AETA 2024

The 9th International Conference on Advanced Engineering - Theory and Applications 2024

07 – 08 November, 2024

Conference Program

Organizer
Brno University of Technology

Co-Organizers

Ton Duc Thang University, Vietnam
VŠB-Technical University of Ostrava, Czech Republic
Pukyong National University, South Korea

Technically Co-Sponsor

Proceedings

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AETA 2024
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CONFERENCE INFORMATION

I. Location:

Brno University of Technology, Brno, Czech Republic

Technicka 12, Brno, 616 00, Czech Republic

II. Reception Desk:

The reception desk is located in the lobby of the building T12, 2nd floor, Faculty of Electrical Engineering and Communication, Technicka 12, Brno.

III. Language

All sessions will be presented in English.

IV. Badges

Admittance to the venue is restricted to participants wearing their name badges. The wearing of badges is compulsory both inside the venue and at all events organized with its context.

V. Conference Room's Location

Conference will be held in the conference rooms of the Faculty of Electrical Engineering and Communication, Brno University of Technology. The conference rooms n. SD2.99 and SD2.100 are located on the 2nd floor of the building T12, Technicka 12, Brno.

VI. Conference Room's Equipment

Each conference room will be equipped with a projector and a desktop computer.

VII. Guideline for Presentation

It takes 18 minutes for each presentation. Each paper will be presented orally for 13 minutes followed by 5 minutes discussion. Speakers will be noticed by the supporting staff 5 minutes before ending.

VIII. Transportation

The AETA 2024 participants will arrange the transportation to the AETA 2024 venue location by them own. There is no transportation provided by the conference organizers.

IX. Parking

Participants with the conference invitation can park their cars at campus parking lots following instructions.

X. Luncheon

Lunch will be served from 12:00 p.m. in the lobby of the building T12, 2nd floor, Faculty of Electrical Engineering and Communication, Technicka 12, Brno.

Conference Banquet

The Organizing Committee invites all registered guests at the Conference Dinner on Thursday, November 7, 19:00. The Conference Dinner will take place in the restaurant "U Tomana", In house no. 22, right in the centre of Brno's Náměstí Svobody (Freedom Square), https://maps.app.goo.gl/PMNWFEV2mV4ZYNTJ6

XI. Contact

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CONFERENCE VENUE

**Brno University of Technology,
Technicka 3082/12, Brno, 616 00, Czech Republic**

PROGRAM AT A GLANCE – AETA 2024

DAY 1 – Thursday, November 7, 2024

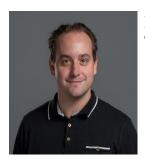| Time	Event	
09:30 – 10:00	**Registration & Coffee Break (Lobby)**	
10:00 – 10:15	**Opening Ceremony (SD2.99)**	
10:15 – 11:00	**Keynote Speech I** Prof. Roman Senkerik, Tomas Bata University, Czech Republic	
11:00 – 11:45	**Keynote Speech II** Dr. Pavel Masek, Brno University of Technology, Czech Republic	
12:00 – 13:00	**Lunch (Lobby)**	
13:00 – 14:30	**Room SD2.99**	**Room SD2.100**
	Session 1-1	Session 1-2
14:30 – 15:30	**Coffee Break & Poster Session (Lobby)**	
	Room SD2.99	**Room SD2.100**
15:30 – 17:00	Session 2-1	Session 2-2
19:00 – 22:00	**Conference Banquet** Restaurant "U Tomana", Náměstí Svobody n. 22 (Freedom Square / main square in the city center)	

DAY 2 – Friday, November 8, 2024

Time	Event
13:00 – 15:00	**Brno City Tour, meeting point: Equestrian ('horse') statue on Moravian Square, https://maps.app.goo.gl/8W2FRdtBivjWDLsA8**

KEYNOTE SPEAKERS

Prof. Roman Senkerik, Tomas Bata University

Dr. Pavel Masek, Brno University of Technology

Prof. ROMAN SENKERIK
Tomas Bata University, Czech Republic

Lecture title: Large Language Models for Metaheuristics Design

Abstract:
This tutorial explores the connection between generative AI and optimization through engaging demonstrations and discussions. The goal is to showcase a unique combination of techniques and provide deeper insights into the usability, prompting, and reasoning of the outputs of Generative AI. Additionally, it highlights the impact of Generative AI on the design, selection, performance improvements, efficiency, and understanding of optimization or machine learning techniques. This research plays a crucial role in science and engineering, both theoretically and practically. Future directions and potential impacts on algorithmic problem-solving in various domains will also be discussed.

Biography:
Prof. Roman Senkerik received his Ph.D. degree in Technical Cybernetics from the Tomas Bata University in Zlin, Czech Republic in 2008. He is currently a full professor at the Tomas Bata University in Zlin, Faculty of Applied Informatics. His research interests include interdisciplinary applications of evolutionary computation, modification and development of evolutionary and swarm based algorithms, computational intelligence, optimization, cyber-security, theory of chaos, emergence and complexity.

