Spatial Clustering of Ambulance Dispatches for Cardiovascular Problems During Heat and Non-Heat Days: Preliminary Study for Milan, Italy**
Julia Nawaro and Lorenzo Gianquintieri (Politecnico di Milano, Italy); Andrea Pagliosa, Giuseppe Sechi (Agenzia Regionale Emergenza Urgenza, Italy); Enrico G Caiani (Politecnico di Milano, Italy)

73 **Leveraging Machine Learning for Physical Exercise Recommendation Based on Heart Rate: Older Adults Personalized Training**
Atieh Mahroo (Italian National Research Council, University of Milano-Bicocca, Italy); Vera Colombo, Daniele Spoladore, Marco Sacco (Italian National Research Council, Italy)

79 **Improving Detection of Type-1 Diabetes Adverse Events Using GRU Networks**
Giorgia Rigamonti, Mirko Paolo Barbato, Davide Marelli and Paolo Napoletano (University of Milano-Bicocca, Italy)

85 **Efficient Tiny Machine Learning for Human Activity Recognition on Low-Power Edge Devices**
Vinamra Sharma (University of Glasgow, United Kingdom); Danilo Pietro Pau (STMicroelectronics, Italy); José Cano (University of Glasgow, United Kingdom)

91 **Automatic Detection of Artifacts in Photoplethysmography Signals Through Convolutional Neural Networks During Robot-Assisted Gait Rehabilitation**
Simone Costantini (Politecnico di Milano, Italy); Emilia Biffi and Fabio A. Storm (Scientific Institute IRCCS Eugenio Medea, Italy); Giuseppe Andreoni and Anna M. Bianchi (Politecnico di Milano, Italy)

Technical Session 4 - Track 4.1 - AI Applications for Industry

Room: Room A0.2

97 **Exploring Fine-Grained Retail Product Discrimination With Zero-Shot Object Classification Using Vision-Language Models**
Anil Osman Tur (University of Trento, Fondazione Bruno Kessler, SpindoxLabs, Italy); Alessandro Conti (University of Trento, Italy); Cigdem Beyan (University of Verona, Italy); Davide Boscaini (Fondazione Bruno Kessler, Italy); Roberto Larcher (Spindox Labs, Italy); Stefano Messelodi and Fabio Poiesi (Fondazione Bruno Kessler, Italy); Elisa Ricci (University of Trento, Italy)

103 **A Topological Optimization Through Reinforcement Learning: An Electromagnetic Case Study**
Enrico Spateri and Giambattista Gruosso (Politecnico di Milano, Italy)

109 **Intelligent Approach for Fouling Detection in Phase Change Heat Exchanger**
Mustafa Alnaser (Yokogawa Saudi Arabia, Saudi Arabia); Sami El Ferik (King Fahd University of Petroleum and Minerals, Saudi Arabia); Abdullatif Alnajim and Abrar Al-Amoudi (Yokogawa Saudi Arabia Company, Saudi Arabia); Rached Ben-Mansour (KFUPM, Saudi Arabia)

115 **Deep Learning-Powered Computer Vision System for Selective Disassembly of Waste Printed Circuit Boards**
Muhammad Mohsin, Stefano Rovetta, Francesco Masulli (University of Genova, Italy); Danilo Greco (Politecnico di Milano, Italy); Alberto Cabri (University of Milan, Italy)

120 **Challenges and Opportunities in Deep Learning and Geostationary Satellite Remote Sensing for Volcanic Cloud Monitoring**
Federica Torrisi, Claudia Corradino, Simona Cariello, Giovanni Salvatore Di Bella, Ciro Del Negro (Istituto Nazionale di Geofisica e Vulcanologia, Italy)

Technical Session 5 - Track 1.2 - Methods and Technologies for AI

Room: Room A1.1

125 **UAV Flight Control via Quaternion Neural Networks and Closed Loop Lyapunov Function**
Paolo Arena (Università Degli Studi Di Catania, Italy); Emanuele Cannizzo and Alessia Li Noce (University of Catania, Italy); Luca Patanè (University of Messina, Italy)

131 **Using Active Learning to Improve Learning Performance**
Clarissa Valeria Amico and Roberto Cigolini (Politecnico di Milano, Italy)

137 **Quaternion Valued Neural Network for Modeling Vibrating Electromechanical Structures to Reduce Physical Vibrating Hazard in the Work Environment**
Matteo Di Mauro and Luigi Fortuna (University of Catania, Italy); Arturo Buscarino (Università degli Studi di Catania, Italy); Shahzeb Zafeer and Carlo Famoso (University of Catania, Italy)

143 **Federated Learning for Rule-Based Systems: Preliminary Studies**
Ahmad Samandari (University of Genoa, CNR-IEIIT, Italy); Mario Marchese (University of Genoa, Italy); Alessia Paglialonga (CNR Consiglio Nazionale delle Ricerche, Italy); Fabio Patrone (University of Genoa, Italy); Vittorio Rampa and Maurizio Mongelli (National Research Council of Italy, Italy)

