

CONFERENCE PROGRAM

icig 2023

THE 12TH INTERNATIONAL CONFERENCE ON IMAGE AND GRAPHICS

Nanjing, China | September 22 – 24, 2023

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ICIG 2023

The 12th International Conference on Image and Graphics (ICIG) will be held in Nanjing, China, on September 22 – 24, 2023. The Conference will be hosted by China Society of Image and Graphics (CSIG), organized by Nanjing University of Posts & Telecommunications, co-organized by Nanjing University of Science & Technology and Nanjing University of Information Science and Technology, and supported by Springer. ICIG is a biennial conference that focuses on innovative technologies of image, video and graphics processing and fostering innovation, entrepreneurship, and networking. It will feature world-class plenary speakers, exhibits, and high-quality peer reviewed oral and poster presentations.

Organizers

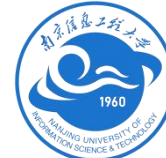
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Welcome Message from General Chairs

It is our great pleasure to welcome all of you working in the field of image and graphics to the 12th International Conference on Image and Graphics (ICIG 2023) which will be held on September 22-24, 2023, in Nanjing, China.

ICIG is an international conference hosted by the China Society of Image and Graphics (CSIG), focusing on innovative technologies of image, video and graphics processing and fostering innovation, entrepreneurship, and networking. It is a flagship conference with 23 years' history in the field. The conference has been held in Tianjin, Hong Kong, Shanghai, and other major cities during the past decades. For the first time, ICIG is being held in Nanjing, and organized by Nanjing University of Posts & Telecommunications, co-organized by Nanjing University of Science & Technology and Nanjing University of Information Science and Technology, and supported by Springer.

On behalf of the ICIG 2023 Committee, we thank all the reviewers and authors for their diligence and professionalism. We also want to thank the staff and volunteers for their crucial support, which ensures a complete and comfortable experience for all participants. Our experienced organizing team is committed to presenting a professional and delightful gathering for worldwide researchers. We wish all of you a pleasant and fruitful trip in Nanjing!

General Chairs

Yaonan Wang, Hunan University, China

Qingshan Liu, Nanjing University of Posts & Telecommunications, China

Ramesh Jain, University of California, Irvine, USA

Alberto Del Bimbo, University of Florence, Italy

Technical Program Chairs' Overview

Welcome to the 12th International Conference on Image and Graphics (ICIG 2023), which will be held on September 22-24, 2023, in Nanjing, China.

ICIG is one of the most comprehensive biennial conferences, which focuses on advances in various aspects of Image and Graphics. The goal of this conference is to bring together both domestic and international researchers from academia and industry, as well as practitioners, to share ideas, problems, and solutions related to the multifaceted aspects of image and graphics. This conference will feature world-class plenary speakers, exhibits, and high quality peer reviewed oral and poster presentations.

This year, we have received a total of 409 high quality submissions. Among them, 42 were accepted as oral and 124 as poster, for a total of 166 accepted papers. The acceptance rate for regular submissions is around 10.27% as oral and 30.31% as poster.

ICIG 2023 features a rich and diversified program. We are honored to have six distinguished keynote speakers: Tieniu Tan (Nanjing University, China), Kun Fu (Aerospace Information Research Institute, Chinese Academy of Sciences), Wenwu Zhu (Tsinghua University, China), Yonggang Wen (Nanyang Technological University, Singapore), Mihai Datcu (University Politehnica of Bucharest, Romania), Baoquan Chen (Peking University, China). ICIG 2023 also includes eight workshops, two tutorials, six oral sessions, two poster sessions and one challenge championship.

ICIG 2023 is organized by Nanjing University of Posts & Telecommunications, co-organized by Nanjing University of Science & Technology and Nanjing University of Information Science and Technology, and supported by Springer. We would like to express our gratitude for the support of China Society of Image and Graphics (CSIG).

We would like to thank our local hosts, the organizing committee chairs and members, the China Society of Image and Graphics committee, the sponsoring societies and organizations, the sponsors, and the program committee members who spent hours of their precious time reviewing the large number of submissions and providing valuable comments.

Technical Program Chairs

Huchuan Lu, Dalian University of Technology, China

Wanli Ouyang, University of Sydney, Australia

Hui Huang, Shenzhen University, China

Jiwen Lu, Tsinghua University, China

Conference Committee

General Chairs



Yaonan Wang
Hunan University, China



Qingshan Liu
Nanjing University of Posts & Telecommunications, China



Ramesh Jain
University of California, Irvine, USA

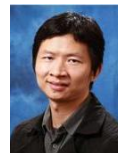


Alberto Del Bimbo
University of Florence, Italy

Technical Program Chairs



Huchuan Lu
Dalian University of Technology, China



Wanli Ouyang
University of Sydney, Australia



Hui Huang
Shenzhen University, China



Jiwen Lu
Tsinghua University, China

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Peking University, China



Xucheng Yin
University of Science and Technology Beijing, China



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Nanjing University of Posts & Telecommunications, China

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Conference Committee

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CAS, China



Shiguang Shan
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Technology, China



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CAS, China



Min Xu
University of Technology
Sydney, Australia

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Fudan University, China



Kai Xu
National University of Defense
Technology, China



Zhu Li
University of Missouri, USA



Oliver Deussen
Universität Konstanz, Germany

Exhibits Chairs



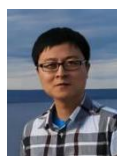
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Huawei Cloud, China



Wu Liu
JD.COM, China



Weishi Zheng
Sun Yat-sen University, China



Kun Xu
Tsinghua University, China

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Zhejiang University, China



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Conference Committee



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Institute of Automation, CAS, China



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Klagenfurt University, Austria

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Xiang Bai
Huazhong University of Science and
Technology, China

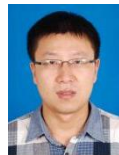


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Information Science &
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CSIG, China

Social Media Chairs



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Beihang University, China



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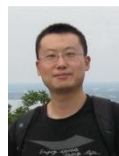


Feifei Zhang
Tianjin University of
Technology, China

Local Chairs



Jian Cheng
Institute of Automation,
CAS, China



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Nanjing University of
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Technology, China



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& Telecommunications,
China

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Rui Huang
The Chinese University of Hong Kong,
Shenzhen, China



Jie Wang
Nanjing University of Posts &
Telecommunications, China

Conference Committee

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Biological and Medical Image Processing	Yong Xia
Compression, Transmission, Retrieval	Xi Peng
Computational Imaging	Boxin Shi, Jian Zhang
Computer Graphics and Visualization	Feng Xu, Jiazhi Xia, Kun Xu, Shiqing Xin, Yu-Kun Lai, Yunhai Wang
Computer Vision and Pattern Recognition	Baoyuan Wu, Dong Wang, Gao Huang, Houwen Peng, Huimin Lu, Jia Xu, Jinshan Pan, Lijun Wang, Limin Wang, Meina Kan, Nannan Wang, Pingping Zhang, Shanshan Zhang, Shiqi Yu, Xiaoguang Han, Xinggang Wang, Yongchao Xu
Multi-View and Stereoscopic Processing	Yuchao Dai, Yulan Guo

Conference Committee

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Peizhen Wang	Yushuang Wu	Chao Yao	Pingping Zhang
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Rui Wang	Yuxuan Xiao	Jingfeng Yao	Xinpeng Zhang
Ruiqi Wang	Jin Xie	Chongjie Ye	Xuanyu Zhang
Ruotong Wang	Jingfen Xie	Dingqiang Ye	Yanan Zhang
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Shaokui Wei	Zizheng Yan	Qingjie Zeng	Jingyi Zhou
Xiu-Shen Wei	Bin Yang	Qiong Zeng	Tao Zhou
Ziyu Wei	Cheng Yang	Yaopei Zeng	Yang Zhou

Zhanping Zhou

Minfeng Zhu

Mingli Zhu

Mingrui Zhu

Xu Zhu

Zihao Zhu

Shinan Zou

Conference Venue



Zhongshan Hotel

Address: No. 307 Zhongshan East Road, District Xuanwu, Nanjing

Transportation

- **From Nanjing Train Station 8km**
About 15 mins by taxi, 30 mins by public transportation
- **From Nanjing South Train Station 12km**
About 25 mins by taxi, 30 mins by public transportation
- **From Nanjing Lukou Airport 41km**
About 45 mins by taxi, 1 h 45 mins by public transportation

