

“DAYS OF SCIENCE OF TECHNICAL UNIVERSITY OF SOFIA”



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IEEE Bulgarian Section

**INTERNATIONAL CONFERENCE
AUTOMATICS, ROBOTICS & ARTIFICIAL INTELLIGENCE
ICARAI' 2026**

PROGRAMME

June 12 ÷ 15, 2026, Sozopol, Bulgaria

Organized by:



TECHNICAL UNIVERSITY OF SOFIA



FACULTY OF AUTOMATICS



IEEE Bulgarian Section

IEEE BULGARIAN SECTION

WITH THE SUPPORT OF

RESEARCH AND DEVELOPMENT SECTOR OF THE TECHNICAL UNIVERSITY OF SOFIA

12 June 2026 Friday		
13:30 ÷ 15:30	REGISTRATION	HOTEL LOBBY
16:00 ÷ 16:15	OPENING CEREMONY	HALL 1
16:15 ÷ 17:15	PLENARY SESSION	HALL 1
17:15	WELCOME PARTY	COFFEE - BAR
13 June 2026 Saturday		
9:00 ÷ 17:30	SESSIONS	HALL 1
9:00 ÷ 17:30	SESSIONS	HALL 2
20:00	COCKTAIL- PARTY	
14 June 2026 Sunday		
9:00 ÷ 17:30	SESSIONS	HALL 1
9:00 ÷ 12:00	SESSIONS	HALL 2
15 June 2026 Monday		
DEPARTURE		

12 JUNE 2026 (Friday)

16:00 ÷ 16:15 OPENING CEREMONY

Prof. Nikolay Nikolov – Vice Head of Research and Development sector of the Technical university of Sofia

Assoc. Prof. Tsonyo Slavov – ICARAI PC Chair and Dean of FA

16:15 ÷ 17:15 PLENARY SESSION

Chairman: Assoc. Prof. Tsonyo Slavov

Technical support: Assist. Prof. Ilian Georgiev

P.P.1	Petia Georgieva , <i>University of Aveiro</i> , Generative AI - Diffusion Models for Image Generation	in-person
P.P.2	Mikulas Huba , <i>Slovak University of Technology in Bratislava, Slovakia</i> , Use of higher order derivatives of on alternative to the fractional order PID control	In-person

13 JUNE 2026 (Saturday)

HALL 1

9:00 ÷ 10:30

SESSION 1 “APPLICATION OF ARTIFICIAL INTELLIGENCE PART 1”

Chairman: Assoc. Prof. Vladislav Slavov

Technical support: Assist. Prof. Ilian Georgiev

S1.1	Dr. Savitha R, Kajal Vivek Singh Chauhan and Anantha M, AdWise: An AI-Driven Persona-Based System for Pre-Launch Advertisement Evaluation	on-line
S1.2	Monali Bhujbal, Saraswati Patil , Rohit Bele, Avinash Bhurke and Chaitanyaa Deokar, AI-Powered Recruitment Orchestration: An Agent-Based Approach to Modern Hiring	on-line
S1.3	Jethro Ezekiel Natividad , Ray Vincent Concepcion, Josh Mendoza, Blu Carlo Lim and Lucy Felix-Sadiwa, CVRankify: Automating Pre-Interview Resume Screening for Remote Software Engineers with Generative Pre-Trained Model	on-line
S1.4	Efe Yılmaz Taşyürek , Sevinç İlhan Omurca, Erol Gerçeker, Çağdaş Yılmaz, Helin İnceoğlu, Furkan İsmet Tufan, Turkan Pelin Damar and Lütfü Çakıl, Performance Evaluation of Classical, Transformer-Based, and VLM-Based Open-Source OCR Models for Handwritten Text Recognition	on-line
S1.5	Chukwueloka Prosper Abanobi and Leonard L. Alejandro, Coastguard ai: design and implementation of a context-aware large language model chatbot for disaster preparedness and response in philippine coastal communities	on-line

10:30 ÷ 11:00 - COFFEE BREAK

11:00 ÷ 12:45

SESSION 2 “APPLICATION OF ARTIFICIAL INTELLIGENCE PART 2”