149 **AI-Assisted GIS Toward GEO-AI: Trends and Innovations Overview**
Fabio Franchi and Alessandra Galassi and Fabio Graziosi (University of L'Aquila, Italy)

Technical Session 6 - Track 2.2 - AI Applications to Energy and Transportation Systems

Room: Room B0.4

154 **Artificial Intelligence Approach to State of Charge Estimation for Smart Battery Management Systems**
Mohammad Bilal Alkouli and Md Ismail Hossain (King Fahd University of Petroleum and Minerals, Saudi Arabia); Mohammad A. Abido (KFUPM, Saudi Arabia)

160 **Fast Voltage Estimation on MV Distribution Networks Through a Machine Learning Hybrid**
Leonardo Gori, Alessandro Verosimile and Andrea Damiani (Politecnico di Milano, Italy); Marco D Santambrogio (Politecnico di Milano, MIT, Italy); Francesca Soldan, Enea Bionda and Carlo Tornelli (RSE, Italy)

166 **Energy Management System for the CN MOST Laboratory at the Savona University Campus**
Matteo Fresia, Tommaso Robbiano, Silvia Siri and Stefano Bracco (University of Genova, Italy)

172 **Risk Evaluation of AI Systems in the Energy Sector - Three Case Studies From TSO Business**
Fabian Heymann (Swiss Federal Office of Energy, Switzerland); Antoine Marot (RTE, France); Medha Subramanian (Elgin Energy, Ireland); Matthias Galus (Swiss Federal Office of Energy, Switzerland)

Technical Session 7 - Track 3.2 - AI Applications to Health and Smart Living

Room: Room B0.1

178 **Deep Neural Quantization for Speech Detection of Parkinson Disease**
Armin Mazinani (University of Parma, Italy); Danilo Pietro Pau (STMicroelectronics, Italy); Luca Davoli and Gianluigi Ferrari (University of Parma, Italy)

184 **Enhancing Elderly Exergaming With AI Components for Assessing Cognitive Status**
Michail Danousis and Christos Goumopoulos (University of the Aegean, Greece)

190 **Lightweight Graph Neural Network for Dementia Assessment From EEG Recordings**
Thomas Barbera, Simone Zini, Simone Bianco and Paolo Napoletano (University of Milano-Bicocca, Italy)

196 **Facial Asymmetry Classification in Neurological Disorders: Integrating Computer Vision and Machine Learning for Improved Patient Care**
Pratik Ranjan (University of Camerino & The BioRobotics Institute of Scuola Superiore Sant'Anna, Italy); Angelo Lasala (The BioRobotics Institute of Scuola Superiore Sant'Anna, Italy); Anna Lina Ruscelli (Scuola Superiore Sant'Anna, Italy); Sujit Kumar Sahu (TeCIP Institute of Scuola Superiore Sant'Anna, Italy); Diego Guarin (University of Florida, USA); Sara Moccia and Piero Castoldi (Scuola Superiore Sant'Anna, Italy); Silvestro Micera (Scuola Superiore Sant'Anna, Italy & EPFL, Switzerland); Andrea Bandini (Scuola Superiore Sant'Anna, Italy)

202 **Sign Language Recognition for Patient-Doctor Communication: A Multimedia / Multimodal Dataset**
Raffaele Mineo (University of Catania & University Campus Bio-Medico of Rome, Italy); Gaia Caligiore, Concetto Spampinato, Sabina Fontana, Simone Palazzo and Egidio Ragonese (University of Catania, Italy)

Technical Session 8 - Track 4.2 - AI Applications for Industry

Room: Room A0.2

208 **Efficient Deep Learning Methods for Food Localization in Canteen Trays**
Flavio Piccoli, Marco Buzzelli, Davide Marelli, Simone Bianco, Gianluigi Ciocca and Raimondo Schettini (University of Milano-Bicocca, Italy)

214 **AI-Enhanced AUTOSAR Configuration Efficient Methods for Dataset Generation and Automated Code Production**
Ahmed Essam Salem, Nada Ayman El-Gnainy, Mira Shanouda, Anas Abdallah Ibrahim, John William, Mariam Elsharkawy and Passant Moustafa (The American University in Cairo, Egypt); Mohamed Al Ansary and Hossam Mahmoud (Siemens Digital Industries Software, Egypt); Ahmed Moro (Siemens Digital Industries Software, Integrated Electrical Systems Segment, Egypt); Cherif R. Salama (The American University in Cairo & Ain Shams University, Egypt)

220 **An Expert System for Managing the Render Farms in Cloud Data Centers**
Auday Al-Dulaimy (Mälardalen University, Sweden); Karam Turki (Gilgamesh Studio, Jordan); Thomas Nolte and Alessandro V. Papadopoulos (Mälardalen University, Sweden)