Conference Room

主楼三层示意图 3rd floor of main Building



大会堂 307 308 309 金陵厅 御河厅 310 312

江苏省会议中心平面图

Zhongshan Hotel of Main Building



Program at a Glance

Thursday, September 21		
Time	Activities	Location
15:00-17:00	Registration	Reception Lobby (1F)
Friday, September 22		
Time	Activities	Location
09:00-17:00	Registration	Reception Lobby (1F)
09:00-12:00	Tutorial: Integrated Development of Computer Graphics and Vision	307
	Tutorial: Visual Information Generation and Credible Identification	308
	Workshop: Biometrics Recognition	309
12:00-13:30	Lunch	Yangzi Hall (1F)
13:30-17:30	CSIG Image and Graphics Challenge Championship	309
13:30-17:45	Workshop: Multi-modal Data Perception and Learning	307
13:30-15:30	Workshop: Progress in Frontier Research of 3D Vision	308
	Workshop: Opportunities and Security Challenges of Large Visual Models	Yangzi Hall South (1F)
	Workshop: Image Perception and Its Oceanic Applications	312
15:00-17:00	Women in Technology Elite Salon	East Building 101
15:30-15:45	Coffee Break	Lobby
15:45-18:00	Workshop: Machine Vision and Learning	308
15:45-17:45	Workshop: Youth Forum for Trustworthy Visual Computing	Yangzi Hall South (1F)
	Workshop: Remote Sensing Image Processing	312
18:00-19:30	Dinner	Yangzi Hall (1F)
Saturday, September 23		
Time	Activities	Location
09:00-17:00	Registration	Reception Lobby (1F)
08:30-09:00	Opening Ceremony	Auditorium (3F)
09:00-09:50	Keynote Tieniu Tan , Nanjing University	
09:50-10:10	Group Photo	East Building Lawn
10:10-10:20	Coffee break	Lobby
10:20-11:10	Keynote Kun Fu , Aerospace Information Research Institute, Chinese Academy of Sciences	Auditorium (3F)
11:10-12:00	Keynote Wenwu Zhu , Tsinghua University	
12:00-13:30	Lunch	Yangzi Hall (1F)

Program at a Glance

Saturday, September 23 (continued)		
Time	Activities	Location
13:00-14:30	Best Paper Session	307
14:00-16:00	Oral Session 1	308
14:00-16:00	Poster Session 1	309
16:00-18:00	Poster Session 2	
16:00-18:00	Oral Session 2	307
	Oral Session 3	308
14:30-17:00	CSIG Council Meeting	Yuhe Hall (3F)
18:15-21:00	Awarding Ceremony	Jinling Hall (3F) / Huangpu Hall

Sunday, September 24		
Time	Activities	Location
09:00-09:50	Keynote Yonggang Wen , Nanyang Technological University	Auditorium (3F)
09:50-10:00	Coffee break	Lobby
10:00-10:50	Keynote Mihai Datcu , University Politehnica of Bucharest	Auditorium (3F)
10:50-11:40	Keynote Baoquan Chen , Peking University	Auditorium (3F)
11:40-13:30	Lunch	Yangzi Hall (1F)
14:00-16:00	Oral Session 4	307
	Oral Session 5	308

Keynote Speakers

Host Qingshan Liu

Time 09:00-09:50, September 23, 2023

Location Auditorium



Tieniu Tan

Nanjing University

Dr. Tieniu Tan received his BSc from Xi'an Jiaotong University in 1984, and his MSc and Ph.D. from Imperial College London in 1986 and 1989, respectively. He subsequently moved to The University of Reading to work at the Department of Computer Science. He returned to China in 1998 to join the National Laboratory of Pattern Recognition (NLPR) at the Institute of Automation of the Chinese Academy of Sciences (CAS). He is currently the Secretary of the CPC Nanjing University Committee. He is also Professor and Director of the Research Center for Intelligent Perception and Computing (CRIPAC) of CAS. He has served as member of many committees and editorial boards including President of IEEE Biometrics Council, Vice President of IAPR, General Chair of ICPR 2018 and Editor-in-Chief of Machine Intelligence Research. He has published over 600 papers in refereed international journals and conferences, with current research interests in biometrics, computer vision, visual content forensics, and multi-modal intelligence. He is a Fellow of Chinese Academy of Sciences, TWAS IEEE and IAPR, and an International Fellow of the UK Royal Academy of Engineering and a Corresponding Member of the Brazilian Academy of Sciences. He is a recipient of the most prestigious award in the field of pattern recognition, the King-Sun Fu Prize.

Abstract

Biometrics for Individual Identification: Progress, Problems and Prospects

Biometric individual identification or simply biometrics encompasses the acquisition and analysis of biometric data (such as physiological or behavioral characteristics of a human individual) for identity verification. Its applications span a wide array of domains such as time and attendance, access and border control, public security, financial services, welfare management and education. Identity forgery and theft is increasingly becoming a major societal problem in the era of generative AI. In this talk, I will outline recent progress, remaining challenges and promising research directions in biometrics. I will highlight notable advancements in major biometric modalities including fingerprint, iris, face, and gait recognition. I will address some of the remaining issues in biometrics as well as promising avenues for future research before closing the talk.

Keynote Speakers

Host Guoping Wang

Time 10:20-11:10, September 23, 2023

Location Auditorium



Kun Fu

Aerospace Information Research Institute, Chinese Academy of Sciences

Kun Fu is a Researcher and Ph.D. Supervisor. He currently holds the positions of Vice President at the Aerospace Information Research Institute of the Chinese Academy of Sciences and Director of a Key Laboratory at the Chinese Academy of Sciences. He also serves as the Editor-in-Chief of the Journal of Electronics and Information Technology. His research primarily focuses on information processing and application technologies of Earth observation satellites. Over the years, he has served as the project leader for more than ten national major tasks. Kun Fu has been recognized with two first-class National Science and Technology Progress Awards and five first-class provincial and ministerial awards. He has been selected for the National Natural Science Fund for Distinguished Young Scholars, the National Innovation Award, and the He Liang He Li Foundation for Scientific and Technological Innovation Award. He has published five monographs, contributed to over 150 academic papers, and holds 23 authorized patents.

Abstract

Knowledge-Guided Remote Sensing Intelligent Interpretation Methods and Applications

Data-driven models have made significant progress in several remote sensing domains, however, the utilization of rich domain knowledge and expert experience is still limited. This report primarily introduces the challenges faced by remote sensing foundation models in integrating knowledge and characteristic processes. It discusses advancements in key technical areas such as cross-modal domain transfer, hypergraph-of-thought reasoning, and combined reinforcement learning. The report also presents application cases to illustrate the enhanced capabilities of foundation models in extracting complex scene elements and dynamically optimizing task workflows through knowledge guidance.

Keynote Speakers

Host Nenghai Yu

Time 11:10-12:00, September 23, 2023

Location Auditorium



Wenwu Zhu

Tsinghua University

Wenwu Zhu is currently a Professor of Computer Science Department and Vice Dean of National Research Center on Information Science and Technology at Tsinghua University. Prior to his current post, he was a Senior Researcher and Research Manager at Microsoft Research Asia. He was the Chief Scientist and Director at Intel Research China from 2004 to 2008. He worked at Bell Labs New Jersey as a Member of Technical Staff during 1996-1999. He received the Ph.D. degree from New York University, New York, USA, in 1996.

He served as the steering committee chair for IEEE Transactions on Multimedia (TMM) from 2020-2022. He served as the Editor-in-Chief for the IEEE T-MM from 2017 to 2019, and Associate Editor-in-Chief for IEEE Transactions on Circuits and Systems for Video Technology from 2020-2021. He served as General Chair for ACM MM 2018 and ACM CIKM 2019. His current research interests are in the areas of multimedia Intelligence and big data analytics. He received 10 Best Paper Awards. He is an ACM Fellow, IEEE Fellow, AAAS Fellow, and SPIE Fellow, a member of Academia Europaea.

Abstract

Self-directed Machine Learning and Its Applications for Multimedia

Although current machine learning methods have achieved great success in many applications ranging from computer vision to natural language processing etc., they rely heavily on manual design from machine learning experts, which is very labor-intensive and time-consuming. To date, we are facing more challenges in open and dynamic environments, where the tasks, data, and models are pre-specified in the current machine learning paradigm, failing to autonomously select data, tasks, and models like humans.

