IEEE INTERNATIONAL CONFERENCE AUTOMATICS AND INFORMATICS'2023 (ICAI'23),

5 - 7 October 2023, VARNA (Technical University of Varna)

http://icai-conf.org

CONFERENCE PROGRAMME

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

Thursday, October 5th

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 (PS)

Chairman: Kosta Boshnakov

Methods, Models and Algorithms of the Computational Intelligence Analyzed from a Practical Point of View

Gancho Vachkov
Baku Higher Oil School

09.50 - 10:00 DISCUSSION

Stream 1 (In attendance) (Room A – Hall 109TV)	Stream 2 (Online) (Room B)
10:00 – 11:30 SESSION A1 "MACHINE LEARNING" **Chairman: Ivaylo Penev**	**10:00 – 11:30 SESSION B1** "CONTROL THEORY" **Chairman: Aleksandra Grancharova**
1. Simulating an Lack of Phase Fault on SynRM and Integrate Results with Machine Leearning, Nikolay Djagarov, Hristo Milushev and Georgi Enchev (8915) **2. Detection of Cyber Attacks in Self-Driving Vehicles By Machine Learning,** Ivaylo Penev, Kristian Ivanov, Georgi Kostadinov and Zahari Stoyanov (4042) **3. Comparative Analysis of the Bernoulli and Multinomial Naive Bayes Classifiers for Text Classification in Machine Learning,** Neli Kalcheva, Ginka Marinova and Maya Todorova (3558) **4. Detailed investigation of ML algoritms for diagnostics of IM on board vessel,** Georgi Enchev (6257)	**1. Model-free non-singular fast terminal sliding mode controller using extended sliding mode observer for series elastic actuator-based robotic arm,** Hongfei Sun, Haoping Wang and Yang Tian (7330) **2. Synchronization of Chaotic Systems Using Novel Sliding Mode Neural Network Controller,** Junhong Xie, Alexandra Grancharova and Liping Fan (8369) **3. Fuzzy-logic Energy Management Strategy of Fuel Cell Hybrid Electric Vehicle Based on Whale Optimization Algorithm,** Yuxuan Liu, Xuejun Zong, Kan He, Lian Lian and Yifei Sun (3830) **4. A Compact and Secure Access Control Solution Based on a Deterministic Finite Automaton,** Akbota Kulzhanova, Timur Bakibayev, Nurassyl Kerimbayev, Kalinka Kaloyanova and Diana Rakhimova (813)
11:30 – 13:00 SESSION A2 "CLASSIFICATION AND VERIFICATION PROBLEMS" **Chairman: Valentina Markova**	**11:30 – 13:00 SESSION B2** "CONTROL APPLICATION" **Chairman: Nencho Deliiski**
1. Study of the K-Nearest Neighbors Method with Various Features for Text Classification in Machine Learning, Neli Kalcheva, Maya Todorova and Ivaylo Penev (7117) **2. Comparing Accuracy and Time of Support Vector Machine with Different Kernels for Handwritten Digits Classification,** Neli Kalcheva, Maya Todorova, Ginka Marinova and Ivaylo Penev (4448)	**1. Development of a Microcontroller Based Automated Greenhouse Cultivation System for Mushrooms – Hardware,** Hristo Kilifarev and Delyan Genkov (3709) **2. Development of a Microcontroller Based Automated Greenhouse Cultivation System for Mushrooms – Software,** Hristo Kilifarev and Delyan Genkov (6104)

3. Development of a Java Syntax Analyzer for C/C++ code recognition, Gergana Spasova and Iliyan Boychev (8569)	**3. Computing the Heat Balance of Boiling Pits during Defrosting of Frozed Logs in them,** Mincho Hadjiski, Nencho Deliiski, Pavlin Vitchev and Dimitar Angelski (121)
4. Automated Verification of the Program Code in The Development Process According to Team Defined Rules, Velislav Kolesnichenko, Hristo Nenov and Donika Stoyanova, (9807)	**4. Reversing BLE Remote Control Protocols of Dual Channel LED Lamps with CCT and Illumination Control**, Rostislav Kandilarov and Yordan Yordanov (8303)

