2024 International Conference on Smart Systems and Technologies (SST 2024)

Osijek, Croatia
16-18 October 2024

IEEE Catalog Number: CFP24G03-POD
ISBN: 979-8-3503-8640-0

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: CFP24G03-POD
ISBN (Print-On-Demand): 979-8-3503-8640-0
ISBN (Online): 979-8-3503-8639-4

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

TABLE OF CONTENTS

MESSAGE FROM THE SST 2024 GENERAL CHAIR AND PROGRAM CO-CHAIRS iii

CONFERENCE CHAIRS iv

PROGRAM COMMITTEE v

STEERING COMMITTEE vi

ORGANIZING COMMITTEE vi

TABLE OF CONTENTS vii

Keynote Speakers

Supporting the Flemish Manufacturing Industry through the Research Centre "Flanders Make": Experiences from an Academic Perspective
Frederik De Belie 2

Making Smart Systems Safe and Secure: Caveats and Blueprints from the Automotive Industry
Milan Z. Bjelica 3

Antenna Design and Signal Modulation 5

Hybrid UHF Quad Antenna for Indoor Use
Tomislav Barić, Hrvoje Glavaš and Vanja Mandrić 7

Influence of gender and physical constitution on the ISK-CC-HBC modulation scheme
Luka Filipović, Marijan Herceg, Domagoj Bilandžija and Jelena Šuljug 15

Impact of parameters for the in-situ measurement of the electric field strength of the SSB signal in a 5G NR system using the frequency-selective
Vanja Mandrić, Slavko Rupčić, Bogdan Pavković and Josip Ilakovac 21

A novel, fluidically reconfigurable patch antenna utilizing conductive fabrics
Adrian K. Stavrakis, Melina Ioannidou and Goran Stojanović 29

Chirp Detection and Signal Transmission: a HackRF Reactive Attack
Josip Šabić, Toni Perkovic and Petar Šolić 35

Machine Learning & Computer Vision Based Applications 41

Enhancing Road Anomaly Detection with Dynamic Cropping System: A YOLOv8 Integrated Approach
Taha Yasin Er and Seda Selçuk 43

Wound Tissue Classification: A Comparative Analysis of Deep Neural Network Models
Antonio Antunović, Emmanuel Karlo Nyarko and Damir Filko 49

BRANCH – a Labeled Dataset of RGB-D Images and 3D Models for Autonomous Tree Pruning
Jana Dukić, Petra Pejić, Andrej Bošnjak and Emmanuel Karlo Nyarko 57

Image Classification of partially labeled Datasets using the Latent Space Representation of Autoencoders
Dejan Bogosavljev and Željko Lukač 65

Synthetic dataset generation methods for computer vision application
Matej Arlović, Davor Damjanović, Franko Hržić and Josip Balen 69

Innovations in Educational Technologies, Network Systems and Cybersecurity 75

Supplementary Learning: Toward Enriching Microlearning from Design Perspective
Mehdi Hatamian 77

Threat Analysis and Risk Assessment and Countermeasures
Against Threat Scenarios for Steer-by-Wire System
Okan Özçetin and Mümin Tolga Emirler 83

Definition and Visualization of Protocols in Computer Networks
Filip Škrabák, Jakub Dubec and Pavel Čičák 89

Concept Exploration of Virtual Humans in Education
Faysal Ahmmed, Mohammad Nasfikur Rahman Khan, Md Khizir Al Zabir, Bhushan Lohar and Kari Lippert 95

Photovoltaic Systems and Applications 101

Rooftop Photovoltaic Potential Estimation Using QGIS and Simple Building Shadow Analysis
Matej Cenký, Jozef Bendík and Illia Lazarenko 103

Analysis of Harmonic Distortion in Low-voltage Distribution Network Caused
by Photovoltaic Power Plants and Electric Vehicle Chargers
Heidi Adrić, Zvonimir Klaić, Mario Primorac and Krešimir Fekete 109

Solar Irradiation High Frequency Simulation Model
Josip Vasilj, Damir Jakus, Joško Novaković and Danijel Jolevski 115

Agrivoltaic – A photovoltaic system on a greenhouse
Sebastijan Seme, Eva Simonič and Klemen Sredenšek 121

Application of photovoltaic systems for power supply heat pumps
Alen Mazalica, Dominik Buzov and Danijel Topić 125

Machine Learning Applications and Knowledge Representation 131

Reducing meta-level data in stacking ensembles for classification
Dražen Bajer, Bruno Zorić and Mario Dudjak 133

Long-term electricity consumption forecasting: how different prediction models forecast into the future
Vili Podgorelec, Špela Pečnik, Zala Lahovnik and Grega Vrbančič 139

Pathfinding in procedurally generated mazes
Matej Kuprešak, Časlav Livada, Tomislav Galba and Alfonzo Baumgartner 145

