



**The 2022 Eighteenth
International Conference on
Intelligent Computing**

**August 7-11, 2022
Xi'an, China**

**The 2022 Eighteenth International
Conference on Intelligent Computing**

**FINAL
PROGRAM**

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Outlines

Welcome Message	4
ICIC2022 Organization	6
Sponsors	19
General Information	20
Schedule Overview	21
Introduction of Plenary Speakers	22
Parallel Sessions for Oral Presentations	27
Parallel Sessions for Workshops	27
Detailed Parallel Sessions for Oral Presentations	28
Detailed Parallel Sessions for Workshops	37

WELCOME MESSAGE FROM GENERAL CHAIRS

The International Conference on Intelligent Computing (ICIC) was started to provide an annual forum dedicated to the emerging and challenging topics in artificial intelligence, machine learning, pattern recognition, bioinformatics, and computational biology. It aims to bring together researchers and practitioners from both academia and industry to share ideas, problems, and solutions related to the multifaceted aspects of intelligent computing.

ICIC 2022, held in Xi'An, China, August 7-11, 2022, constituted the 18th International Conference on Intelligent Computing. It built upon the success of ICIC 2021 (Shenzhen, China), ICIC 2020 (Bari, Italy), ICIC 2019 (Nanchang, China), ICIC 2018 (Wuhan, China), ICIC 2017 (Liverpool, UK), ICIC 2016 (Lanzhou, China), ICIC 2015 (Fuzhou, China), ICIC 2014 (Taiyuan, China), ICIC 2013 (Nanning, China), ICIC 2012 (Huangshan, China), ICIC 2011 (Zhengzhou, China), ICIC 2010 (Changsha, China), ICIC 2009 (Ulsan, South Korea), ICIC 2008 (Shanghai, China), ICIC 2007 (Qingdao, China), ICIC 2006 (Kunming, China), and ICIC 2005 (Hefei, China).

This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was "Advanced Intelligent Computing Technology and Applications". Papers that focused on this theme were solicited, addressing theories, methodologies, and applications in science and technology. ICIC 2021 received 449 submissions from 21 countries and regions. All papers went through a rigorous peer-review procedure and each paper received at least three review reports. Based on the review reports, the Program Committee finally selected 209 high-quality papers for presentation at ICIC 2022, included in three volumes of proceedings published by Springer: two volumes of Lecture Notes in Computer Science (LNCS), i.e., LNCS 13393, LNCS 13394, and one volume of Lecture Notes in Artificial Intelligence (LNAI), i.e., LNAI 13395.

The organizers of ICIC 2022, including EIT Institute for Advanced Study, Tongji University and Xi'an Polytechnic University, China, made an enormous effort to ensure the success of the conference. We hereby would like to thank all the ICIC 2022 organizers, the members of the Program Committee and the referees for their collective effort in reviewing and soliciting the papers. We would like to thank Ronan Nugent, executive editor from Springer, for his frank and helpful advice and guidance throughout as well as his continuous support in publishing the proceedings. In particular, we would like to thank all the authors for contributing their papers. Without the high-quality submissions from the authors, the success of the conference would not have been possible. Finally, we are especially grateful to the International Neural Network Society and the National Science Foundation of China for their sponsorship.

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De-Shuang Huang, Haiyan Wang

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	Fuyi Li	

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Jin Sun	Naida Fetic	Jing
Ruiwen Xing	Bing	Feng
Lianxin Zhong	Sun	Xin Juan
Hongyuan	Zhenzhong Chu	Hongguo Zhao
Zhang	Meijing Li	Masoomah Mirrashid
Han Xupeng	Wentao Chen	Jialiang
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Jianxun Mi	Zhihao	Yaping Hu
Michele Scarpiniti	Tang	Xiangzhen Kong
Hugo	Li keng Liang	Mi-Xiao Hou
Morais	Alberto Mazzoni	Zhen Cui
Alamgir Hossain	Domenico Buongiorno	Juan Wang
Felipe Saraiva	Zhang Lifeng	Na Yu
Xu Yang	Chi	Meiyu Duan
Yasushi Mae	Yuhong	Pavel
Haoran Mo	Meng-Meng Yin	Osinenko
Pengfei	Yannan Bin	Chengdong Li
Cui	Wasiq Khan	Stefano Rovetta
Yoshinori Kobayashi	Yong Wu	Mingjun Zhong
Qing Yu Cui	Qinhu	Baoping Yuan
Kongtao Chen	Zhang	Akhilesh M.
Feng Feng	Jiang Liu	Srivastatva
Wenli	Yuzhen Han	Vivek Baghel
Yan	Pengcheng Xiao	Umarani Jayaraman
Zhibo Wang	Harry Haoxiang	Somnath Dey
Ying Qiao	Wang	Guanghai Li
Qiyue Lu	Fengqiang	Lihong Peng
Geethan Mendiz	Li	Wei Zhang
Dong	Chenggang Lai	Hailin
Li	Dong Li	Chen
Di	Shuai Liu	Fabio Bellavia
Liu	Cuiling Huang	Giosue' Lo Bosco
Feilin Zhang	Lian-Yong	Giuseppe Salvi
Haibin Li	Qi	Giovanni
Heqi Wang	Qi Zhu	Acampora
Wei Wang	Wenqiang Gu	Zhen Chen
Tony Hao	Haitao Du	Enrico De Santis
Yingxia	Bingbo Cui	Xing Lining
Pan	Qinghua	Wu
Chenglong Wei	Li	Guohua
My-Ha	Xin Juan	Dong Nanjiang
Le	Emanuele Principi	Jhony H. G. Zuluaga
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General Information

I. Conference Working Language

English is the official language of the conference.

