13th International Conference on Intelligent Control and Information Processing (ICICIP 2025)

February 6-11, 2025
Abu Dhabi, UAE &
Muscat, Oman

ICICIP 2025 Final Program

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Welcome Messages

On behalf of the Organizing Committee of the 13th International Conference on Intelligent Control and Information Processing (ICICIP 2025), we are pleased to welcome you to this event, which will take place in Muscat, Oman, and online from February 6–11, 2025. Building on the success of previous events, ICICIP has become a well-established series of popular and high-quality conferences in intelligent control and information processing. ICICIP 2025 aims to provide a high-level international forum for scientists, engineers, and educators to present the latest advancements in intelligent control and information processing research and their applications in related fields. The conference will feature plenary speeches by world-renowned scholars, regular sessions with broad coverage, and special sessions focusing on trending topics.

This year, the conference received 91 submissions from 10 countries worldwide. Each submission was reviewed by at least two and, on average, three program committee members. After rigorous peer reviews, the committee accepted 56 papers for publication in the proceedings, resulting in an acceptance rate of 61.5%. These papers cover a wide range of topics, including theory, methodology, and applications. In addition to the contributed papers, the conference's technical program featured a keynote speech by the renowned scholar Prof. Marios M. Polycarpou from the University of Cyprus, Cyprus (IEEE Fellow, IFAC Fellow, 2023 IEEE Frank Rosenblatt Technical Field Awardee, 2016 IEEE Neural Networks Pioneer Awardee, Past President of the IEEE Computational Intelligence Society, and Past Editor-in-Chief of the *IEEE Transactions on Neural Networks and Learning Systems*). The program also included an invited speech for the workshop by Prof. Dongbin Zhao (IEEE Fellow) from the Institute of Automation, Chinese Academy of Sciences, and University of Chinese Academy of Sciences, China.

Many organizations and volunteers contributed greatly to the success of this conference. We would like to express our sincere gratitude to Texas A&M University at Qatar and City University of Hong Kong for their co-sponsorship, and to the IEEE Systems, Man, and Cybernetics Society for its technical co-sponsorship. We also extend our heartfelt thanks to all the committee members for their efforts in organizing the conference. Special thanks go to the program committee members and reviewers, whose insightful reviews and timely feedback ensured the high quality of the accepted papers and the smooth flow of the conference. Finally, we would like to thank all the speakers, authors, and participants for their support.

Tingwen Huang and Han-Xiong Li, *General Chairs*
Jawher Ghommam, Yasser Al Wahedi, and Jun Wang, *Organizing Chairs*
Jianchao Fan, Rushi Lan, and Nian Zhang, *Program Chairs*

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Program at a Glance

February 7, 2025

Classroom #1, Mohamed bin Zayed University of Artificial Intelligence (MBZUAI)	
14:30 - 14:35	Welcome Speech
14:35 - 15:20	Invited Talk by Professor Dongbin Zhao
15:20 - 16:40	Pre-conference Workshop

February 8, 2025

Transit from UAE to Oman

February 9, 2025

Ballroom Julnar B (first floor right wing), Hotel Royal Tulip Muscat	
8:30 - 9:20	Registration and Refreshments
9:20 - 9:30	Opening Ceremony
9:30 - 10:30	Plenary Speech: Professor Marios M. Polycarpou
10:30 - 11:00	Coffee break
11:00 - 12:40	S1: Machine Learning
12:40 - 14:40	Lunch break (Wave Restaurant)
14:40 - 17:00	S2: Intelligent Systems
18:00 - 19:30	Banquet (Wave Restaurant)

February 10, 2025

Online Sessions	
8:00 - 12:00	S3: Machine Learning & Applications
12:00 - 13:00	Lunch break
13:00 - 16:20	S4: Control & Robotics

February 11, 2025

Online Session	
8:00 - 12:40	S5: Information Processing & Applications

NB: The conference is scheduled in a hybrid mode with both onsite sessions and online sessions. All times are in local zone. Muscat and Abu Dhabi time is four (4) hours behind Beijing time, one hour ahead of Istanbul time and nine hours ahead of New York Time.

