

2025 15th International Conference on Advanced Computer Information Technologies (ACIT 2025)

**Sibenik, Croatia
17-19 September 2025**

Pages 1-536



**IEEE Catalog Number: CFP25S92-POD
ISBN: 979-8-3315-9545-6**

**Copyright © 2025 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: | CFP25S92-POD |
| ISBN (Print-On-Demand): | 979-8-3315-9545-6 |
| ISBN (Online): | 979-8-3315-9544-9 |
| ISSN: | 2770-5218 |

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

CONTENTS

SECTION 1

Computational Intelligence and Mathematical Modeling

| | |
|---|-----------|
| Web Application for Transport Infrastructure Simulation | 1 |
| Alexander Firsov, Mykola Mormul, Yulia Ulyanovskaya, Alexander Shchytov, Dmytro Shchytov | |
| A Methodological Framework for Quantifying Sensitivity of Prediction Performance to Conceptual Uncertainty: The Case of Churn Window Size..... | 9 |
| Ana Perišić, Ivana Beljo | |
| Spatial Analogue of the Conformal Mapping Method for Identifying the Coordinates of Impulse Point Sources | 13 |
| Andrii Bomba, Mykhailo Boichura | |
| Modeling Processes in Biogas Plants Based on an Ontological Approach | 17 |
| Andriy Melnyk, Mykhailo Sopiha, Yaroslav Voytyuk, Iryna Spivak, Svitlana Krepych, Vadym Nadvynychnyy | |
| Embracing SwiftData: A Streamlined Paradigm for Persistence in Native iOS Applications | 22 |
| Andriy Melnyk, Roman Vovk, Taras Sitkar, Arkadiusz Banasik, Piotr Pikiewicz, Aleksandra Czupryna-Nowak | |
| Research into the Effectiveness of Using the Stochastic Optimization Method in Constructing Discrete Dynamic Models..... | 28 |
| Bohdan Melnyk, Yuriy Kozak, Nataliya Melnyk, Stepan Trokhaniak, Ivan Dyyak, Mykola Yatsyshyn | |
| Reinforcement Learning for Economically Optimized Churn Management: A Contextual Bandit Framework | 35 |
| Halyna Melnyk, Vasyl Melnyk | |
| Mathematical Modeling and Simulation of Electrode Skewing in Capacitive Proximity Sensor..... | 42 |
| Ievgen Zaitsev, Viktoriia Bereznychenko, Sergy Zakusilo | |
| Adaptive Neuro-Fuzzy Inference System (ANFIS) for Control of Loading Logic in Parcel Sorting Centers | 46 |
| Igor Grebennik, Oleksii Kovalenko | |
| Modeling Epidemiological Processes using Reinforcement Learning Methods | 51 |
| Ihor Kosovych, Igor Cherevko, Dmytro Shkilniuk | |
| Using the Delphi Method for Expert Evaluation of Digital Images by Lightness | 55 |
| Iryna Chebotarova, Ruslan Chebotarov, Volodymyr Manakov, Oleksandr Vovk, Mariia Mendieliava, Tetiana Trunova | |
| Brightness Differences Matrix Comparison Method for Region of Interest Tracking..... | 59 |
| Kostiantyn Dergachov, Eugene Ovdiyuk | |
| Reinforcement Learning Control of Markov Chains Based on Stochastic Gradient Descent | 66 |
| Leonid Lyubchyk, Olena Akhiezer, Nataliia Protsai | |
| Enhancement of the Logic-Probabilistic Trajectory Modelling Method for Calculating the Probability of Pairwise Connectivity in an Electronic Ground Surveillance Complex | 70 |
| Leonid Ozirkovskyy, Bohdan Volochiy, Nazar Prymak, Yurii Zhuk | |
| Comparative Analysis of Handgun Detection Methods for Aviation Security Provision..... | 75 |
| Maksym Zaliskyi, Roman Odarchenko, Zarina Poberezhna, Lidiia Tereshchenko, Yuliia Petrova, Alina Osipchuk | |

| | |
|---|------------|
| Mathematical Model of Effective Thermal Parameters under Dynamic Thermal Fields in Photothermal Experiments | 79 |
| Mykhailo Kasianchuk, Pavlo Basisty, Iryna Humovska, Serhii Mokhun, Pavlo Chopyk, Iryna Belova | |
| Modeling the Impact of EM Field Radiation on the Human Body in the Range of MHz Frequencies..... | 83 |
| Mykhaylo Andriychuk, Taras Nazarovets | |
| Simulation of Acute Hepatitis A in Ukraine Using LSTM Deep Learning Model | 88 |
| Mykola Butkevych, Dmytro Chumachenko | |
| Modeling of the Efficiency of Electricity Generation Processes by a Solar Power Plant Research Using the Example of a 570 W Model..... | 92 |
| Mykola Dyvak, Nataliia Petryshyn, Oleksandr Kindzerskyi, Oleksandr Papa, Yuriy Franko, Oleh Opalko | |
| Implementation of the Structural Identification for Interval Models Based on the Behavioral Model of an Artificial Bee Colony..... | 98 |
| Mykola Dyvak, Oleksandr Kindzerskyi | |
| Semi-Physical Modeling of Drone Swarm Control Processes | 102 |
| Mykola Suslo, Volodymyr Kazymyr, Petro Oleksiienko, Dmytro Kagitin | |
| Demographic Shock of War: Population Forecasting for Ukraine with LSTM Models under Fertility and Migration Disruption | 109 |
| Nataliia Dziubanovska, Zoriana Pushkar, Volodymyr Nemeryshyn, Liudmyla Sydoruk, Lyudmyla Honchar, Anna Ivanova | |
| Modeling of Diagnostic and Decision-Making Systems Based on the Combination of Fuzzy Logic and Dempster–Shafer Theory | 114 |
| Nataliia Komleva, Svetlana Antoshchuk | |
| Numerical Analysis Of The Relationship Between Gas Filtration Model Parameters In Underground Gas Storage | 118 |
| Nazariy Lopuh, Myroslav Prytula, Zoia Prytula, Yaroslav Pyanylo, Nazar Prytula, Olga Khymko | |
| Modelling and Biomechanical Smart Control of Human Arm Model. Application to Athletes Performance Prediction | 123 |
| Oksana Zamurueva, Vasyl Sakhniuk, Jacek Wąsik, Anatolii Tsos, Andrii Ivanovskyi, Andriy Flyak | |
| Utilizing Data-Level Parallelism to Improve the Efficiency of Numerical Simulation of Thermal Modes in Technological Systems | 131 |
| Oleg Zhulkovskyi, Inna Zhulkovska, Hlib Vokhmianin, Yuliia Ulianovska, Mikhail Kashcheev, Artem Pokhvalityi | |
| Mathematical Modeling of Residual Life Assessment for Structural Elements Based on Acoustic Emission Signal Parameters | 135 |
| Oleksandr Andreykiv, Iryna Dolinska, Taras Skalsky, Olha Peliushkevych, Yaroslav Sobko, Maksym Romaniuk | |
| Risk-Aware Modeling of Control Loss Using Reinforcement Learning and Partially Observable Markov Decision Process Models..... | 139 |
| Oleksandr Chaban, Volodymyr Hladun | |
| An Object-Based Classification Model and Method for Measuring the Quality of Student Knowledge in Higher Education | 143 |
| Olena Syrotkina, Ziad Kobti, Mykhailo Aleksieiev, Dmytro Moroz, Iryna Udovyk, Olha Shevtsova | |
| Information Technology for Stability Analysis of Complex Nonlinear Dynamic Systems Using the Example of a Biological Object | 150 |