II. Conference Registration

- The ICIC2022 is going to a fully virtual conference due to COVID-19. All registered participants are welcome to this webinar "ICIC2022 Virtual" or on-site of Xi'An Jianguo Hotel.

III. Conference Rooms

The used Virtual Meeting is **VooV one based on Tencent Cloud**, and the website is available at <https://voovmeeting.com/>. The Virtual Rooms are detailed as follows:

- Virtual Room A (2022/8/8: 676-483-737; 2022/8/9: 773-880-178)
- Virtual Room B (2022/8/8: 256-293-695; 2022/8/9: 627-828-546)
- Virtual Room C (2022/8/8: 715-685-768; 2022/8/9: 565-580-554)
- Virtual Room D (2022/8/9: 542-628-977)

IV. Information for Oral Presenters

- Please prepare a 15-minute PowerPoint (PPT) slide. Your actual presentation time may depend on the number of presentations in your session.
- Please check this Final Program for your presentation time and room. Please go to the room five minutes before the session starts and report to the Session Chair.
- Please follow the instructions of the Session Chair(s) not to exceed your time allocated to you by them.
- If the Session Chair(s) is/are absent from the session, the last speaker is requested to serve as the Session Chair.

V. Information for Session Chairs

The Organizing Committee would like to ask for your kind help as Session Chair (s). If you cannot fulfill your duties as session chair, please try to make sure that someone else will take your place as Session Chair(s).

As a Session Chair, you are kindly requested to help at the following:

- Arrive at the room of the session at least 5 minutes before the session starts and identify each of the speakers for the session.
- Calculate and announce the time allocated for each paper in your session for only the authors present before the session starts.
- The time allocated to a paper may be different in different sessions, due to uneven distribution of papers in different areas and a small number of absentees due to visa and other reasons. Request the presenters to leave 2 minutes for question and answers. For example, if the calculated time for each presentation is 12 minutes, then request each presenter to talk for no more than 10 minutes, with 2 minutes for question and answers.

Schedule Overview

Date	Morning	Afternoon
<p style="text-align: center;">August 8, Monday Beijing time: 08:30 - 18:00 pm, UTC+8 Room A: 676-483-737 Room B: 256-293-695 Room C: 715-685-768</p>	<p>Opening Ceremony Session Chair: De-Shuang Huang 08:30-08:50 am Room A</p> <p>Plenary Speeches Speaker: Vladimir Filaretov Chair: De-Shuang Huang 08:50-09:40 am Speaker: Dacheng Tao Chair: Prashan Premaratne 09:40-10:30 am Room A</p>	<p>Plenary speeches Speaker: Irwin King Chair: De-Shuang Huang 13:50-14:40 pm Speaker: Zhiwen Yu Chair: Prashan Premaratne 14:40-15:30 pm Room A</p>
	<p>Coffee Break, 10:30-10:40 am</p>	<p>Coffee Break, 15:30-15:40 pm</p>
	<p>Oral Presentation 10:40 -12:40 pm Room A, Room B, Room C</p>	<p>Oral Presentation 15:40-17:40 pm Room A, Room B, Room C</p>
<p style="text-align: center;">August 9, Tuesday Beijing time: 08:30 - 18:00 pm, UTC+8 Room A: 773-880-178 Room B: 627-828-546 Room C: 565-580-554 Room D: 542-628-977</p>	<p>Oral Presentation 08:30-10:30 am Room A, Room B, Room C</p>	<p>Oral Presentation 13:30-15:30 pm Room A, Room B, Room C</p>
	<p>Coffee Break, 10:30-10:40 am</p>	<p>Coffee Break, 15:30-15:40 pm</p>
	<p>Oral Presentation 10:40-12:40 am Room A, Room B, Room C</p>	<p>Oral Presentation 15:40-17:40 pm Room A, Room B, Room C</p>
	<p>Workshop 4: The 2nd International Workshop on Mathematical Methods for Analyzing Biological Data 08:30-12:00 am Room D</p>	<p>Workshop 9: The 1st International Workshop on Data Mining and Computing for Biomedicine 13:30-17:30 pm Room D</p>

Introduction of Keynote Speakers

■ Keynote Speaker 1: Vladimir Filaretov

Methods of Recognition and Information Processing for Intelligent Control of Various Robots

Vladimir Filaretov, PhD & Professor

Academicians of Russian Engineering Academy and Russian Science Academy

Vice-president of Russian Engineering Academy, Vladivostok, Russia

Head of Robotics Laboratory at Institute of Automation and Control Processes Far

Eastern Branch of Russian Academy of Science

Head of the Department of robotics and Automation at Far Eastern Federal University

Member of Presidium of the Highest Engineering Council of Russia

Email: filaretov@inbox.ru



Abstract: The talk is dedicated to creation technologies of intelligent control systems of various robots which can automatically perform complex technological operations in non-deterministic operating environment. These systems are constructed based on information processing, obtained from different vision systems, and provide automatic generation and correction of robot's motion trajectory in a priori unknown and changeable environment. For realization of these systems, a different method of recognition and processing of information obtained from vision systems (optical and laser) will be presented.