226 **Full-Scale Output Adjustment of CSTR by Feedforward and Feedback Controllers**
Ali M. Almohammedi (King Fahd University of Petroleum and Minerals & King Fahd International Airport, Saudi Arabia); Mohammad A. Abido (KFUPM, Saudi Arabia)

232 **Mapping Music Onto Robot Joints for Autonomous Choreographies: PCA-Based Approach**
Giuseppe Saviano (University of Pisa, Italy); Alberto Villani and Domenico Prattichizzo (University of Siena, Italy)

Thursday, September 19

Technical Session 9 - Track 1.3 - Methods and Technologies for AI
Room: Room A1.1

238 **β -Quaternion Centralized Fusion Estimation Problem Under First-Order Properness Conditions**
José Domingo Jiménez-López, Rosa M. Fernández-Alcalá, J. Navarro-Moreno and Ruiz-Molina (University of Jaén, Spain); Eleonora Grassucci and Danilo Comminiello (Sapienza University of Rome, Italy)

243 **Equivalent Circuit of Electrothermal Memristor Model Based on HfO2**
Khitem Lahbacha and Antonio Maffucci (University of Cassino and Southern Lazio, Italy)

248 **Optimizing Partner Selection for Cooperative Solar Generation Forecasting**
Lejla Pašić, Azra Pašić, Alija Pašić and Jozsef Biro (Budapest University of Technology and Economics, Hungary)

254 **Ground-Based Contrail Detection by Means of Computer Vision Models: A Comparison Between Visible and Infrared Images**
Paolo Pertino (Politecnico di Milano, Italy); Enrico Miotto and Leonardo Pavarino (Politecnico di Torino, Italy); Simone Lomolino (Politecnico di Milano, Italy); Daniele Rege Cambrin and Paolo Garza (Politecnico di Torino, Italy); Emanuele Ogliari (Politecnico di Milano, Italy)

260 **PHemoNet: A Multimodal Network for Physiological Signals**
Eleonora Lopez, Aurelio Uncini, Danilo Comminiello (Sapienza University of Rome, Italy)

Technical Session 10 - Track 2.3 - AI Applications to Energy and Transportation Systems
Room: Room B0.7

265 **Analysis of Driving Behaviour Under Different Disturbance Conditions Through Virtual Reality**
Andrea Di Martino and Michela Longo (Politecnico di Milano, Italy); Wahiba Yaici (Natural Resources Canada, Canada)

271 **Evaluating the V2X Latency for Vehicle Positioning: A Comparison Between 5G-V2X and ITS-G5**
Raffaele Viterbo, Mattia Brambilla, Mattia Cerutti and Simone Specchia (Politecnico di Milano, Italy); Diego Franceschini and Benedetto Carambia (Movyon SpA, Italy); Sergio Savaresi and Monica Nicoli (Politecnico di Milano, Italy)

277 **Real-Time Rule-Based Algorithm for Track Detection of Tram-Train**
Jihyeon Baek (Sungkyunkwan University); Jae-Ho Kwak, Hyeon-Chyeol Hwang, Heegyun Jeon, SungWon Park and Hyunsuk Lee (Korea Railroad Research Institute, Korea (South)); Tae Yong Kuc (Sungkyunkwan University, Korea (South))

283 **Joint Occupancy and Load Profile Prediction for Electric Vehicle Charging Stations**
Yuksel Utku Koruturk, Cesar Diaz-Londono and Fredy Ruiz (Politecnico di Milano, Italy)

289 **Private Company Decarbonization: A Methodology for Renewable Integrated Full-Electric Fleet**
Cristian Giovanni Colombo, Michela Longo, Seyedmahdi Miraftabzadeh and Dario Zaninelli (Politecnico di Milano, Italy)

Technical Session 11 - Track 3.3 - AI Applications to Health and Smart Living

Room: Room B0.1

295 **AI-Based Acoustic Surveillance System for Smart Cities**
Jan Holub and Jakub Svatos (Czech Technical University in Prague, Czech Republic)

300 **SAALUS: Smart Ambient Assisted Living Ubiquitous System**
Gaetano Pagano (ICS Maugeri SB of Bari, Italy); Federico Colelli Riano (Istituti Clinici Scientifici Maugeri IRCCS, Laboratory of Bioengineering, Italy); Giovanni Iaselli (Bioengineering Unit Istituti Clinici Scientifici Maugeri IRCCS Pavia, Italy); Alberto Malovini and Matteo Terzaghi (Laboratory of Medical Informatics ICS Maugeri IRCCS Pavia, Italy); Giovanni D'Addio (S. Maugeri Foundation, Rehabilitation Institute of Telese, Italy)

