

# **2024 IEEE 18th International Symposium on Applied Computational Intelligence and Informatics (SACI 2024)**

**Timisoara, Romania  
23-25 May 2024**



**IEEE Catalog Number: CFP2445C-POD  
ISBN: 979-8-3503-2953-7**

**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:	CFP2445C-POD
ISBN (Print-On-Demand):	979-8-3503-2953-7
ISBN (Online):	979-8-3503-2952-0
ISSN:	2833-9010

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Table of Contents

Organizers

Committees

<b>Views on Artificial Intelligence and Machine Learning perspectives .....</b>	<b>11</b>
<i>Hamido Fujita</i>	
<b>E-CARGO and Role-based Collaboration .....</b>	<b>13</b>
<i>Haibin Zhu</i>	
<b>Spread Spectrum Modulation Combined with AI in for Jamming Resistant Communication .....</b>	<b>15</b>
<i>Nikos Mastorakis</i>	
<b>Turning the Tables in Hybrid Classical-Quantum Systems—Classical Optimization of Quantum Algorithms .....</b>	<b>23</b>
<i>Mihai Udrescu</i>	
<b>Integral Characterizations of Uniform h-Dichotomy in Mean for Stochastic Skew-Evolution Semiflows .....</b>	<b>25</b>
<i>Tímea Melinda Személyi Fülöp, Diana Ioana Borlea (Patraşcu)</i>	
<b>Simplified DC-DC Converter Models for Interconnecting Loads to a DC Microgrid.....</b>	<b>31</b>
<i>Cezara-Liliana Rat, Octavian Prostean</i>	
<b>Artificial Intelligence and Energy Efficiency Revolution in Electric Consumption Management.....</b>	<b>37</b>
<i>Róbert Štefko, Marek Bobček</i>	
<b>Laboratory Studies of Artificial Inertia .....</b>	<b>43</b>
<i>Péter Kádár, István Bendiák</i>	
<b>Multidisciplinary and Multiphysical Model Represents Complex Research in Applied Informatics .....</b>	<b>49</b>
<i>László Horváth</i>	
<b>On Uniform Dichotomy with Growth Rates of Skew-Evolution Cocycles in Banach Spaces .....</b>	<b>55</b>
<i>Ariana Găină, Mihail Megan,</i>	
<b>Comparison of the Consumer Blockchain (CB) and the Óbuda Ethereum Private Blockchain (ÓEPB) to Store Even More Secure Consumer Habits .....</b>	<b>61</b>
<i>Krisztián Bálint</i>	
<b>The Impacts of Artificial Intelligence and Knowledge-Based Systems on Corporate Decision Support .....</b>	<b>65</b>
<i>Máté Prorok, István Takács</i>	
<b>Exploring Social Dynamics in the Information Society .....</b>	<b>71</b>
<i>Kornélia Lazányi</i>	
<b>Generational Differences in Online Behavior - Exploring Attitudes Towards Privacy, Trust, and Social Interaction.....</b>	<b>77</b>
<i>Rozália Hanna Szatmáry</i>	
<b>A Comparative Analysis of Different Longitudinal Bending Stiffness Shoes on Running Biomechanics in Adolescent Amateur Runners .....</b>	<b>83</b>
<i>Hairong Chen, Qiaolin Zhang, István Bíró</i>	
<b>Prediction and Effectiveness Verification of Chevron Osteotomy Surgical Plan using Finite Element Method .....</b>	<b>89</b>
<i>Qiaolin Zhang, Hairong Chen, Xinyan Jiang, István Bíró</i>	
<b>Effects of Long-Distance Running on Lower Limb Joint Kinematics in Recreational Runners.....</b>	<b>95</b>
<i>Xinyan Jiang, Qiaolin Zhang, István Bíró</i>	
<b>Fuzzy Adaptive Speed Controller for a Small Turbojet Engine .....</b>	<b>99</b>
<i>Rudolf Andoga, Ladislav Fózó, Ján Vaščák</i>	
<b>Current and Potential New Methods to Prevent Damage Caused by Wild Animals in Agricultural Areas.....</b>	<b>105</b>
<i>Dániel Kovács, Éva Hajnal</i>	