Plenary Speech

Title: Connecting AI to the Cyber-Physical World

Professor Marios M. Polycarpou, University of Cyprus, Cyprus

Abstract

The development of cyber-physical systems with multiple sensor/actuator components and feedback loops has given rise to advanced automation applications, including energy and power, intelligent transportation, water systems, manufacturing, etc. Traditionally, feedback control has focused on enhancing the tracking and robustness performance of the closed-loop system; however, as cyber-physical systems become more complex and interconnected and more interdependent, there is a need to refocus our attention not only on performance but also on the resilience of cyber-physical systems. In situations of unexpected events and faults, computational intelligence can play a key role in improving the fault tolerance of cyber-physical systems and preventing serious degradation or a catastrophic system failure. The goal of this presentation is to provide insight into the design and analysis of intelligent monitoring methods for cyber-physical systems, which will ultimately lead to more resilient societies.

Marios Polycarpou is a Professor of Electrical and Computer Engineering and the President of the Advisory Board of the KIOS Research and Innovation Center of Excellence at the University of Cyprus. He is also a Founding Member of the Cyprus Academy of Sciences, Letters, and Arts, an Honorary Professor of Imperial College London, and a Member of Academia Europaea (The Academy of Europe). He received the B.A degree in Computer Science and the B.Sc. in Electrical Engineering, both from Rice University, USA in 1987, and the M.S. and Ph.D. degrees in Electrical Engineering from the University of Southern California, in 1989 and 1992 respectively. His teaching and research interests are in intelligent systems and networks, adaptive and learning control systems, fault diagnosis, machine learning, and critical infrastructure systems. Prof. Polycarpou is the recipient of the 2023 IEEE Frank Rosenblatt Technical Field Award and the 2016 IEEE Neural Networks Pioneer Award. He is a Fellow of IEEE and IFAC. He served as the President of the IEEE Computational Intelligence Society (2012-2013), as the President of the European Control Association (2017-2019), and as the Editor-in-Chief of the IEEE Transactions on Neural Networks and Learning Systems (2004-2010). Prof. Polycarpou currently serves on the Editorial Boards of the Proceedings of the IEEE and the Annual Reviews in Control. His research work has been funded by several agencies and industry in Europe and the United States, including the prestigious European Research Council (ERC) Advanced Grant, the ERC Synergy Grant and the EU-Widening Teaming program.

Invited Speech

Title: Reinforcement Learning Assisted Large Models and Embodied Intelligence

Professor Dongbin Zhao, IEEE Fellow
Chinese Academy of Sciences and the University of Chinese Academy of Sciences, China

Abstract

Large models and embodied intelligence are hot directions in the field of artificial intelligence, where reinforcement learning methods play a significant role in their development. This report first introduces the basic concepts and scope of reinforcement learning, then elaborates on its supporting role in the development of large models and embodied intelligence, and finally shares the research work of the team in applying related methods to the fields of robotics and autonomous driving.

Dongbin Zhao is a professor with the Institute of Automation, Chinese Academy of Sciences, and the University of Chinese Academy of Sciences, China. Dr. Zhao serves as several Associate Editors, including IEEE Transactions on Systems, Man and Cybernetics: Systems, and IEEE Transactions on Artificial Intelligence. He is involved in organizing many international conferences, including General Chair of IEEE Conference on Games 2022. He has published 9 books, and over 300 international journal and conference papers, including the Outstanding/Best Paper Award of IEEE TASE, TETCI, and TCDS. His current research interests lie in deep reinforcement learning, large models and embodied intelligence, smart driving, game artificial intelligence, robotics, etc. He is an IEEE Fellow.

