

2025 XXX International Conference on Information, Communication and Automation Technologies (ICAT 2025)

**Sarajevo, Bosnia and Herzegovina
2-4 September 2025**



**IEEE Catalog Number: CFP2591G-POD
ISBN: 979-8-3315-7533-5**

**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:	CFP2591G-POD
ISBN (Print-On-Demand):	979-8-3315-7533-5
ISBN (Online):	979-8-3315-7532-8
ISSN:	2379-3791

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

2025 XXX International Conference on Information, Communication and Automation Technologies (ICAT)

S1 (Robotics and Real-World Automation)

<i>Multi-functional Active Markers for Motion Tracking with RGB and Event-based Cameras</i> Jasmin Hadzajic (Microwee d.o.o. Sarajevo, Bosnia and Herzegovina), Emir Sokic (University of Sarajevo, Bosnia and Herzegovina), Anes Vrce (University of Sarajevo, Bosnia and Herzegovina), Adnan Kreho (NXP Semiconductors Austria, Austria), Nedim Osmic (University of Sarajevo & Faculty of Electrical Engineering, Bosnia and Herzegovina), Almir Salihbegovic (University of Sarajevo, Bosnia and Herzegovina)	1
<i>Search-Based Robot Motion Planning With Distance-Based Adaptive Motion Primitives</i> Benjamin Kraljušić (University of Sarajevo, Bosnia and Herzegovina), Zlatan Ajanovic (RWTH Aachen University, Germany), Nermin Čović (University of Sarajevo, Bosnia and Herzegovina), Lačević Bakir (University of Sarajevo, Bosnia and Herzegovina)	7
<i>Vision-Guided Robotic Automation for Materials Informatics: Enabling Autonomous Additive Manufacturing in Self-Driving Laboratories</i> Amer Sarajlić (University of Zenica, Bosnia and Herzegovina), Lejla Banjanovic-Mehmedovic (University of Tuzla, Bosnia and Herzegovina), Francesco Mercuri (Consiglio Nazionale delle Ricerche, Italy)	13
<i>Using Visual Language Models to Control Bionic Hands: Assessment of Object Perception and Grasp Inference</i> Ozan Karaali (Aalborg University, Denmark), Hossam Farag (Aalborg University, Denmark), Čedomir Stefanović (Aalborg University, Denmark), Strahinja Dosen (Aalborg University, Denmark)	19

S2 (AI Applications in Healthcare and Medical Diagnostics)

<i>Enhanced Skin Cancer Diagnosis Using a CAD System with CNN Feature Extraction and GKSO-Optimized Classification</i> Malak Bouali (University of Sharjah, United Arab Emirates), Hessa Aldhanhani (University of Sharjah, United Arab Emirates), Leen W. Abu-Hamdeh (University of Sharjah, United Arab Emirates), Fatima Rashid (University of Sharjah, United Arab Emirates), Pravija Raj (University of Sharjah, United Arab Emirates), Ahmed Khedr (UOS, United Arab Emirates)	25
<i>Long-Term Forecasting of Alzheimer's Disease Progression Using Time-Aware Models</i> Naida Solak (Arti Analytics Inc., USA), Adnan Sabanovic (Arti Analytics Inc., USA), Hana Dedovic (Arti Analytics Inc., USA), Tarik Hubana (ARTI Analytics, USA), Migdat Hodzic (International University of Sarajevo, Bosnia and Herzegovina), Adnan Fojnica (Technical University of Munich, Germany), Adnan Mesalic (Mindspan Inc., USA)	31
<i>Performance Evaluation of Image Compression Algorithms for Medical Retinal Images</i> Altuğ Şimşek (Boğaziçi University, Turkey), İlke Bahçeci Şimşek (Yeditepe University, Turkey), Gunhan Dündar (Bogazici University, Turkey)	37
<i>Parallel DNA sequencing using exact string-matching algorithms for multiple patterns</i> Dženana Terzić (University of Sarajevo, Bosnia and Herzegovina), Naida Pita (University of Sarajevo, Bosnia and Herzegovina), Nejla Bećirspahić (University of Sarajevo, Bosnia and Herzegovina), Dženis Muhić (University of Sarajevo, Bosnia and Herzegovina)	42