305 **Utilizing Business Intelligence Software to Track Key Performance Indicators (KPIs) for Assessing the Computerized Maintenance Management System (CMMS)**
Paola Picozzi (Politecnico di Milano, Italy); Veronica Cimolin (Politecnico di Milano & IRCCS Istituto Auxologico Italiano, Italy); Umberto Nocco (Clinical Engineering Department of ASST Grande Ospedale Metropolitano Niguarda, Italy); Andrea Pezzillo and Adriana De Cosmo (Politecnico di Milano, Italy)

311 **Supervised and Unsupervised Soft Sensors for Capsule Recognition in Espresso Coffee Machines**
Nicolas Tortora (Italy); Antonio De Moliner (Zoppas Industries, Italy); Francesco Borsatti, Roberto Oboe and Gian Antonio Susto (University of Padova, Italy)

Technical Session 12- Special Session 3 - AI for microscopy, imaging and bio-data analytics

Room: Room A1.1

317 **Physically Inspired Scattering Correction for Non-Linear Excitation Imaging of Tissues**
Davide Panzeri, Mario Marini, Luca Presotto, Laura Sironi, Maddalena Collini and Giuseppe Chirico (University Milano-Bicocca, Italy)

322 **Open-Set Based Single Cell Identification in Microfluidics**
David Dannhauser and Filippo Causa (University of Naples, Italy); Paolo Netti (Center for Advanced Biomaterials Fore Health Care @CRIB, IIT Napoli, Italy)

327 **Label-Free Nervous System Single Cell Classification Using Pretrained VGG and ResNet Networks**
Pierpaolo Fiore, Francesco Bardozzo, Roberto Tagliaferri (University of Salerno, Italy)

333 **Strategies of T-Cells Identification in AI-Powered Quantitative Phase Imaging Flow Cytometry**
Daniele Pirone (CNR-ISASI, Italy); Beatrice Cavina (University of Bologna, Italy); Martina Mugnano (DICMAPI UNINA, Italy); Vittorio Bianco and Lisa Miccio (CNR-ISASI, Italy); Anna Myriam Perrone, Anna Maria Porcelli and Giuseppe Gasparre, Ivana Kurelac (University of Bologna, Italy); Pasquale Memmolo (CNR-ISASI, Italy)

339 **Towards a Deep Learning Approach to Discriminate Hereditary Anemia**
Francesco C Morabito, Cosimo Ieracitano and Nadia Mammone (University Mediterranea of Reggio Calabria, Italy); Marika Valentino (Istituto di Scienze Applicate e Sistemi Intelligenti ISASI-CNR, Italy); Zhe Wang (Institute of Applied Sciences and Intelligent Systems (CNR), Italy); Michela Schiavo (Institute of Applied Sciences and Intelligent Systems (CNR-ISASI), Italy); Vittorio Bianco (CNR-ISASI, Italy); Anthony Iscaro, Antonella Nostroso and Immacolata Andolfo (University of Naples Federico II, Italy); Roberta Russo (University of Naples Federico II, Naples, Italy); Lisa Miccio (CNR-ISASI, Italy)

345 **A Deep Learning Approach for the Automatic Video Classification of Silicone Oil Droplet Deformation Induced by Electrohydrodynamic Effect**
Cosimo Ieracitano (University Mediterranea of Reggio Calabria, Italy); Daniele Tammaro (University of Naples Federico II, Italy); Nadia Mammone (University Mediterranea of Reggio Calabria, Italy); Volodymyr Tkachenko (ISASI-CNR, Italy); Sara Coppola and Veronica Vespini (CNR-ISASI, Italy); Pietro Ferraro (ISASI CNR, Italy); Simonetta Grilli (Institute of Applied Sciences and Intelligent Systems (ISASI), CNR, Italy); Francesco C Morabito (University Mediterranea of Reggio Calabria, Italy); Pier Luca Maffettone (University of Naples Federico II, Italy)

351 **KBNet-Based Noise Suppression in Edge Illumination X-Ray Phase Contrast Imaging**
Neam Halat, Domenico Iuso, Jan Sijbers and Jan De Beenhouwer (University of Antwerp, Belgium)

Technical Session 13 - Special Session 7 - AI and ICT to support robotic rehabilitation - the activity 7 of fit4med project

Room: Room B0.7

357 **Extended Reality and Artificial Intelligence for Exergaming: Opportunities and Open Challenges for Rehabilitation and Cognitive Training**
Manuela Chessa, Lorenzo Gerini, Razeen Hussain, Matteo Martini and Marianna Pizzo (University of Genoa, Italy); Fabio Solari (Via Dodecaneso 35, Italy); Eros Viola (University of Genoa, Italy)

363 **Telemedicine and AI: From Co-Design to Explainability**
Silvia Filogna (IRCCS Fondazione Stella Maris, Italy); Alessio Malizia, Daniele Mazzei, Giuseppe Prencipe, Giuseppina Sgandurra and Tommaso Turchi (Università di Pisa, Italy)

