IEEE INTERNATIONAL CONFERENCE AUTOMATICS AND INFORMATICS'2024 (ICAI'24),

10 - 12 October 2024, VARNA (Technical University of Varna)

http://icai-conf.org

CONFERENCE PROGRAM

THE GIVEN TIME IS ACCORDING TO THE BULGARIAN TIME ZONE - SOFIA UTC+3 HOURS

Thursday, October 10th

In the NUK gallery
08.00 - 09.00 REGISTRATION OF PARTICIPANTS

Stream 1 (Conference Hall NUK)
09.00 - 09.15 WELCOME AND OPENING CEREMONY

Stream 1 (Conference Hall NUK)
09.15 - 09:50 PLENARY SESSION 1

Chairman: Kosta Boshnakov

The Inception of Electronic Digital Computing

Vladimir Getov
University of Westminster in London

09.50 - 10:00 DISCUSSION

Stream 1 (In attendance) (Room A – Hall 109TV)	Stream 2 (Online) (Room B)
10:00 – 11:30 SESSION A1 **"CYBERSECURITY"** **Chairman:** Veneta Aleksieva	**10:00 – 11:30 SESSION B1** **"CONTROL THEORY"** **Chairman:** Alexandra Grancharova
1.Probabilistic Corporate Cybersecurity Stack, Willian Dimitrov, Dragostin Tsekov and Valentin Rujenov (170) **2.A Simulation Tool for ZigBee Application Layer Security,** Marieta Yordanova, Aydan Haka, Veneta Aleksieva and Hristo Valchanov (43) **3.Attack and Hack with Padding Oracle,** Ivan Ivanov and Mariyana Dimitrova (148) **4.Exploring the Possibilities of Geocoding Systems with Equal Area Tessellation,** Pavel Petrov (45)	**1.Adaptive Gradient Time Delay Estimator-Based Model-free Fast Nonsingular Terminal Sliding Mode Control for Upper-Limb Exoskeleton Driven by PAMs,** Penghao Li, Haoping Wang and Yang Tian (79) **2.Fractional Order Ultra-Local Model-Based Sliding-Mode-Assissted Disturbance Observer and Model-Free Control,** Liuchang Zhang, Haoping Wang and Yang Tian (90) **3.Linearization of the algebraic Riccati inequality for continuous and discrete-time descriptor systems,** Andrey Yonchev (75) **4.Phase Root Locus - Application in Internal Model Control Systems,** Vesela Karlovasergieva, Nina Nikolova, Boris Grasiani and Georgi Stefanov (177)
11:30 – 13:00 SESSION A2 **"MEASUREMENT AND MONITORING"** **Chairman:** Nikola Nikolov	**11:30 – 13:00 SESSION B2** **"APPLICATION OF MACHINE LEARNING"** **Chairman:** Valeri Mladenov
1.Development of a Measuring System for Studying the Force Load of Tillage Machinery in the Precision Agriculture using a Strain Resistance Integrating Period-Meter, Svilen Stoyanov, Desislava Mihaylova, Asparuh Atanasov and Steliyana Hristova (32) **2.Precise Ambient Air Temperature Data Logging and Data Processing,** Panayot Petrov and Valentin Mollov (96)	**1.Intelligent Automated Testing Frameworks for IoT Networks Utilizing Machine Learning for Advanced Anomaly Detection,** Marian Ileana and Maria Miroiu (135) **2.Integrating Industrialization into Heat Wave Risk Classification using Machine Learning,** Kevin Geng and Sajeev Magesh (115) **3.A Deep Learning Framework for Memory Retrieval from Lifelogging Data,**

3.Evaluating the Performance and Optimizing the Flow Measurement of a Vortex Flowmeter Using Specialized Software, Pavel Dimitrov and Mariela Alexandrova (3) **4.**	Mohd Aman, Musfira Jilani, Cristina Muntean, Pramod Pathak and Paul Stynes (158) **4.Robust UAV Image Stitching via Multiscale Feature Matching and Local Homography Matrix Estimation**, Rou Li and Wei Xue (131)