<b>The Impact of Spatial Distribution on Wind Power Availability: A Model-based Analysis for Hungary .....</b>	<b>111</b>
<i>Ágnes Gerse, Adrienn Dineva, Rita Fleiner</i>	
<b>Various Wing end Plates and their Effect on the Two-Dimensionality of Airflow .....</b>	<b>117</b>
<i>Jozef Pavlinský, Peter Gašparovič, Ladislav Fózó, Rudolf Andoga</i>	
<b>Essential Teambuilding Skills for Project Work in Engineering Studies .....</b>	<b>121</b>
<i>Monika Pogátsnik, Éva Beke, Rita Bodáné Kendrovics</i>	
<b>Fuzzy Ideas Explain Fechner Law and Help Detect Relation Between Objects in Video .....</b>	<b>127</b>
<i>Olga Kosheleva, Vladik Kreinovich, Ahnaf Farhan</i>	
<b>A Systematic Approach to The Development of an Automated Assessment System for Laparoscopic Surgery Fundamentals .....</b>	<b>133</b>
<i>Mohsen Mohaidat, Fatemeh Rashidi Fathabadi, Koloud N. Alkhamaiseh, Janos Grantner, Saad A Shebrain, Ikhlas Abdel-Qader</i>	
<b>Driving Behavior Extraction Based on Eyes Movement Patterns .....</b>	<b>139</b>
<i>Alexandru M. Pescaru, Mihai V. Micea</i>	
<b>New Similarity Correlation Functions for Sets and Binary Data based on Jaccard Similarity Measure .....</b>	<b>145</b>
<i>Ildar Batyrshin, Imre J. Rudas</i>	
<b>Multi-Criteria Evaluation of Battery Electric Vehicles via Circular Intuitionistic Fuzzy PROMETHEE .....</b>	<b>151</b>
<i>Esra Çakir, Emre Demirciođiu</i>	
<b>Utilizing Transfer Learning in In Vitro Dissolution Prediction based on Raman Maps .....</b>	<b>157</b>
<i>Gábor Knyihár, Kristóf Csorba</i>	
<b>Evaluation of DarkNet19 and DarkNet53 Inference Time on CPU, GPU, and FPGA .....</b>	<b>163</b>
<i>George-Vlăduț Popescu, Mihai Antonescu, Alexandra-Mihaela Enescu, Teodor Mărgineanu</i>	
<b>Multi-agent Deep Reinforcement Learning for Multi-modal Orienteering Problem .....</b>	<b>169</b>
<i>Wei Liu, Kaiwen Li, Wenhua Li, Rui Wang, and Tao Zhang</i>	
<b>Real-Time Rail Energy Consumption Minimization: Optimal Speed Profile Planning .....</b>	<b>175</b>
<i>László Lindenmaier, Szilárd Aradi, István Ferenc Lövetei</i>	
<b>Differentiable Particle Filtering using Optimal Placement Resampling .....</b>	<b>183</b>
<i>Domonkos Csuzdi, Olivér Törő and Tamás Bécsi</i>	
<b>Formula 1 – Information Solutions on and off the Racetrack.....</b>	<b>189</b>
<i>Lili Belkovic, Krisztina András, István Takács</i>	
<b>Cultural Differences in Attitudes towards Robots – Based on Negative Attitude towards Robots (NARS) Scale: Protocol for a Systematic Literature Review.....</b>	<b>195</b>
<i>Mariann Békésy, László Gulácsi, Orsolya Szigeti</i>	
<b>Tasks Related to Whistleblower Protection. Integrity and Organization .....</b>	<b>199</b>
<i>Csilla Ilona Mizser</i>	
<b>Lean Management Knowledge Survey in Hungary .....</b>	<b>205</b>
<i>János Kosztolányi, Zsolt Téglá</i>	
<b>QR Code Applications Digital Literacy Skills in Today’s Technology-driven World in the Field of Education .....</b>	<b>211</b>
<i>Izabella Krajnik, Robert Demeter</i>	
<b>Aspects of Successful Teamwork on the Road to Agility.....</b>	<b>217</b>
<i>Ágnes Csiszárík-Kocsir, István Márk Tóth, János Varga</i>	
<b>Small Business Digital Solutions for Competitive Advantage in Operations .....</b>	<b>223</b>
<i>János Varga, Ágnes Csiszárík-Kocsir</i>	
<b>The Use of Artificial Intelligence in Learning on Social Networking Sites among Hungarian and Turkish Youth .....</b>	<b>231</b>
<i>Ágnes Csiszárík-Kocsir, Bernadett Revák, Serkan Savas</i>	
<b>The Role of Top Management in Corporate Innovation Projects.....</b>	<b>237</b>
<i>Attila Balogh</i>	
<b>AI as Viewed by Generation Z. Advantages, Disadvantages and Challenges of AI Based on Primary Findings .....</b>	<b>243</b>
<i>Jäckel Katalin, Monika Garai-Fodor</i>	