369 **Developing a Prototype Healthcare Data Platform for Advanced Analytics in Rehabilitation Environments**
Antonio Foschi, Domenico Pistilli, Gaia Bondani and Fabio Rebecchi (Eustema, Italy)

375 **Systematic Comparison of Machine Learning for Activity Recognition in Cross-Subject vs. NonCross-Subject Scenarios: A Preliminary Analysis**
Samuele Pe, Giovanna Nicora, Bruna Guerra, Stefania Sozzi and Enea Parimbelli (University of Pavia, Italy)

380 **AI Processing of Wearable IMU Data for Exoskeleton Gait Analysis**
Bruna Guerra and Stefania Sozzi (University of Pavia, Italy); Serena Pizzocaro (LUNEX International University of Health, Exercise and Sports, Luxembourg); Alessandro Marco De Nunzio (LUNEX International University of Health, Exercise and Sports Luxembourg, Luxembourg); Micaela Schmid (University of Pavia, Italy)

385 **Challenges in Implementing ICT Rehabilitation Environments in Real Clinical Practice**
Valentina Tibollo (Istituti Clinici Scientifici Maugeri IRCCS, Italy); Lucia Sacchi (University of Pavia, Italy); Alberto Malovini (Laboratory of Medical Informatics ICS Maugeri IRCCS Pavia, Italy); Anna Giardini (Istituti Clinici Scientifici Maugeri IRCCS Pavia, Italy); Giovanni D'Addio (S. Maugeri Foundation, Rehabilitation Institute of Telese, Italy); Christian Lunetta (Istituti Clinici Scientifici Maugeri IRCCS Pavia, Italy)

Technical Session 14 - Special Session 11 - Artificial Intelligence in Medical Applications

Room: Room B0.1

390 **Revolutionizing Emergency Care: How Telemedicine is Addressing Non-Urgent Calls and Medic Shortages in Italy**
Sarah Behnam and Marco Sacco (Italian National Research Council, Italy)

396 **Explainable AI Assessment of Meal-Related Features Impact in Predicting Basal Insulin for Type I Diabetes**
Giovanni Annuzzi, Pasquale Arpaia, Lutgarda Bozzetto, Sabatina Criscuolo, Egidio De Benedetto and Marisa Pesola (University of Naples Federico II, Italy)

402 **A Cognitive Computing Tool for Identification and Classification of Brain Tumors**
Camilla Russo, Paolo Maresca, Alfredo Marinelli (University of Naples Federico II, Italy)

408 **The "Medical Exception" to Emotion Detection Algorithms Within the EU's Forthcoming AI Act: Regulatory Implications for Therapeutical Smart Cobotics**
Riccardo Vecellio Segate (University of Groningen & University of Dundee, The Netherlands)

414 **Exploring the Latent Space of Person-Specific Convolutional Autoencoders for Eye-Blink Artefact Mitigation in EEG Signals**
Sabatina Criscuolo, Salvatore Giugliano and Andrea Apicella (University of Naples Federico II, Italy); Francesco Donnarumma (National Research Council, Italy); Francesco Amato and Annarita Tedesco (University of Naples, Federico II, Italy); Luca Longo (Technological University Dublin, Ireland)

420 **Unveiling Trustworthy AI Challenges: Characterizing Prediction Reliability**
Isotta Trescato, Alessandro Guazzo, Enrico Longato, Erica Tavazzi and Martina Vettoretti (University of Padova, Italy); Umberto Manera and Adriano Chiò (University of Turin, Italy); Marta Gromicho, Inês Alves and Mamede De Carvalho (Instituto de Medicina Molecular João Lobo Antunes, Universidade de Lisboa, Italy); Barbara Di Camillo (University of Padova, Italy)

Technical Session 15.1- Special Session 4 - Telecommunications Solutions for Next-Generation Industrial IoT (NG-IIoT)

Room: Room A1.1

426 **A Flexible Scheme for Critical mMTC**
Alessandro Mirri and Diego Forlivesi (University of Bologna, Italy); Riccardo Schiavone and Roberto Garello (Politecnico di Torino, Italy); Marco Chiani and Enrico Paolini (University of Bologna, Italy)

432 **Blind User Activity Detection for Grant-Free Random Access in Cell-Free mMIMO Networks**
Muhammad Usman Khan, Enrico Testi, Marco Chiani and Enrico Paolini (University of Bologna, Italy)

437 **Designing a Broker Extension for Seamless CoAP and MQTT Interoperability**
Corrado Innamorati, Alessandro E. C. Redondi and Matteo Cesana (Politecnico di Milano, Italy)

443 **DNN Hardware Accelerator Selection for Feasible Deployment of MARL-Based MAC Protocols in Industrial IoT Networks**
Enrico Russo, Elio Vinciguerra, Giuseppe Ascia and Daniela Panno (University of Catania, Italy)