13:00 – 14:00 LUNCH in the UNIVERSITY CANTEEN

14:00 – 15:30 SESSION A3 **"CONTROL THEORY AND APPLICATIONS"** **Chairman:** Kamen Perev	**14:00 – 15:30 SESSION B3** **"COMMUNICATION AND CYBER SECURITY 1"** **Chairman:** Willian Dimitrov
1.Controllability and Observability Gramians for the Circular Membrane with Radial Symmetry, Kamen Perev (54) **2.Replacing the coefficient of the PID controller with a mathematical function,** Petar Panayotov and Goran Goranov (103) **3.From Automation Pyramid to Industry 4.0: Transitioning Process and Practical Applications,** Pavel Dimitrov and Mariela Alexandrova (68) **4.Optimal geometrical synthesis of cylindrical gear transmissions,** Dimitrinka Dahterova and Ina Nikolova (94)	**1.Flogista: audio encryption with filtered triple Logistic map,** Borislav Stoyanov, Tsvetelina Ivanova, Dimitar Dobrev and Plamen Ribarski (37) **2.Signal Detection in Impulse Interference,** Ivan Garvanov, Magdalena Garvanova, Georgi Tsonkov, Desislava Garvanova, Maria Mindova and Daniela Borissova (107) **3.Analysis and processing of certificates for various purposes,** Maleyka Abbaszade Vugar Akbarov and Khatayi Mammadov (136) **4.Rapid Deployment of Low-Cost Wireless Monitoring Solution for Smart Building**, Radu-Nicolae Pietraru, Robert-Alexandru Craciun and Daniel-Marian Merezeanu (57).
15:30 – 17:00 SESSION A4 **"MODELING AND SIMULATION"** **Chairman:** Nikolay Djagarov	**15:30 – 17:00 SESSION B4** **"ANALYSIS AND DESIGN OF ELECTRICAL AND ELECTRONIC DEVICES 1"** **Chairman:** Angel Marinov
1.Study of the Processes in Double Star Ship's Synchronous Propulsion Motor, Nikolay Djagarov and Zhivko Grozdev (30) **2.Study of Operating Modes of a**	**1.Synthesis and Analysis of Low-Pass and High-Pass Voltage-Controlled Voltage Source Active Filters for Educational Purposes in the Communication Circuits Course,** Adriana

Synchronous Motor without Damper Winding, Nikolay Djagarov and Zhivko Grozdev (31)

3.Evaluating computer software model adequacy of electromagnetic processes, Marin Marinov and Rosen Dimitrov (130)

4.Supply Chain Logistics Marine Simulator, Bozhidar Dyakov, Milena Karova , Aneta Varbanova, Ivaylo Penev and Danail Dimitrov (111)

5.Camera calibration for robotic lab setup, Zhivko Zhekov and Elena Vasileva (26)

Borodzhieva and Snezhinka Zaharieva (38)

2.A New Method for Synthesis of Complementary Pairs of Sequences and Mismatched Filters, Borislav Bedzhev and Dilyan Simitrov (92)

3.Two Recursive Methods for Synthesis of Complementary Pairs and Quads of Sequences with Odd Lengths, Borislav Bedzhev and Dilyan Dimitrov (91)

4. **Modeling a microprocessor with RISC architecture,** Ilian Varbov, Petar Minev, Matyo Dinev and Valentina Kukenska (40)

17:00 – 17:30 COFFEE BREAK

17:30 – 19:00 SESSION A5

"OPTIMIZATION OF COMMUNICATION SYSTEMS"

Chairman: Vencislav Nikolov

17:30 – 19:00 SESSION B5

"AI APPLICATION METHODS"

Chairman: Gancho Vachkov

1.Optimisation models and algorithms for wireless communications within an office building, Zlatan Ganev (51)

2.Multi-hop transmission model for optimization of wireless communications and WSNs, Zlatan Ganev (52)

3.Spam Detection System Based on Hybrid Scorin, Stefka Popova, Hristo Nenov and Donika Stoyanova (114)

4.An Automatic Spam Detection System Based on Hybrid Scoring Models, Stefka Popova, Hristo Nenov and Velislav Kolesnichenko (122)