Chairman: Prof. Petia Georgieva

Technical support: Assist. Prof. Ilian Georgiev

S2.1	Orlando Martins Marinheiro , Nuno Loureiro, Tsonyo Slavov and Petia Georgieva, Retrieval Augmented Generation (RAG-Based) Chatbot enhanced with Chain-of-Thought Augmented Generation	on-line
S2.2	Diogo Marto , Nelson Vieira, Manuela Rodrigues, Petia Radeva and Petia Georgieva, Neural Network Training with Fractional Gradients	on-line
S2.3	Koycho Georgiev , Alexander Gegov, Hamidreza Khaleghzadeh, Mo Adda and Alexandar Ichtev, Causal Discovery Framework for Large Language Models	on-line
S2.4	Shukra Shakaf, Anna Rosner , Alexander Gegov, Gelayol Golcarenenrenji and Alexandar Ichtev, Surrogate decision trees for explaining black box models for breast cancer classification.	on-line
S2.5	Bernard Vic Caay , SharpTrack: An Interactive and Adaptive C# Programming Learning Platform Using User Progress Analytics	on-line
S2.6	André Ribeiro, Rúben Garrido, Violeta Ramos, Samuel Teixeira and Petia Georgieva, RAG-based LLM Evaluation	on-line
S2.7	Pietro Merlin , Pedro Domingues, Paula Vilarinho and Petia Georgieva ML approach for predicting the properties of ceramic products	on-line

12:45 ÷ 14:00 - LUNCH BREAK

14:00 ÷ 15:45**SESSION 3 “CONTROL SYSTEMS ENGINEERING”****Chairman: Prof. Kamen Perev****Technical support: Assist. Prof. Aleksi Mochi**

S3.1	Devasmito Das , Ina Taralova, Tsonyo Slavov and Jean Jacques Loiseau PINN-Enhanced Constrained NMPC for Chaos Suppression in a Fractional Forced Duffing Oscillator	on-line
S3.2	Andrey Yonchev , LMI based H2 nominal performance of continuous-time descriptor systems	on-line
S3.3	Andrey Yonchev , Non-local perturbation bounds of the discrete-time linear quadratic regulator problem	on-line
S3.4	Mikulas Huba , Teofana Puleva, Alexandar Ichtev and Pavol Bistak Triple Integrator Based Design of an Automatic Offset Controller	in-person
S3.5	Sayak Dasgupta , Farzard Arabikhan, Mohamed Bader-El-Den, Alexander Gegov and Alexandar Ichtev, Hybrid Machine Learning and Fuzzy Inference System for University Admission Prediction	in-person
S3.6	Kamen Perev , System Gramians for the Circular Membrane without Radial Symmetry	in-person
S3.7	A. Mitov, T. Slavov and J. Kravlev, PI-based adaptive actor-critic control of axiql piston pump	in-person

15:45 ÷ 16:00 - COFFEE BREAK**16:00 ÷ 17:30****SESSION 4 “APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 3”****Chairman: Assoc. Prof. Alexander Ichtev****Technical support: eng. Aleksi Mochi**

S4.1	Basudeo Shrestha , Dorsa Norouzi and Edison Pignaton De Freitas, A CNN–GNN–LSTM Hybrid Deep Learning for Multi-Agent Tactical Maneuver Prediction	on-line
S4.2	Abdullahi Abdulkadir , Alexander Gegov, Alexandar Ichtev, Farzad Arabikhan, Mo Adda, Okhiria Udebhulu, Aliyu Umar, Altaleb Alshenqiti and Dorris Jeruto, Intelligent Reservoir Characterization Through a Progressive Tiered AI Approach	on-line
S4.3	Mo Adda , Nancy Scheidt, Alexander Gegov, Fahad Ahmad, Pravin Ram Sivaraman and Alexandar Ichtev, Feature Extraction from AI generated songs	on-line
S4.4	Alaa Mohasseb , Inferring Conflict Fatalities from Event Narratives: A Comparative Evaluation of Text-Based Classification Models	on-line
S4.5	Sai Chaitanya Kumar Paidi , Context Freshness-Aware Query Serving in MCP-Enabled Distributed Enterprise Search Systems	on-line
S4.6	Alireza Izaddoost , Marsa Rayani and Amlan Chatterjee Evaluating Data Partitioning Strategies in Distributed Deep Learning for Fraud Detection	in-person