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

14:00 – 15:30 SESSION A3 **"INTELLIGENT CONTROL SYSTEMS"** **Chairman: Nikola Nikolov**	**14:00 – 15:30 SESSION B3** **"INTELLIGENT COMPUTER SYSTEMS"** **Chairman: Ventsislav Nikolov**
1. Control of ROV Thrusters via Discrete Modal State Controller, Nikola Nikolov, Ivan Grigorov and Konstantin Chterev (7970)	**1. Improving the process of training staff in software companies through specialized software**, Slavka Stamenova (5744)
2. Development of a Recipe Analysis System for Technological Processes Controlled by PLCs, Iliyan Boychev and Gergana Spasova (1455)	**2. Towards blockchain wallets classification and implementation**, Ivan Popchev, Irina Radeva and Miroslava Dimitrova (8327)
3. ICPGF: An Industrial Control Protocol Format-Aware and Feedback-Guided Fuzzing, Xuejun Zong, Bowei Ning, Guogang Wang, Kan He, Lian Lian and Yifei Sun (3220)	**3. Semantic interoperability as a tool for the management of an e-Governance project**, Lyubo Blagoev, Rumen Trifonov and Kamen Spassov (6743)
4. Integrated Environment for Monitoring Data from Wireless Sensor Technologies for IoT, Aydan Haka, Diyan Dinev, Veneta Aleksieva and Hristo Valchanov (4359)	**4. Hamming Code: An Analysis of its Reliability and Efficiency in Computer Networks,** Alla Levina and Nawras H. Sabbry (109)
15:30 – 17:00 SESSION A4 **"ADVANCED INDUSTRIAL CONTROL"** **Chairman: Mariela Alexandrova**	**15:30 – 17:00 SESSION B4** **"ADVANCED COMPUTING 1"** **Chairman: Georgi Tsochev**
1. Software system for determining and visualizing locations and routes of underwater robots, Milena Karova and Ivaylo Penev (2201)	**1. Accessible UX/UI design**, Todor Todorov and Juliana Dochkova-Todorova (9496) **2. Android Agile Test-Driven Development**, Mohammed Alimam, Rand Kouatly and Manish Kaushik (8395)

2. Visual Servoing in Door Opening Task for Omnidirectional Mobile Manipulator, Tihomir Stoyanov, Vasil Popov, Andon Topalov, Sevil Ahmed-Shieva, Nikola Shakev and Bozhidara Nedelcheva (1909) **3. Digitalization and Sustainable Development in the Creation and Operation of Automation and Control Systems,** Alexander Georgiev, company presentation of Rittal EOOD - Bulgaria, part of FLG. **4. Industrial Cybersecurity and how Regulation Support Industrial Manufactu-ring,** Nikola Petkov, Anton Naumov, company presentation of Siemens EOOD, Digital Industries.	**3. Analysis of source code based on changes in its state over time – using user behavior models**, Mihail Petrov and Vladimir Valkanov (535)

17:00 – 17:30 COFFEE BREAK	

17:30 – 19:00 SESSION A5 **"ADVANCED ANALYSIS AND CONTROL OF ELECTRICAL DRIVES"** **Chairman: Nikolay Djagarov**	**17:30 – 19:00 SESSION B5** **"ADVANCED COMPUTING 2"** **Chairman: Idilia Batchkova**
1. Modeling and Analysis of Shipboard DC Grid System, Nikolay Djagarov and Dimitar Tsvetanov (6507) **2. Analysis of the induction motor load characteristics at different frequencies,** Marin Todorov, (1011) **3. Migration form PLC-5 to ControlLogix and Improvement of an Excavator Positioning System Using Frequency Converter and Induction Motors,** Plamen Bahov (9905) **4. Analysis of the induction motor losses and T-equivalent parameters at different frequencies,** Marin Todorov, Marin Marinov and Maik Streblau (5426) **5. Equipment and Methodology for EV Battery Testing**, Viktor Mashkov and Milena Karova (9261)	**1. Development of an Ontology for Bulgarian Wild, Cultivated and Protected Flora**, Zornica Radeva, Asya Stoyanova-Doycheva, Ivan Popchev and Stanimir Stoyanov (6276) **2. Development of an ontology for Bulgarian soil types**, Asya Stoyanova-Doycheva, Sebiha Madanska and Sheban Bilyanov (2363) **3. Pareto Optimal Solutions of the Biobjective Bottleneck Assignment Problem**, Lasko Laskov and Marin Marinov (2082) **4. Software for animation and graphic visualization of mechatronic elements and control process of FMS**, Javanshir Mammadov, Gafar Atayev, Ulduz Agayev, Sabina Aliyeva, Tarana Safarova and Agil Huseynov (205)

19:00 COCKTAIL in the NUK gallery

09.00 - 09:45 PLENARY SESSION (PS)