1.Image compression-then-encryption model based on A1 attractor, Tsvetelina Ivanova, Dimitar Dobrev, Borislav Stoyanov and Plamen Ribarski (36)

2.Handwritten Alphabet Recognition Using Convolutional Neural Networks, Nafeesath Parappurath Puthiyapurayil, Meerah Karunanithi, Yasir Jamal, Sakina Juzar Neemuchwala, Rand Kouatly and Ahmed Hassan (157)

3.Binarization via Local Gradient-like Differences in four Directions, Stefan Panov and Svetlana Panova (163)

4.The Serbian Retrieval Augmented Generation System based on Hybrid Search, Aleksandar Cenić, Suzana Stojković and Matin Jovanović (61)

19:00 COCKTAIL in the NUK gallery

Stream 1 (Hall 109TV)
09.00 - 09:45 PLENARY SESSION (PS)

Chairman: Valentina Markova
Interpretable Machine Learning for Explainable Artificial Intelligence

Alexander Gegov
School of Computing, University of Portsmouth, UK

09.45 - 10:00 DISCUSSION

Stream 1 (In attendance) (Room A – Hall 109TB)	Stream 2 (Online) (Room B)
10:00 – 11:30 SESSION A6 **"SOCIAL ASPECT OF ENGINEERING"** **Chairman:** Milena Karova	**10:00 – 11:30 SESSION B6** **"COMPLEX INDUSTRIAL SYSTEMS CONTROL"** **Chairman:** Idilia Batchkova
1. Conversational AI for Students with Hearing Disabilities: Approach to the Text Quality Evaluation, Radka Nacheva (172) **2. Social Engineering Threats in Cybersecurity: Risk Mitigation through Behavioral Insights,** Ivaylo Tsanov (62) **3. The Role of Social Psychology in the Creation of Ethical AI Systems,** Ivaylo Tsanov (63)	**1.Future Enterprise as a self-organizing Complex system**, Simona Iuliana Caramihai, Dragos Constantin Popescu and Ioan Dumitrache (138) **2.Modelling of the Deployment of ERP Systems,** Radoslav Hrischev, Nikola Shakev and Sevil Ahmed-Shieva (10) **3.Smart Manufacturing Integration of Heterogeneous Information Systems via OPC UA. A Case Study**, Plamen

4. Evaluating the Accessibility of Electronic Educational Resources in PDF Format, Bonimir Penchev and Latinka Todoranova (88)	Vasilev, Ani Boneva, Veronika Ivanova and Tsetso Tsvetanov (25)
	4.Risk and quality in the test production stage of the rapid prototyping process, Svilen Simeonov (123)
11:30 – 13:00 SESSION A7 **"COMMUNICATION NETWORKS AND SYSTEMS CHAIR"** **Chairman:** Hristo Valchanov	**11:30 – 13:00 SESSION B7** **"AI APPLICATION IN SOCIO-PROBLEMS"** **Chairman:** Gancho Vachkov
1.Behavior of Voice Codecs QoS Metrics in the IP Network Overload Zone, Vladimir Vichev and Todorka Georgieva (59) **2.IP Network Performance Analysis in VoIP Environment,** Vladimir Vichev and Todorka Georgieva (58) **3.Technical overview & performance evaluation of Virtio-loopback,** Timos Ampelikiotis, Alvise Rigo and Daniel Raho (55) **4.Implementing a High-Precision Boat Navigation System Using Raspberry Pi with RTK and GPS Integration via ESP32,** Ivan Grigorov, Nasko Atanasov, Nikola Nikolov and Dian Dzhibarov (169)	**1.Application of Machine Learning Agriculture Between Developing and Developed Countries: A Systematic Literature Review,** Mario Leonardi, Muhammad Resnandya Rafif, Nicholaus Putra and Ali Gunawan (47) **2.Neural Classifier of Honey Plants Pollen Using a Combination of Textural and Geometric Features**, Lyubomir Zaykov and Diana Tsankova (1) **3.Supporting Digitization of a Cultural and Historical Heritage Platform**, Iliya Nedelchev, Veneta Tabakova-Komsalov, Ivan Stoyanov, Stanimir Stoyanov, Vanya Ivanova and Tsvetomira Kazashka (39) **4.Adaptive Neuro-Fuzzy Inference System for Beverage Identification Based on VIS/NIR Spectral Analysis,** Mariyana Sestrimska, Veselin Nachev, Tanya Titova and Plamen Nikovski (9)
13:00 – 14:00 LUNCH in the UNIVERSITY CANTEEN	
14:00 – 15:30 SESSION A8 **"MODELING AND CONTROL IN INDUSTRY"** **Chairman:** Hristo Nenov	**14:00 – 15:30 SESSION B8** **"COMMUNICATION AND CYBER SECURITY 2"** **Chairman:** Miroslav Markov
1.Enabling SME Participation in Cross-Border Agricultural Futures: A Tokenized Pooling Model with OTC Clearing Integration Deyan Paroushev and Petko Ruskov (146)	**1.Android Agile Test-Driven Development,** Manish Kaushik, Rand Kouatly and Mohammed Nazeh Alimam (164)