S3 (Modern Power Systems and Energy Management)

<i>Analyses of Aging Mechanism of Composite Polymer Insulators with Simulation Support using Comsol Mph</i> Mirza Batalović (Faculty of Electrical Engineering, Bosnia and Herzegovina), Mirza Matoruga (Elektroprenos - Elektroprijenos BiH, Bosnia and Herzegovina), Emir Buza (University of Sarajevo, Bosnia and Herzegovina), Senad Smaka (University of Sarajevo, Faculty of Electrical Engineering, Bosnia and Herzegovina)	48
<i>Regional Inertia Estimation of Power Systems Using Empirical Mode Decomposition and Frequency Response Analysis</i> Maja Muftić Dedović (University of Sarajevo, Bosnia and Herzegovina), Samir Avdaković (University of Sarajevo, Bosnia and Herzegovina), Ajdin Alihodžić (University of Sarajevo, Bosnia and Herzegovina), Nedis Dautbašić (University of Sarajevo, Bosnia and Herzegovina), Adin Memić (University of Sarajevo, Bosnia and Herzegovina), Adnan Mujezinović (University of Sarajevo & Faculty of Electrical Engineering, Bosnia and Herzegovina)	54
<i>Modeling tram power consumption using multilayer perceptron and feature engineering</i> Nermin Čolo (University of Sarajevo, Bosnia and Herzegovina), Izudin Džafić (University of Sarajevo, Bosnia and Herzegovina)	60
<i>Discrete Time Sliding Mode Based Voltage Controller of a DC-DC Boost Converter with Integrated Disturbance Estimator</i> Lejla Ahmethodzic (University of Sarajevo, Bosnia and Herzegovina), Senad Huseinbegovic (University of Sarajevo, Bosnia and Herzegovina)	66

S4 (Environmental Monitoring and Smart Cities)

<i>Immersive Virtual Reality Safety Education/Training of Young Adults</i> Džeja Omerhodžić (SSST, Bosnia and Herzegovina), Belma Ramic-Brkic (SSST, Bosnia and Herzegovina)	72
<i>Long-Horizon Prediction of PM10 Concentrations in Sarajevo Using FB Prophet and SHAP</i> Fatima Kaljanac (University of Sarajevo, Bosnia and Herzegovina), Amina Mević (University of Sarajevo, Bosnia and Herzegovina), Senka Krivic (University of Sarajevo, Bosnia and Herzegovina)	78
<i>Benchmarking RGB Image Segmentation of Arabidopsis thaliana using Encoder-Decoder Models</i> Rijad Saric (La Trobe University, Australia), Stefani Kecman (University of Freiburg, Germany), Amila Akagic (University of Sarajevo, Bosnia and Herzegovina), Edhem Custovic (Photon Systems Instruments, Czech Republic), Mathew Lewsey (La Trobe University, Australia), James Whelan (Zhejiang University, China)	84
<i>Deep Learning-Enhanced Monitoring and Analysis of Leaf Traits of Arabidopsis thaliana</i> Emina Efendic (University of Sarajevo, Bosnia and Herzegovina), Amila Akagic (University of Sarajevo, Bosnia and Herzegovina), Emir Buza (University of Sarajevo, Bosnia and Herzegovina), Rijad Saric (La Trobe University, Australia), Mathew Lewsey (La Trobe University, Australia), Edhem Custovic (Photon Systems Instruments, Czech Republic), James Whelan (Zhejiang University, China)	90

S5 (Autonomous Navigation and Vehicle Localization)