Here I will talk about method of fast combination of three-dimensional models of deformed parts obtained from laser scanners with their reference CAD-models. Based on this combination it is possible to make trajectory planning of robots in real time for exact processing of the parts. For mobile robots I will present new algorithm for combining images into a one whole raster photo map from a sequence of individual images or video frames using tile graphics and simple transformations of input images. The use of tiles allows to present the generated map in a convenient form both for a person and for the on-board control system of the robot.

Bio-Sketch: Vladimir Filaretov was born in 1948. In 1973 graduated from Moscow State Technical University named after Bauman with honors with the specialty “Automatic

systems”. In 1976 Mr. Filaretov was awarded the degree of candidate of sciences (engineering) and in 1990 he was awarded the degree of Doctor of Sciences in the field of automatic control. In 1992 Mr. Filaretov was confirmed in professor’s degree. In 1995 he was elected the member of an Russian and in 1996 the member of an International Engineering Academy. At present he is head of Department of Robotics and Automation at Far Eastern Federal University and Head of Robotic Laboratory of the Institute of Automatics and Control Process of Russian Academy of Sciences, President of Far Eastern Branch Russian Engineering Academy and Vice-president of Russian Engineering Academy. Professor Vladimir Filaretov is a specialist in the field of adaptive and optimal control devices of complicated nonlinear systems of automatic control with unknown and variable parameters, and also in the field of mathematical description of complicated multi-connected mechanisms dynamics. His researches are mainly directed at creation both industrial and underwater robots and manipulators and also other dynamic systems, allowing to automate technical devices and technological processes. Professor V. Filaretov has more than 640 scientific publications, 10 monographs and 330 patents (inventions) for developed technical systems and devices.

■ Keynote Speaker 2: Dacheng Tao

More Is Different: ViTAE Elevates the Art of Computer Vision

Dacheng Tao, PhD & Professor

Fellow of the Australian Academy of Science, IEEE Fellow, ACM Fellow

Director of JD Explore Academy

Email: dacheng.tao@gmail.com



Abstract: Deep learning has witnessed remarkable success in many application domains and is now shifting towards training super deep models with extremely large scale labeled or unlabeled data on expensive computational resources. In this talk, I will present some of the recent progress. Specifically, I will first show the PAC-Bayes generalization bounds and present some practical implications for new algorithm designs. Then, I will propose an efficient architecture design for visual transformers, named ViTAE, by exploring the intrinsic inductive biases. Next, he will introduce a novel self-supervised training method called RegionCL, which uses a simple region swapping strategy to build effective supervisory signals from rich positive/negative pairs at both the instance level and the region level. It

greatly advances the ability of representative self-supervised learning frameworks including MoCo, SimCLR, and SimSiam. Finally, some promising applications of visual transformers and self-supervised learning will be presented, including image classification, object detection, semantic segmentation, and pose estimation.

Bio-Sketch: Dacheng Tao is the Inaugural Director of the JD Explore Academy and a Senior Vice President of JD.com. He is also an advisor and chief scientist of the digital science institute in the University of Sydney. He mainly applies statistics and mathematics to artificial intelligence and data science, and his research is detailed in one monograph and over 200 publications in prestigious journals and proceedings at leading conferences. He received the 2015 Australian Scopus-Eureka Prize, the 2018 IEEE ICDM Research Contributions Award, and the 2021 IEEE Computer Society McCluskey Technical Achievement Award. He is a fellow of the Australian Academy of Science, the World Academy of Sciences, the Royal Society of NSW, AAAS, ACM, IAPR and IEEE.

■ Keynote Speaker 3: Irwin King

Graph Neural Networks from Theory to Applications

Irwin King, PhD & Professor

IEEE Fellow, INNS Fellow, ACM Distinguished Member

Department of Computer Science & Engineering

The Chinese University of Hong Kong, China

Email: king@cse.cuhk.edu.hk



Abstract: Graph Neural Network (GNN) is a neural network that can process graph-structured data such as social networks, citation networks, traffic networks, semantic networks, polygon mesh, molecular structures, etc. In addition to non-Euclidean data, GNN can also handle Euclidean data such as sentences, images, and videos. The main approach is through graph embedding, which refers to the problem of projecting the elements in a graph, including nodes, edges, substructures, or the whole graph, to a low-dimensional space while preserving the graph's structural information. In this talk, we present some recent advances in the development of GNN including graph embedding, convolution-based methods, attention networks, etc. with some interesting social

computing applications for node classification, link prediction, social recommendation, etc.