2.Algorithmic model for complex assessment of the competitiveness of an industrial enterprise, Krasimira Dimitrova (49) **3.IoT system for AQI monitoring and control**, Ivan Ganchev and Zhanlin Ji (117) **4.Sensor data processing methodology based on flexible architecture and secure data storage,** Valentin Mollov and Panayot Petrov (86)	**2.A comparative analysis of Jenkins as a data pipeline tool in relation to dedicated data pipeline frameworks,** Angel Georgiev, Vladimir Valkanov and Penyo Georgiev (87) **3. Longitudinal and Lateral Stability of Mobile Wheeled Robots - Method of the Surrounding Pyramidal Surface,** Stoyan Lilov (110)
15:30 – 17:00 SESSION A9 **"OPTIMIZATION AND COMPANY PRESENTATIONS"** **Chairman:** Mariela Alexandrova	**15:30 – 17:00 SESSION B9** **COMPUTING 1** **Chairman:** Sevinç Gülseçen
1.Evaluation of Energy Efficiency of Si and GaN FET for Power Electronic Converters, Angel Marinov, Kristiyan Mihalev, Firgan Feraodv and Svetlozar Zahariev (99) **2.Minimum Complete Pareto Front of a Biobjective Minimum Spanning Trees Problem,** Lasko Laskov and Marin Marinov (76) **3.Senseye – AI Based Predictive Maintenance by Siemens,** Nikola Petkov **4.Rittal's digitalization – customer-oriented,** Alexander Georgiev	**1.IoT Continuum for Energy Management**, Simeon Tsvetanov, Dimitar Chalamov and Stela Ruseva (176) **2.Laboratory set-up for the research of roller conveyors for logistics warehouses,** Vladimir Hristov and Ivan Chekurov (178) **3.A Systematic Review on Detection of Aortic Dissection by Utilizing Deep Learning,** Hatice Koç, Nilgün Bozbuğa and Sevinç Gülseçen (149) **4.SWOT Analysis Of The Possibility Of Using AI For Education,** Nikolay Yanev, Iglika Getova, Teodora Hristova, Iva Kostadinova, Georgi Dimitrov and Elizabet Mihaylova (33)
17:00 – 17:30 COFFEE BREAK	
Stream 1 (Online) **(Room A)**	**Stream 2 (Online)** **(Room B)**
17:30 – 19:00 SESSION A10 **"ENERGY EFFICIENT CONTROL"** **Chairman**: Kosta Boshnakov	**17:30 – 19:00 SESSION B10** **"ANALYSIS AND DESIGN OF ELECTRICAL AND ELECTRONIC DEVICES 2"** **Chairman:** Yasen Gorbunov