<i>Scenario-Based Hierarchical Reinforcement Learning for Automated Driving Decision Making</i> Mahmoud Youssef Abdelhamid (RWTH Aachen University, Germany), Lennart Vater (RWTH Aachen University, Germany), Zlatan Ajanovic (RWTH Aachen University, Germany)	96
<i>A ROS 2-Based Guidance System for Agricultural Vehicles: Architecture and Algorithm Design</i> Mateusz Nijak (Lukasiewicz - Poznan Institute of Technology & Poznan University of Technology, Poland), Piotr Skrzypczynski (Poznan University of Technology, Poland)	102
<i>Leveraging Distance Information to Compute Collision-Free Volumes in Robot Configuration Space</i> Dženan Kreho (University of Sarajevo, Bosnia and Herzegovina), Nermin Čović (University of Sarajevo, Bosnia and Herzegovina), Lačević Bakir (University of Sarajevo, Bosnia and Herzegovina)	110

S6 (Generative and Multimodal Artificial Intelligence)

<i>Generating Music Using Deep Learning</i> Selma Kurtović (University of Sarajevo, Bosnia and Herzegovina), Arman Hasanbegović (University of Sarajevo, Bosnia and Herzegovina), Senka Krivic (University of Sarajevo, Bosnia and Herzegovina)	116
<i>PARTNR: Pick and place Ambiguity Resolving by Trustworthy Interactive Learning</i> Jelle D Luijckx (Delft University of Technology, The Netherlands), Zlatan Ajanovic (RWTH Aachen University, Germany), Laura Ferranti (Delft University of Technology, The Netherlands), Jens Kober (TU Delft, The Netherlands)	122
<i>Beyond Traditional Models: Hyper-Tuned 3D BiLSTM Architectures for Enhanced Financial Risk Prediction</i> Adaleta Gicic (University of Sarajevo & Endava, Bosnia and Herzegovina), Dzenana Donko (Bosnia and Herzegovina)	128
<i>PDDL-Guided Robot Cloth Folding from Simulation to Real World</i> Aldin Dželo (University of Sarajevo, Bosnia and Herzegovina), Adna Šestić (University of Sarajevo, Bosnia and Herzegovina), Andrej Gams (Jožef Stefan Institute, Slovenia), Senka Krivic (University of Sarajevo, Bosnia and Herzegovina)	134

S7 (Edge AI and Embedded IoT Systems)

<i>Edge-Compatible Deep Learning for Biometric Identification from Wrist-Worn PPG Signals</i> Oguz Kagnici (Bogazici University, Turkey), Yekta S Can (Tatilsepeti, Turkey), Fatih Alagoz (Bogazici University, Turkey)	140
<i>Edge AI-based LSTM Voice-Controlled Mobile Robot for Industrial Pipe Inspection</i> Muhibija Kavazovic (Camozzi Digital & Mehatronics BH, Bosnia and Herzegovina), Lejla Banjanovic-Mehmedovic (University of Tuzla, Bosnia and Herzegovina)	146
<i>LDPC Decoding via Processing-in-Memory for Mobile and Wireless Communications</i> Mojtaba Mahdavi (Ericsson, Sweden)	152
<i>MAPFL: GNSS-Free Map-Based Particle Filter Localization for Autonomous Vehicles</i> Syeda Zillay Nain Zukhruf (University of Tartu, Estonia), Naveed Muhammad (University of Tartu, Estonia)	158

S8 (Cybersecurity and Intelligent Communication Systems)

<i>Real-Time Detection of Polymorphic Malware Using AI and Synthetic Data Augmentation</i> Pallavi (Manipal University Jaipur, India), Sandeep Joshi (Manipal University Jaipur, India), Amit Kumar Bairwa (Manipal University Jaipur, India)	165
<i>Scalable Wi-Fi RSS-Based Indoor Localization via Automatic Vision-Assisted Calibration</i> Abdulkadir Bilge (Koc University, Turkey), Erdem Ergen (Koc University, Turkey), Burak Soner (Koc University, Turkey), Sinem Coleri (Koc University, Turkey)	171
<i>Secrecy Outage Performance Analysis over Composite Gamma-Shadowed Two-Ray with Diffuse Power Fading Channels</i> Pamela Njemčević (University of Sarajevo, Bosnia and Herzegovina), Almir Maric (University of Sarajevo, Bosnia and Herzegovina)	177