Chairman: Todor Ganchev

The Artificial Intelligence Perspective

Arthur Kordon
Kordon Consulting LLC

09.45 - 10:00 DISCUSSION

Stream 1 (In attendance) (Room A – Hall 109TB)	Stream 2 (Online) (Room B)
10:00 – 11:30 SESSION A6 **"INTELLIGENT POWER CONTROL SYSTEMS"** **Chairman: Bohos Aprahamyan**	**10:00 – 11:30 SESSION B6** **"ARTIFICIAL INTELLIGENCE 1"** **Chairman: Valeri Mladenov**
1. Exogenous Disturbance Observer-based Distributed Bipartite Consensus of Nonlinear Multiagent Systems with Multiple Time-varying Delays, Zhen Tang, Ziyang Zhen, Zhengen Zhao and Geert Deconinck (8725) **2 Estimation of Power Consumption for an Electric Vehicle Through Variable Parameter Modelling**, Viktor Mashkov and Milena Karova (2275)	**1. Multivalued Network Logic with One Real and Two Imaginary Logic Structures**, Vassil Sgurev and Lyubka Doukovska (692) **2. Unraveling the Elements of Effective Altruistic Appeals through Machine Learning and Natural Language Processing**, Sourav Yadav, Sankalp Arora, Akash Kumar and Kaveri Verma (8061)

3. Improving Power Quality in Shipboard Power System using a Static Synchronous Compensator: A Simulation Study, Nikolay Djagarov and Dimitar Tsvetanov (7343) **4. Investigation of Power Quality Using a Laboratory Experimental Setup of a Shipboard Power Plant,** Nikolay Djagarov and Dimitar Tsvetanov (4341)	**3. Comparative Analysis of Different Wavelet Transforms for Noise Reduction in CT Images**, Miroslav Petrov (7505)
11:30 – 13:00 SESSION A7 **"AI-BASED PERSONALIZED EDUCATION"** **Chairman: Vladimir Jotsov**	**11:30 – 13:00 SESSION B7** **"ARTIFICIAL INTELLIGENCE 2"** **Chairman: Valeri Mladenov**
1. The use of mobile technologies in education with an emphasis on a student-centered approach, Vladimir Jotsov, Gulnar Madyarova, Zhanat Umirzakova, Aliya Akramova, Galina Tkach, Nurassyl Kerimbayev and Nurbol Beisov (6586) **2. Recursive Estimation Library For Education**, Ivan Grigorov, Nasko Atanasov and Nikola Nikolov (5453) **3. Compact EEG Features for Person Identification**, Firgan Feradov and Todor Ganchev (553)	**1. Memristor-Based Neural Network Implementation with Adjustable Synaptic Weights in LTSPICE**, Valeri Mladenov, Georgi Tsenov and Stoyan Kirilov (9736) **2. Network Intrusion Detection through Classification Methods and Machine Learning Techniques**, Dimitrios Simeonidis, Pavel Petrov and Jordan Jordanov (8686) **3. Predicting High-Resolution Maps of Atmospheric Formaldehyde Concentration Using Vision Transformers**, Ryan Rad (5291)
13:00 – 14:00 LUNCH in the UNIVERSITY CANTEEN	
14:00 – 15:30 SESSION A8 **"ARTIFICIAL INTELLIGENCE 3"** **Chairman: George Mengov**	**14:00 – 15:30 SESSION B8** **"INTELLIGENT DIAGNOSIS IN HEALTH CARE"** **Chairman: Tania Pencheva**
1. A Neural Model Forecasts Macroeconomic Indicators, Iliyan Nenov, Ralitsa Simeonova-Ganeva, Kaloyan Ganev and George Mengov (3023) **2. Agent Irrationality in Socio-Economic Choices**, Anton Gerunov, Ilia Atanasov and George Mengov (6934)	**1. Diagnosing diseases for Prostate Cancer Prediction Using Hybrid Learning**, Sathesh Abraham Leo Ebi (5066) **2. Autism Spectrum Disorder Detection through Facial Analysis and Deep Learning: Leveraging Domain-Specific**

3. Efficient Generative Adversarial DAG Learning with No-Curl, Hristo Petkov and Feng Dong (4638)

4. An Algorithm for Random Tessellation using a Steppe Fire Model, Ognyan Zhelezov and Valentina Petrova (8835)

Variations, Anupam Agrawal and Krishna Sai Koppula (8527)

3. A model of a two-stage classification system for glial tumors in magnetic resonance imaging, Miroslav Petrov (4801)

4. Robust Intelligent System for COVID-19 Detection using CT-Scan, Ahmad Al Smadi, Ahed Abugabah and Ahmad Mohammad Al-Smadi (8814)

Stream 1 (Online)	Stream 2 (Online)
(Room A)	(Room B)