Bio-Sketch: Prof. Irwin King is the Chair and Professor of Computer Science & Engineering at The Chinese University of Hong Kong. His research interests include machine learning, social computing, AI, and data mining. He has over 350 technical publications in journals and conferences in these research areas with high citations. He is an IEEE Fellow, INNS Fellow, and an ACM Distinguished Member. He is an Associate Editor of the Journal of Neural Networks (NN) and has served as the President of the International Neural Network Society (INNS), General Co-chair of WebConf 2020, ICONIP 2020, WSDM 2011, RecSys 2013, ACML 2015, and in various capacities in top conferences and societies such as WWW, NIPS, ICML, IJCAI, AAAI, APNNS, etc. He is the recipient of several Test of Time Awards including ACM CIKM2019, ACM SIGIR 2020, and ACM WSDM 2022 for his contributions made in social computing with machine learning. He also won the 2021 INNS Dennis Gabor Award for his outstanding contributions to engineering applications of neural networks. In early 2010 while on leave with AT&T Labs Research, San Francisco, he taught classes as a Visiting Professor at UC Berkeley. He received his B.Sc. degree in Engineering and Applied Science from the California Institute of Technology (Caltech), Pasadena, and his M.Sc. and Ph.D. degree in Computer Science from the University of Southern California (USC), Los Angeles.

■ **Keynote Speaker 4: Zhiwen Yu**

Crowd Sensing 2.0: From Human-Centered to Heterogeneous Crowd Sensing

Zhiwen Yu, PhD & Professor

Editor-in-Chief, CCF Transactions on Pervasive Computing and Interaction

CCF Young Scientist Award, CCF Excellent Doctoral Dissertation Award

School of Computer Sciences at Northwestern Polytechnical University, China

Email: zhiwenyu@nwpu.edu.cn



Abstract: Crowd sensing is a new sensing paradigm that uses individual sensing capability to accomplish complex social sensing tasks. In this speech, I will introduce our work in crowd sensing in various aspects, such as theory, methods, and platform. Furthermore, I will present the main idea of crowd sensing 2.0, including the features and enabling technologies of heterogeneous crowd sensing.

Bio-Sketch: Dr. Zhiwen Yu is currently a professor and dean of School of Computer Science, Northwestern Polytechnical University, China. He has worked as an Alexander Von Humboldt Fellow at Mannheim University, Germany from Nov. 2009 to Oct. 2010, a research fellow at Kyoto University, Japan from Feb. 2007 to Jan. 2009, and a post-doctoral researcher at Nagoya University, Japan in 2006-2007. His research interests cover pervasive computing, Internet of Things, and mobile social networks. He is the Editor-in-Chief of CCF Transactions on Pervasive Computing and Interaction. He has served as an associate/guest editor for a number of international journals, such as IEEE Transactions on Human-Machine Systems, IEEE Communications Magazine, and ACM Transactions on Intelligent Systems and Technology. He received the CCF Young Scientist Award in 2011, the Humboldt Fellowship in 2008, and the CCF Excellent Doctoral Dissertation Award in 2006. He got the National Science Fund for Distinguished Young Scholars in 2017.

Parallel Sessions for Oral Presentations

Room Time	Room A	Room B	Room C
Morning Aug. 8 10:40-12:40 UTC+8	Intelligent Optimization Algorithms and Applications Chair: Xu-Ying Ji	Image Processing Chair: Jin-Feng Zhang	Artificial Intelligence in Real World Applications Chair: Zhi-Yu Cheng
Afternoon Aug. 8 15:40-17:40 UTC+8	Intelligent Control and Automation Chair: Aleksander Zuev	Artificial Intelligence in Real World Applications Chair: Dakshina Ranjan Kisku	Pattern Recognition Chair: Chao Wang
Morning Aug. 9 8:30-10:30 UTC+8	Machine Learning Chair: Jared Cervantes	Intelligent Computing in Computer Vision Chair: Prashan Premaratne	
Morning Aug. 9 10:40-12:40 UTC+8	Fuzzy Theory and Information Security Chair: Guang-Dong Xue	Theoretical Computational Intelligence and Applications Chair: Yun-Yi Bai	Intelligent Data Analysis and Prediction Chair: Peng-Wei Hu
Afternoon Aug. 9 13:30-15:30 UTC+8	Intelligent Computing in Drug Design Chair: Jing-Lu Tao	Intelligent Computing in Drug Design Chair: Qi-Qi Jiao	Computational Genomics Chair: Xin-Guo Lu
Afternoon Aug. 9 15:40-17:40 UTC+8	Biomedical Data Modeling and Mining Chair: Yan-Nan Bin	Intelligent Computing in Computational Biology Chair: Zi-Han Lai	

Parallel Sessions for Workshops

Room Time	Room D
Morning Aug. 9 8:30-12:00 UTC+8	Workshop 4: The 2nd International Workshop on Mathematical Methods for Analyzing Biological Data Chairs: Tatsuya Akutsu, Hongmin Cai, Xiaoqing Cheng
Afternoon Aug. 9 13:30-17:30 UTC+8	Workshop 9: The 1st International Workshop on Data Mining and Computing for Biomedicine Chairs: De-Shuang Huang, Da-Ming Zhu, Bin Liu, Yi Zhao, Chun-Hou Zheng

Detailed Parallel Sessions for Oral Presentations

Morning, August 8, Monday, Room A (ID: 676-483-737)