HALL 2

9:00 ÷ 10:30**SESSION 5 “APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 4”****Chairman: Assoc. Prof. Vladimir Hristov****Technical support: Assist. Prof. Aleksi Mochi**

S5.1	Dimitar Lyubchev and Angel Marchev Jr. , NEADS - an Improved Neuro-Evolution Method for Self-perfecting Modeling	in-person
S5.2	Teodora Hristova, Albena Taneva and Anastasia Velichkova, Using a Fuzzy Logic Approach as a Selection Criterion in Photovoltaic Applications of Sustainable Development	in-person
S5.3	Todor Georgiev , Edge-Native Time-Series Database: Integrating Real-Time Anomaly Filtering And Streaming Aggregation With Learned Indices	in-person
S5.4	Emanuil Markov , Identifying Caregiver Sick Leave Records in Bulgarian National Health Insurance Fund Ambulatory Data: A Two-Stage NLP Approach	in-person
S5.5	Emanuil Markov , GDPR-Compliant Pseudonymization Architecture for Multi-Source Healthcare Data: A Hardware-Secured Approach for Disease Registry Construction	in-person
S5.6	Albena Taneva , Machine Vision Defect Detection and Analysis in a Flexible Assembly System	in-person

10:30 ÷ 11:00 - COFFEE BREAK**11:00 ÷ 12:30****SESSION 6 “INDUSTRIAL AUTOMATION AND ROBOTICS”****Chairman: Assoc. Prof. Stanislav Enev****Technical support: Assist. Prof. Aleksi Mochi**

S6.1	Kostadin Slavov and Alexander Hotmar, How to make a modular and cost effective robotic system	in-person
S6.2	Plamen Kolev and Alexander Hotmar Design and Implementation of a PD Controller on an STM32 Microcontroller for a Dual-Rotor Thrust-Balancing Platform	in-person
S6.3	Boris Grasiani, Vesela Karlova-Sergieva, Nina Nikolova and Georgi Stefanov , Robust Fractional-Order Control of PWM Inverters under Parametric Uncertainty	in-person
S6.4	Matej Hanzalík and Juraj Paulech, A Conceptual Proposal for an Open-Source Methodology for Ansys ACT: A Preliminary Piezoresistive Study	in-person
S6.5	Martin Minkov , Energy Efficiency of SIMD-Vectorized Li-ion Battery Cluster Simulation on a Hybrid-Core CPU	in-person
S6.6	Stanislav Enev , Minimum-Fuel Control Of Second-Order Overdamped Plants with Arbitrary Initial Conditions	in-person

12:30 ÷ 14:00 - LUNCH BREAK**14:00 ÷ 15:45****SESSION 7 “ELECTRICAL ENGINEERING AND ROBOTICS”****Chairman: Assoc. Prof. Georgi Tzenov****Technical support: Assist. Prof. Ilian Georgiev**

S7.1	Aleksi Mocci and Nikolina Petkova, Analysis and Simulation of a Temperature Sensor: Using an NTC Thermistor, Voltage Divider, Low Pass Filtering and Output Linearization	in-person
S7.2	Ivan Trushev , Analysis of Passive Two-Port Networks – Part I: Parallel Connection of Two-Ports	in-person
S7.3	Ivan Trushev , Analysis of Passive Two-Port Networks – Part II: Series Connection of Two-Ports	in-person
S7.4	Georgi Tsenov , Ivan Trushev, Ivan Zaykov, Miroslav Nikolov and Rumen Valchev, ML methods and Deep Neural Networks for Early Diabetes Detection: A Web-Based Prototype of the DiagnoDoc System	in-person