Olga Ivanets, Vladyslav Shlykov, Rimvidas Khrashchevskiy, Oleksii Horskyi, Maryna Arkhyrei, Nataliia Bilak

| | |
|--|------------|
| Mathematical Modelling of Household Financial Behaviour in the Context of Modern Digital Technologies | 154 |
| Olga Kyrylenko, Svitlana Savchuk, Yurii Semenenko, Natalia Kolomyichuk, Anatoliy Sydorчук | |
| Random Forest Model for Evaluating Recidivism Risk in Women..... | 159 |
| Olha Kovalchuk, Serhiy Banakh, Ludmila Babala, Roman Ivanytskyy, Solomiia Chopyk, Olha Fedchyshyn | |
| Mathematical Modelling of System for Platforms Stabilization Based on Accelerometer Data..... | 163 |
| Olha Sushchenko, Yurii Bezkorovainyi | |
| Rhythm-Adaptive Processing of Electrical Cardiac Signals under Conditions of Patient Physical Load | 169 |
| Roman Butsiy, Serhii Lupenko | |
| Correlation-Based Methods for Tracking Moving Objects Using UAS Systems | 174 |
| Roman Krepych, Mykola Dyvak, Svitlana Krepych, Iryna Spivak | |
| Toward AI-assisted Framework for Agile Requirement Knowledge Management: Five-Stage Generative LLM Approach | 180 |
| Roman Kruk, Nataliia Zhukovska | |
| Vegetation Indices Dynamics Model in GIS Based on an Adaptive Predictive Method and the Mono System | 186 |
| Roman Pasichnyk, Ludmila Babala, Mykhaylo Machulyak | |
| A Correlation-Based Analysis of the Spectral Composition of Vibrations for a Gas-Turbine Engine with Unbalanced Rotor | 192 |
| Roman Yuzefovych, Ihor Javorskyj, Yury Torba, Oleh Lychak, Yevgen Sbrodov, Bohdan Komarnytskyi | |
| Optimizer Based on Sequential Splitting Algorithm I for Training a Multilayer Neural Network | 196 |
| Serhiy Sveleba, Ivan Katerynychuk, Ivan Kunyo, Volodymyr Brygilevych | |
| Optimal Neural Network Control of Helicopter Turboshaft Engines Gas Temperature to Compensate Dynamic Properties of Temperature Sensor..... | 200 |
| Serhii Vladov, Andrii Dankiv, Svitlana Sachenko, Agnieszka Molga, Nataliia Vladova, Oleksandr Muzychuk | |
| About Modeling Intraparticle Diffusion in Porous Catalysts Using Fractional Differential Equations | 206 |
| Viktor Zhukovskyy, Nataliia Zhukovska, Denys Hrabovskyi | |
| Using Dynamic Bayesian Methods in the Task of Financing Educational Institutions | 212 |
| Volodymyr Lytvynenko, Mariia Voronenko, Viktor Moshynskiy, Nataliia Savina, Volodymyr Manzhula, Saule Smailova | |
| Probabilistic Modeling of Delivery Performance in Uncertain Supply Chains Using the Monte Carlo Method | 217 |
| Volodymyr Lytvynenko, Svetlana Antoshchuk, Volodymyr Manzhula, Mariia Voronenko, Irina Lurie, Andrew Mrykhin | |
| Methods of Analysis of Integrity of Gas Facilities..... | 224 |
| Yaroslav Pyanylo, Nazar Prytula, Nazariy Lopuh, Myroslav Prytula, Zoia Prytula, Olga Khymko | |
| Modeling of Mass Transfer Process in Biological Tissues Considering Deformation..... | 228 |

| | |
|---|------------|
| Yaroslav Pyanylo, Nazariy Lopuh, Anna Lyantse, Halyna Pyanylo | |
| QSPR Prediction of Aqueous Solubility of Organic Compounds: Active Pharmaceutical Ingredients and Excipients | 232 |
| Yaroslava Pushkarova, Raim Izmailov | |
| Adaptive Online Bagging using Double Neo-fuzzy Neuron | 236 |
| Yevgeniy Bodyanskiy, Sergiy Popov, Iryna Pliss, Olha Chala, Pavlo Mulesa | |
| Constructing a Metamodel of Inductive Modeling Algorithms | 241 |
| Yevheniya Savchenko-Syniakova, Volodymyr Stepashko | |