15:30 – 17:00 SESSION A9 "INTELLIGENT ROBOTICS" Chairman: Andon Topalov	15:30 – 17:00 SESSION B9 "ADVANCED MONITORING AND MODELING IN HEALTH" Chairman: Gancho Vachkov
1. Longitudinal Stability of Wheeled Mobile Robots - Permissible Forces and Accelerations, Stoyan Lilov, Vanya Markova, Nickolay Popov and Ventseslav Shopov (5819) **2. Payload Stabilization in Multidirectional Robot Motion by Applying Trajectory Analysis Algorithm and Feedback Encoders**, Tsvetelina Georgieva, Aleksandar Ivanov and Anton Anchev (7328) **3. An application of artificial potential functions method in the robotic formation control**, Vanya Markova and Ventseslav Shopov (2677) **4. Intelligence in Human-Robot Collaboration – Overview, Challenges and Directions**, Katya Madzharova-Atanasova and Nikola Shakev (3955)	**1. Monitoring heart rate and udder surface temperature in dairy cows under heat stress conditions by infrared thermography**, Hristo Hristov and Toncho Penev (415) **2. Towards Enhanced Well-being: Monitoring Stress and Health with Smart Sensor Systems Muhammad Moazam Shahid**, Georgina Enuwa Agada, Mohammed Kayyali, Isibor Kennedy Ihianle and Pedro Machado (1097) **3. Model-free based neural network time delay estimation control for a 3-DOF ankle exoskeleton**, Hao Gu, Yang Tian and Haoping Wang (3062) **4. Intelligent Triage: Integrating Artificial Intelligence, Queuing Theory and Game Theory for Automated Patient Prioritization in Infectious Disease Wards**, Angel Ivanov (7023)

17:00 – 17:30 COFFEE BREAK

17:30 – 19:00 SESSION A10 "ADVANCED ROBOTIC APPLICATION" Chairman: Nikola Shakev	17:30 – 19:00 SESSION B10 "ADVANCED MEASUREMENT APPLICATION 1" Chairman: Kosta Boshnakov
1. Use of KUKA KR300 Industrial Robot in Electric Arc Furnace Operation, Georgi Georgiev, Nikolay Todorov and Alexandra Grancharova (8847) **2. An Object Detection And Tracking Approach To Control Of a Mobile Agriculture Robot**, Vladimir Kotev, Ivan Ivanov, Georgi Komitov, Georgi Stanchev and Kostadin Kostadinov (1059) **3. Comparative analysis of algorithms for wheat weed recognition**, Asya Toskova and Borislav Toskov (2636) **4. Studying the influence of working fluid temperature on the performance of an electrohydraulic servo system in dynamic mode**, Stanimir Yordanov, Krasimir Ormandzhiev, Georgi Mihalev, Krasen Kostov and Veselin Mitev (1102)	**1. Impact Evaluation of the Optical Devices for Obtaining Soil Color Characteristics**, Antonina Mihaylova, Tsvetelina Georgieva and Plamen Daskalov (3866) **2. Cultivator-based soil density measurement sensor**, Asparuh Atanasov, Svilen Stoyanov and Desislava Mihaylova (5700) **3. An Expert System for the Diagnosis of Livestock Poisoning, Veneta Tabakova-Komsalova**, Stanimir Stoyanov, Asya Stoyanova-Doycheva, Ivan Stoyanov, Lyubka Doukovska and Atanas Dukovski (5961) **4. Simple conditioning interfaces for strain measurement**, Desislava Mihaylova, Svilen Stoyanov, Asparuh Atanasov, Svetlozar Zahariev, Angel Marinov and Kaloyan Solenkov (9411)
19:00 GALA DINNER in the Old Chinar restaurant	