S7.5	Stanimir Andonov, Stiliyan Georgiev, Georgi Tsenov , Passenger car driver experience case study with biosignal and magnetic field measurements	in-person
S7.6	Georgi Tsenov, Ivan Trushev, Stoyan Kirilov and Valeri Mladenov, Analysis of Memristor-Based Passive Filters	in-person

15:45 ÷ 16:00 - COFFEE BREAK

16:00 ÷ 17:30 SESSION 8 “ROBOTIC SYSTEMS AND INFORMATION MEASUREMENT TECHNOLOGY”

Chairman: Prof. Vladimir Hristov

Technical support: Assist. Prof. Martin Minkov

S8.1	Kamen Hristov , Design and Simulation of a LabVIEW Tool for Automated Temperature Testing in Automotive EOL Systems	on-line
S8.2.	Ivan Stoyanov and Docho Tsankov, Development and Implementation of an Intelligent HMI for Two-Axis Welding Manipulator Control in Small-Batch Wire Mesh Production	in-person
S8.3	Dimitar Mankov , Energy Optimization thru Constant Lighting Control and Automatic shutter control in buildings	in-person
S8.4	Antonia Pandelova, Ilian Georgiev , Nikolay Stoyanov and Bozhidar Dzhudzhev, Calibration of IoT-based System for Indoor Air Quality Monitoring	in-person
S8.5	Neven Kanchev , Nikolay Stoyanov, Georgi Mulishev, Simultaneous prediction of natural gas parameters by using an artificial neural network	in-person
S8.6	Vladimir Hristov, Ivan Shilov and Utkal Mehta ROS-Based Control Architecture and PID Synchronization of an Omni-Directional Mobile Robot	in-person

14 JUNE 2026 (Sunday)

HALL 1

9:30 ÷ 11:00 SESSION 9 “APPLICATION OF ARTIFICIAL INTELLIGENCE PART 5”

Chairman: Assoc. Prof. Vladislav Slavov

Technical support: Assist. Prof. Martin Minkov

S9.1	Rezier John Magno , Christian Jude Faminiano, Putli Rahema Usama and Odon Maravillas, Demand-Driven Traffic Signal Optimization: Minimizing Vehicular Delay Using YOLOv8 Computer Vision and Hardware in the Loop Validation	on-line
S9.2	John Kyle Alas-As , Ruderick Abalos, Adreanna Jade Esteban and Jason Catadman, Invasive Hybrid Recommendation-Based Scheduling with Pomodoro and Genetic Algorithm for Improving Office Worker Productivity	on-line
S9.3	Winmher Khan Mauludani , Pauline Joy Robin, Albert Tanael, Katrine Nicole Laque, Hisham Samsaraji and Ivy Francisco AquaNex: Enhancing Sustainable Milkfish (Chanos Chanos) Production Through Smart Water Quality and Security System Using Hybrid YOLOv5-LSTM Model	on-line

S9.4	Abdel Nasser Tindick, John Mhar Besas , Zachary Ipanto, John Lloyd Ledesma, Hazel Joy Dela Cruz and Gajil Santos GomaCheck: Portable Smart Sensor-Based Rubber Quality Checker Using YOLOv8 and Random Forest for Yellow Index Detection and Latex Classification	on-line
S9.5	Zhamyr Jibran Isahac , Joey Ezekiel Demaraye, Ahamd Shareef Sali, Geezel Larracochea, Marie Antoinette Regencia and Mary Grace Catong, Agrimate: Solar-Powered System for Optimized Soil Nutrients Management and Smart Irrigation for Enhanced Crop Yield	on-line
S9.6	Naureen Anne Ramirez, Chloie Kate Salatan , Andrie John Datuan, Zyka Crizhyl Tanoy, Shamila Tatu and Jocelyn Castillo, CrayTure: Smart Aquaculture System and Water Quality Monitoring for Australian Red-Claw Crayfish Farming using YOLOv11	on-line

11:00 ÷ 11:15 - COFFEE BREAK

11:15 ÷ 13:00

SESSION 10 “APPLICATION OF ARTIFICIAL INTELLIGENCE PART 6”