SECTION 2

Information in Economy and Management

| | |
|---|------------|
| Digital Transformation and Data-Driven Management in a Regional Seafood Supply Chain: A Case Study in Kerala | 245 |
| Ali Thasni, Berislav Andrić, Obil Caneshious | |
| Digital Transformation Models Public Finances in Ukraine..... | 251 |
| Andriy Krysovaty | |
| Human-Computer Interaction in Decision Support Systems for Mining Operations | 255 |
| Artur Skoczylas, Artur Rot | |
| AI Office and Automation Software: Cross Country Survey on Utilization in Logistics | 261 |
| Bernhard Axmann, Biljana Cvetić, Vanina Macowski Durski Silva, Maja Trstenjak | |
| AI-Driven Analytical Module for Evaluating and Enhancing Public Spending Efficiency on Corruption Prevention | 267 |
| Bohdan Malyniak, Andriy Melnyk, Andrii Derlytsia, Jurij Klapkiv, Yaroslav Kulinich, Roksolana Malyniak | |
| Contradictions and Inconsistencies in Regulatory Documents – A Qualitative Assessment from Practice | 273 |
| Gerrit Schumann | |
| Assessment of the Environmental Component in the Economic Security System of the Region..... | 283 |
| Inna Chaikovska, Pavlo Hryhoruk, Nila Khrushch, Svitlana Grygoruk, Taras Tkach, Maksym Chaikovskyy | |
| Synergy of Information Technology and Management: Digital Strategies for Improving Management Efficiency | 287 |
| Inna Sysoieva, Andriy Pukas, Natalia Dobizha, Borys Pohrishchuk, Oleh Pohrishchuk, Sergiy Nadvynychnyy | |
| Factor-Oriented Digital Model for Optimizing Biomass Supply Chains in the Circular Bioeconomy | 293 |
| Iryna Belova, Oleksiy Yaroshchuk, Vasyl Brych, Olena Borysiak, Bohdan Brych, Nina Petrukha | |
| Graph Analysis of Ukrainian Airport Network Change..... | 298 |
| Ivan Ostroumov, Nataliia Kuzmenko | |
| The Use of Artificial Intelligence Technologies for Optimizing Business Processes and Enhancing Human Capital Productivity in the Agricultural Sector..... | 302 |
| Lesia Buiak, Mykola Shynkaryk, Iryna Fedorovych, Kateryna Pryshliak, Yurii Semenenko, Oleksandr Bilobrovko | |

| | |
|--|------------|
| Influence of Artificial Intelligence Systems on Quality of Working Life - Current Aspects..... | 308 |
| Magdalena Parcheva | |
| Human Capital as a Foundation for the Effective Institutionalization of Inclusive Higher Education in Ukraine..... | 313 |
| Marian Tripak, Yaroslava Toporivska, Lavruk Oleksandr, Oleh Vatslavskiy, Iurii Shcherbiak, Mariya Mudrak | |
| The Institutional Impulse of EU Candidate Status: An Event-Study Analysis of WGI..... | 320 |
| Nataliia Dziubanovska, Vadym Maslii | |
| Information Modeling in Construction Management: A Cluster-Based Accounting Approach..... | 324 |
| Nataliia Pochynok, Anton Lupiichuk | |
| Transformation of Financial Risks in the Agricultural Sector in the Context of Digitalization..... | 330 |
| Oksana Desyatnyuk, Olena Ptashchenko | |
| Information Insights into Effective Monetary Influence on the Economy as a Basis for Sustainable Development..... | 334 |
| Oleksandr Dziubliuk, Volodymyr Manzhula, Mykola Stetsko, Iryna Maksymova, Nina Petrukha, Olena Sydorovych | |
| Implementation of International Marketing Tools in the Field of High Technologies..... | 340 |
| Olena Ptashchenko, Nataliia Reznikova, Andrii Kotsur, Serhiy Kyrylenko, Myhailo Grod | |
| Computer-mathematical Modeling of the Attractiveness of the Higher Education System..... | 344 |
| Olena Rayevnyeva, Silvia Matusova, Olha Brovko | |
| Diagnostics of the Potential of Ukrainian Enterprises in Wartime and Management of their Activity on the Market..... | 353 |
| Olga Gonchar, Vasyl Brych, Serhii Moroz, Liudmyla Bohatchyk, Volodymyr Moroz | |
| ESG-Oriented Accounting Systems: Integrating Sustainability Metrics into Enterprise Reporting Models..... | 359 |
| Ruslan Brukhanskyi, Oleksiy Yaroshchuk, Vasyl Mazuryk | |
| Application of Modern Python-type Information Systems in the Modeling of Ukrainian Agricultural Enterprises by Clusterization Method..... | 365 |
| Serhii Spivak, Serhii Harmatii, Nataliya Harmatii, Bohdan Seniv, Ievgen Bondarenko | |
| Analysis of the Impact of Digital Transformation on Territorial Communities and Prospects for Sustainable Development..... | 369 |
| Serhii Spivak, Viktor Rusin, Andrii Tymkiv, Tetyana Korolyuk | |
| Analytical Toolkit for Monitoring the Assortment Policy of Marketplaces based on Omnichannel Approach and CRM Technologies..... | 373 |
| Sviatoslav Kniaz, Vasyl Brych, Nelli Heorhiadi, Sergey Shevchenko, Oksana Sterniuk, Ruslan Skrynkovskyy | |
| Information and Analytical Support for Adapting Financial Management in E-Commerce Enterprises to Market Changes..... | 377 |
| Sviatoslav Kniaz, Vasyl Brych, Nelli Heorhiadi, Oleksii Fedorchak, Yaroslava Moskvyyak, Yuriy Tyrkalo | |
| Assessment and Clusterization of Socio-Economic Sustainability of European Countries Based on a Composite Index..... | 381 |
| Svitlana Pryima, Roman Vovk, Volodymyr Vovk, Oksana Huhul, Bohdan Seniv, Volodymyr Korol | |
| Software Solution for Enhancing Customer Orientation and Improving Management Efficiency in Healthcare Institutions..... | 388 |