<b>Streamlining Serious Game Development: An Extensible System for Unifying Controls in Crossplatform Serious Game Development .....</b>	<b>249</b>
<i>Raul Brumar, Mihai-Alexandru Grosu, Stelian Nicola, Horia Ciocârlie</i>	
<b>Development of an Attack Detection Module for Vehicular Ad-hoc Networks.....</b>	<b>255</b>
<i>Rajmund Drenyovszki, Zsolt Csaba Johanyák</i>	
<b>Enhancing Patient Care: Achieving Interoperability between General Practitioners' and Stomatologists' Information Systems using FHIR Standard and Firebase Cloud.....</b>	<b>261</b>
<i>Oana Sorina Chirila, Denis Avram, Mihaela Monica Szilagyi, Ciprian-Bogdan Chirila, Lăcrămioara Stoicu-Tivadar</i>	
<b>Self-Categorization Theory with 3D Emotional Model for Chatbot Emotional Support Systems .....</b>	<b>267</b>
<i>Akihiro Yorita, Mario Radke, Matthias Rättsch, Naoyuki Kubota</i>	
<b>Java Single vs. Platform vs. Virtual Threads Runtime Performance Assessment in the Context of Key Class Detection .....</b>	<b>273</b>
<i>Ciprian-Bogdan Chirila, Ioana Sora</i>	
<b>A Review of the Weaponization of IoT: Security Threats and Countermeasures.....</b>	<b>279</b>
<i>Marek Kulbacki, Zenon Chaczko, Sophie Barton, Peter Wajs-Chaczko, Jan Nikodem, Jerzy W. Rozenblit, Ryszard Klempous, Atsushi Ito, Michał Kulbacki</i>	
<b>Improving the Tracking Precision of a Robust Sliding Mode Controller using Steffensen's Convergence Accelerator Strategy .....</b>	<b>285</b>
<i>Awudu Atinga, Krisztián Kósi, József K. Tar</i>	
<b>Pie: A General-Purpose Code Editor Focused on Simplicity.....</b>	<b>291</b>
<i>Mario-Mihai Mateas, Cosmin Marsavina</i>	
<b>Machine Learning Used in Cyber Security.....</b>	<b>297</b>
<i>Nagy Attila, Ács Szilvia, Horváth-Kiss Anikó, Fregan Beatrix, Rajnai Zoltán</i>	
<b>An Implementation for Secure Data Deduplication on End-to-End Encrypted Documents .....</b>	<b>303</b>
<i>Toraş-Mihnea Jipianu, Iulian Aciobăniţei</i>	
<b>Password Usage among Users of Smart Devices in Hungary and Serbia.....</b>	<b>309</b>
<i>Dorottya Mandic, Gábor Kiss, Zoltán Rajnai</i>	
<b>Gamification, GenAI and Reinforcement Learning as Motivational Assets in Performance Sports .....</b>	<b>315</b>
<i>Attila Biró</i>	
<b>Activity Recognition Based on Accelerometer Data with Enhanced ROCKET Algorithm .....</b>	<b>321</b>
<i>Krisztian Buza</i>	
<b>Artificial Neural Networks-based Cell Counting Techniques Using Microscopic Images: A Review .....</b>	<b>327</b>
<i>Vivien Patak völgyi, Levente Kovács, Dániel András Drexler</i>	
<b>Integrating Expert Knowledge into Fuzzy Reinforcement Learning.....</b>	<b>333</b>
<i>Tamás Tompa, Szilveszter Kovács</i>	
<b>Noise Reduction with Wavelet Transform for Clustering Time Series of Tumor Volumes .....</b>	<b>339</b>
<i>Lilla Kisbenedek, Melánia Puskás, Borbála Gergics, Levente Kovács, Dániel András Drexler</i>	
<b>A Review of Multi-Objective Optimization Algorithms in the Field of Chemotherapy Optimization .....</b>	<b>345</b>
<i>Martin Ferenc Dömény, Melánia Puskás, Levente Kovács, Dániel András Drexler</i>	
<b>Safe Process State Upgrades through Static Analysis .....</b>	<b>351</b>
<i>Daniel Ferenczi, Melinda Tóth</i>	
<b>Analysis of Optimization Task Running Results on DWave and IBM Quantum Computers.....</b>	<b>357</b>
<i>Kornélia Sára Szatmári</i>	
<b>DAnke - An Application for Promoting a Healthy Lifestyle using Gamification and Blockchain .....</b>	<b>365</b>
<i>George Andronache, Iulian Aciobăniţei</i>	
<b>Implemented University Practical Course for 5G Stand Alone System with Augmented Reality .....</b>	<b>371</b>
<i>Márk Tamás Baross, András Németh, Balázs Gábor Szatmári, Tibor Ágoston, Péter János Varga</i>	