Dr. PAVEL MASEK
Brno University of Technology, Czech Republic

Lecture title: Cellular IoT Technologies for Intelligent Networks

Abstract:
The Internet of Things is transforming the information and communication technology industry. It embodies the vision of connecting virtually anything to everything and builds on the global growth of the overall number of connected end devices. To support this growth, the 3GPP standards development organization has in its Releases defined communication technologies Narrowband IoT and LTE Cat-M. These technologies provide cellular connectivity for a massive number of IoT devices with stringent requirements in terms of connection density, energy efficiency, reachability, reliability, and latency, leading to massive Machine-Type Communication scenarios. This keynote focuses on performance characteristics, implementation challenges, and specific enhancements required for modern IoT applications, all of which are critical in the context of the ongoing development and deployment of 5G and future 6G networks, especially in case of the energy grids and remote smart metering scenarios.

Biography:
Dr. Pavel Mašek is an expert in the research area of wireless communication technologies and protocols for industrial Internet of Things. His focus is mainly on the 5G-IoT communication technologies for critical smart-grid infrastructure and Industry 4.0+.

ORAL PRESENTATION

Session 1–1, 1-2:	**13:00 – 14:30**
Session 1–2, 2-2:	**15:30 – 17:00**
Poster 1:	**14:30 – 15:30**

Session 1-1 – Intelligent Systems 1
Day 1 – Thursday, November 7, 2024
Time: 13:00 – 14:30; Venue: Room SD2.99
Session Chair: Dr. Pham Van Huy, Ton Duc Thang University, Vietnam

№	Time	Paper Title
1	13:00 ~ 13:17	**Optimal Scheduling of Electric Vehicle Charging and Discharging in Distribution Networks with Optimal Allocation of Distributed Generations** Thien Minh Vo; Tien Doan Thi Kieu; Khai Mai Phu; Khanh Tran Trung Dieu Vo Ngoc
2	13:18 ~ 13:35	**Practical use in exhibiting devices as well as optical heat measurement: phosphors Na3Zr2(SiO4)2PO4: Er3+/Yb3+ through up-transmutation with heat consistency** Anh-Tuan Le, Nguyen Doan Quoc Anh
3	13:36 ~ 13:53	**Multi-Power Beacon Assisted Short Packet Communication in D2D Network** Si-Phu Le, Tan N. Nguyen, Anh-Vu Le, Lam-Thanh Tu, Minh Tran, Van-Van Huynh, and Miroslav Voznak
4	13:54 ~ 14:11	**Image Steganography using Chaotic encryption and reconstruction based Lipschitz observer** Luan T. M. To, Lap Luat Nguyen, Long TonThat, Uyen L. P. Nguyen, and Vo-Tan Phuoc
5	14:12 ~ 14:30	**Robust Frequency Regulation for Thermal and Hydro Power Plants Based on Sliding Mode Controller Application** Anh-Tuan Tran, Dao Huy Tuan, Van Van Huynh, and Boopathi D

Session 1-2 – Advanced Control and Signal Processing 1
Day 1 – Thursday, November 7, 2024
Time: 13:00; Venue: Room SD2.100
Session Chair: Prof. Miroslav Voznak, VSB - Technical University of Ostrava, Czech Republic

№	Time	Paper Title
1	13:00 ~ 13:17	**Optimal Power Flow in Distribution Grids Considering Charging Stations and Renewable Energy Sources Using War Strategy Optimization** Nguyen Phuc Khai, Nguyen Trong Tai, Lam Buu Qui and Nguyen Ngoc Lan Anh
2	13:18 ~ 13:35	**Federated Learning for Breast Cancer Diagnosis: A case study** Pham Duc Lam, Pham Vinh Hung, Nguyen Tai Bui Dat, Ho Duc Tai, Tran Anh Khoa, and Nguyen Hoang Nam
3	13:36 ~ 13:53	**The Stator and Rotor Resistance Estimating Technique for Induction Motor Drive** Dinh, Bach; Tran, Cuong Dinh; Nguyen, Phuong; Nguyen, Lien; Nguyen, Phuong; Kirschner, Stepan
4	13:54 ~ 14:11	**Analysis and optimization first modal shape frequency of an amplifying compliant mechanism flexure hinge using Finite Element Method and Taguchi method** Hoang, Le Quang Nhat; Nguyen, Tien Dung; Vu, Anh Thu; Huynh, Ngoc Thai
5	14:12 ~ 14:30	**Innovation of jecklin disc microphone technique** Ondrej Jirasek

Session 2-1 – Intelligent Systems 2
Day 1 – Thursday, November 7, 2024
Time: 15:30 – 17:00; Venue: Room SD2.99
Session Chair: Dr. Phuong T. Tran, Ton Duc Thang University, Vietnam