| | |
|--|------------|
| Taras Shynkaryk, Yurii Semenenko | |
| Digital and Innovation Development in EU Countries: Influencing Factors and Trends | 392 |
| Tetiana Polozova, Iryna Sheiko, Serhii Stepanenko, Stanislav Ponomarov, Nataliia Ihumentseva, Olena Peresada | |
| Predicting the Impact of Investment in the Production of Dual-Use Goods on Economic Growth Using a Neural Network..... | 396 |
| Tetiana Zatonatska, Alim Syzov, Serhiy Dyachenko, Oleksandr Ostapenko, Oles Koval | |
| Leveraging Artificial Intelligence in Public Procurement of Dual-Use Goods | 407 |
| Tetiana Zatonatska, Oleksandr Artiushenko, Olena Liashenko, Alim Syzov, Serhiy Dyachenko, Kira Horiacheva | |
| Information Technologies of Public Governance in the Context of Digitalization and Demographic Challenges..... | 413 |
| Tetiana Zheliuk, Dmytro Shushpanov, Alina Zhukovska, Oleksandr Brechko, Viktor Ostroverkhov, Vadym Posheliuzhnyu | |
| Impact of Digitalization on the Tax System: New Approaches to Digital Taxation and Reporting | 420 |
| Tetyana Korolyuk, Serhii Spivak, Volodymyr Uhryn, Andriy Kizyma | |
| Mathematical Model of Investment Decision-Making under Uncertainty | 425 |
| Viacheslav Dzhezdzhula, Iryna Yepifanova | |
| Diagnostics of Business Activity and Stability under Digital Transformation | 430 |
| Vita Semaniuk, Svitlana Zhukevich, Andrii Papinko, Natalia Zhuk, Ruslan Brukhanskyi, Volodymyr Shpak | |
| Fuzzy Analysis of Customer Loyalty of a Pharmacy Network as a Method for Making Marketing Decisions | 436 |
| Yuliia Kravchuk, Vasyl Pryimak, Olga Holubnyk, Andrii Hrytsaiko | |
| Assessment of Information Support for Technological Renewal Management at Enterprises | 443 |
| Yuliya Voytsekhovska, Olexandr Yemelyanov, Oleh Karyy, Viktoriya Voytsekhovska | |
| Business Model Management Based on Information and Communication Technologies in the Economic Security System of Aviation Enterprises | 449 |
| Zarina Poberezhna, Maksym Zaliskyi | |
| Radio Frequency Identification of Goods in Self-Service Trade Accounting | 453 |
| Zenovii-Mykhailo Zadorozhnyi, Oksana Desyatnyuk, Volodymyr Muravskyi, Oleg Shevchuk, Vasyl Muravskyi | |
| Smart Energy Meters in the Digitalization of Accounting and Security Control..... | 457 |
| Zenovii-Mykhailo Zadorozhnyi, Volodymyr Muravskyi, Nadiia Khoma, Iryna Nazarova, Vasyl Muravskyi | |

SECTION 3 Cyber Security

| | |
|--|------------|
| Combined Asymmetric Encryption Algorithm with Error Correction | 461 |
| Alina Davletova, Vasyl Yatskiv, Stepan Ivasiev, Taras Tsavolyk, Ivan Albanskiy | |
| Method of Quantum Key Distribution Based on a Modified BB84 Protocol Using the Residue Number System..... | 466 |
| Anastasiya Hnatiuk, Mykhailo Kasianchuk, Ruslan Shevchuk, Lidiia Tymoshenko | |

| | |
|---|------------|
| Construction of Perfect Form of Residue Number System for Gaussian Integers to Asymmetric Cryptosystems | 471 |
| Andrii Aliluiko, Mykhailo Kasianchuk, Nataliia Dziubanovska, Mykola Netrobiak | |
| An IP Telephony Security System based on Methods of Intelligent Traffic Analysis..... | 476 |
| Andriy Melnyk, Ruslan Shevchuk, Ihor Romanets, Serhiy Voznyak, Oleh Kvasnytsia, Oleksandr Yashchuk | |
| Enhancing European Cyber Forensics: A Computational Intelligence Approach for Detecting Illicit Money Flows..... | 481 |
| Bogdan Adamyk, Vladlena Benson, Oksana Adamyk, Ruslan Shevchuk, Haider Al-Khateeb, Bożena Fraczek | |
| Turkish Email Phishing Detection Using Fine Tuned Large Language Models | 487 |
| Egemen Gülsertiler, Deniz Egemen Keneş, Şerif Bahtiyar | |
| Email Augmentation: A Comparison of Fine-tuned Small Language Models | 491 |
| Francisco Cardoso, Eva Maia, Isabel Praça | |
| GEN-TPRM: An OSINT-Driven Risk Assessment Model for Third-Party Organizations | 497 |
| Harika Asılı, Şerif Bahtiyar | |
| A Symmetric Cryptoalgorithm in a Polynomial Hierarchical Residual Number System | 501 |
| Ihor Yakymenk, Mykhailo Kasianchuk, Olesia Martyniuk, Serhii Martyniuk, Andrii Martyniuk, Yurii Yakymenko | |
| Stochastic SIR Model for Computer Worm Propagation..... | 505 |
| Ihor Zhuravel, Serhiy Semenyuk, Tetiana Korobeinikova, Oleksandr Romanyuk, Oleksandr Reshetnik, Volodymyr Maydanyuk | |
| Comparative Analysis of EU and Ukrainian Cybersecurity Legal Framework: Joint Impact on Global Security Policy | 509 |
| Ljubo Runjić, Mario Dominik Burić, Ivan Livaja | |
| A Method for Classifying Polymorphic Viruses Based on Fuzzy Logical Inference..... | 516 |
| Maksym Chaikovskyy, Oleg Savenko, Sergii Lysenko, Vladyslav Ivanyna, Inna Chaikovska, Bohdan Savenko | |
| HSM-Secured Hierarchical Deterministic Wallets for Cryptocurrency Custody..... | 522 |
| Mert Yıldız, Şerif Bahtiyar | |
| Affine Ciphers Based on Quadratic and Cubic Functions..... | 528 |
| Mykhailo Kasianchuk, Mykhailo HOLEMBIOVSKYY, Oleh Momotiuk, Oleksiy Yaroshchuk, Inna Shylinska, Oksana Karabin | |
| Implementing Post-Quantum Cyber Security in Financial Systems | 532 |
| Nadav Voloch, Noa Voloch - Bloch | |
| Embedding a Digital Watermark into an Image Using a Hamming Code and a Solver of the Square Root of a Prime Number | 537 |
| Nataliia Kukharska, Andrii Lagun, Serhiy Semenyuk, Orest Polotai, Oles Hospodarsky, Mykhailo Ozhha | |
| Rethinking Phishing Detection: How Dataset Quality Affects Model Generalization..... | 542 |
| Pedro Afonso, Eva Maia, Ivone Amorim, Isabel Praça | |
| Generating False Handshakes: A Modern Honey-pot Strategy for Wi-Fi Network Protection | 548 |
| Roman Banakh, Taras Popovych | |
| Post-Quantum Security Enhancements for the TRISA Framework: A Technical Perspective..... | 553 |
| Ruslan Shevchuk, Bogdan Adamyk, Vladlena Benson | |