To address this issue, this talk proposes a new concept of machine learning, namely select-directed (autonomous) machine learning. Self-directed machine learning refers to the ability of machines to autonomously decide what tasks to learn, which data and models to select based on their environments and states. Self-directed machine learning can ultimately realize the paradigm shift from current task-driven machine learning to autonomous-driven machine learning. Moreover, we discuss the various applications of self-directed machine learning in multimedia scenarios.

Keynote Speakers

Host Yanning Zhang

Time 09:00-09:50, September 24, 2023

Location Auditorium



Yonggang Wen

Nanyang Technological University

Dr. Yonggang Wen is a Professor and President’s Chair in Computer Science and Engineering at Nanyang Technological University (NTU), Singapore. He also serves as the Associate Vice President (Capability Building) at NTU Singapore. He is also the Director of NTU Centre for Computational Technologies in Finance (CCTF). He received his Ph.D. degree in Electrical Engineering and Computer Science (minor in Western Literature) from Massachusetts Institute of Technology (MIT), Cambridge, USA, in 2008. Dr. Wen has published over 300 papers in top journals and prestigious conferences. His systems research has gained global recognitions. His work in Multi-Screen Cloud Social TV has been featured by global media (more than 1600 news articles from over 29 countries) and received ASEAN ICT Award 2013 (Gold Medal). His work on Cognitive Digital Twin for Data Centre, has won the 2015 Data Centre Dynamics Awards – APAC (the ‘Oscar’ award of data centre industry), 2016 ASEAN ICT Awards (Gold Medal), 2020 IEEE TCCPS Industrial Technical Excellence Award, 2021 W.Media APAC Cloud and Datacenter Technology Leader Award, and 2022 Singapore Computer Society Digital Achiever Tech Leader Award. He was the winner of 2019 Nanyang Research Award and the sole winner of 2016 Nanyang Awards for Innovation and Entrepreneurship, both of which are the highest recognition at NTU. He is a co-recipient of multiple Best Paper Awards from top journals, including 2019 IEEE TCSVT and 2015 IEEE Multimedia, and at international conferences, including 2016 IEEE Globecom, 2016 IEEE Infocom MuSIC Workshop, 2015 EAI Chinacom, 2014 IEEE WCSP, 2013 IEEE Globecom and 2012 IEEE EUC. He is the Editor in Chief of IEEE Transactions on Multimedia (T-MM), serves or has served on editorial boards for multiple IEEE and ACM transactions, and was elected as the Chair for IEEE ComSoc Multimedia Communication Technical Committee (2014-2016). His research interests include cloud computing, green data center, big data analytics, multimedia network and mobile computing. He is a Fellow of IEEE and Singapore Academy of engineering.

Abstract

EasyFL: Optimising Federated Learning for Computer Vision Applications

Deep learning has transformed industries through powerful computer vision applications. However, the traditional centralized training approach is facing serious challenges due to ever-increasing data privacy regulations. To mitigate this problem, Federated Learning (FL) has emerged as a distributed training paradigm that trains deep learning models on user devices, protecting data privacy by eliminating the need for data transfer to a central server. Despite FL's significant potential for training computer vision applications, it is still in its early stage and requires further optimization in terms of system performance and specificity for booming computer vision applications.

In this talk, we focus on how to optimize FL platforms for computer vision applications through system and algorithmic optimizations. We begin by introducing our low-code FL platform, EasyFL, which improves researchers' productivity and efficiency in implementing new federated computer vision applications. It allows users to write less code with 1.5 times of training speedup. Built on EasyFL, we then present multiple algorithmic optimizations to improve accuracy for various computer vision applications, including person re-identification, face recognition, and self-supervised learning. Finally, we present algorithmic and system optimizations for training multiple simultaneous FL activities under resource constraints.

Keynote Speakers

Host Bin Luo

Time 10:00-10:50, September 24, 2023

Location Auditorium



Mihai Datcu

University Politehnica of Bucharest

Prof. Mihai Datcu is Professor, and director of the Research Center for Spatial Information (CEOSpaceTech) at University Politehnica of Bucharest (UPB), and also Visiting Professor with the Φ -lab of the European Space Agency (ESA). His research concerns theoretical aspects of information theory, Bayesian inference, computational sensing, artificial intelligence and quantum machine learning with applications to SAR Earth Observation. From 1993 to 2023, he has been with the German Aerospace Center (DLR), as Senior Scientist with the Remote Sensing Technology Institute (IMF). From 1992 to 2002, he had a longer Invited Professor Assignment with the Institute of Communication Technology of the Swiss Federal Institute of Technology (ETH Zurich), Zurich, Switzerland. From 2005 to 2013 has been Professor holder of the DLR-CNES Chair, at ParisTech, Paris Institute of Technology. He was awarded National Order of Merit with the rank of Knight, for outstanding international research results, by the President of Romania in 2008, and he was the recipient of the Chaire d'excellence internationale Blaise Pascal 2017 for international recognition in the field of data science in EO and the 2018 Ad Astra Award for Excellence in Science. He has served as a Co-organizer for international conferences and workshops and as Guest and Associate Editor for IEEE and other journals. In 2022 he got the IEEE GRSS David Landgrebe Award in recognition of outstanding contributions to Earth Observation analysis using innovative concepts for big data analysis, image mining, machine learning, smart sensors, and quantum resources. He is IEEE Fellow.

Abstract

Quantum Machine Learning meets Image Processing

At present, quantum computing and AI are the key technologies in the digital era. The progress and transfer of quantum resources for use in practical applications is in constant acceleration. Quantum computing, quantum annealing, quantum circuits, or simulators for quantum computing are currently easily accessible. The exploitation of quantum physics effects such as superposition and entanglement opens new, still unexplored perspectives. Yet, with very limited capacities, hundreds of qubits, they draw the attention stimulating the new area of quantum machine learning.

In this context the presentation will focus on relevant aspects of quantum technologies for image understanding. With the goal to identify if a quantum algorithm may bring any advantage compared with classical methods, will be firstly analysed the data complexity (i.e. data as prediction advantage). Secondly, it will be presented the classes of complexity of the algorithms. Thirdly, it will be identify major challenges in satellite imaging which could not yet be solved by classical methods, as for instance the causality analysis. The presentation will address the entire image analysis cycle encompassing the particular features from data acquisition, understanding and modelling of the image sensor, followed by information extraction. Hybrid methods will be discussed for satellite observations, i.e. managing the I/O of the data and maximally use the resources of quantum computers and quantum algorithms.

Keynote Speakers

Host Lianfa Bai

Time 10:50-11:40, September 24, 2023

Location Auditorium



Baoquan Chen

Peking University

Baoquan Chen is a Professor of Peking University, where he is Associate Dean of the School of Artificial Intelligence. His research interests generally lie in computer graphics, 3D vision, visualization, and human-computer interaction. He has published 200+ papers in international journals and conferences, including 60+ papers in ACM Transactions on Graphics (TOG) / SIGGRAPH _ North _ America / SIGGRAPH _ Asia, and won several best paper awards in prestigious conferences, including SIGGRAPH Asia 2023, SIGGRAPH 2023 (Honorary Mention), and IEEE Visualization 2005. Chen has served as associate editor of ACM Transactions on Graphics and IEEE Transactions on Visualization and Graphics, conference steering committee member of ACM SIGGRAPH Asia and IEEE VIS, conference chair of SIGGRAPH Asia 2014 and IEEE Visualization 2005, as well as program chair/committee member of numerous conferences in the visualization and computer graphics fields.

Chen served as the Chief Scientist of Beijing Advanced Innovation Center for Future Visual Entertainment, Beijing Film Academy (2016-2021). He is a guest professor of the School of Art, Peking University. Chen is the recipient of 2003 NSF CAREER award, 2004 McKnight Land-Grant Professorship at the University of Minnesota (Twin Cities), and 2014 Outstanding Award of Chinagraph. Chen received an MS in Electronic Engineering from Tsinghua University, and a Ph.D. in Computer Science from the State University of New York at Stony Brook. For his contribution to spatial data visualization, he was elected IEEE Fellow in 2020, and was inducted to IEEE Visualization Academy in 2021.

Abstract

CGGC or AIGC for visual content generation?

With the emerging AIGC (AI Generated Content) techniques, imagery or video generation is seemingly made easy, indicated by a mere text prompt. Nevertheless, we must recognize that the traditional CGGC (Computer Graphics Generated Content) is still the indispensable choice for the vast majority, if not all, 'serious' applications. In this talk, I will try looking into the fundamentals and the latest advancements of the computer graphics technology, and hope to illustrate a potential where CGGC and AIGC ultimately join the force.