Technical Session 16.1 - Special Session 5 - Techniques AI-based for Innovative High Frequency Power Converters: Analysis of Architectures, Components, Controllers and Materials

Room: Room B0.7

449 **Prediction of DC/DC Boost Converter Switching Power Losses Using a Backpropagation Algorithm Neural Network**
Michele Quercio and Lorenzo Sabino (Università Degli Studi Roma Tre, Italy); Gabriele Maria Lozito (University of Florence, Italy); Rafiq Asghar (Roma Tre University, Italy); Mauro Parise (Università Campus Bio-Medico di Roma, Italy); Francesco Riganti Fulginei (Roma TRE University, Italy)

453 **Foreign Object Detection for Wireless Power Transfer Systems Using MLMVN**
Marco Bindi (University of Florence, Italy); Vipinkumar Shriram Meshram (University of Campania Luigi Vanvitelli, Italy); Antonio Luchetta, Lorenzo Becchi and Matteo Intravaia (University of Florence, Italy); Alicia Triviño and Eliseo Villagrasa (University of Malaga, Spain)

459 **A Neural Network Based Control Strategy for Constant Current Battery Chargers With PV Source**
Lorenzo Becchi, Marco Bindi, Cristian Garzon Alfonso, Matteo Intravaia, Gabriele Maria Lozito and Francesco Grasso (University of Florence, Italy)

Technical Session 17.1 - Special Session 12 - Simulation, co-simulation and digital twins for CCAM: AI opportunities and challenges

Room: Room B0.1

465 **An Artificial Intelligence Approach for Automated Asset Management of Railway Systems**
Luca Di Costanzo, Angelo Coppola and Stefano Marrone (University of Naples Federico II, Italy)

470 **Leveraging AI Techniques to Understand and Simulate Driving Behaviours**
Angelo Coppola and Amir Reza Safari (University of Naples Federico II, Italy)

476 **Machine Learning-Based Method for Energy Economy Driver Assistance**
Hao Chen, Shailesh Hegde, Angelo Bonfitto and Nicola Amati (Politecnico di Torino, Italy)

482 **Enhancing Safety by Obstacle Detection at Railway Level Crossings**
Alessia Saggese (University of Salerno, Italy); Vincenzo Carletti (Unviersity of Salerno, Italy); Antonio Greco (University of Salerno, Italy); Bruno Vento (AITECH, Italy)

Technical Session 15.2- Special Session 4 - Telecommunications Solutions for Next-Generation Industrial IoT (NG-IIoT)

Room: Room A1.1

488 **Guidelines for RIS Planning in IIoT Scenarios**
Alessia Tarozzi, Enrico M. Vitucci, Franco Fuschini and Roberto Verdone (University of Bologna, Italy)

494 **IN-Rep: A New Open Data Repository for AI-Based Positioning in Industrial Networks**
Nadir Bouzar, Luca De Nardis and Maria Gabriella Di Benedetto (Sapienza University of Rome, Italy); Enrico M. Vitucci and Marco Chiani (University of Bologna, Italy); Stefano Caputo and Lorenzo Mucchi (University of Florence, Italy)

500 **Impact of Rain on Frequency Bands in 4G/5G Networks: Implications for Industrial Connectivity**
Roberta Avanzato, Francesco Beritelli and Maria Grazia Borzì (University of Catania, Italy)

Technical Session 16.2 - Special Session 5 - Techniques AI-based for Innovative High Frequency Power Converters: Analysis of Architectures, Components, Controllers and Materials

Room: Room B0.7

506 **Advancements in Artificial Intelligence for Design, Control, and Maintenance of Power Electronics: A Comprehensive Review**
Vipinkumar Shriram Meshram (University of Campania Luigi Vanvitelli, Italy); Cristian Garzon Alfonso, Lorenzo Becchi, Alberto Reatti, Francesco Grasso and Libero Paolucci (University of Florence, Italy)

512 **Duty Cycle Control for a Series-Series Compensated Wireless DC-DC Converter Using a Hybrid Controller**
Vittorio Bertolini (Università degli Studi di Perugia, Italy); Marco Stella (University of Perugia, Italy); Riccardo Scorretti (University of Perugia, Italy & CNRS, France); Antonio Faba and Ermanno Cardelli (University of Perugia, Italy)

518 **Comparison of Control Strategies Performances Based on a PID Controller and on an ANN Controller to Stabilize a Misaligned Wireless Resonant Converter**
Marco Stella (University of Perugia, Italy); Riccardo Scorretti (University of Perugia, Italy & CNRS, France); Antonio Faba and Ermanno Cardelli (University of Perugia, Italy)

Technical Session 17.2 - Special Session 12 - Simulation, co-simulation and digital twins for CCAM: AI opportunities and challenges