| | |
|--|------------|
| QR Code Scanner with Anti-Qrishing Real-Time Technique | 559 |
| Ruslan Shevchuk, Patryk Ihas | |
| A Weighted Expert-Based Method for Asset Criticality Assessment in Cyber Risk Evaluation..... | 565 |
| Tetiana Korobeinikova, Bohdan Shapovalov, Ihor Zhuravel, Oleksandr Romanyuk, Roman Chekhmestruk, Anatoliy Snigur | |
| Combined ML Approaches for Automated Detection of Server Attack | 569 |
| Tetiana Korobeinikova, Nazar Kravchuk, Serhiy Semenyuk, Sergey Romanyuk, Oleksandr Romanyuk, Oleksandr Reyda | |
| The McEliece Cryptosystem Based on the Redundant Residue Number System | 573 |
| Vasyl Yatskiv, Nataliia Yatskiv, Stepan Ivasiev, Serhii Kulyna, Taras Tsavolyk, Illya Yatskiv | |
| Selected Aspects of Law Enforcement Investigations into the Modus Operandi of Potential Offenses Involving Ethereum Smart Contracts | 578 |
| Vitalii Nosov, Oleksandr Manzhai, Svitlana Luchykh, Vasyl Luchykh | |
| Automotive Hacking: Security Risks in Connected and Autonomous Vehicles | 584 |
| Zlatan Morić, Dominik Matahlija, Ana Kapulica | |

SECTION 4

Specialized Information and Computer Systems

| | |
|--|------------|
| The Evolution of the Data Engineer Role in Poland Over the Past Decade: Trends, Technologies, and Work Modes..... | 589 |
| Agnieszka Rosa, Artur Skoczylas, Wiesława Gryncewicz, Ryszard Zygała | |
| Crime Pattern Detection Utilizing Power BI Visualizations on the Microsoft Fabric Data Platform With the Public data.police.uk Dataset..... | 593 |
| Aleksandar Todosijević, Pavle Dakić, Tjaša Heričko, Živana Kljajić, Vladimir Todorović | |
| Generative AI-Assisted High-Level Design of Computing Devices: First Experience..... | 599 |
| Anatoliy Melnyk | |
| Specialized Computer Control System for Hybrid Power Supply of Small Electric-Powered Vessel | 605 |
| Andrii Topalov, Andrii Makhnov, Pavlo Ihnatenko, Victoria Lukashova, Victoria Leontieva, Natalia Kondratieva | |
| Features of Service-Oriented Architecture Implementation in the System for Recurrent Laryngeal Nerve Identification | 609 |
| Andriy Pukas, Iryna Voytyuk, Volodymyr Dmytriv, Vitalii Smal, Andrii Onyshchuk, Serhii Tyran | |
| Analysis of the Interaction of Channels Based on Text Content and Time Dimension | 613 |
| Artem Kalancha, Dmytro Uhryn | |
| Web-based User Interface for Unmanned Aerial Vehicle | 619 |
| Asad Saeed Khan | |
| Enhancing Cancer Patient Flow with AI..... | 624 |
| Bartosz Szczęsny, Wiesława Gryncewicz | |
| Application of Docker Compose for Constructing the Infocommunication System for Online Processing of Astronomical Images | 629 |
| Emil Hadzhyiev, Sergii Khlamov, Andrii Frolov, Iryna Tabakova, Serhii Lytvynenko, Mariia Shypova | |
| Trend Visualization and Storage Optimization for Powerlifting Data on Oracle Database | 634 |