№	Time	Paper Title
1	15:30 ~ 15:47	**A Proposed Model for Load Forecasting during Lunar New Year Holidays in Countries Using the Lunar Calendar** Phuc Diem Nguyen Ngoc and Thanh Tuan Huynh
2	15:48 ~ 16:05	**An AI Based Tool Using DGA Method for Fault Diagnosis of Power Transformers** Nhat Nam Nguyen, Gia Huy Tran and Minh Hoang Pham
3	16:06 ~ 16:23	**Design of Adaptive Sliding Mode Combined Extend Observer Strategy with Automatic Load Frequency Regulator** Dao Huy Tuan, Anh-Tuan Tran, Huynh Van Van, Vo Hoang Duy and Nguyen Huu Khanh Nhan
4	16:24 ~ 16:41	**A Comprehensive Analysis of the Impact of Thanh Hai Wind Power Plant on Electrical Grid Performance in Ben Tre Province, Vietnam** Vanphu Huynh, Ngocdieu Vo, Huutinh Tran, Phattrien Huynh, Hoviet Thong
5	16:42 ~ 17:00	**Distance-of-pairs based IQR - a new efficient approach to detect outliers in GPS trajectory** Khoa Nguyen Dang Dinh, Anh Tu Le, and Peppino Fazio

Session 2-2 – Advanced Control and Signal Processing 2
Day 1 – Thursday, November 7, 2024
Time: 15:30 – 17:00; Venue: Room SD2.100
Session Chair: Dr. Pavel Masek, Brno University of Technology, Czech Republic

№	Time	Paper Title
1	15:30 ~ 15:47	**Removal of Deposit Accumulation on Engine Head using Emulsion Fuel** Faheem Ahmed Solangi, Fayaz Hussain, Shahryar Khan, Atika Qazi, Zhou Ding
2	15:48 ~ 16:05	**A proposed strategy for parameter identification of power transformers** Si Huy Cuong Nguyen and Dinh Anh Khoi Pham
3	16:06 ~ 16:23	**Increasing the efficiency of the UAV video communication system** Andrii Ponomarov, Stanislav Ivanenko
4	16:24 ~ 16:41	**Advanced Protection Solution for Medium Voltage Broken Conductor Faults in Southern Vietnam** Thi-Tinh-Minh LE, Hanh Dang-Ngoc
5	16:42 ~ 17:00	**Enhancing Energy Efficiency in BBUs: Predictive Analysis with Long-Term and Granular Data** Aneta Kolackova, Viet Anh Phan, Elham Younesian, Jiri Hosek, Jan Jerabek, Nabhan Khatib

Day 1 – Thursday, November 7, 2024
Time: 14:30 – 15:30; Venue: Room: Lobby
Session Chair: Assoc. Prof. Jiri Hosek, Brno University of Technology, Czech Republic

№	Time	Paper Title
1	14:30 – 15:30	**Optimal Location and Size of Electric Vehicle Charging Stations in Distribution Systems with Integrated Distributed Generations** Thien Vo, Tien Doan Thi Kieu, Hau Nguyen Van, Thong Luong Van, Dieu Vo Ngoc
2	14:30 – 15:30	**Orbital Search Algorithm for Optimal Placement of electric vehicle charging stations in distribution networks considering Location Constraints** Khoa Truong Hoang, Phuong Le Minh, Hung Nguyen Duc, Dieu Vo Ngoc Vo, and Phan Quang An
3	14:30 – 15:30	**Three-Phase Hybrid Seven-Level Inverter using T-Type Configuration Combined with H-Bridge Modules** Ngoc Minh Doan Nguyen, Tan Luong Van, Xuan Tri Nguyen
4	14:30 – 15:30	**Optimizing the placement of soft open points in the IEEE 69-node distribution network to power loss reduction** Hai Van Tran, Anh Viet Truong, Trieu Ngoc Ton, Thang Trung Nguyen, Ly Huu Pham
5	14:30 – 15:30	**Maximizing Total Electric Sale Revenue for a Hybrid Battery Storage Energy System and Solar Power System** Tan Minh Phan, Ha My Le, Thang Trung Nguyen, and Bach Hoang Dinh
6	14:30 – 15:30	**Reducing power loss of distribution bus network with the presence of charge stations** Hung Duc Nguyen, Ly Huu Pham and Tan Dat Vo
7	14:30 – 15:30	**The Effects of Relay Protection on Medium Voltage Sys-tems with High Integration of Renewable Energy Sources** Thi-Tinh-Minh LE, The-Cuong HOANG
8	14:30 – 15:30	**Efficient battery energy storage allocation in distribution networks based on generalized normal distribution optimization** Hung Duc Nguyen, Phuong Minh Le, Nguyen Thi Hoang Lien, Nhuan An Le, and Khoa Hoang Truong
9	14:30 – 15:30	**Leveraging Inverters for Effective Fault Current Management and Recloser-Fuse Coordination** Khanh Dang Tuan, Dieu Vo Ngoc, Huy Nhat Huynh
10	14:30 – 15:30	**An Application of the Radial Basis Function - Finite Difference Matrix Operators for Solving 2-D Electromagetic Problems** Xuan-Binh Nguyen, Huu-Luong Huynh Tran, Nhat-Nam Nguyen and Phan-Tu Vu
11	14:30 – 15:30	**Assessing the Feasibility of 5G-IoT Networks for Remote Firmware Updates** Radek Možný, Pavel Masek, Pavel Palurik, Petr Cika, and Jiri Hosek