

2023 15th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT 2023)

**Ghent, Belgium
30 October – 1 November 2023**



**IEEE Catalog Number: CFP2363G-POD
ISBN: 979-8-3503-9329-3**

**Copyright © 2023 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:	CFP2363G-POD
ISBN (Print-On-Demand):	979-8-3503-9329-3
ISBN (Online):	979-8-3503-9328-6
ISSN:	2157-0221

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

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Optimized UAV-Based Connectivity Solutions for Urban IoT Networks	1
<i>Balaji Kirubakaran, Elham Younesian, Joonas S�e, Jiri Hosek</i>	
Utilization of UAVs as Flying Base Stations in Urban Environments.....	7
<i>Nikita Tafintsev, Alessandro Chiumento, Olga Vikhrova, Mikko Valkama, Sergey Andreev</i>	
Efficiency of VANET Routing Algorithms in Traffic Use Cases	12
<i>Michal Vanek, Libor Michalek, Filip Lauterbach</i>	
Monitoring Vehicles Using OBD II and LPWA Network.....	17
<i>Miroslav Babela, Petr Musil, Radek Mozny, Michal Mahut, Martin Ruzs</i>	
Implementation and Field Testing of V2V Vehicle Stopping System.....	22
<i>Jan Dvorak, Jan Pospisil, Pavel Seda, Zdenek Martinasek, Lukas Malina, Vladimir Taborsky, Martin Srotыр, Igor Miklosik</i>	
License Plate Recognition on Low-Cost Devices.....	28
<i>Jiri Prinosil, Petr Kriz</i>	
Attention-Based VGG-Residual-Inception Module for EEG-Based Depression Detection.....	33
<i>Gautam Verma, Mohan Karnati, Malay Kishore Dutta, Vojtech Myska, Anzhelika Mezina</i>	
DMRBNNet: Dilated Multi-Scale Residual Block-Based Deep Network for Detection of Breast Cancer from MRI Images	38
<i>Himanshi Sinha, Mohan Karnati, Garmia Aggarwal, Malay Kishore Dutta, Anzhelika Mezina, Radim Burget</i>	
Attention-Based Multiscale Deep Neural Network for Diagnosis of Polycystic Ovary Syndrome Using Ovarian Ultrasound Images	44
<i>Suzain Rashid, Mohan Karnati, Garmia Aggarwal, Malay Kishore Dutta, Pavel Sikora, Radim Burget</i>	
Multi-Scale Attention Network for Early Detection of Alzheimer's Disease from MRI Images.....	50
<i>Vaishali Aggarwal, Geet Sahu, Malay Kishore Dutta, Martin Jonak, Radim Burget</i>	
AI-Enhanced Mental Health Diagnosis: Leveraging Transformers for Early Detection of Depression Tendency in Textual Data	56
<i>Srishti Verma, Vishal, Rakesh Chandra Joshi, Malay Kishore Dutta, Stepan Jezek, Radim Burget</i>	
CovidStopHospital: e-Health Service for X-Ray-Based COVID-19 Classification and Radiologist- Assisted Dataset Creation.....	62
<i>Vojtech Myska, Anzhelika Mezina, Petr Vanek, Radim Burget, Samuel Genzor, Jan Mizera, Michal Stybнар, Martin Kiac, Jakub Frolka</i>	
Leveraging Compute Heterogeneity in Federated Multi-Task Classification.....	68
<i>Aleksei Ponomarenko-Timofeev, Olga Galinina, Ravikumar Balakrishnan, Nageen Himayat, Sergey Andreev, Yevgeni Koucheryavy</i>	
Empirical Characterization of Wireless Connectivity Performance for Cognitive Edge IoT Nodes	73
<i>Diluna Adeesha Warnakulasuriya, Konstantin Mikhaylov</i>	