Erik Zemčík, Matej Zachveja, Michal Kvet

| | |
|---|------------|
| Applying Network and Cloud Solutions to Organize Data for Rapid Measurement of Toxic Element Concentrations in Water | 641 |
| Ihor Surovtsev, Volodymyr Stepashko, Yaroslav Antoniuk, Volodymyr Lyahov, Andrii Khanevych | |
| FPGA-based Implementation and Efficiency Analysis of a 5G Physical Channel..... | 645 |
| Ilya Pyatin, Juliy Boiko, Volodymyr Druzhynin, Oleksander Eromenko, Lesya Karpova | |
| Vehicle Navigation with Time Difference of Arrival Method in Hexagonal Hierarchical Spatial Index..... | 651 |
| Ivan Ostroumov | |
| Fundamentals and Classification of Additive and Subtractive-Additive Methods for Analog-to-Digital Conversion of Information in Control Systems..... | 655 |
| Lubomyr Petryshyn, Mykhailo Petryshyn | |
| Additive and Subtractive-Additive Methods for Analog-to-Digital Conversion of Information in Control Systems | 659 |
| Lubomyr Petryshyn, Mykhailo Petryshyn | |
| Software Development Kit for Integration of Environmental Data | 664 |
| Marius-Marian Dinu, Andreea-Mălina Stanciu, Anca-Daniela Ioniță | |
| Safety-Security Interaction in IoT | 669 |
| Mohammad Rezaul Karim, Sohag Kabir, Ci Lei, Raluca Lefticaru | |
| Enhancing the Efficiency of Software Development through Industry Knowledge..... | 673 |
| Mykhailo Khymchuk, Inna Sysoieva, Iryna Spivak, Andriy Pukas, Iryna Voytyuk, Andrii Onyshchuk | |
| Concept of Applying EMG for the Hardware and Software Complex Recurrent Laryngeal Nerve Identification during Thyroid Surgery | 678 |
| Mykola Dyvak, Volodymyr Tymets, Andriy Dyvak, Ihor Deikalo, Dmytro Osadchuk | |
| Increasing the Effectiveness of Neural Networks for Recurrent Laryngeal Nerve Identification by Signal Preprocessing..... | 683 |
| Mykola Dyvak, Volodymyr Tymets, Andriy Dyvak, Bohdan Kostyk, Serhii Tyran, Yurii Maslyiak | |
| Method and Algorithm for Web Content Analysis Based on Computer Vision for Contrast Evaluation..... | 688 |
| Mykola Pylypchuk, Natalia Porplytsya, Iryna Stasiv, Lyudmyla Honchar, Ivan-Stanislav Mazur, Taras Pavlyshyn | |
| The Internet of Things Vision: Applications and Challenges..... | 693 |
| Myroslava Bosovska, Marharyta Boiko, Nadiia Vedmid, Mariia Kulyk, Alla Okhrimenko | |
| The Method of Forecasting a Researcher's Project and Publication Activity Indicators Based on Interval Data Analysis | 701 |
| Oksana Desyatnyuk, Mykola Dyvak, Andriy Yushko, Uliana Koruts, Sergiy Nadvynychnyy, Viktor Ostroverkhov | |
| Advanced Timestamping: Synchronization and Consistency in Public Information Systems | 708 |
| Oleksandr Berezovskiy, Bohdan Melnyk, Grygoriy Zholtkevych, Nataliya Melnyk, Ruslan Avhustyn, Olha Potapchuk | |
| Information and GIS Technologies for Development of Regional Tourism in Post-war Ukraine: Concepts and Approaches..... | 713 |
| Oleksandr Bubyry, Yuliia Prasul, Natalia Bubyry | |
| A Machine Learning Approach to Regression Suite Optimization for Verification and Validation of Information Systems..... | 719 |

| | |
|---|------------|
| Oleksandr Nelipa, Nadiia Kalyta, Svitlana Ponomarova | |
| New Illumination Model for Rendering | 723 |
| Oleksandr Romanyuk, Yevhen Zavalniuk, Oksana Romanyuk, Sergii Kotlyk, Oleksii Bobko, Oleksandr Melnyk | |
| Permutation Code in Noise Presence Study | 728 |
| Orest Ivakhiv, Markiyan Nakonechnyi, Oleksandr Viter, Yurii Nakonechnyi, Rostyslav Deyneka | |
| Cloud Architecture for the Blurred Image Deconvolution in Astronomical CCD Frames..... | 735 |
| Sergii Khlamov, Emil Hadzhyiev, Dmytro Zhuzhniiev, Yuliia Teslenko, Andrii Frolov, Zhanna Deineko | |
| Automated Control of Milling Machine Parameters with Cloud Data Processing | 739 |
| Taras Humeniuk, Vadym Telehin, Pavlo Ihnatenko, Taras Styslo, Oksana Styslo, Serhii Havrylko | |
| A Web-Based Information System for Electronic Trading in Computer Equipment | 743 |
| Valentyna Pleskach, Illya Dmytrenko, Yaroslav Zhyluk | |
| Research on the Marginal Errors of Estimates of LFM Signal Parameters in the Receiving Channel of a Phantomization Radar | 749 |
| Volodymyr Pavlikov, Maksym Peretyatko, Pavlo Malashta, Eduard Tserne, Anatolii Popov, Denys Kolesnikov | |
| Radio Channel Design for Radio Pulse Parameters Estimation in Image Phantomization Radar | 753 |
| Volodymyr Pavlikov, Maksym Peretyatko, Pavlo Pozdniakov, Pavlo Malashta, Denys Kolesnikov, Eduard Tserne | |
| Digitization of Wells Geophysical Survey Results by Information and Software | 758 |
| Volodymyr Volovetskyi, Yulia Romanyshyn, Taras Romanyshyn, Vasyl Sheketa, Mykola Yatsyshyn, Oksana Laba | |
| Automated Goniometric Analysis System Based on Neural Networks | 762 |
| Yaroslav Tsapiv, Mykola Dyvak, Dariya Popovych, Andrii Havrylenko, Roman Tykhyi, Viktor Kasianchuk | |

SECTION 5 Artificial Intelligence and Cognitive Systems

| | |
|---|------------|
| Corn Disease Detection with Using Transfer Learning Deep Convolutional Network..... | 767 |
| Allen Nicole P. Bagaporo, Alvin Sarraga Alon, Leonard L. Alejandro, Charlene I. Vergara, Jesus Paguigan | |
| A GraphQL-based Interface for Secure and Efficient Querying of CSAF Documents..... | 773 |
| Andriy Melnyk, Iryna Spivak, Svitlana Krepych, Arkadiusz Banasik, Piotr Pikiewicz, Aleksandra Czupryna-Nowak | |
| AI-Based Vector Filtering of Irrelevant Academic Publications Using Research Interest Modeling | 779 |
| Andriy Yushko, Mykola Dyvak, Andriy Melnyk, Yuliia Trufanova, Vitalii Kobytisia, Yevgeniya Martsenyuk | |
| Ethical Issues in AI Policy for Academia: Is It Enough for AI Effective Implementation? | 785 |
| Artem Artyukhov, Nadiia Artyukhova, Oleksandr Dluhopolskyi, Serhii Kozlovskyi, Lesia Buiak, Nadiia Moskaliuk | |
| GenAI and Academic Integrity in Dialogue: Pros and Cons..... | 789 |