Tutorial Sessions

Integrated Development of Computer Graphics and Vision

Time	09:00-12:00 September 22, 2023	Location	307	Host	Weiwei Xu
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Tutorial Session Introduction: In today's digital era, the integrated development of computer graphics and vision, as a key area that promotes scientific and technological progress, is increasingly attracting widespread attention. From virtual reality to augmented reality, from special effects in movies to medical image processing, the integrated development of computer graphics and vision has profoundly changed the way people live and work. This forum will explore the intersection technologies and applications of computer graphics and computer vision. Computer graphics and computer vision are two closely related fields, and their integration will produce new innovative technologies. This forum will explore how to combine computer graphics and vision technology to achieve deep integration of the virtual and real worlds. From smart glasses to interactive projections, visual fusion technology is leading the future of human-computer interaction. In addition, the fusion of computer graphics and vision also has broad application prospects in fields such as medical imaging and industrial design. This forum will discuss how to use 3D visualization technology to assist doctors in surgical planning and simulation, and how to use virtual prototype and digital twin technology in industrial design to accelerate product innovation and development process. This forum will gather experts from academia to discuss the cutting-edge developments in the integration of computer graphics and computer vision, as well as specific application practices.

Time Table

Time	Presenter	Title
09:00-10:00	Juyong Zhang Professor, University of Science and Technology of China	High-fidelity 3D Digitization Based on Neural Implicit Representation
10:00-11:00	Kai Xu Professor, National University of Defense Technology	Embodied Intelligence Based on Three-dimensional Geometric Perception
11:00-12:00	Jie Guo Associate researcher, Nanjing University	Estimating Material Appearance from a Single Image

Organizer



Weiwei Xu

Professor, Zhejiang University

Biography: Weiwei Xu is currently a tenured professor of the State Key Laboratory of CAD&CG, School of Computer Science and Technology, Zhejiang University, and a Changjiang Scholar of the Ministry of Education. He used to be a postdoctoral fellow at Ritsumeikan University in Japan, a researcher in the Network Graphics Group at Microsoft Research Asia, and a distinguished professor of Zhejiang Qianjiang Scholar at Hangzhou Normal University. His main research direction is computer graphics, covering 3D reconstruction, deep learning, physical simulation, and 3D printing. He has published more than 80 papers in high-level academic conferences and journals at

home and abroad, including more than 40 CCF-A papers such as ACM Transactions on Graphics, IEEE TVCG, IEEE CVPR, and AAAI. Obtained 15 patents authorized by China and United States. The developed 3D registration and reconstruction technology has been applied in high-precision scanners and human body 3D reconstruction systems. In 2014, he was funded by the National Science Fund for Distinguished Young Scholars, hosted a key project of the National Natural Science Foundation of China, and won the second prize of the Zhejiang Provincial Natural Science Award.

Speaker



Juyong Zhang

Professor, University of Science and Technology of China

Biography: Juyong Zhang, a professor at the School of Mathematical Sciences at the University of Science and Technology of China, received funding from the National Outstanding Youth Foundation and the Excellent Membership of the Youth Innovation Promotion Association of Chinese Academy of Sciences. In 2006, he graduated from the Department of Computer Science, University of Science and Technology of China. In 2011, he graduated from Nanyang Technological University, Singapore. From 2011 to 2012, he worked as a postdoctoral researcher at Swiss Federal Institute of Technology Lausanne. His research field is computer graphics and 3D vision. His recent research interests are efficient and high-fidelity 3D digitization of the real physical world based on neural implicit representation, inverse rendering and numerical optimization methods, and the creation of high-realistic virtual digital content.

Title: High-fidelity 3D Digitization Based on Neural Implicit Representation

Abstract: Efficient and high-precision three-dimensional reconstruction of people, objects, and scenes in the real physical world is a core research issue in the fields of computer graphics, three-dimensional vision, and other fields. Traditional 3D vision and 3D reconstruction usually include multiple steps such as depth acquisition, point cloud registration, and grid reconstruction. The cumbersome technical processes and requirements for hardware equipment make high-fidelity 3D reconstruction and presentation unable to be as popular as 2D images. In recent years, neural implicit functions represented by neural radiation fields (NeRF) have made great breakthroughs in new perspective synthesis and high-precision three-dimensional reconstruction with their powerful fitting expression capabilities and differentiability. In this report, I will introduce the concept of neural implicit representation, various improvements, and its applications in the reconstruction of digital people, objects, and large scenes.

Speaker



Kai Xu

Professor, National University of Defense Technology

Biography: Kai Xu is a professor of National University of Defense Technology, funded by the National Science Fund for Distinguished Young Scholars. He is also a visiting scholar at Princeton University. His research directions are computer graphics, 3D vision, robot perception, digital twins, etc. He has published more than 80 CCF A papers, including 29 papers on SIGGRAPH, the top conference on computer graphics. He serves on the editorial board of top international journals such as ACM Transactions on Graphics. He serves as the co-chairman of the papers of international conferences such as GMP 2023 and CAD/Graphics 2017, and the program committee member of conferences such as SIGGRAPH and Eurographics. He serves as the deputy director of the 3D Vision Committee of the Chinese Society of Image and Graphics, the deputy director of the Geometric Design and Computing Committee of the Chinese Society of Industrial and Applied Mathematics, and the director of the Chinese Graphics Society. He has won 2 first prizes of the Hunan Provincial Natural Science Award (ranked 1 and 3 respectively), the first prize of the Natural Science Award of the China Computer Federation (ranked 3), the second prize of the Army Science and Technology

Progress Award, and the second prize of the Army Teaching Achievement Award.

Title: Embodied Intelligence Based on Three-dimensional Geometric Perception

Abstract: Visual perception is the most important way for robots to explore, perceive, and understand unknown environments. With the rapid development of 3D sensing technology, 3D graphics are being deeply integrated with robot vision, forming a new way of robot perception and interaction based on 3D geometry, realizing 3D perception and dexterous interaction of robots to unknown environments, and finally supporting robots in 3D environments to achieve embodied intelligence. This report focuses on three aspects of reconstruction, understanding, and interaction, and reports our series of work in recent years, including robust and scalable real-time 3D reconstruction, robot autonomous and cooperative scene scanning and reconstruction, robot active scene understanding, and based on Robot dexterous grasping based on three-dimensional geometric representation learning, etc., and trying to explore the future development direction of embodied intelligence based on three-dimensional geometric perception.

Speaker



Jie Guo

Associate researcher, Nanjing University

Biography: Dr. Jie Guo is an associate researcher in the Department of Computer Science and Technology at Nanjing University. He received his Ph.D. from Nanjing University in 2013. His current research interest is mainly in computer graphics, virtual reality and 3D vision. He has over 70 publications in internationally leading conferences (SIGGRAPH, SIGGRAPH Asia, CVPR, ICCV, ECCV, IEEE VR, etc.) and journals (ACM ToG, IEEE TVCG, IEEE T-IP, etc.). He has developed several applications on illumination prediction, material prediction and real-time rendering, which have been widely used in industry and achieved good economic and social benefits. He is the recipient of JSCS Youth Science and Technology Award, JSIE Excellent Young Engineer Award, Huawei Spark Award, 4D ShoeTech Young Scholar Award and Lu Zengyong CAD&CG High-Tech Award.

Title: Estimating Material Appearance from a Single Image

Abstract: Building a virtual world that is consistent with the real world has always been a goal pursued by researchers in the field of computer graphics. Material estimation techniques are an essential part of this process. In recent years, deep learning has emerged as an important foundational technology that has driven the development of material estimation techniques and accelerated their practical applications. This talk aims to explore the material estimation problem in real-world scenarios and focuses on solving the problem under a lightweight setting that uses a single image as the input.