<b>A Preliminary Analysis of E-sports Game Reviews .....</b>	<b>377</b>
<i>Judit Szűcs, Tibor Guzsvinecz</i>	
<b>Enriching an Open-Source Access Management Platform using Multi-Factor Authentication.....</b>	<b>383</b>
<i>Bianca-Daniela Ionaşcu, Iulian Aciobăniţei</i>	
<b>Neural Network-Based Fault Learning using Artificial Intelligence and Kalman's Filter .....</b>	<b>389</b>
<i>Marek Bobček, Zsolt Čonka, Judith Palfy</i>	
<b>AI-based Text to Scene Generation as part of a Pandemic Compliant Infrastructure.....</b>	<b>395</b>
<i>Atlanta Choudhury, Kandarpa Kumar Sarma, Nikos Mastorakis</i>	
<b>Electronic Rotor Speed Control for a Sustainable Aviation Fuel Pump Test Bench.....</b>	<b>399</b>
<i>Károly Tamás Beneda, Bendegúz Balázs Bánfi</i>	
<b>Mindset-Shaping Solutions with Innovative IT and PM Technologies in Higher Education .....</b>	<b>405</b>
<i>Mariann Váraljai, Enikő Nagy, Bálint Nagy, Zoltán Balogh, György Molnár</i>	
<b>Implementing Supplemental Fuel System for Testing Sustainable Aviation Fuel on TKT-1 Micro Turbojet Engine .....</b>	<b>411</b>
<i>Mhd Bashar Al Kazzaz, Károly Tamás Beneda</i>	
<b>Machine Learning Prediction of Gas Hydrates Phase Equilibrium in Porous Medium .....</b>	<b>417</b>
<i>Saeed Beheshtian, Sara Kishan Roodbari, Hamzeh Ghorbani, Mohamadreza Azodinia, Mohamed Mudabbir</i>	
<b>Machine Learning-assisted Approach for Optimizing Step Size of Hill Climbing Algorithm .....</b>	<b>425</b>
<i>Sándor Szénási, Gábor Légrádi, Balázs Vígh</i>	
<b>Exploitation of Thick Client Application Vulnerabilities and a Synopsis of Mitigation .....</b>	<b>431</b>
<i>Jean Rosemond Dora, Ladislav Hluchy</i>	
<b>Applying NeuralODE-based Cardiovascular Model Identification for Experimental Data Analysis .....</b>	<b>437</b>
<i>Ákos Antal, Bálint Szabó, Ákos Szlávecz, Katalin Kovács, J. Geoffrey Chase, Balázs Benyó</i>	
<b>Digital Medical Devices in Infection Prevention and Control .....</b>	<b>443</b>
<i>Száva Bánsághi, László Gulácsi, Márta Péntek, Tamás Haidegger,</i>	
<b>Enhancing Reliability in Induction Machines: A Focus on Stator Inter-Turn Fault Diagnosis .....</b>	<b>449</b>
<i>Krish K Raj, Jiuta Tamata, Liliti Waisale, Mansour H Assaf, Voicu Groza, Rahul R Kumar</i>	
<b>Electric Boat Online Battery Fault Detection and Identification .....</b>	<b>455</b>
<i>Zoltán Farkas, Viktor Vass, György Györök</i>	
<b>Visualizing the COVID-19 Pandemic: Retrospective Insights and Implications for Public Health Strategies .....</b>	<b>461</b>
<i>Stefania-Mihaela Firiza, Alfred-Marius Scornea, and Alexandru Topirceanu</i>	
<b>Motion Planning of Tree Fruit Robot Picker in Presence of Obstacles Using Heuristic Approach .....</b>	<b>467</b>
<i>Aleksandar Rodić, Jelena Kljajić</i>	
<b>Automatic System for Learning the Process of Solving Rubik's Cube .....</b>	<b>473</b>
<i>Lucian Şoşdean, Loredana Stanciu, Adriana Albu</i>	
<b>Adaptive Control Lyapunov Function-based Controller Using Fixed Point Iteration .....</b>	<b>479</b>
<i>Massimo Stefanoni, Dominik Csik, Peter Sarcevic, Ákos Odry, József K. Tar</i>	
<b>Tissue Block and Digital Slide Registration Method for Microscopic Samples .....</b>	<b>485</b>
<i>Róbert Paulik, Miklós Kozlovsky, Béla Molnár</i>	
<b>Experiments with a One Parameter Computed Torque Position Control Method Using a PLC and a Simple Linear Actuator .....</b>	<b>491</b>
<i>Árpád Varga, János Fricz, Zoltán Braun</i>	
<b>Evaluating the Use of ChatGPT by University and High School Students .....</b>	<b>497</b>
<i>Judit Sörfőző Szügyi, Edit Szügyi, Márta Takács,</i>	
<b>Development of Smart Electromechanical Clock .....</b>	<b>503</b>
<i>Balázs Vígh, Sándor Szénási</i>	
<b>A New Mutation Operator for Tabu Search Algorithm for Continuous Optimization .....</b>	<b>509</b>
<i>Masoumeh Vali, Kovacs Levente, Amir H Gandomi,</i>	