| | |
|--|------------|
| Artem Artyukhov, Oleksandr Dluhopolskyi, Oksana Adamyk, Nadiia Artyukhova, Bogdan Adamyk, Oksana Liashenko | |
| AI-Driven Reasoning Mechanism for Enhanced Detection of Illicit Money Flows..... | 796 |
| Bogdan Adamyk, Vladlena Benson, Ruslan Shevchuk, Haider Al-Khateeb, Dmytro Grydzhuk, Oksana Adamyk | |
| Post-Earthquake Building Collapse Detection and Damage Reporting using Deep Learning | 802 |
| Cagri Karakas, Ilhan Aydin, Erhan Akin | |
| Multimodal Deep Learning Based Brain Tumor Segmentation Using CT and MRI Scans..... | 807 |
| Diğdem Orhan, Mehmet Kaya | |
| Automatic Detection and Semantic Segmentation of Flood Events Using Deep Learning-based Methods | 811 |
| Emre Güçlü, Ilhan Aydin, Yusra Karabulut, Erhan Akin | |
| Object Detection of Parasites in Oreochromis Niloticus Using Advanced Convolutional and Spatial Attention Mechanisms..... | 818 |
| Jennifer P. Pilante, Alvin Sarraga Alon, Leonard L. Alejandro, Charlene I. Vergara, Jesus Paguigan | |
| Diagnosis Heart Attack and Stroke Risk using Machine Learning Algorithms: Risk Classification and Explanation of Diagnostic Reasons with LIME | 824 |
| Kazım Tibet Sar, Buket Kaya | |
| Improved Post-Trained Adaptive Network with Texture Bias Robustness..... | 828 |
| Kostiantyn Khabarlak | |
| Smartphone Tomato Growth Monitoring Using YOLO12 Neural Network..... | 832 |
| Kostiantyn Khabarlak, Ivan Laktionov, Iryna Udovyk, Grygorii Diachenko | |
| Visual Object Tracking Using Neural Networks for Embedded Systems..... | 836 |
| Kostiantyn Verhun, Mykola Dyvak | |
| Synthetic Data Augmentation for Table Detection: Re-evaluating TableNet’s Performance with Automatically Generated Document Images | 841 |
| Krishna Sahukara, Zineddine Bettouche, Andreas Fischer | |
| Wind Turbine Blade Defect Classification Based on Neuro-Fuzzy System | 847 |
| Lesia Dubchak, Nazar Vivchar, Yevgeniy Bodyanskiy, Anatoliy Sachenko, Nadiia Vasylykiv, Lesia Bilovus | |
| Legal Loopholes in the EU Artificial Intelligence Act: Addressing Disinformation and Human Rights Protection – the Need for Further Refinement..... | 852 |
| Mariia Pleskach | |
| YOLOv11-Based Explainable Framework for Anomaly Detection in Crowded Scenes using Attention Fusion..... | 859 |
| Melisa Gozet, Mehmet Karakose, Asim Egemen Yilmaz | |
| Detecting Deepfake Audio and Video Manipulation with Multimodal Deep Learning..... | 863 |
| Merve Yıldırım, Ilhan Aydin | |
| Particle Swarm Optimized Federated Learning for Efficient Classification of Medical Images | N/A |
| Musa Yenilmez, Ilhan Aydin | |
| Parameterized Prompting as a Framework for Scalable and Controlled Use of LLMs..... | 873 |
| Mykhailo Rokosh, Mykola Striletskyi | |
| Parallelization and Optimization of a Method for Web Content Analysis and Accessibility Evaluation for Visually Impaired Users | 879 |

| | |
|---|------------|
| Mykola Pylypchuk, Natalia Porplytsya, Iryna Stasiv, Roman Monko, Yurii Popyk, Tetiana Yurchyshyn | |
| A Comparative Analysis of YOLOv8, YOLOv9, YOLOv10 and YOLOv11 for Bone Fracture Detection | 884 |
| Nisanur Pirinçci, İbrahim Ethem Özdemir, Ertan Bütün | |
| Decision Support System for Stock Trading based on Reinforcement Learning Methods | 888 |
| Oksana Hromyk, Yaroslav Panasiuk, Liudmyla Matviichuk, Emiliia Dibrivna | |
| A Unified Approach to Medical and Financial Data Classification using Individual and Ensemble Machine Learning Models | 892 |
| Oleksandr Andronati, Svetlana Antoshchuk, Anatolii Nikolenko, Olena Arsirii, Oksana Babilunha | |
| A Rule-based Artificial Intelligence for Automation of Irrigation Water Quality Analysis | 896 |
| Pavlo Lykhovyd, Sergiy Lavrenko, Nataliia Lavrenko, Olesia Revto, Anastasiia Maliarchuk, Volodymyr Maliarchuk | |
| Comparative Performance of ANN Predicting Soybean Yields from NDVI: Execution Time and CPU Usage in C and Python | 902 |
| Pavlo Lykhovyd, Sergiy Lavrenko, Nataliia Lavrenko, Olesia Revto, Anastasiia Maliarchuk, Volodymyr Maliarchuk | |
| Exploring the Potential of Brain-Computer Interfaces and EEG Signal Analysis Algorithms: A Review and Analysis of Computational Techniques | 906 |
| Petar Nikolov, Olexiy Bychkov, Katia Rasheva–Yordanova, Georgi Dimitrov, Pavel Petrov, Vasyl Martsenyuk | |
| AI Ethics in Machine Learning: A Framework for Fairness-Aware Decision Making..... | N/A |
| Rasha Shakir AbdulWahhab Al Jassim, Shqran Shakir Al Mansoor | |
| Enhancing Topic Modeling for User Expertise Profiling | 921 |
| Saida Kichou, Fouad Dahak, Abdelkrim Meziane | |
| Classification and Identification of Saccharum Officinarum Diseases using Deep Transfer Learning Computer Vision..... | 927 |
| Salma Anikaa, Alvin Sarraga Alon, Leonard L. Alejandro, Charlene I. Vergara, Jesus Paguigan | |
| Classification of Disease with Explainable Artificial Intelligence..... | 933 |
| Senanur Armağan, Esra Gündoğan, Mehmet Kaya | |
| Conflict Definition, Detection and Reconciliation in Federated Intelligent Domain Management . | 939 |
| Serhii Podelskyi, Oksana Mulesa, Volodymyr Sabadosh, Serge Dolgikh | |
| AI-Driven OCR in Practice: Assessing ChatGPT-4o and Google Vision as Alternatives to Manual Optical Character Recognition..... | 944 |
| Serhii Robotko | |
| Reconfiguration of Redundant Structures of Ship Actuators Using Zero Motion Method | 948 |
| Serhii Zinchenko, Oleh Tovstokoryi, Ihor Popovych, Pavlo Nosov, Dmytro Onyshko, Yevgeniy Kalinichenko | |
| Fine-Tuning and Reasoning: Empowering LLMs for Solving Turkish Math Word Problems..... | 954 |
| Taha Kubilay Şener, İlhan Aydın | |
| The Use of LLMs for Synthesis Data for Small Datasets..... | 959 |
| Valentyn Fedorov, Roman Bilyy, Oleksandr Toroshanko, Yulia Zhykhareva | |
| The Implementation of Artificial Intelligence Technologies in the Military Domain: Opportunities and Risks..... | 965 |
| Viktoriia Hurochkina, Svitlana Bondarenko, Tomasz Szapiro | |