Room: Room B0.1

524 **Combining Deep Networks With Model-Based Scene Segmentation for Reliably Detecting Rocks on Railway Tracks**
Vincenzo Carletti (Unviersity of Salerno, Italy); Pasquale Foggia, Speranza Ranieri, Alessia Saggese and Camilla Spingola (University of Salerno, Italy); Mario Vento (Universita' di Salerno, Italy)

530 **Application of Quantum Genetic Algorithms to Connected and Electric Vehicles Energy Consumption Optimization**
Giovanni Acampora (University of Naples Federico II & Istituto Nazionale di Fisica Nucleare, Italy); Angela Chiatto (University of Naples Federico II, Italy); Stefano de Luca, Roberta Di Pace and Chiara Fiori (University of Salerno, Italy); Enrico Landolfi (Netcom Engineering, Italy); Alfredo Massa (QuantumNet Srl, Italy); Roberto Schiattarella and Autilia Vitiello (University of Naples Federico II, Italy)

536 **Realization of the Penetration Rate of Automated Driving System-Equipped Vehicles in the Presence of CCAM Enabled New Mobility Services**
Muhammad Tabish Bilal, Angela Di Febbraro, Davide Giglio and Nicola Sacco (University of Genoa, Italy)

Friday, September 20

Technical Session 18 - Track 4.3 - AI Applications for Industry
Room: Room A1.1

542 **Automatic Surveillance of Accelerated Cooling Line Against Cyber-Attacks and Faults**
Stefano Dettori and Vincenzo Iannino (Scuola Superiore Sant'Anna, Italy); Lorenzo Vannini (Scuola Superiore Sant Anna, Italy); Valentina Colla (Scuola Superiore Sant'Anna, Italy); Francesco Ferraris (Prisma Impianti S.P.A., Italy)

548 **Strengthening Applications' Security With Handwritten Arabic Calligraphy Captcha**
Hela Lajmi (Research Group on Intelligent Machines in ENIS sfax, Tunisia); Faiza Idoudi and hasna njah (University of Gabes, Tunisia); Habib M. Kammoun (University of Sfax & REGIM-Lab., Tunisia); Ines Njeh (National School of engineer of sfax, Tunisia)

554 **Privacy-Preserving Detection of Helmet and Mask Wearing With Fully Homomorphic Encryption: Towards A Secure Inference Approach**
Jia-Lin Chan, Wun-She Yap and Denis Chee-Keong Wong (Universiti Tunku Abdul Rahman, Malaysia); Bok-Min Goi (Universiti Tunku Abdul Rahman (UTAR), Malaysia); Wai Kong Lee (Universiti Tunku Abdul Rahman, Malaysia)

560 **Hidden in Plain Sight: Adversarial Attack on Wavelet-Based Banknote Authentication**
Julian Knaup (Institute Industrial IT & Technische Hochschule Ostwestfalen-Lippe, Germany); Christoph-Alexander Holst (Institute Industrial IT (inIT), Germany); Volker Lohweg (Technische Hochschule Ostwestfalen-Lippe, Germany)

566 **Monitoring Data Streams in Industry 5.0: A Knowledge Graph Approach**
Monica Marconi Sciarroni, Marco Esposito, Paola Pierleoni, Emanuele Storti (Università Politecnica Delle Marche, Italy)

Technical Session 19 - Track 4.4 - AI Applications for Industry
Room: Room B0.4

572 **Predictive Maintenance for Filling Machines With Online Evolving Spiking Neural Networks**
Valentina Tessoni (Sidel & University of Parma, Italy); Michele Amoretti (University of Parma, Italy); Michele Ollari (Sidel, Italy)

578 **Predictive Maintenance of Marine Engines Using a Long Short-Term Memory Algorithm**
Francesco Maione, Paolo Lino and Guido Maione (Politecnico di Bari, Italy); Giuseppe Giannino (Isotta Fraschini Motori Spa, Italy)

584 **Using Neural Networks With Linear Regression as a Scalable Model to Predict the Behaviour of Pumps**
Benjamin Peric (Hochschule Furtwangen, Germany)

590 **Milk-Run Optimization Under Time Windows for Collection and Replacement of Low-Charge e-Scooters**
Esra Çakır (Galatasaray University, Turkey)

595 **Interpretable Data-Driven Anomaly Detection in Industrial Processes With ExIFFI**
Davide Frizzo (University of Padova, Italy); Francesco Borsatti (University of Padua, Italy); Alessio Arcudi (University of Padova, Italy); Antonio De Moliner (Zoppas Industries, Italy); Roberto Oboe and Gian Antonio Susto (University of Padova, Italy)

601 **Efficient Deep Learning Models for Litter Detection in the Wild**
Simone Bianco, Elia Gaviraghi and Raimondo Schettini (University of Milano-Bicocca, Italy)