Tutorial Sessions

Visual Information Generation and Credible Identification

Time	09:00-12:00 September 22, 2023	Location	308	Host	Nannan Wang Shengsheng Qian
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Tutorial Session Introduction: With the rapid development of artificial intelligence and digital image processing, we are facing the generation and dissemination of large amounts of images, videos, and graphic content. However, the authenticity and credibility of these visual contents have been seriously challenged. Under this circumstance, the generation and credible identification of visual content have become a hot topic in the field of computer vision. First, this forum will delve into visual content generation methods based on technologies such as generative AI. These methods can not only be used in the synthesis of images and videos, but can also be extended to 3D models and animations. What follows is how to ensure the authenticity and legality of the generated content and prevent the spread of false information. This forum will discuss the application of credible identification technology for visual content. Focusing on the credibility of visual content, we review tampering and counterfeiting technologies, analyze the difficulties and hot issues of visual content counterfeiting, and focus on the research work on face authentication and liveness detection in the data layer, content layer and semantic layer. This forum will bring together experts from academia to discuss topics including basic technological progress and analysis in both directions of generation and identification, as well as specific application practices. Visual content generation and credible identification is a research field full of challenges and opportunities. It is also an inevitable trend in the development of content creation and dissemination in the digital era.

Time Table

Time	Presenter	Title
09:00-10:00	Jun Zhu Tsinghua University	Diffusion Probability Model and Its Application
10:00-11:00	Weihong Deng Beijing University of Posts and Telecommunications	Fake Visual Content Detection
11:00-12:00	Baoyuan Wu Chinese University of Hong Kong, Shenzhen	Visual AIGC and Its Detection

Organizer



Nannan Wang

Professor, Xidian University

Biography: Nannan Wang is a professor at Xidian University, doctoral supervisor, and deputy director of the National Key Laboratory of Space, Space and Ground Integrated Business Network. In recent years, he has been engaged in research on image cross-domain reconstruction and credible identification. He has published more than 200 papers in international academic journals such as IEEE T-PAMI and IJCV and international academic conferences such as CVPR, ICCV, ECCV, ICML, and NeurIPS, and has been granted 30 national invention patents. The remaining projects include 7 patented technology transfers and 3 software copyrights. Related achievements have won the first prize of the

Natural Science Award of the Ministry of Education, the first prize of the Shaanxi Provincial Science and Technology Award, and the Outstanding Doctoral Thesis of the China Artificial Intelligence Society. Hosted the National Natural Science Foundation of China Outstanding Youth Fund, joint fund key, general, and youth projects, scientific and technological innovation 2030-"New Generation Artificial Intelligence" major project sub-topics, equipment pre-research-Ministry of Education Joint Fund, etc. Served as the associate-editor-in-chief of the international journal "Visual Computer".

Co-organizer



Shengsheng Qian

Associate Professor, Institute of Automation, Chinese Academy of Sciences

Biography: Shengsheng Qian, associate professor at the Institute of Automation, Chinese Academy of Sciences. In recent years, he has been engaged in research on cross-media reasoning and trustworthiness assessment. He has published 46 papers in IEEE T-PAMI and other IEEE/ACM Trans. journals and CCF-A conferences, one of which was selected as ESI Highly Cited. The related results won the 2018 Excellent doctoral Dissertation of Chinese Academy of Sciences, the best paper of ACM Multimedia in 2016, the best paper nomination of ACM Multimedia in 2019, and the best paper of China Multimedia Conference in 2019, etc. He hosted the National Natural Science Foundation of China youth, general, and key project sub-projects, the Chinese Academy of Sciences Special Research Assistant Funding Project, the Tencent WeChat Rhino-Bird Focused Research Program, and the 166 Project.

Speaker



Jun Zhu

Professor, Tsinghua University

Biography: Jun Zhu is Bosch AI Professor in the Department of Computer Science at Tsinghua University, IEEE Fellow, Vice President of the Institute of Artificial Intelligence at Tsinghua University, and former adjunct professor at Carnegie Mellon University. He received his bachelor's and doctoral degrees from Tsinghua University from 2001 to 2009. He mainly engaged in machine learning research. He served as the deputy editor-in-chief of the internationally renowned journal IEEE T-PAMI, and served as senior field chairperson and best paper review committee member for ICML, NeurIPS, ICLR, etc. more than 20 times. He won the Qiushi Outstanding Youth Award of the China Association for Science and Technology, the Scientific Exploration Award, the First Prize of the Natural Science of the Computer Society of China, the First Prize of the Natural Science of Wu Wenjun in Artificial Intelligence, the ICLR International Conference Outstanding Paper Award, etc., and was selected as the Ten Thousand Talents Program Leading Talent, the CCF Young scientist, MIT TR35 Chinese Pioneer, etc. Many doctoral students he has supervised have won the Outstanding Doctoral Thesis of the CCF, the Outstanding Doctoral Thesis of the China Artificial Intelligence Society, and the Tsinghua University Special Scholarship.

Title: Diffusion Probability Model and its Application

Abstract: AIGC is developing rapidly. The diffusion probability model is one of the key technologies of AIGC. It has made significant progress in cross-modal text and image generation, 3D generation, and video generation. This report will introduce several advances in diffusion probability models, including the basic theory and efficient algorithms of diffusion probability models, large-scale multi-modal diffusion models, text to 3D generation, controllable video generation, etc.

Speaker



Weihong Deng

Professor, Beijing University of Posts and Telecommunications

Biography: Professor at the School of Artificial Intelligence, Beijing University of Posts and Telecommunications, and Young Yangtze Scholar of the Ministry of Education. His research interests include biometric identification, affective computing, and multimodal learning. In recent years, he has presided over more than 20 projects of the National Key R&D Plan and the National Natural Science Foundation of China. He has published more than 100 papers in international journals and conferences such as IEEE T-PAMI, IJCV, T-IP, ICCV, CVPR, ECCV, etc., and has been cited more than 13,000 times by Google Scholar. He has served as the area chair of CVPR, ECCV, ACM MM, AAAI, IJCAI, and other conferences for many times. He has been selected as Beijing's Outstanding Doctoral Thesis, Beijing Science and Technology Star, Ministry of Education's New Century Outstanding Talents, Elsevier China Highly Cited Scholar, etc.

Title: Fake Visual Content Detection

Abstract: As the most direct way to record objective facts, visual data is irreplaceable in daily life, but it also has problems that cannot be ignored: In the era of booming online media, with breakthroughs in generative technologies such as generative adversarial networks and diffusion models, The authenticity and safety of visual content have become increasingly prominent, attracting great attention from the country to the public. In this tutorial, focusing on the credibility of visual content, we briefly review the generation, tampering and counterfeiting technologies, analyze the difficulties and hot issues of visual content counterfeiting, and focus on our research team's work on face forgery and liveness detection in the data layer, content layer and semantic layer.

Speaker



Baoyuan Wu

Associate Professor, Chinese University of Hong Kong, Shenzhen

Biography: Dr. Baoyuan Wu is a Tenured Associate Professor of School of Data Science, the Chinese University of Hong Kong, Shenzhen (CUHK-Shenzhen). His research interests are AI security and privacy, machine learning, computer vision and optimization. He has published 70+ top-tier conference and journal papers, including T-PAMI, IJCV, NeurIPS, ICML, CVPR, ICCV, ECCV, ICLR, AAAI, and one paper was selected as the Best Paper Finalist of CVPR 2019. He is currently serving as an Associate Editor of Neurocomputing, Organizing Chair of PRCV 2022, Area Chair of CVPR 2024, NeurIPS 2022/2023, NeurIPS Datasets and Benchmarks Track 2023, ICLR 2022/2023/2024, ICML 2023, AAAI 2022/2024, AISTATS 2024, WACV 2024, and ICIG 2021/2023. He was selected into the world's top 2% scientist list of 2021 and 2022, released by Stanford University.

Title: Visual AIGC and Its Detection

Abstract: In this tutorial, I will firstly introduce the basics of visual AIGC, including its history, applications, and two mainstream technologies, i.e., GANs and diffusion models. Then, a complete taxonomy will be presented to summarize the main branches of visual AIGC, covering facial and natural images, as well as their applications, with the focus on face forgery. Finally, I will introduce the detection of two types of generated visual contents (image or video), including face forgery and AI generated natural images, covering the main challenges, mainstream detection methods and future trends.

Workshops

Biometrics Recognition

Time	09:00-12:00 September 22, 2023	Location	309	Host	Lunke Fei
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Workshop Introduction: With the rapid development of modern digital society, how to perform security personal authentication plays a foundation role for various practical applications. Biometrics, which automatically recognizes individuals by using one’s distinct physiological or behavioral traits, has served as one the most effective technologies for personal authentication and also played an increasingly important role in the national economy. In recent years, deep learning technologies have achieved impressive performance in various pattern recognition and computer vision tasks, which has also be successfully applied in biometric recognition, profoundly changing the directions of biometric recognition technology. For this reason, it is highly necessary to convene a biometric recognition technology forum to discuss the latest development of biometric recognition technology. At this forum, four outstanding young scholars will provide interesting and valuable technical reports on several important biometric recognition fields, including the trustworthy face recognition, face anti-spoofing, animal biometric recognition, and vein recognition. At this forum, attendees can better study the latest progress in the above directions of biometrics. Moreover, through a panel discussion, the attendees can further understand and discussion the future potential development directions of biometric recognition technology. Therefore, this forum is of great significance for researchers in the related fields of biometric recognition.