Explainable Deep Learning with Embedded Feature Selection for Electricity Demand Forecasting
Manuel Jesús Jiménez Navarro, Angela del Robledo Troncoso García, Alicia Troncoso, Francisco Martínez-Álvarez and María Martínez Ballesteros 153

Transformation of Natural Language Interrogative Sentences into Question Formalized Node of Knowledge (QFNOK) Record
Martina Ašenbrener Katić, Sanja Čandrlić and Marina Rauker Koch 159

Smart Health Software to Support Rescue Personnel in Emergency Situations
Abu Shad Ahammed and Roman Obermaisser 165

Power Systems Analysis and Resilience 171

Analysis of the USB standard as a power supply
Hrvoje Glavaš, Dražen Dorić and Antun Severović 173

Microgrids Resilience Against Extreme Events in Distribution Power Systems: A Case Study
Tekai Eddine Khalil Zidane, Younes Zahraoui and Pietro Elia Campana 179

A Robust Centralized Peer-to-Peer Energy Trading in the Energy Community
Younes Zahraoui, Binghui Han, Tekai Eddine Khalil Zidane, Pietro Elia Campana and Saad Mekhilef 185

Grid-Forming Technologies for Resilient Renewable Energy Integration Into Power Systems: A Review
Younes Zahraoui, Anes Bouhanik, Tekai Eddine Khalil Zidane, Pietro Elia Campana and Saad Mekhilef 191

Technical and Economic Analysis of Investment in a Self-Sufficient System Based on the New Network Tariff Model
Klemen Sredenšek, Eva Bahčič, Eva Simonič and Sebastijan Seme 197

Measurements and computation to obtain the phase-frequency characteristics from ferroresonant circuit data
Tin Benšić, Kruno Milicevic, Davor Vinko and Goran Kurtović 203

Smart Systems, Services and Assistive Technologies 209

A Wearable System for Diagnosing and Monitoring the Intensity of Stuttering
Petar Sušac, Nikola Gudan, Petra Kuk, Karla Salamun and Hrvoje Džapo 211

Towards a Privacy Resilient Mobility-as-a-Service (MaaS): A Threat-driven Approach
Otuekong Ekpo, Valentina Casola and Alessandra De Benedictis 217

Implementation and Analysis of LoRaWAN Technology for Remote Water Meter Reading in Urban Areas
Adrian Satja Kurdija, Željko Ilić and Gordan Šišul 225

The Role of Mobile Platforms in Psychosocial Rehabilitation – A Case Study
Bruno Zorić and Petar Lenart 233

Electric Vehicles and Energy Management 239

Electric Ship Charging Load Scenario Generation Method Based on Improved D-W-CGAN
Fei Liao, Jun Yang, Yi Lin, Jingwei Xue, Shaojiang Wu, Rui Zhu and Junjie Fu 241

Electric Vehicles as Flexible Assets for Households and System Operators: Survey Results
Nemanja Mišljenović, Matej Žnidarec, Goran Knežević and Danijel Topić 247

Evaluating the Impact of Sellback Rates and Metering Schemes
on Battery Storage Size in Grid-Connected PV Systems
Damir Jakus, Josip Vasilj, Joško Novaković, Danijel Jolevski and Tomislav Vujeva 255

System-level Simulation of Transient Loads in HV/LV DC-DC Electric Vehicle Converter
Kristian Knol, Alexander Ulbing and Denis Pelin 263

Technical challenges of integrating electric vehicles in the distribution grid
Filip Cupan, Rene Prenc, Vedran Kirinčić and Michele Rojnić 269

Automation and Control 277

Safety Manifold for Stochastic Model Predictive Control
of an Autonomous Vehicle Approaching Unsignalized Crosswalks with Pedestrians
Branimir Škugor, Joško Deur, Vladimir Ivanović and H. Eric Tseng 279

Constrained Prioritized 3T2R Task Control for Robotic Agricultural Spraying
Ivo Vatavuk and Zdenko Kovačić 287

Coordinated Control of Tethered Unmanned Aerial Vehicle With Launch And Recovery System
Vicko Prkačin, Antun Đuraš and Ivana Palunko 293

Modulation, measurement system and Web Interface implementation
in new generation multi-core Arm processors for vector control of induction machine
Robert Lesjak, Matija Varga, Dominik Cikač and Neven Bulić 299

Digital control system based on multi-core ARM processor for induction machine vector control
Želimir Galić, Matija Varga, Neven Bulic and Nikola Turk 305

Special Sessions.....311

Creating synergies in Widening countries on the topic of low-voltage grid management – SynGRID.....313

Radiofrequency Spectrum Management and Monitoring 314

Cutting-edge algorithms for innovations in cloud-based business intelligence solutions 316

AUTHOR INDEX 317

LIST OF PAPER REVIEWERS 318