Technical Session 20 - Track 4.5 - AI Applications for Industry
Room: Room A1.1

607 **Ultra Tiny Neural Network for Accurate Pressure Sensors Under Multiple Thermal Stresses**
Danilo Pietro Pau, Welid Ben Yahmed, Stefano Bosco and Santo Pennino (STMicroelectronics, Italy); Gian Domenico Licciardo, Prof. and Paola Vitolo (University of Salerno, Italy)

613 **Development of a Wildfire Detection and Monitoring Solution Using Computer Vision**
Leo Thomas Ramos (Computer Vision Center, Universitat Autònoma de Barcelona, Spain & Kauel Inc., USA); Edmundo Casas (Kauel Inc., USA); Eduardo Bendek (NASA, USA); Cristian Romero (Kauel Inc., Chile); Francklin Rivas-Echeverría and Dunetchka Cerpa (Kauel Inc., USA); Pablo Hernández and Gonzalo Orellana (Kauel Inc., Chile); José Luis Ibarra (Kauel Inc., Ecuador); Carlos Rosas (Kauel Inc., Chile); Natalia Cuevas (Kauel Inc., USA); Juan Carlos Gallardo (Kauel Inc., Chile)

619 **IMU User Transparent Tiny Neural Self-Calibration**
Matteo Cardoni and Danilo Pietro Pau (STMicroelectronics, Italy); Kiarash Rezaei (Politecnico di Milano & STMicroelectronics, Italy)

625 **Arm Gesture Recognition With Smartwatches**
Andrea Colombo, Luigi Celona and Simone Bianco (University of Milano-Bicocca, Italy); Antonino Nocera (University of Pavia, Italy); Paolo Napoletano (University of Milan Bicocca, Italy)

630 **Multivariate Forecasting of Multiple Pollutants With Representative Deep Learning Architectures**
Simone Bianco, Luigi Celona, Matteo Lanzillotti, Paolo Napoletano (University of Milano-Bicocca, Italy)

Technical Session 21 - Track 2.4 - AI Applications to Energy and Transportation Systems
Room: Room B0.4

636 **Analyzing the Impact of Training Data Availability on Machine Learning Models Accuracy for Regional Photovoltaic Production Forecast**
Nabi Taheri (University of Pisa, Italy); Antonio Piazzi (Data Science Department, Italy); Mauro Tucci (University of Pisa, Italy)

642 **Optimizing Battery Storage Systems in Energy Microgrids: A Reinforcement Learning Approach Comparing Multiple Reward Functions**
Giorgia Ghione, Vincenzo Randazzo and Marco Badami (Politecnico di Torino, Italy); Eros GA Pasero (Politecnico of Turin, Italy & Neuronica Lab, Italy)

647 **Dynamic Life Cycle Assessment of Electric Power Dispatch With Different Temporal Precision Levels**
Mohammad Hemmati and Navid Bayati (University of Southern Denmark, Denmark); Thomas Ebel (CIE SDU, Denmark)

653 **An Efficient and Scalable Algorithm for the Creation of Representative Synthetic AC-OPF Datasets**
Luca Perbellini (Politecnico di Milano, Italy); Matteo Baù (RSE SpA, Italy); Samuele Grillo (Politecnico di Milano, Italy)

Technical Session 22 - Track 4.6 - AI Applications for Industry
Room: Room B0.1

659 **The GPT Store Release and Its Multifaceted Impact**
Laura Bies, Daniela Podevin, Tobias Greff and Tim Grundtner (August-Wilhelm Scheer Institut, Germany); Dirk Werth (AWS-Institute for Digitized Products and Processes gGmbH, Germany)

665 **Educational Experience Developed Between Industry and University for Students of a Course of Fluid Flow and Heat Transfer for Chemical Engineers**

Hugo Aldana (Tecnologico de Monterrey, Mexico); Alberto Cantú Pérez (Nutec Bickley, Mexico); José Luis López Salinas, Orlando Castilleja Escobedo and Rubén Eduardo Sánchez García (Tecnologico de Monterrey, Mexico)

671 **Comparison of Different Investment Strategies on the Market for Alternative Investment (MAI), Thailand**

Chanrathanak Ngauv and Rujira Chaysiri (Sirindhorn International Institute of Technology, Thammasat University, Thailand)

677 **AI Education for Tomorrow's Workforce: Leveraging Learning Factories for AI Education and Workforce Preparedness**

Mohammad Hossein Dehbozorgi (Politecnico di Milano, Italy); Monica Rossi (Politecnico di Milano & MIT, Italy); Sergio Terzi (Politecnico di Milano, Italy); Luca Carminati, Roberto Sala, Francesco Magni and Fabiana Pirola (University of Bergamo, Italy); Rossella Pozzi, Fernanda Strozzi and Tommaso Rossi (LIUC Università Cattaneo, Italy)