A Practical Implementation of Spread FBMC in a Multitone Jamming Scenario Using USRP Radios.....	81
<i>Hamad Fadhel Aldoseri, Tairan Wu, Andreas Czylik</i>	
Water-Filling for Friendly Wide-Band Jamming.....	85
<i>Werner Henkel, Lynda W. Mwema, M. Ahmed Leghari</i>	
Design and Examples of Fractional-Order Capacitor Based on C-R-NC Layer Structure.....	91
<i>Cole Christie, Ty Clements, Alison Humpal, David Kubanek, Jan Jerabek, Pavel Seda, Jan Dvorak, Peter Ushakov, Ilya Knyazev</i>	
An Android Federated Learning Framework for Emergency Management Applications.....	97
<i>Jakub Michalek, Vaclav Oujezsky, Vladislav Skorpil</i>	
Selected Software and Tools for Smart Grid Simulation in Research.....	102
<i>Vaclav Oujezsky, Bacem Mbarek, Frantisek Kasl, Tomas Pitner</i>	
Ransomware File Detection Using Hashes and Machine Learning.....	107
<i>Pavel Novak, Patrik Kaura, Vaclav Oujezsky, Tomas Horvath</i>	
The Role of AGT State Model in Hybrid AnS Resource Control Algorithms Development.....	111
<i>Ondrej Mamula, David Hrycej, Petr Stejskal, Jitka Stoklasová, Premysl Šucha, Martin Henych</i>	
Communication with the End Customer Device - Smart Box and Load Management.....	118
<i>Petr Mlynek, Jan Slacik, Jiri Misurec, Lukas Benesl</i>	
Technology Approaches to Metering in Flexibility Aggregation.....	122
<i>Ondrej Mamula, Tomáš Pitner, Martin Strelec, David Hrycej, František Kasl, Petr Janecek</i>	
A Study on Quantum Key Distribution Satellite Communications.....	128
<i>Filip Lauterbach, Michal Vaněk, Miralem Mehic, Miroslav Voznak</i>	
Secure Cloud Storage System for Digital Evidence.....	134
<i>Lukas Malina, Petr Muzikant, Martin Nohava, Jan Hajny, Antonin Dufka, Petr Svenda, Vaclav Stupka</i>	
Container Scheduling in Kubernetes Clusters Using a Mixed Integer Linear Programming Approach.....	140
<i>Camilla Martins, Pedro Nuno De Souza Moura, Sidney C. De Lucena, Carlos Alberto Vieira Campos</i>	
Efficient Web Application Mapping During the Reconnaissance Phase of Penetration Testing.....	146
<i>Willi Lazarov, Zdenek Martinasek</i>	
A Reinforcement Learning Framework for Knowledge-Defined Networking.....	152
<i>Dalibor Zeman, Ivan Zelinka, Miroslav Voznak</i>	
Communication Perspective of Wildfire Detection and Suppression: A Survey of Technologies, Requirements, and Future Directions.....	157
<i>Gianmarco Canello, Konstantin Mikhaylov, Tuomo Hänninen</i>	
Multi-Head Attention-Based Transfer Learning Approach for Potato Disease Detection.....	165
<i>Ritesh Maurya, Radim Burget, Rudra Shaurya, Martin Kiac, Malay Kishore Dutta</i>	
Plant Disease Identification Using a Dual Self-Attention Modified Residual-Inception Network.....	170
<i>Rashi Chauhan, Mohan Karnati, Malay Kishore Dutta, Radim Burget</i>	

From Segmentation to Clustering: Advancing Algorithms for Grouping Microbial Colonies on Agar Plates	176
<i>Michal Ciatka, Radim Burget, Jan Lancos</i>	
Unveiling the Smell Inspector and Machine Learning Methods for Smell Recognition	182
<i>Petr Kriz, Pavel Sikora, Kamil Riha, Radim Burget</i>	
Forensic Comparison of Soil Particles Using Gaussian Mixture Models and Likelihood Ratio Test.....	188
<i>Martin Jonák, Jan Dorazil, Martin Kolarik, Štěpán Ježek, Radim Burget, Marek Kotrlý</i>	
Exploiting NB-IoT Network Performance and Capacity for Smart-Metering Use-Cases.....	193
<i>Martin Stusek, Pavel Masek, Radim Dvorak, Thao Le Dinh, Radek Mozny, Krystof Zeman, Aleksandr Ometov, Petr Cika, Petr Mlynek, Jiri Hosek</i>	
Wearable-Based System for the Ubiquitous Tracking of Vulnerable People in Remote Areas	200
<i>M. Carmen Pérez-Rubio, Javier Quintanar-Pascual, Alejandro Garcia-Requejo, J. Manuel Villadangos-Carrizo, J. Jesús García-Domínguez, Liam Marnane</i>	
Renewable Energy Sources Optimization for Electric Vehicles' Charging Stations.....	206
<i>Lukas Jabloncik, Pavel Palurik, Radim Dvorak, Martin Stusek, Pavel Masek, Michal Mikulasek, Petr Mlynek, Petr Cika, Jiri Hosek</i>	
LWM2M for Cellular IoT: Protocol Implementation and Performance Evaluation	212
<i>Radim Dvorak, Lukas Jabloncik, Michal Mikulasek, Martin Stusek, Pavel Masek, Radek Mozny, Aleksandr Ometov, Petr Mlynek, Petr Cika, Jiri Hosek</i>	
A Method of Cryptographically Strong Pseudorandom Sequences Generation Based on the Blender	219
<i>Vladimir Grozov, Alexei Guirik, Mikhail Budko</i>	
Optimizing Resource Allocation in 5G Networks Through Downlink and Uplink Decoupling	225
<i>Christos Bouras, Charalampos Chatzigeorgiou, Vasileios Kokkinos, Apostolos Gkamas, Philippos Pouyioutas</i>	
Using Generalized (L, G)-Codes for Implementation the Classic McEliece Cryptosystem.....	231
<i>Ivan Noskov, Sergey Bezzateev</i>	
Continuous Authentication in a UAVs Swarm	235
<i>Sergey Bezzateev, Svetlana Fomicheva</i>	
Blockchain-Based Device Authentication Method in Industrial Internet of Things	243
<i>Ivan R. Fedorov, Ivan B. Getmaniuk, Sergey V. Bezzateev</i>	
3GPP Release 18 MIMO Enhancements: Channel State Information for Higher Speed Scenarios	250
<i>Luis Suárez, Roman Kovalchukov, Eugene Visotsky, Filippo Tosato</i>	

Author Index