Pre-conference Workshop

February 7, 2025

Classroom #1, Mohamed bin Zayed University of Artificial Intelligence
(MBZUAI), Abu Dhabi, UAE

Zoom link: https://cityu.zoom.us/j/81948795180 (ID: 819 4879 5180)

14:30 - 14:35 Welcome Speech

14:35 - 15:20 Invited Speech by Prof. Dongbin Zhao
Reinforcement Learning Assisted Large Models and Embodied Intelligence

15:20 - 15:40 *Pseudoinverse Learning Algorithm as a Unified Framework for Normalization in Deep Learning*
Ping Guo, Xiyan Deng, Yuping Wang

15:40 - 16:00 *Bi-clustering of Binary Data via Neurodynamics-driven Binary Matrix Factorization*
Hongzong Li, Jun Wang

16:00 - 16:20 *A Discrete-Time Collaborative Neurodynamic Approach to Distributed Global Optimization*
Haoen Huang, Zhigang Zeng, Jun Wang

16:20 - 16:40 *Automated Motion System of 5-DOF Hybrid Serial-Parallel Manipulator for Invasive Medical Procedures*
Khaled El Haj Youssef, Abdelrahman M. Abdeldaim, Ahmed E. Abdelrahman, Mohanad M. H. Ismail, Mohammad Alkhedher

Main Conference

February 9, 2025
Ballroom Julnar B (first floor right wing), Hotel Royal Tulip Muscat
Zoom link: https://cityu.zoom.us/j/86201259617 (ID: 862 0125 9617)

8:30 - 9:20   Registration and Refreshments

9:20 - 9:30   Opening Ceremony

9:30 - 10:30   Keynote Speech by Prof. Marios M. Polycarpou
               Connecting AI to the Cyber-Physical World

10:30 - 11:00 Coffee break

S1: Machine Learning
Chairs: Xiaodong Gu and Shuang Cong
Room: Julnar B

11:00 - 11:20 *A Quantum Phase Neuron*
               Shuang Cong

11:20 - 11:40 *A Framework for Solving Quadratic Knapsack Problem Based on
               Deep Reinforcement Learning*
               Jiajia Huang, Shijie Zhao, Xiaoyu Fu, Shenshen Gu

11:40 - 12:00 *Quantifying Bird Strikes due to Migration from a Machine Learning
               Perspective*
               Murari B. Deshpande, Netra D. Patel, P.M. Mayank, N.P. Pragashri, Prema
               Ramasamy

12:00 - 12:20 *Natural Language Processing in Albanian Language*
               Enda Alidema, Trime Ismajli, Jetmir Gjoni, Eliot Bytyci

12:20 - 12:40 *High-Precision Face Generation and Manipulation Guided by Text, Sketch,
               and Mask*
               Qi Guo, Xiaodong Gu

12:40 - 14:40 Lunch in Wave Restaurant (ground floor)

S2: Intelligent Systems
Chairs: Jawhar Ghommam and Shaik Rafi Ahamed
Room: Julnar B

14:40 - 15:00 *Adaptive Prescribed Time Path Following Controller for Underactuated
               Surface Vessels*
               Jawhar Ghommam, Maarouf Saad, Quanmin Zhu, Mohammad Rahman

15:00 - 15:20 *Filtered Sliding Mode Tracking Controller Design for Robot Joint Using
               Linear Matrix Inequalities*

Lotfi Mostefai, Brahim Brahmi, Angel Valera, Valles Marina

15:20 - 15:40   *TAPNet: Tunnelled Asymmetric Pyramid Network for Achieving a Pragmatic Semantic Segmentation Solution for Autonomous Driving*
Nadeem Atif, Saquib Mazhar, M.K. Bhuyan, Shaik Rafi Ahamed

15:40 - 16:00   *Tensor Decomposition-Based Feature Transfer Learning for BCI Applications*
Zahra Sohrabi Bonab, Mohammad B. Shamsallahi

16:00 - 16:20   *Intelligent Supplier Evaluation and Selection Module for Fast-Moving Consumer Goods*
Sultan Ceren Oner, Ahmet Tugrul Bayrak, Bekir Berker Turker

16:20 - 16:40   *Exploring the Role of Large Language Models in Product Bundling*
Ahmet Tugrul Bayrak, Alper Kaplan

19:00 - 20:30   Banquet in Wave Restaurant (ground floor)

February 10, 2025

S3: Machine Learning & Applications
Chairs: Zhongying Chen and Mahsa Tavasoli
Zoom link: https://cityu.zoom.us/j/87666589767 (ID: 876 6658 9767)

8:00 - 8:20   *Does Federated Learning Improve the Resiliency of Machine Learning Models Against Data Fault Attacks?*
Mahsa Tavasoli, Abdolhossein Sarrafzadeh, Ahmad Patooghy