September 22

Time Table

Time	Presenter	Title
09:00-09:30	Di Huang Beihang University	Face Anti-spoofing Against Physical and Digital Attacks
09:30-10:00	Qijun Zhao Sichuan University	Animal Biometrics Based on Audiovisual Computing
10:00-10:30	Wenxiang Kang South China University of Technology	Application-Driven Vein Recognition
10:30-11:00	Jianjun Qian Nanjing University of Science and Technology	Robust Face Perception in Uncontrolled Scenarios
11:00-12:00	Panel	

Organizer



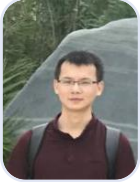
Wei Jia

Professor, Hefei University of Technology

Biography: Wei Jia received the B.Sc. degree in informatics from Central China Normal University, Wuhan, China, in 1998, the M. Sc. Degree in computer science from the Hefei University of Technology, Hefei, China, in 2004, and the Ph.D. degree in pattern recognition and intelligence system from the University of Science and Technology of China, Hefei, in 2008. He is currently a professor and doctoral supervisor of School of Computer and Information Science, Hefei University of Technology, and also the Deputy Director and Secretary General of the Youth Work Committee

of the Chinese Society of Graphic Arts. He had served as the procedural and organizational chairpersons of renowned international and domestic conferences for over 20 times. His research interests include computer vision, biometrics, pattern recognition, image processing, and machine learning. He has published more than 100 scientific papers, including more than 40 papers in CCF Class A and top journals such as IEEE Transactions. The papers have been cited more than 5000 times with an H-factor of 35. He now serves as an editorial board member of the Chinese Journal of Image and Graphics.

Co-organizer



Lunke Fei

Associate Professor, Guangdong University of Technology

Biography: Lunke Fei received the Ph. D. degree in computer science and technology from the Harbin Institute of Technology, China, in 2016. He is currently an Associate Professor with the School of Computer Science and Technology, Guangdong University of Technology, Guangzhou, China, and the CCF/CSIG/IEEE Senior member. His research interests include pattern recognition, biometrics and image processing. He has published more than 60 papers at prestigious international journals and conferences, including more than 30 papers in CCF-A conference or IEEE Transactions. His paper has more than 4500 Google Scholar citations and the H-index is 33. He is now an editorial board member of International Journal of Biometrics (IJB), an associate editor of International Journal of Image and Graphics (IJIG) and a young editorial board member of IEEE/CAA Journal of Automatica Sinica.

Speaker



Di Huang

Professor, Beihang University

Biography: Dr. Di Huang is currently a Professor with the School of Computer Science and Engineering at Beihang University. His research interests include biometrics, 2D/3D face analysis, pattern recognition and image/video processing. He has worked as the PI or key participant in many international and national grants, e.g., NSFC and ANR. He has authored more than 80 papers at prestigious international journals and conferences with around 8,500 citations received. He has won academic paper awards for 5 times, including ICB and AMFG, as well as champions of challenges at top-tier conferences, such as MM and ICRA. Related techniques are successfully applied in the industry.

Title: Face Anti-spoofing Against Physical and Digital Attacks

Abstract: In recent years, there has been a rapid emergence of facial perception applications, which are playing a crucial role in key domains, such as access control and financial payment, and enhancing the convenience of people's lives. However, the large advances in 3D printing and deep learning technologies also lead to more vivid face forgeries, significantly threatening the security of biometric authentication systems. This talk focuses on face anti-spoofing, presenting the latest progress of physical and digital attack detection by the research team. In particular, it shows the paradigm of detecting unknown spoofing types, the method of spatial and frequency feature learning, and the strategy of texture-geometry information fusion. In addition, thoughtful considerations on potential perspectives within this field are discussed.

Speaker



Qijun Zhao

Professor, Sichuan University

Biography: Zhao Qijun, Ph.D., Professor, Vice Dean of College of Computer Science, Sichuan University. He

obtained a bachelor's and master's degree in the Department of Computer Science and Technology of Shanghai Jiaotong University from 1999 to 2006, a doctor's degree in the Department of Computing of Hong Kong Polytechnic University from 2006 to 2010. He used to serve as a postdoctoral researcher in Michigan State University, and a visiting professor in Tibet University. His research interest lies in the field of biometric recognition, and focuses on animal biometrics in recent years. He has been awarded the second prize of the Shanghai Natural Science Award, the third prize of the Sichuan Provincial Science and Technology Progress Award, an outstanding reviewer in CVPR2020, and an outstanding editorial board member of the Chinese Journal of Image Graphics.

Title: Animal Biometrics Based on Audiovisual Computing

Abstract: Identifying animal species and attributes, distinguishing individual animals, and understanding their behavior are of crucial value for wildlife monitoring and protection. In recent years, due to emerging deep learning technologies, computer vision and auditory computing have developed rapidly, providing potential more efficient solutions for identifying animals. In this talk, we will introduce the application of audio-visual computing technology in animal biometric recognition and report our recent research outcomes, including animal individual recognition or re recognition based on appearance features, as well as animal species recognition, attribute classification, and emotional analysis based on vocalization.

Speaker



Wenxiong Kang

Professor, South China University of Technology

Biography: Dr. Wenxiong Kang is currently a Professor with the School of Automation Science and Engineering & School of Future Technology at South China University of Technology, deputy director of Guangdong Province Intelligent Financial Enterprise Key Laboratory; and director of SCUT-BenLiu Power Artificial Intelligence Joint Laboratory. His research interests include biometric recognition and computer vision. In recent years, he has presided over more than 20 national key research and development projects and projects of the National Natural Science Foundation of China and Guangdong Province, and he has published nearly 100 papers (more than 30 papers in JCR 1 journals) at prestigious international journals and conferences, of which 10 papers have won the Best Paper Award, the Distinguished Paper Award, and the Outstanding Paper Award. He has applied for more than 70 international and national invention patents and more than 40 were authorized, of which 16 patents have been successfully transferred to enterprises, and related techniques have been successfully applied to airports, power grids, and superstores and factories.

Title: Application-Driven Vein Recognition

Abstract: In recent years, vein recognition has received extensive attention from the society due to its unique live body detection capability, and many progress have been made in vein image preprocessing, vein feature extraction and expression, etc. Especially on the existing public vein datasets, most recent work have been able to achieve good recognition performance, which has greatly facilitated the grounded application of finger vein recognition technology in a variety of occasions. This report focuses on the application-driven vein recognition research, and highlights the team's vein recognition research work for different application scenarios, including: reflection-based imaging finger vein recognition for handheld devices, three-dimensional finger vein recognition for high-security situations, and on-the-fly palm vein recognition for unconstrained and weak-cooperative scenarios, and focuses on the research methodology, dataset construction, and prototype development.

Speaker



Jianjun Qian

Associate Professor, Nanjing University of Science and Technology

Biography: Dr. Qian is currently an Associate Professor with the School of Computer Science and Engineering at Nanjing University of Science and Technology. His research interests include pattern recognition, vision perception and biometrics. He has authored more than 80 papers in international journals and conferences such as IEEE T-PAMI/T-IP/TNNLS/TIM, IJCV, CVPR/ICCV/AAAI/IJCAI and other conferences many times. He has presided over three National Nature Science Funds, and participate key projects of NSFC many times. He has won two first prizes of Jiangsu Science and Technology Awards. He has been selected as Hong Kong Scholar, Outstanding Young Teacher of "Qinglan Project" in Jiangsu Province.

Title: Robust Face Perception in Uncontrolled Scenarios

Abstract: Face robust perception plays an important role in real scene applications. However, face perception is still a challenging problem in non-controllable scenario due to illumination changes, large scale pose variations, small scale and occlusions. This report will introduce our recent research work from the aspects of robust face representation and face perception based physiological information measurement: (1) We provide an intrinsic analysis to reveal the working mechanism of softmax from the view of closeness and diversity. We find that enhancing the closeness of easy samples and preserving the diversity of hard samples can improve face representation robustness. (2) We leverage the short-term invariant prior of environment temperature to develop the dynamic group difference coding method for infrared face image, and further design the remote human body fever screening system.