Intelligent Optimization Algorithms and Applications

Chair: Xu-Ying Ji

Paper 131 10:40-10:55	A mixed-factor evolutionary algorithm for multi-objective knapsack problem Yanlian Du
Paper 557 10:55-11:10	NSLS with the Clustering-based Entropy Selection for Many-Objective Optimization Problems Zhaobin Ma
Paper 567 11:10-11:25	An Efficient Multi-objective Evolutionary Algorithm for a Practical Dynamic Pickup and Delivery Problem Junchuang Cai
Paper 614 11:25-11:40	An Efficient Evaluation Mechanism for Evolutionary Reinforcement Learning Xiaoqiang Wu
Paper 629 11:40-11:55	Neighborhood Combination Strategies for Solving the Bi-Objective Max-Bisection Problem Rong-Qiang Zeng
Paper 376 11:55-12:10	Application of Changed Fruit Fly Optimization Algorithm in Three Bar Truss Dao Tao
Paper 527 12:10-12:25	A “Push-Pull” Workshop Logistics Distribution under Single Piece and Small-lot Production Mode Mengxia Xu
Paper 372 12:25-12:40	A new fitness-landscape-driven particle swarm optimization Xuying Ji

Morning, August 8, Monday, Room B (ID: 256-293-695)

Image Processing	
Chair: Jin-Feng Zhang	
Paper 118 10:40-10:55	Palmprint Feature Extraction Utilizing WTA-ICA in Contourlet Domain Li Shang
Paper 193 10:55-11:10	A hardware implementation method of radar video scanning transformation based on dual FPGA Naizhao Yu
Paper 195 11:10-11:25	An image binarization segmentation method combining global and local threshold for uneven illumination image Jin-Wu Wang
Paper 329 11:25-11:40	A Classification Algorithm based on Discriminative Transfer Feature Learning for Early Diagnosis of Alzheimer's Disease Xinchun Cui
Paper 439 11:40-11:55	Joint semantic segmentation and object detection based on relational Mask R-CNN Yanni Zhang
Paper 448 11:55-12:10	High-voltage tower nut detection and positioning system based on binocular vision Zhiyu Cheng
Paper 217 12:10-12:25	Blockwise Feature-based Registration of Deformable Medical Images Su Wai Tun
Paper 450 12:25-12:40	Nut recognition and positioning based on YOLOv5 and RealSense Jin-Feng Zhang
Morning, August 8, Monday, Room C (ID: 715-685-768)	
Artificial Intelligence in Real World Applications	
Chair: Zhi-Yu Cheng	
Paper 412 10:40-10:55	Remaining Useful Life Prediction Based on Improved LSTM Hybrid Attention Neural Network Mang Xu

Paper 573 10:55-11:10	A Torque-Current Prediction Model Based on GRU for Circumferential Rotation Force Feedback Device Zekang Qiu
Paper 316 11:10-11:25	K-Nearest Neighbor based local distribution alignment Bo Li
Paper 322 11:25-11:40	A video anomaly detection method based on sequence recognition Lei Yang
Paper 516 11:40-11:55	Application of Stewart Platform as a haptic device for teleoperation of a mobile robot Duc-Vinh Le
Paper 536 11:55-12:10	TB-LNPs: a web server for access to lung nodule prediction models Huaichao Luo
Paper 472 12:10-12:25	Gait Identification using Hip Joint Movement and Deep Machine Learning Luke Topham
Paper 330 12:25-12:40	An improved Mobilenetv2 for rust detection of angle steel tower bolts based on small sample transfer learning Zhiyu Cheng
Afternoon, August 8, Monday, Room A (ID: 676-483-737)	
Intelligent Control and Automation	
Chair: Aleksander Zuev	
Paper 560 15:40-15:55	Geometric Parameters Calibration Method for Multilink Manipulators Anton Gubankov
Paper 452 15:55-16:10	Development of AUV Two-loop Sliding Control System with Considering of Thruster Dynamic Dmitry Yukhimets
Paper 565 16:10-16:25	An Observer-Based Fixed Time Sliding Mode Controller for a Class of Second-Order Nonlinear Systems and Its Application to Robot Manipulators Thanh Nguyen Truong
Paper 337 16:25-16:40	Model Predictive Control for Voltage Regulation in Bidirectional Boost Converter NGUYEN DUY LONG
Paper 654 16:40-16:55	A Robust Position Tracking Strategy for Robot Manipulators using Adaptive Second Order Sliding Mode Algorithm and Nonsingular Sliding Mode Control Tran Quang Huy
Paper 121 16:55-17:10	A Novel IoMT System for Pathological Diagnosis based on Intelligent Mobile Scanner and Whole Slide Image Stitching Method Peng Jiang
Paper 139 17:10-17:25	Deep Reinforcement Learning Algorithm for permutation Flow Shop Scheduling Problem Yuanyuan Yang