8:20 - 8:40   *Integrating the Dynamic Optimization Strategies of Adam and AdaGrad*
Zhixuan Huang, Xiaonan Luo

8:40 - 9:00   *Optimization Algorithm for Global K-means Algorithm*
Sen Li, Fang Li, Xiaonan Luo

9:00 - 9:20   *Decentralized Federated Learning with Auto-switchable Local Optimizers*
Ting Li, Zhongyi Chang, Zhiyao Pan, Shaofu Yang, Wenying Xu, Zhongying Chen

9:20 - 9:40   *Contrastive Learning Regularization Method for Information Extraction of Marine Floating Raft Aquaculture*
Chu Chu, Jun Xing, Xinzhe Wang, Jianchao Fan

9:40 - 10:00   *IRSEnet: Differentially Private Image Generation with Multi-Scale Feature Extraction and Residual Channel Attention*
Jiahao Li, Zhongshuai Wang, Kamarul Hawari Bin Ghazali, Suqing Yan, Rushi Lan, Xiyan Sun, Xiaonan Luo

| 10:00 - 10:20 | *Multi-Scale Fusion and Saliency Suppression Network for Fine-Grained Visual Classification* |
| | Tong Guo, Zhuozhen Wei, Cheng Pang, Rushi Lan, Chaoyi Huang, Jiahao Li |

| 10:20 - 10:40 | A Defect Detection Method for Artificial Leather Based on YOLOv5 |
| | Wenbin Chen, Xiaonan Luo, Xiaoshu Zhu |

| 10:40 - 11:00 | *Research on Mango Ripeness Based on YOLO* |
| | Tiezheng Qiao, Xiaonan Luo, Xiaoshu Zhu |

| 11:00 - 11:20 | *Cross-Organization Single-Cell Transcriptome Data Clustering Methods* |
| | Xiaoshu Zhu, Dong Liang |

| 11:20 - 11:40 | *Insulators Defect Detection for Power Grid Based on Improved YOLOv7 Algorithm* |
| | Zhiwei Zhang, Yan Zhuang, Zhida Liang, Shuai Kong, Shengyi Zhu |

| 11:40 - 12:00 | *MSAFNet: Integrating Multi-Scale and Self-Modulated Attention for Comprehensive Feature Representation* |
| | Zhuozhen Wei, Tong Guo, Cheng Pang, Rushi Lan, Chaoyi Huang, Jiahao Li |

| 12:00 - 13:00 | **Lunch Break** |

S4: Control & Robotics
Chair: Wing Ng and Peng Liu
Zoom link: https://cityu.zoom.us/j/87666589767 (ID: 876 6658 9767)

| 13:00 - 13:20 | *Anti-swing Control Strategies for Unmanned Overhead Cranes Based on Embodied Intelligence* |
| | Shengyu Lu, Xinyi Le, Hesheng Wang, Yuan Shan |

| 13:20 - 13:40 | *Motion-Force Control for Redundant Robots with Orientation Maintenance* |
| | Qinru Yang, Xuan Gu, Rongshen He |

| 13:40 - 14:00 | *Invariant Set Analysis and Control Synthesis of Multi-Equilibrium Switched Systems under Control Constraints* |
| | Yuejiang Han, Lixian Zhang, Yihang Ding, Yifei Dong, Ye Liang |

| 14:00 - 14:20 | *Clustering Algorithm for Vessel Trajectory Anomaly Detection Based on Binary Hashing Method* |
| | Yuhan Liang, Wing W. Y. Ng, Qihua Li, Xing Tian, Xiong Su, Qin Qiu, Zhengzhi Hou |

| 14:20 - 14:40 | *A Neurodynamic Approach for Distributed Optimization with Delayed Feedback* |
| | Yucheng Qi, Mengxin Wang, Xinrui Jiang, Sitian Qin |