| | |
|---|------------|
| Anchor-Guided Semantic Double-Clustering: Scalable, High-Recall Contradiction Detection for Massive Knowledge Bases..... | 975 |
| Vladyslav Holubiev, Ihor Simashko, Bohdan Ihnatiuk, Vasyl Sheketa, Mykola Koromysel, Andrii Dankiv | |
| Hierarchical Channel Clustering with Bayesian-Optimized Pruning for High-Fidelity CNN Compression..... | 981 |
| Xiaoxin Liu, Xiong Pan, Junhua Tong, Jingchun Cheng, Jiajie Song, Luyue He | |
| Uncovering Structural Hierarchies in Molecules with Rich Club-Informed Representation Learning..... | 987 |
| Yasida Insika Wanigatunga, Asela Hevapatthige | |

SECTION 6

Information Technology in Education

| | |
|--|-------------|
| Online Interaction Skills: The Essence and Ways of Its Formation in Junior Schoolchildren..... | 992 |
| Andriana Shyshak, Rostyslav Rudenskyi, Oksana Pysarchuk, Volodymyr Chaika, Iurii Shcherbiak, Martin Taraj | |
| AI-Powered Knowledge Assessment: Application of GPT Models in Educational Testing..... | 997 |
| Andriy Melnyk, Vasyl Tymchyshyn, Iurii Shcherbiak, Serhii Kozibroda, Anton Shevchuk, Roman Mudrak, Saak Hudratian | |
| Recommendations Generating Module for Improving the Activities in the Academic Staff Performance Appraisal System Using AI Tools | 1002 |
| Andriy Pukas, Inna Sysoieva, Oleh Vatslavskyi, Andrii Simak, Lesia Bilovus, Myroslava Huryk | |
| Immersive University: Step Beyond the Metaverse and Education | 1007 |
| Artem Artyukhov, Nadiia Artyukhova, Alla Navolokina, Vasyl Brych, Viktor Koziuk, Lesya Kolinets | |
| Immersive Tools in Education: Do We Need Total Immersiveness?..... | 1013 |
| Artem Artyukhov, Yurii Zuban, Nadiia Artyukhova, Alla Navolokina, Vasyl Brych, Oleksandr Dluhopolskyi | |
| Future Trends of AI in Higher Education: Google Workspace and Gemini..... | 1019 |
| Bohdan Rozputnia, Lyudmila Shevchenko, Volodymyr Umanets, Yuliia Sabadosh, Alina Kushnir, Nataliia Voitsekhivska | |
| Modernizing Computer Science Education with Micro-Credentials | 1026 |
| Frane Urem, Ivana Kardum Goleš, Marko Pavelić | |
| Development of Students' Digital Competence in the Context of using Artificial Intelligence Technologies..... | 1030 |
| Halyna Henseruk, Serhii Martyniuk, Oksana Vasylenko, Yuliia Henseruk, Viktor Henseruk, Ivanna Andriychuk | |
| Integration of AI in Studying Foreign Language for Professional Purposes: Statistical Analysis of Students' Motivational Competence | 1035 |
| Iurii Shcherbiak, Dmytro Kostenko, Wojtek Duczmal, Kateryna Binytska, Kateryna Brovko | |
| Analyzing the Relationship Between Teacher Performance and Student Feedback Using a Mixed-Methods Approach | 1042 |
| Jesus Paguigan, Rogelio Mamaradlo | |
| Online Method for Learning Process States in Cyber-Physical Production Systems..... | 1048 |
| Kyrylo Kadomskyi, Georgi Dimitrov, Olexiy Bychkov | |

| | |
|--|-------------|
| Videoconferencing Platforms in Ukrainian Education: Facts and Prospects..... | 1055 |
| Marta Dmytryshyn, Tetyana Goran, Roman Rusyn | |
| BioMirror Therapy: A Conceptual Framework for Integrated Biometric-Facial Emotion Analysis in Trauma Recovery for War-Affected Children | 1059 |
| Mykhailo Kotyk, Olena Budnyk | |
| Assessment of the Educational Potential of Ukraine’s Regions for Knowledge Management under Martial Law: Integral Approach and Geo-Information Analysis | 1068 |
| Nataliia Mishchuk, Andrii Zubyk, Andrii Gukaliuk, Bohdan Melnyk, Rostyslav Mykhailyshyn, Bohdan Pushkar | |
| Potential of Applying Artificial Intelligence in the Professional Education of Software Engineers | 1076 |
| Oleksandr Vetoshkin, Olena Budnyk | |
| Simulation Technologies in Blended Learning Formats: The Impact of Virtual Laboratories on the Quality of University Education..... | 1082 |
| Olena Budnyk, Iurii Shcherbiak, Maryna Vasylieva-Khalatnykova | |
| Educational Digital Technologies for Teaching Interdisciplinary Courses in Higher Education Institutions: The Case Study..... | 1087 |
| Tetiana Stepura, Nataliya Didukh, Olha Korytska | |
| Information System for Integrated Education and Employment of Students of Higher Education Institutions..... | 1092 |
| Volodymyr Vasyliv, Viktor Moshynskyi, Valerii Soroka, Mykhailo Boichura, Pavlo Panko | |
| Information Technologies for Studying the Field of Microrelief for the Management of Future Yield | 1097 |
| Yurii Gunchenko, Natalia Pasichnyk, Sergey Shvorov, Vladislav Mykhailenko, Larysa Martynovych, Liudmyla Moshenska | |