Chairman: Assoc. Prof. Aleksandar Ichtev

Technical support: Assist. Prof. Martin Minkov

S10.1	Sava Statkov , Simeon Stamboliyski and Georgi Hristov, Vision-Guided Rotational Inspection for Facet Width Evaluation in Robotic Processing of Optical Elements	on-line
S10.2	Mani Ghahremani , Hamidreza Khaleghzadeh, Jay Rawal, Alexander Gegov and Aleksandar Ichtev, Mathematical Success: A Review of Impact Factors and Predictive Analytics for Student Achievement	on-line
S10.3	Mohit Bhoir, Anna Rosner , Aleksandar Ichtev, Gelayol Golcarenenrenji and Alexander Gegov Explainability-Driven Decision Gating for Risk-Controlled Algorithmic Trading	on-line
S10.4	Atefeh Khazaei , Gelayol Golcarenenrenji, Alexander Gegov and Aleksandar Ichtev, Bimodal Fake News Detection Using Integrated Image and Text Analysis	on-line
S10.5	Khamar Sipin, Meryll Jae Evangelista, Al-Camlan Ocubillo , Claire Rojas, Marielle Angeles and Antonio Angelo Limbaga, ShroomTech: Automated Smart Greenhouse System for Oyster Mushroom Growth and Quality Detection using YOLOv5	on-line
S10.6	Rashideen Ahmad , Anthony Win Field Olivar, Vincent Rex Cardino, Bryan Kim Faustino, Kevin Marc Bejerano and Aylene Ingkoh FishSure: Smart Net-Attachable Device with Adaptive Acoustic and Illumination – Based Fish Attraction	on-line
S10.7	Weslie Shane Dacuba, John Paul Fernandez , Chor Angelo Baylosis, Imee Joyce Cresmundo, Princess Zaira Cabayacruz and Alvin Viola, iSeeWeeds: Smart Solar-Powered Sonar and Bioacoustic Fish Repellent for Protecting Eucheumatoid Seaweed Cultivation using Random Forest	on-line

13:00 ÷ 14:00 - LUNCH BREAK

14:00 ÷ 15:45

SESSION 11 “APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 7”

Chairman: Prof. Petia Georgieva

Technical support: Assist. Prof. Aleks Mochi

S11.1	Sarim Durrani, Anna Rosner , Alexander Ichtev, Alexander Gegov, Gelayol Golcarenenrenji and Mo Adda, Demystifying the Black Box: An Explainable AI Framework for Transparent Detection of Engine Assistance in Chess	on-line
S11.2	Robiyakhon Akhmedova , Generalizable and Explainable Multimodal Learning for Early Detection of Alzheimer's and Parkinson's Diseases: A Review	on-line
S11.3	Sunil Kumar Paidi , Learning-Based Adaptive Index Optimization for Distributed Enterprise Search Systems	on-line

S11.4	Sunil Kumar Paidi , Index-State Uncertainty Quantification for Trustworthy Retrieval-Augmented Generation in Distributed Enterprise Search	on-line
S11.5	Sunil Kumar Paidi , CascadeGuard: Topology-Aware Predictive Modeling for Preventing Cascading Failures in Distributed Search Systems	on-line
S11.6	Khushvir Singh , Robotics Applications in Autonomous Vehicles and Drones: Architectures, Deployments, and Future Trajectories	on-line
S11.7	Sandeep Deshmukh , Transformer-Based Analysis of Vocal Biomarker Features for Parkinson's Disease Classification	on-line

15:45 ÷ 16:00 - COFFEE BREAK

16:00 ÷ 17:30 SESSION 12 "APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 8"