Paper 517 17:25-17:40	An Advanced Terminal Sliding Mode Controller for Robot Manipulators in Position Tracking Problem Anh Tuan Vo
Paper 379 17:40-17:55	Robust Virtual Sensors Design for Linear Systems Aleksander Zuev
Afternoon, August 8, Monday, Room B (ID: 256-293-695)	
Artificial Intelligence in Real World Applications	
Chair: Dakshina Ranjan Kisku	
Paper 558 15:40-15:55	Efficient Post Event Analysis and Cyber Incident Response in IoT and e-commerce through innovative graphs and cyberthreat intelligence employment Marek Pawlicki
Paper 365 15:55-16:10	Comparison of subjective and physiological stress levels in home and office work environments Matthew Harper
Paper 555 16:10-16:25	A Systematic Review of Distributed Deep Learning Frameworks for Big Data Francesco Berloco
Paper 293 16:25-16:40	A comparative study of autoregressive and neural network models: forecasting the GARCH process Firuz Kamalov
Paper 281 16:40-16:55	Measuring Shape and Reflectance of Real Objects using a Handheld Camera Shwe Yee Win
Paper 603 16:55-17:10	Classification of spoken English Accents using Deep Learning and Speech Analysis Zaid Ali Shadhan Al-Jumaili
Paper 135 17:10-17:25	Application of Deep Learning Autoencoders as Features Extractor of Diabetic Foot Ulcer Images Abbas Alatrany
Paper 223 17:25-17:40	Non-invasive Haemoglobin Prediction using Nail Color Features: An Approach of Dimensionality Reduction Dakshina Ranjan Kisku
Afternoon, August 8, Monday, Room C (ID: 715-685-768)	
Pattern Recognition	
Chair: Chao Wang	
Paper 148 15:40-15:55	Quasi Fourier Descriptor for Affine Invariant Features

	Chengyun Yang
Paper 159 15:55-16:10	Modified Lightweight U-Net with Attention Mechanism for Weld Defect Detection Lei Huang
Paper 447 16:10-16:25	A new PM2.5 concentration predication study based on CNN-LSTM parallel integration Zhenbang Wang
Paper 488 16:25-16:40	Handwritten Chemical Equations Recognition based on Lightweight Networks Zhihuang He
Paper 525 16:40-16:55	A Feature Extraction Algorithm for Enhancing Graphical Local Adaptive Threshold Shaoshao Wang
Paper 571 16:55-17:10	Deep Discriminant Non-negative Matrix Factorization Method for Image Clustering Kexin Xie
Paper 631 17:10-17:25	Person Re-identification Based on Transform Algorithm Chao Wang

Morning, August 9, Tuesday, Room A (ID: 773-880-178)

Machine Learning

Chair: Jared Cervantes

Paper 615 08:30-08:45	Stability Analysis of Hopfield Neural Networks with Conformable Fractional Derivative: M-matrix Method Changbo Yang
Paper 364 08:45-09:00	Semidefinite Relaxation Algorithm for Source Localization Using Multiple Groups of TDOA Measurements with Distance Constraints Tao Zhang
Paper 273 09:00-09:15	A clustering method based on improved density estimation and shared nearest neighbors Ying Guan
Paper 424 09:15-09:30	Cross Distance Minimization for Solving the Nearest Point Problem Based on Scaled Convex Hull

	Qiangkui Leng
Paper 464 09:30-09:45	Artificial neural networks for COVID-19 forecasting in Mexico: an empirical study Eréndira Rendón Lara
Paper 474 09:45-10:00	Clustering analysis in the student academic activities on COVID-19 pandemic in Mexico Eréndira Rendón Lara
Paper 312 10:00-10:15	Single Image Dehazing Based on Generative Adversarial Networks Bo Li
Paper 606 10:15-10:30	Optimization of Vessel Segmentation using genetic algorithms Jared Cervantes
Morning, August 9, Tuesday, Room B (ID: 627-828-546)	
Intelligent Computing in Computer Vision	
Chair: Prashan Premaratne	
Paper 134 08:30-08:45	Object detection networks and mixed reality for cable harnesses identification in assembly environment Yixiong Wei
Paper 230 08:45-09:00	Squared Cross Entropy for The Class Imbalance in Target Detection Guanyu Chen
Paper 355 09:00-09:15	Inverse Sparse Object Tracking via Adaptive representation Jian-Xun Mi
Paper 519 09:15-09:30	Image Dehazing based on Deep Multiscale Feature Fusion Network and Continuous Memory Mechanism Qiang Li, Zhihua Xie
Paper 531 09:30-09:45	Improved YOLOv5s Model for Vehicle Detection and Recognition Xingmin Lu
Paper 646 09:45-10:00	Detection of Personal Protective Equipment in Factories: A Survey and Benchmark Dataset Zhiyang Liu
Paper 582 10:00-10:15	Garbage classification detection model based on YOLOv4 with lightweight neural network feature fusion

	Jian-Tao Wang
Paper 485 10:15-10:30	Vehicle Detection, Counting and Classification- Accuracy Detection Prashan Premaratne
Morning, August 9, Tuesday, Room A (ID: 773-880-178)	
Fuzzy Theory and Information Security	
Chair: Guang-Dong Xue	
Paper 215 10:40-10:55	An Incremental Approach based on Hierarchical Classification in Multikernel Fuzzy Rough Sets under the Variation of Object Set Wei Fan
Paper 343 10:55-11:10	Some Results on the Dominance Relation between Conjunctions and Disjunctions Gang Li
Paper 106 11:10-11:25	An Intrusion Detection Method Fused Deep Learning and Fuzzy Neural Network for Smart Home Qin Zhang, Xi Yang
Paper 175 11:25-11:40	Legal Analysis of the Right to Privacy protection in the Age of Artificial Intelligence Xin Sun
Paper 207 11:40-11:55	Research on the Rule of Law in Network Information Security Governance Zhaobin Pei, Yixiao Yu
Paper 339 11:55-12:10	Bagging-AdaTSK: An Ensemble Fuzzy Classifier for High-Dimensional Data Guangdong Xue, Jian Wang
Morning, August 9, Tuesday, Room B (ID: 627-828-546)	
Theoretical Computational Intelligence and Applications	
Chair: Yun-Yi Bai	
Paper 142 10:40-10:55	An integrated GAN-based approach to imbalanced disk failure data Shuangshuang Yuan