<b>NB-IoT Based IoT Gateway Reference Design for Energy Metering .....</b>	<b>515</b>
<i>József Kopják, István Szűcs</i>	
<b>A Comprehensive Statistical Assessment of the Maximum Power Point of Dye-Sensitized Solar Cell .....</b>	<b>519</b>
<i>Zoltan Varga, Ervin Racz</i>	
<b>Digital Defense: Investigating Human Aspects of Cybersecurity .....</b>	<b>525</b>
<i>Norbert Samson, Andrea Tick</i>	
<b>Literature Review on Security of Personal Information in Electronic Payments .....</b>	<b>533</b>
<i>Yuqing Guan, Andrea Tick</i>	
<b>Navigating Children’s Cybersecurity Landscape: Understanding the Impact of Cyberbullying, Online Harrasment and Identity Theft on Children .....</b>	<b>541</b>
<i>Szandra Anna Laczi, Valéria Póser</i>	
<b>Beyond Static Defense: Dynamic Honeypots for Proactive Threat Engagement .....</b>	<b>547</b>
<i>Dániel László Hegedűs, Ádám Balogh, Máté Érsok, László Erdődi, Lajos Olcsák, Anna Bánáti</i>	
<b>Signal Detection in Three-Dimensional Confocal Microscopy Images through Deep Learning .....</b>	<b>553</b>
<i>Róbert Paulik, Miklós Kozlovsky, Béla Molnár</i>	
<b>Mobile Application Development for Diabetes Patient .....</b>	<b>559</b>
<i>Csaba Potyok, Barbara Simon, Ádám Hartveg, Máté Siket, Lehel Dénes-Fazakas, György Eigner, Milán Balázs, Levente Kovács and László Szilágyi</i>	
<b>Review of Reinforcement Learning-based Control Algorithms in Artificial Pancreas Systems for Diabetes Mellitus Management .....</b>	<b>565</b>
<i>Lehel Dénes-Fazakas, Győző Dénes Fazakas, György Eigner, Levente Kovács and László Szilágyi</i>	
<b>Web Application Development for Diabetes Patients.....</b>	<b>573</b>
<i>Miklos Nagy, Barbara Simon, László Szász, Máté Siket, Lehel Dénes-Fazakas, György Eigner, Patrik Péter Süli, Levente Kovács and László Szilágyi</i>	
<b>Mechanical Brush Commutation Motor Drive Solution for Higher Education .....</b>	<b>581</b>
<i>Mark Wendler, József Kopják</i>	
<b>Mapping IQRF Wireless Networks Using Relative Addressing Technique .....</b>	<b>587</b>
<i>Gergely Sebestyén, József Kopják</i>	
<b>Hamiltonian-Based Control Approach with Pendulum Application .....</b>	<b>593</b>
<i>Claudiu Pozna, Radu-Emil Precup, Aron Ballagi</i>	
<b>A Real Time Self-Generating Control for AI Platforms .....</b>	<b>599</b>
<i>Mircea Trifan, Bogdan Ionescu, Dan Ionescu</i>	
<b>Authors Index.....</b>	<b>605</b>