Chairman: Prof. Asparuh Markovski,

Technical support: Asist. Prof. Aleks Mochi

S12.1	Simona Filipopva-Petrakieva , Mobile application for online control and booking of free parking spots	on-line
S12.2	Aaron McMillan and Gelayol Golcarenenrenji Comparative Evaluation of Object-Detection Models for MMA Fighter Localisation in Mixed Martial Arts Bouts	on-line
S12.3	Sai Chaitanya Kumar Paidi , COST-AWARE LLM INVOCATION STRATEGIES IN LARGE-SCALE ENTERPRISE SYSTEMS	on-line
S12.4	Vladimir Hristov and Alexander Todorov , Comparative Evaluation of Joint Space and Inverse Kinematics Based Pick and Place Programming for a myCobot 320 M5 Manipulator in ROS2/Gazebo	on-line
S12.5	Vladimir Hristov, Alexander Todorov and Bibhya Sharma, A Cyber-Physical ROS2 Laboratory Platform for Robotics and Automation Education	on-line
S12.6	Asparuh Markovski , Lidia Zaharieva, Christina Andreeva and Tسانislava Genova, Decision tree based preliminary analysis of insufficient data for classification of mixtures of sunflower and olive oil samples using laser-induced fluorescence spectroscopy	in-person
S12.7	Plamen Stanchev, Reni Kabakchieva and Nikolay Hinov. Comparative Analysis of PID, Q-Learning, and Model Predictive Control for DC–DC Converters	on-line

17:30 ÷ 17:45 - COFFEE BREAK

17:45 ÷ 18:30 SESSION 13 "APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 9"

Chairman: Prof. Asparuh Markovski

Technical support: Asist. Prof. Aleks Mochi

S13.1	Plamen Stanchev, Nikolay Hinov, Silvia Ivanova and Yordan Petkov. Adaptive Control of Road Traffic Through Intelligent Traffic Signal Systems: A review	on-line
S13.2	Plamen Stanchev, Nikolay Hinov, Reni Kabakchieva , Atakan Salimov and Adnan Redjeb. Control System Challenges in the Energy Sector in the Context of Electricity 5.0	on-line
S13.3	Plamen Stanchev, Nikolay Hinov, Silvia Ivanova and Yordan Petkov. Challenges in Intelligent Traffic Management within Smart City Environments: A comprehensive review	on-line

HALL 2**9:30 ÷ 11:00****SESSION 14 “APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 10”****Chairman: Assoc. Prof. Stanislav Enev****Technical support: Assist. Prof. Ilian Georgiev**

S14.1	Naga Vyshnavi Konduri , Cloud-Ledger Railways for Regulated Banking Microservices	on-line
S14.2	Naga Vyshnavi Konduri, Mixed-Mandate Momentum: Designing Universal-Bank Investment Banking for Scale and Control	on-line
S14.3	Naga Vyshnavi Konduri , Runbooks and Risk: Banking IT Support in Action	on-line
S14.4	Jennifer Pilante and Jesus Paguigan, Smart Vision-Based Inventory System for Real-Time Sack Monitoring and Predictive Stock Optimization	on-line
S14.5	Salma Anika and Leonard L. Alejandro, Vision Aid: A Mobile Application using Computer Vision and Machine Learning to Enhance Color Perception for Color blind users through Multisensory Feedback	on-line
S14.6	Aditya Kad, Gaurang Panganti, Yash Takwane and Vaishali Kuralkar, An AI-Based Virtual Interview Evaluator for Communication Assessment	on-line

11:00 ÷ 11:15 - COFFEE BREAK**11:15 ÷ 12:00****SESSION 15 “INFORMATION MEASUREMENT TECHNOLOGY”****Chairman: Assoc. Prof. Docho Tzankov****Technical support: Assist. Prof. Ilian Georgiev**

S15.1	Aleksandar Dimitrov , Nikolay Stoyanov, Ambient air quality and its impact on human health – short review	in-person
S15.2	Aleksandar Dimitrov , Nikolay Stoyanov, Effect of particulate matter on cardiovascular and neurological diseases – a narrative review	in-person
S15.3	Nikolay Stoyanov, Aleksandar Dimitrov , Antonia Pandelova, Bozhidar Dzhudzhiev, Long-term exposure to ozone and hypertension incidence – a cohort study in Sofia, Bulgaria	in-person