Paper 144 10:55-11:10	Disk failure prediction based on transfer learning Guangfu Gao
Paper 145 11:10-11:25	Imbalanced disk failure data processing method based on CTGAN Jingbo Jia
Paper 208 11:25-11:40	Problems and Countermeasures in the Construction of Intelligent Government under the Background of Big Data Ying Wang
Paper 410 11:40-11:55	Application of Auto-encoder and Attention Mechanism in Raman Spectroscopy Yunyi Bai
Morning, August 9, Tuesday, Room C (ID: 565-580-554)	
Intelligent Data Analysis and Prediction	
Chair: Peng-Wei Hu	
Paper 123 10:40-10:55	A Hybrid Daily Carbon Emission Prediction Model Combining CEEMD, WD and LSTM Xing Zhang
Paper 231 10:55-11:10	A Hybrid Carbon Price Prediction Model Based on VMD and ELM optimized by WOA Xing Zhang
Paper 529 11:10-11:25	Deep Spatio-Temporal Attention Network for Click-Trough Rate Prediction Peng Gao
Paper 345 11:25-11:40	An Effective Chinese Text Classification Method with Contextualized Weak Supervision for Review Autograding Yupei Zhang
Paper 636 11:40-11:55	Topic Analysis of Public Welfare Microblogs in the Early Period of the COVID-19 Epidemic Based on LDA Model Ji Li, Yujun Liang
Paper 395 11:55-12:10	Safety and Efficacy of Short-term vs. Standard Periods Dual Antiplatelet Therapy after New-Generation Drug-Eluting Stent Implantation: A Meta-Analysis Xiaohua Gao

Paper 392 12:10-12:25	Cost and Care Insight: An interactive and Scalable Hierarchical Learning System for Identifying Cost Saving Opportunities Pengwei Hu
Afternoon, August 9, Tuesday, Room A (ID: 773-880-178)	
Intelligent Computing in Drug Design	
Chair: Jing-Lu Tao	
Paper 420 13:30-13:45	Elucidating quantum semi-empirical based QSAR, for predicting Tannins' anti-oxidant activity with the help of Artificial Neural Network Chandrasekhar Gopalakrishnan
Paper 428 13:45-14:00	Drug-Target Interaction Prediction Based on Transformer Junkai Liu
Paper 440 14:00-14:15	Protein-ligand binding affinity prediction based on deep learning Yaoyao Lu
Paper 161 14:15-14:30	Integrating Knowledge Graph and Bi-LSTM for Drug-Drug Interaction Predication Lei Huang
Paper 341 14:30-14:45	Anti-breast Cancer Drug Design and ADMET Prediction of ERa Antagonists Based on QSAR Study Wentao Gao
Paper 227 14:45-15:00	A Targeted Drug Design Method Based on GRU and TopP Sampling Strategies Jinglu Tao
Afternoon, August 9, Tuesday, Room B (ID: 627-828-546)	
Intelligent Computing in Drug Design	
Chair: Qi-Qi Jiao	
Paper 277 13:30-13:45	MRLDTI: An Meta-path-based Representation Learning Model for drug-target interactions prediction

	Bo-Wei Zhao
Paper 332 13:45-14:00	Drug-Target Binding Affinity Prediction Based on Graph Neural Networks and Word2vec Minghao Xia
Paper 451 14:00-14:15	Unsupervised Prediction Method for Drug-Target Interactions Based on Structural Similarity Xinyuan Zhang
Paper 456 14:15-14:30	Drug-Target Affinity Prediction Based on Multi-Channel Graph Convolution Jing Hu
Paper 371 14:30-14:45	Predicting Drug-disease Associations via Meta-path Representation Learning base on Heterogeneous Information Networks Menglong Zhang
Paper 569 14:45-15:00	NSAP: A neighborhood subgraph aggregation method for drug-disease association prediction Qiqi Jiao
Afternoon, August 9, Tuesday, Room C (ID: 565-580-554)	
Computational Genomics	
Chair: Xin-Guo Lu	
Paper 201 13:30-13:45	Position-defined CpG islands provide complete co-methylation indexing for human genes Ming Xiao
Paper 470 13:45-14:00	Construction of gene network based on inter-tumor heterogeneity for tumor type identification Hongyu Duan
Paper 628 14:00-14:15	A novel trajectory inference method on single-cell gene expression data Jinxin Li
Paper 359 14:15-14:30	Research on the potential mechanism of Rhizoma Drynariae in the treatment of periodontitis based on network pharmacology Caixia Xu
Paper 476 14:30-14:45	Predicting Protein-DNA binding sites by Fine-Tuning BERT Yue Zhang
Paper 480 14:45-15:00	i6mA-word2vec: A Newly Model which used Distributed features for Predicting DNA N6-Methyladenine Sites in Genomes Wenzhen Fu
Paper 623 15:00-15:15	A novel synthetic lethality prediction method based on bidirectional attention learning Xinguo Lu