Saturday, October 7th

Stream 1 (Online) (Room A)	Stream 2 (Online) (Room B)
09:00 – 10:30 SESSION A11 "INTELLIGENT COMMUNICATION" **Chairman: Ivan Garvanov**	**09:00 – 10:30 SESSION B11** "AI TECHNOLOGIES BASED LEARNING 1" **Chairman: Margarita Todorova**
1. Investigation of Underwater Packet Radio Communication at 433 MHz, Nikolai Kolev, Darin Peev and Neli Stoycheva (8466) **2. Mobile application for creating and exporting geofences**, Victoria Velkova and Rosen Ivanov (2983) **3. Geocodes in Geographic Information Systems**, Pavel Petrov (5801) **4. Drone Detection Approach Based on Radio Frequency Detector**, Ivan Garvanov, Denislav Kanev, Magdalena Garvanova and Vladimir Ivanov (551)	**1. Using Big Data and Hadoop in the Student Learning Process - Enhancing the Educational Process through Real Experience**, Irena Valova (3719) **2. Implementing Gamified Learning in University Environment**, Milen Sotirov, Valentina Petrova and Donika Nikolova-Sotirova (5502) **3. Prolog Education in Selected High Schools in Bulgaria**, Veneta Tabakova-Komsalova, Ivan Stoyanov, Laska Kostadinova-Tzankova, Atanas Dukovski and Tsvetomira Ivanova (7849) **4. STEM educational kit for assistance of individuals with special needs**, Todor Todorov and Pajtim Vela (2949)
10:30 – 12:00 SESSION A12 "ADVANCED PROCESS CONTROL" **Chairman: Mariela Alexandrova**	**10:30 – 12:00 SESSION B12** "AI-TECHNOLOGIES BASED LEARNING 2" **Chairman: Margarita Todorova**
1. IEC/EN 62264 Energy-based Restriction Knapsack Optimization Scheduling for Wood Processing SME, Plamen Vasilev, Tsvetelina Ivanova and Yordan Belev (6105) **2. Pareto Optimal Solutions of the Minimal Cost Minimal Time Assignment Problem**, Lasko Laskov and Marin Marinov (2438) **3. Steady State Optimization and Model**	**1. System Tempura - a modern approach for describing and managing temporal processes in a virtual educational space**, Mihail Petrov and Vladimir Valkanov (8903) **2. The Nine-Steps Gamification Process: Increasing Student Engagement in LMS**, Milen Sotirov and Valentina Petrova (1540)

Predictive Control of a Tubular Reactor, Alexandra Grancharova, Junhong Xie and Jus Kocijan (5360)

4. Technological Machines Diagnostics of Grain Processing Enterprises as the Object of Automation, Palvan Kalandarov, Shakhnoza Ubaydullayeva, Nikola Nikolov, Aziz Hayitov and Husen Sharifov (8996)

12:00 – 13:00 LUNCH	

13:00 – 14:30 SESSION A13 **"MODELING AND CONTROL OF POWER SYSTEMS"** **Chairman: Kamen Perev**	**13:00 – 14:30 SESSION B13** **"AI APPLICATION IN SOCIAL SYSTEMS"** **Chairman: Kamen Spasov**
1. Model Predictive Control for a Single Machine Infinite Bus Power System of Full and Reduced Order, Andrey Yonchev and Kamen Perev (3181) **2. Modelling of grid-connected PV-systems using real meteorological data**, Svetlozar Zahariev, Desislava Mihaylova, Angel Marinov and Kaloyan Solenkov (8181) **3. Study of output mechanical energy, developed by a small permanent magnet direct current motor, using simulations of linear motor models**, Nickolay Popov, Stoyan Lilov, Ventseslav Shopov and Vanya Markova (4458) **4. Generation of Electricity Using Compression Piezoelectric Harvesters**, Rumyana Stoyanova, Velimira Todorova and Dimo Kolev (5848)	**1. A Deep Learning Wheat-Weed Dataset**, Asya Toskova and Borislav Toskov (8692) **2. Opportunities and Challenges of Using Artificial Intelligence in Energy Communities**, Vitali Atias (9616) **3. An Evaluation of Web3 Concepts and Technologies and Relation with Digital Forensics**, Blerim Krasniqi and Eliza Stefanova (7407)
14:30 – 16:00 SESSION A14 **"ADVANCED MEASUREMENT APPLICATION 2"** **Chairman: Kosta Boshnakov**	

1. Research and Analysis of the Method for Measuring the Moisture Content of Cottonmaterials at Ultrahigh Frequencies, Palvan Kalandarov, Khasan Turkmenov, Shakhnoza Ubaydullayeva, Nikola Nikolov and Mariela Alexandrova (134) **2. Automation of Technological Processes for Controlling Grain Moisture in the Flow**, Palvan Kalandarov, Shakhnoza Ubaydullayeva, Rano Gaziyeva, Nikola Nikolov and Mariela Alexandrova (2311) **3. Compensation of the Temperature Impact on the Characteristics of a Titania-Silica Thin Film Humidity Sensor element**, Stefan Ivanov, Nedyu Nedev and Zvezditsa Nenova (6509) **4. Multisensor Sunflower Oil Quality Assessment System Based on "Electronic Nose"**, Stefan Ivanov, Todor Todorov, Toshko Nenov and Jacek Wilk-Jakubowski (120)	
16:00 – 16:15 CLOSING CEREMONY - Stream 1 (In attendance) (Room A – Hall 109TV)	