14:40 - 15:00	*Fractional-order Adaptive Sliding Mode Projective Synchronization of Different Hyperjerk Systems* Baojie Zhang, Changchao Liu, Zhiyuan Zhu, Yuming Feng, Longzhou Cao
15:00 -15:20	*A Recurrent Neural Network Based Bicriteria Repetitive Motion Collision Avoidance Scheme for Motion Planning of Dual Redundant Manipulators* Shirui Chen, Huanli Gao, Shaolin Hu, Zhijun Zhang
15:20 - 15:40	*A Hybrid Intelligent Control Strategy to Improve the Stability of Wind-PV-thermal-bundled System* Guolong Zeng, Peng Liu, Jiahao Xu, Mengjie Zhu, Haoyu Li
15:40 - 16:00	*Neural Dynamics Incorporated Noise-Resistance Bi-criteria Scheme for Redundant Manipulators* Junde Cheng, Xiaohai Chen
16:00 – 16:20	*Improved LYT-Net Image Enhancement Model for Underwater Robotics Vision* Wenjie Li, Xiaonan Luo

February 11, 2025

S5: Information Processing & Applications
Chairs: Nian Zhang and Rushi Lan
Zoom link: https://cityu.zoom.us/j/87015029126 (ID: 870 1502 9126)

8:00 - 8:20	*Semantic Neuroanatomical Segmentation of Brain MRI Scans Using Pretrained SynthSeg Neural Network* Kaiya Baker-Adell, Nian Zhang, Max Denis
8:20 - 8:40	*WeCAViT: A Weighted CNN Model for Pneumonia Detection in Chest X-rays* Arnur Jumabekov, Maryam Yashtini
8:40 - 9:00	*Efficient and Accurate Two-step Sequence-based Loop Closure Detection* Dezhi Jin, Xucan Chen, Zhe Liu, Ruihao Li, Wei Yi
9:00 - 9:20	*Attitude Detection Model Based on Improved High Resolution Network* Dongliang Shi, Yuhan Li, Xiaonan Luo
9:20 - 9:40	*Application of the CTPN-CRNN Model with Attention Mechanism in Scene Text Recognition* Weijie Zhang, Xiaonan Luo, Xiaoshu Zhu
9:40 - 10:00	*A Fully Sparse Detector with Cascade Heads for LiDAR-based 3D Object Detection* Junnan Chen, Gang Zhang, Xiaolin Hu, Zhigang Zeng

10:00 - 10:20   *Tomato Leaf Disease Identification and Growth Dataset Augmentation Based on UAE-GAN*
Xin Li, Fang Li, Xiaonan Luo

10:20 - 10:40   ISP Based Degradation Model for Infrared-Visible Image Fusion
Xueyi Guo, Yisha Liu, Weimin Xue, Zhiwei Zhang

10:40 - 11:00   Multi-OP: A Multilevel Model for Orbital Prediction Using Multi-Feature Fusion
Qinghao Chu, Zhelong Wang, Yu Jiang, Pengrong Hou, Pinliang Zhang

10:40 - 11:00   A Non-Intrusive Load Monitoring Method Based on Relative Position Matrix and Residual Network
Jin-Yang Huang, Chun-Hua Chen,Yunwei Yan, Yi Jiang, Jun Zhang, Zhi-Hui Zhan

11:00 - 11:20   A Novel LSTM Optimized by Neurodynamic Network for Heat Prediction of Power Equipment
Huang Wei, Minghao Zhu, Shiyuan Zheng, Yaofa Wu, Yansheng Zhang, Zhijun Zhang

11:20 - 11:40   *Underwater Image Restoration Based on Improved SwinIR Model*
Yanke Lu, Fang Li, Xiaonan Luo

11:40 - 12:00   *Research on Collaborative Filtering Algorithm of E-commerce Based on Flink*
Haohao Zheng, Xiaonan Luo, Xiaoshu Zhu

12:00 - 12:20   *Portfolio Optimization and Risk Assessment Based on Random Weighting, Markowitz Mean-Variance Model and Genetic Algorithm*
Lai Ming, Guici Chen

12:20 - 12:40   *Strong Initial State Discrete Noise-Resistant Zeroing Neurodynamics for Solving Systems of Nonlinear Equations and Its Applications*
Chuncheng Chen, Xiuchun Xiao, Zhiyuan Song, Dongyang Fu

-Adjournment-

Floor Plan at the Conference Venue (Hotel Royal Tulip Muscat)