1.**Prospects of Intelligent Techniques for Energy Efficient Control of Drying Process,** Desislava Delicheva and Snejana Yordanova (41)	1.**Program module for spectral analysis of continuous periodic signals,** Radoslava Gabrova, Hristina Andreeva and Kamen Toromanov **(77)**
2.**Modeling and Analysis of a Real Residential Heating System,** Nikolay Komitov and Margarita Terziyska (69)	2.**A modular approach of PV-systems modelling using real meteorological data,** Svetlozar Zahariev (108)
3.**Smart IoT-Based Home Automation System,** Nikolay Komitov and Margarita Terziyska (83)	3.**Algorithm for Maritime Target Detection,** Ivan Garvanov and Magdalena Garvanova (106)
4.**Implementation of ESD in automatic temperature, pressure and level control system in raw gypsum calcination plant,** Viktor Tsolov and Nikola Nikolov (165)	4.**Development and Practical Application of a Small Laser Engraving Machine,** Stanislav Simeonov, Marin Zhilevski and Mikho Mikhov

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**20:00 GALA DINNER in the BM City restaurant
(it is located behind the Festival and Congress Center)**

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Saturday, October 12th

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Stream 1 (Online)
09.00 - 09:45 PLENARY SESSION (PS)

Chairman: Veneta Aleksieva

Machine Learning Methods for Trustworthy Autonomous Systems

Lyudmila Mihaylova
University of Sheffield

09.45 - 10:00 DISCUSSION

Stream 1 (Online) (Room A)	Stream 2 (Online) (Room B)
10:00 – 11:30 SESSION A11 **"INTELLIGENT ROBOTICS"** **Chairman:** Yasen Gorbunov	**10:00 – 11:30 SESSION B11** **"COMMUNICATION AND CYBER SECURITY 3"** **Chairman:** Stanislav Penchev
1.Generative AI-Driven Personnel Training in Industrial Robotics through Intelligent HXM, Stela Stoykova and Nikola Shakev (89) **2.Distributed 3D camera distance measurement system for intelligent mobile robots**, Radoslav Vasilev, Nayden Chivarov and Maya Staikova (73) **3.Cascade Control of PMDC Motor on FANUC M-430iA/4FH Robot**, Vesela Karlova-Sergieva and Nina Nikolova (71) **4.Automated control of a stand for determining the critical angles of static stability of agricultural robots**, Veselin Mengov, Vladimir Kotev, Georgi Komitov and Evgeni Kehayov (154)	**1.Some Cybersecurity Issues in Artifical Intelligence Systems,** Vassil Sgurev and Lyubka Doukovska (173) **2.Preserving Privacy and Security in Online Assessment Process: Exploration and Analysis**, Iskra Trifonova and Malinka Ivanova (6) **3.Using Reed-Solomon codes to securely transmit data over radio frequencies using broadband communications,** Alla Levina and Nikita Galkin (56). **4.Performance and Accuracy Assessment of Detecting Network Intrusions with eSOM-Based Techniques,** Dimitrios Simeonidis, Pavel Petrov, Georgi Penchev, Stefka Petrova, George Dimitrov and Volodymyr Petrivskyi (16)
11:30 – 13:00 SESSION A12 **"COMPUTING 2"** **Chairman:** Ivaylo Penev	**11:30 – 13:00 SESSION B12** **"PROCESS MEASUREMENT AND CONTROL"** **Chairman:** Plamen Daskalov
1.Hardware implementation of lightweight cryptographic algorithms: An overview, Dilyana Dimitrova and Ivaylo Dimitrov (150) **2.Exploring Web3 Challenges: Implications for Investigative Techniques and Evidence Acquisition in Digital Forensics,** Blerim Krasniqi and Eliza Petrova Stefanova (4)	**1.Switching Multi-regulator Control of Electro-Hydraulic Servo System,** Georgi Mihalev, Stanimir Yordanov and Krasimir Ormandzhiev (112) **2.Application of a Modified Multiparametric PID Controller for Control of an Electrohydraulic Servo System,** Stanimir Yordanov, Georgi Mihalev, Krasimir Ormandzhiev and Stefan Ivanov (113)