Workshops

Multi-modal Data Perception and Learning

Time	13:30-17:45 September 22, 2023	Location	307	Host	Huimin Lu
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Workshop Introduction: Multi-modal data is an information form similar to human perceptual learning and is easily obtainable in large quantities. Compared to unimodal data, the synchronicity of concepts across different modalities in these data provides supervised information for unlocking the latent explanatory factors of each modality. Traditional approaches to processing multi-modal data mainly focus on preserving the invariant factors within each modality while ignoring the other factors. This forum aims to explore artificial intelligence that achieves learning and thinking capabilities similar to humans through brain-like computation. It aims to promote research and development in multi-modal data perception learning, open up new problems, directions, and challenges in the field of pattern recognition, and provide an international platform for academic and industrial exchange, learning, and collaboration. At the same time, this forum has selected three highly influential papers published in Machine Intelligence Research (MIR), a Chinese journal also known as "机器智能研究" (abbreviated as MIR). The authors of these papers come from renowned research institutions and their teams both domestically and internationally, with the aim of bringing the latest progress and achievements to the conference attendees. On one hand, this promotes academic exchanges and discussions within the machine vision community, and on the other hand, it showcases the forward-thinking nature and impact of ICIG to a broader audience of MIR authors and readers. This workshop is supported by Technical Committee on Machine Vision.

Time Table

Time	Presenter	Title
13:30-14:10	Xin Geng Southeast University	The "Gene" of Machine Learning: Making Machines Learn Like Humans
14:10-14:50	Zhen Wang Northwestern Polytechnical University	Research and Applications of Game Intelligence
14:50-15:30	Mang Ye Wuhan University	Multi-modal Person Re-identification
15:40-16:10	Xinggang Wang Huazhong University of Science and Technology	From Panoramic Driving Perception (YOLOP) to Perception Prediction and Planning Integrated Automatic Driving
16:10-16:40	Ge-Peng Ji Australian National University	Towards AI-Powered Colonoscopy
16:40-17:10	Jing Shi Institute of Automation, Chinese Academy of Sciences	From Image-language to Full-modal Large Model, Multi-modal Integration and Unified Path Exploration
17:15-17:45	Panel	

Organizer



Ming-Ming Cheng

Professor, Nankai University

Biography: Distinguished Professor of Nankai University, Head of Department of Computer Science. He presided over and undertook the National Science Fund for Distinguished Young Scholars, the Science Fund for Outstanding Young Scholars, and major projects of the Ministry of Science and Technology. His main research direction is computer vision and computer graphics. He has published more than 100 academic papers (including more than 30 IEEE T-PAMI papers) in SCI District 1/CCF Class A journals, with an h-index of 75 and 40,000 papers cited by Google. He has been cited more than 4,700 times for a single article, and has been selected as a global highly cited scientist and a Chinese highly cited scholar for many times. The technological achievements have been applied to the flagship products of Huawei, the National Disaster Reduction Center and other units. He has won 2 first prizes of the Natural Science Award of the Ministry of Education, 1 first prize of the Natural Science Award of the Chinese Society of Image and Graphics, and 1 second prize of the Natural Science Award of the Chinese Association for Artificial Intelligence. Three doctoral students trained won provincial and ministerial excellent doctoral dissertation awards. He is currently the deputy secretary-general of the Chinese Society of Image and Graphics, the vice-chairman of the Tianjin Artificial Intelligence Society, and the editorial board member of IEEE T-PAMI and IEEE T-IP, a journal of SCI.

Organizer

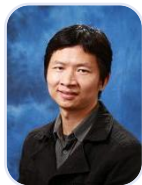


Guangwei Gao

Associate Professor, Nanjing University of Posts and Telecommunications

Biography: In 2014, he received a Ph.D. degree in pattern recognition and intelligent systems, a national key discipline, from Nanjing University of Science and Technology. The research direction involves the perception and understanding of low-quality visual content. Currently presiding over the General Project of the National Natural Science Foundation of China, the Excellent Youth Fund Project of the Natural Science Foundation of Jiangsu Province, and one high-level talent project of the "Six Talent Peaks" of Jiangsu Province, and participating in the key projects of the National Natural Science Foundation of China, Science and Technology Innovation 2030-"New One major project of "Generation of Artificial Intelligence". Served as a visiting researcher at the National Institute of Informatics of Japan (2019-2021). In recent years, he has published more than 70 papers in domestic and foreign core journals and important international conferences, including international authoritative journals IEEE T-IP/TMM/TCSVT/TIFS/TITS, PR and authoritative conferences AAAI, IJCAI, etc.

Co-organizer



Wanli Ouyang

Professor, Shanghai AI Laboratory

Biography: He used to be the director of research at the School of Electronic and Information Engineering, University of Sydney. In 2011, he received a Ph.D. from the Chinese University of Hong Kong. His research interests include pattern recognition, deep learning, computer vision, and AI for Science. Google Scholar has 30,000+ citations and an H-index of 79. In the industry-university-research circles, there are good scientific research resources and project cooperation, and the influence of scientific research is widely recognized in the industry. Published more than 160 papers in CCF Class A journals and conference papers such as T-PAMI, JCV, CVPR, and NeurIPS. According to AIMiner, its influence in the field of computer vision ranks 50th in the world and 2nd in Australia. Received the Vice Chancellor's award for "Outstanding Research" from the University of Sydney (Vice Chancellor's award for "Outstanding Research", only 2

people from the Faculty of Engineering of the University of Sydney won this award in the same year). According to the statistics of papers published in the field of computer vision and pattern recognition from 2016 to 2021 by Elsevier, an international authoritative organization, the average number of citations per article (Citations per paper) and field-weighted citation impact (FWCI) are both Australian No. 1, top 10 in the world. Two articles were selected as the most influential articles of paperdigest CVPR/ICCV. He and his team won the first place in ImageNet and COCO object detection. ICCV Best Reviewer, IJCV and Pattern Recognition Editorial Board, T-PAMI Guest Editor, ICCV2019 Exhibition Chair, CVPR2023 Senior Area Chair, CVPR2021, ICCV2021 Area Chair.

Co-organizer



Huimin Lu

Associate Professor, Kyushu Institute of Technology

Biography: Part-time professor at the Key Research and Development Center for IoT Intelligent Systems at Kyushu Institute of Technology, a national high-level talent. Research areas include artificial intelligence, robotics, and ocean observation. Serves as editor-in-chief for Computers & Electrical Engineering, Cognitive Robotics, Applied Soft Computing, Wireless Networks, IEEE Internet of Things Journal, IEEE/CAA Journal of Automatica Sinica, IEEE Transactions on Network Science and Engineering, Pattern Recognition, ACM Trans on Internet Technology, and guest editor for other journals. Senior member of IEEE, Chairman of the IEEE Computer Society Big Data Technical Committee.

Speaker



Xin Geng

Professor, Southeast University

Biography: Executive Vice President of the Graduate School, winner of the National Outstanding Youth Fund and Excellent Youth Fund, and an outstanding member of the International Society of Engineering and Technology. His research interests include machine learning, pattern recognition, and computer vision. He has won many teaching and scientific research awards such as the second prize of the National Natural Science Award and the first prize of the National Teaching Achievement Award. He is currently a member of the Computer Discipline Appraisal Group of the Academic Degrees Committee of the State Council, a member of the Artificial Intelligence Expert Committee of the Computer Professional Teaching and Guidance Committee of the Ministry of Education, the vice chairman of the Jiangsu Computer Society, and a member of the Steering Committee of the Asia-Pacific International Conference on Artificial Intelligence.

Title: The "Gene" of Machine Learning: Making Machines Learn Like Humans

Abstract: One of the fundamental driving forces behind this round of artificial intelligence boom is the development of modern machine learning, especially deep learning technology. Deep learning requires a lot of training data and computing resources. However, humans are often able to quickly learn a new concept from a small number of samples. This is because the brains of newborns are not random, and the result of thousands of years of human evolution has initialized the brains of newborns through genes. Inspired by this, we propose the "gene" of machine learning - Learngene. The new learning framework based on Learngene is expected to change the current rules of the game in the field of deep learning: now we only need to conduct large-scale training for open world tasks at a few "model suppliers", and a "customer" for specific tasks only needs to learn from Purchase a Learngene from the "model supplier" to initialize your own lightweight model, and you can quickly adapt to your target task with a small number of samples, just like human learning.