Afternoon, August 9, Tuesday, Room A (ID: 773-880-178)

Biomedical Data Modeling and Mining

Chair: Yan-Nan Bin

Paper 109 15:40-15:55	A Sub-network Aggregation Neural Network for Non-invasive Blood Pressure Prediction Peng Chen
Paper 647 15:55-16:10	A 3D Medical Image Segmentation Framework Fusing Convolution and Transformer Features Ziheng Wu
Paper 421 16:10-16:25	Medical Image Registration Method Based on Simulated CT Xuqing Wang
Paper 137 16:25-16:40	A comparison study of predicting lncRNA-protein interactions via representative network embedding methods Guoqing Zhao
Paper 595 16:40-16:55	Identification and evaluation of key biomarkers of acute myocardial infarction by machine learning Zhen Run
Paper 656 16:55-17:10	Functional Analysis of Molecular Subtypes with Deep Similarity Learning Model based on Multi-omics Data Shuhui Liu
Paper 467 17:10-17:25	Automated Diagnosis of Vertebral Fractures Using Radiographs and Machine Learning Sun-yuan Hsieh
Paper 165 17:25-17:40	An ensemble framework integrating whole slide pathological images and miRNA data to predict radiosensitivity of breast cancer patients Yannan Bin

Afternoon, August 9, Tuesday, Room B (ID: 627-828-546)

Intelligent Computing in Computational Biology

Chair: Zi-Han Lai

Paper 174 15:40-15:55	iEnhancer-BERT: A novel transfer learning architecture based on DNA-language model for identifying enhancers and their strength Hanyu Luo
Paper 334 15:55-16:10	Prediction of miRNA-Disease Association based on Higher-Order Graph Convolutional Architectures Zhengwei Li
Paper 353 16:10-16:25	SCDF:A Novel Single-cell Classification Method Based On Dimensionality-Reduced Data Fusion Chujie Fang
Paper 593 16:25-16:40	Identification of miRNA-lncRNA underlying interactions through representation for multiplex heterogeneous network Jiren Zhou
Paper 619 16:40-16:55	STE-COVIDNet: A Multi-Channel Model with Attention Mechanism for Time Series Prediction of COVID-19 Infection Hongjian He
Paper 643 16:55-17:10	KDPCnet: A keypoint-based CNN for the Classification of Carotid Plaque Binding Liu
Paper 651 17:10-17:25	Multi-source Data-based Deep Tensor Factorization for Predicting disease-associated miRNA combinations Zihan Lai

Detailed Parallel Sessions for Workshops

Morning, August 9, Tuesday, Room D (ID: 542-628-977)

Workshop 4: The 2nd International Workshop on Mathematical Methods for Analyzing Biological Data

Chairs: Tatsuya Akutsu, Hongmin Cai, Xiaoqing Cheng

08:30-12:00am	Data-driven drug discovery and healthcare by machine learning Yoshihiro Yamanishi
	Food recommendation for mental health by using knowledge graph approach Xingpeng Jiang
	Transcriptome analysis by sample-specific network Xiaoping Liu

	<p>Fundamental Principles of Enhancer-Promoter Communication in Transcriptional Bursting Jiajun Zhang</p>
	<p>Computational methods for alternative splicing regulatory mechanisms during epithelial-mesenchymal transition Yushan Qiu</p>
	<p>Learning Pyramidal Multi-scale Harmonic Wavelets for Identifying the Neuropathology Propagation Patterns of Alzheimer's Disease Jiazhou Chen</p>
<p>Afternoon, August 9, Tuesday, Room D (ID: 542-628-977)</p>	
<p>Workshop 9: The 1st International Workshop on Data Mining and Computing for Biomedicine</p>	
<p>Chairs: De-Shuang Huang, Da-Ming Zhu, Bin Liu, Yi Zhao, Chun-Hou Zheng</p>	
<p>13:30-17:30pm</p>	<p>Multi-objective optimization methods and applications on bioinformatics Yansen Su</p>
	<p>Identifying multi-functional therapeutic peptide functions using multi-label deep learning Junfeng Xia</p>
	<p>Matrix Decomposition (MD) Methods for Analyzing Cancer Omics Data Jin-Xing Liu</p>
	<p>3CAC: improving the classification of phages and plasmids in metagenomics assemblies using assembly graphs Lianrong Pu</p>
	<p>Specific interaction recognition between functional protein receptors and small molecules Fei Guo</p>
	<p>NcRNA-disease association identification based on relation network representation Hang Wei</p>
	<p>Multi-scale deep biological language learning model for the interpretable prediction of DNA methylations Leyi Wei</p>
	<p>A scalable and interpretable multi-omics deep learning framework in cancer prognostic analysis Lianhe Zhao</p>

	<p>Self-Supervised Cryo-Electron Tomography Volumetric Image Denoising with Noise Modeling and Sparsity Guidance Renmin Han</p>
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