3.Text Mining Student Comments for Teaching Performance Evaluation using VADER and Latent Dirichlet Allocation Algorithm*, Jenny Resuello, Larmie Feliscuzo) and Cheryl Pantaleon (27)*	**3.Single-channel ultrahigh frequency moisture meter with direct measurement of moisture content of bulk materials***, Palvan Kalandarov, Shakhnoza Ubaydullayeva, Nikola Nikolov and Mariela Alexandrova (20)*
4.Features of FDM printing of test specimens, Miglena Paneva and Peter Panev (101)	**4.In-Situ Optical Emission Spectroscopy for Process Monitoring and Material Identification in Laser Powder Bed Fusion***, Ema Vasileska, Mite Tomov, Xiaoshuan Zhang and Valentina Gecevska (50)*

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13:00 – 14:00 LUNCH

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14:00 – 15:30 SESSION A13 **"ADVANCED METHODS IN LEARNING AND TEACHING 1"** **Chairman:** Aydan Haka	**14:00 – 15:30 SESSION B13** **"AI APPLICATION IN HEALTH CARE"** **Chairman:** Tanya Pencheva
1.A Comparative Analysis of Generative AI Models for Improving Learning Process in Higher Education, Nurassyl Kerimbayev, Zhanbota Menlibay, Magdalena Garvanova, Saltanat Djaparova and Vladimir Jotsov (134) **2.Effective management of educational resources – Automated scheduling of lectures,** Boris Stoykov, Mariyan Apostolov, Simeon Arnaudov and Nikolay Nichev (121) **3.Review Using AI Learning Models to Develop E-Learning Platforms,** Lyazzat Zhaidakbayeva, Makpal Dildabayeva and Raushan Sambetova (152) **4.The Impact of a Web Platform with Motivational Elements on Student Engagement in the Learning Process,** Nikolay Nikolov (116)	**1.Methods and Applications of Artificial Intelligence In Mental Health Care***,* Vitali Atias and Katerina Atias (65) **2.Enhancing Model Robustness Using Differential Debugging in Jupyter Notebooks: A Case Study with Noisy Breast Cancer Data**, Martin Vassilev and Alexander Penev (105) **3.Malaria Cell Classification Using CNN: A Deep Learning Approach,** Nafeesath Parappurath Puthiyapurayil, Meerah Karunanithi, Muhammad Qasim Ali, Rand Kouatly, Ali Vaisifard and Ahmed Hassan (155) **4.Classifying Human Emotions through EEG data with Machine Learning,** Gaganjot Kaur, Meenu Gupta and Rakesh Kumar (11)
15:30 – 17:00 SESSION A14 **"ADVANCED METHODS IN LEARNING AND TEACHING 2"** **Chairman**: Aydan Haka	**15:30 – 17:00 SESSION B14** **"PROCESS CONTROL"** **Chairman:** Nikola Nikolov

1.Emerging technologies: focus on distance learning, Boris Stoykov, Mariyan Apostolov, Simeon Arnaudov and Nikolay Nichev (120)	**1.Design and Development of a 3D printed gripper,** Damjan Pecioski, Albion Shaipi and Dejan Shishkovski (78)
2.Streamlining Feedback Processes in Virtual Educational Systems, Nurassyl Kerimbayev, Aliya Akramova, Zhanat Umirzakova and Karlygash Adamova (67)	**2.Comparative analysis of different forms of grinding bodies and media, including innovative ones in ball mill**, Miglena Paneva, Peter Panev and Nikolay Stoimenov (102)
3.Exploring the Impact of Educational Serious Game in a Gamified LMS, Milen Sotirov, Valentina Petrova and Donika Nikolova-Sotirova (72)	**3.Methodology for Predicting and Optimizing Process Parameters and Accuracy Indicators of Complex Plastic Parts Through Virtual Prototypes**, Todor Todorov, Georgi Todorov and Yavor Sofronov (171)
4.Learning through Gamification: A Case Study on the Development and Integration of a University Educational Serious Game*,* Milen Sotirov, Valentina Petrova and Donika Nikolova-Sotirova (64)	**4.Rapid prototyping of process-driven applications using low-code development platforms: A case study from the Greek public sector,** Marios Konstantinos Gialitakis, Nikolaos Nousias, George Tsakalidis, and Kostas Vergidis (74)
17:00 – 17:15 CLOSING CEREMONY - Stream 1 (Online)	