Speaker



Zhen Wang

Professor, Northwestern Polytechnical University

Biography: Secretary of the School of Cybersecurity, Executive Vice Dean of the National Institute of Confidentiality, Elected Member of The Academy of Europe, AAIA Fellow, globally highly cited scientist, National Distinguished Youth Scholar, Leader of Defense Innovation Team. His research interests include artificial intelligence, intelligent unmanned systems, and intelligent confrontation in cyberspace. He has published a series of achievements in Nature Communications, PNAS, Science Advance, Physical Review Letters, IEEE Transactions, IJCAI, AAAI, NeurIPS, ICML, ICLR, WWW, etc., with over 24,000 citations. The systems he developed have been deployed in multiple models. His accomplishments and deeds have been covered by major media outlets such as People's Daily, Guangming Daily, Xinhua News Agency, Nature News, Live Science, Sciencedaily, and he has received commendations from the Northern Theater Command. He has delivered more than 80 keynote or invited speeches at international conferences, and has led more than 20 projects including key projects of the National Natural Science Foundation, overseas funds, and GF projects. He has received awards such as the Scientific Exploration Prize, China Youth May Fourth Medal, National Innovation Advancement Medal, National Labor Medal on May Day, the inaugural MIT-TR35 China (sole representative from the western region), and the first prize of the Ministry of Education, Shaanxi Province, Chinese Society of Aeronautics and Astronautics, and Chinese Institute of Electronics Science and Technology Award.

Title: Research and Applications of Game Intelligence

Abstract: Game intelligence is an intersecting field covering game theory, artificial intelligence, etc. It focuses on the study of interactions between individuals or organizations, and how to achieve accurate solutions to optimal strategies through quantitative modeling of game relationships, ultimately forming an intelligent Decision-making and decision-making knowledge base. In recent years, with the massive explosion of behavioral data and the diversification of game forms, game intelligence has attracted the research interest of more and more scholars and has been widely used in real life. We will focus on game intelligence This research field has been systematically investigated from three aspects. First, the relevant background of game intelligence is reviewed, covering the single-agent Markov decision-making process, multi-agent modeling technology based on game theory, and reinforcement learning. , multi-agent solution solutions such as game learning. Secondly, according to the different game relationships between agents, the game is divided into three major paradigms: cooperative game, confrontational game and mixed game, and the characteristics of each game intelligence paradigm are introduced respectively. Main research questions, mainstream research methods and current typical applications. Finally, it summarizes the current research status of game intelligence, as well as the main problems and research challenges that need to be solved, and gives future prospects for academia and industry to further promote the national artificial intelligence development strategy.

Speaker



Mang Ye

Professor, Wuhan University

Biography: Mang Ye is currently a Full Professor at the School of Computer Science, Wuhan University. He received the Ph.D. degree from Hong Kong Baptist University in 2019, supported by Hong Kong Ph.D. Fellowship. He received the B.Sc and M.Sc degrees from Wuhan University in 2013 and 2016. He worked as a Research Scientist at Inception Institute of Artificial Intelligence and worked as a Visiting Scholar at Columbia University. He has published more than 80 papers, including 40+ CCF-A papers as the first/corresponding author. He received 5500+ citations, including those from 2 Turing awardees (Geoffrey Hinton and Yann Lecun). Ten papers are ESI Highly Cited. He received the National Science Foundation of China (NSFC) Excellent Youth Fund (Overseas). His research interests include

open-world visual learning and its applications in multimedia analysis and reasoning.

Title: Multi-modal Person Re-identification

Abstract: Person re-identification has achieved inspiring performance in single-modality RGB scenarios. However, in complex real-world environments, relying solely on a single modality has certain limitations and struggles to effectively handle diverse scene variations. Practical applications of person re-identification may require the integration of various modalities of data, including visible images/videos, infrared images, sketch images, text, sound, and others. In this talk, I will firstly provide a brief introduction to several common cross-modal person re-identification tasks, presenting the research background and challenges. Secondly, I will introduce the research progress of our team in the field of multi-modal person re-identification, including sketch-to-photo, text-to-image, infrared-to-visible, etc. Finally, some future research directions on this topic will be discussed.

Speaker



Xinggong Wang

Professor, Huazhong University of Science and Technology

Biography: Professor of the School of Telecommunications, Huazhong University of Science and Technology, National Top-notch Young Talents Program, co-editor-in-chief of Image and Vision Computing Journal. Published more than 60 academic papers in international top journal conferences, Google cited more than 20,000 times, and the highest single paper cited more than 2,100 times. He serves as the field chair of CVPR 2022, ICCV 2023, and CVPR 2024, and serves as the editorial board member of journals such as Pattern Recognition. Selected into the Young Talents Project of the China Association for Science and Technology, won the Hubei Youth May 4th Medal, CSIG Young Scientist Award, Wu Wenjun Artificial Intelligence Outstanding Youth Award, CVMJ 2021 Best Paper Award, Hubei Provincial Natural Science Second Prize, etc., and guided students to win the 2022 Natural Science Award The National "Internet +" Competition Gold Award.

Title: From Panoramic Driving Perception (YOLOP) to Perception Prediction and Planning Integrated Automatic Driving

Abstract: This report will present the Single-stage Panoramic Driving Perception (YOLOP) method developed by our research group, which has been published in the journal "Machine Intelligence Research". It analyzes how to efficiently perform joint optimization of tasks such as object detection, drivable area segmentation, and lane detection in autonomous driving perception, as well as its real-time deployment on embedded AI chips. Furthermore, it will discuss how our research group achieves accurate 3D object detection, object trajectory prediction, and self-vehicle trajectory planning based on omni-directional cameras, Transformers, and Query mechanisms for complex dynamic traffic scenarios. This aims to enhance the accuracy of perception, prediction, and planning integration in autonomous driving, while maintaining a concise framework.

Speaker



Ge-Peng Ji

Australian National University

Biography: A doctoral student at the Australian National University. He graduated from Wuhan University in 2021 with a master's degree. His main research directions include medical image analysis, complex visual scene understanding, video content analysis and other technologies. He has more than 10 papers in T-PAMI, TMI, CVPR, ICCV, MICCAI, and has been invited to serve as a reviewer for several top computer vision journals and conferences, and has been cited by Google Scholar more than 2,000 times. He has worked as a research intern in Yuanyuan Artificial Intelligence Research Institute, Alibaba and other companies.

Title: Towards AI-Powered Colonoscopy

Abstract: As the third largest cancer group in the world, colorectal cancer has gradually evolved into the second leading cause of malignant death in industrialized countries, seriously threatening human life and health. Most colorectal cancers are evolved from adenomatous polyps. If precancerous lesions can be detected and removed through early colonoscopy, the incidence rate can be greatly reduced by about 30%, effectively preventing the occurrence and development of colorectal cancer. Therefore, endoscopists can accurately find and judge the area of polyps through optical diagnosis during examination, which will avoid unnecessary surgical resection and pathological examination, and improve the cost-benefit ratio of colonoscopy screening. In recent years, with the vigorous development of artificial intelligence technology, what kind of sparks will it create with traditional colonoscopy screening technology? With the theme of AI-driven colonoscopy screening technology, this report introduces the origin of the problems, challenges, and technical solutions of colonoscopy screening technology, and discusses potential future research directions.

Speaker**Jing Shi**

Assistant Professor, Institute of Automation, Chinese Academy of Sciences

Biography: Assistant Professor at the Institute of Automation of the Chinese Academy of Sciences, a specially-appointed research backbone, and a core algorithm developer for the full-modal large model of "Zidong Taichu". Visiting scholar at the Center for Language and Speech Processing (CLSP) at Johns Hopkins University, and the co-professor is Professor Shinji Watanabe, a well-known scholar in the field of speech. One of the maintainers of ESPnet, an end-to-end NLP/Speech open source popular framework. He has published more than 20 papers in top international journal conferences, and his research direction is multi-modal human-computer interaction and speech processing.

Title: From Image-language to Full-modal Large Model, Multi-modal Integration and Unified Path Exploration

Abstract: In this report, we will present an overview of vision-language pre-training based on the article "VLP: A Survey on Vision-Language Pre-training" published by our research team in the journal "Machine Intelligence Research". We will discuss the overall summary of vision-language multi-modal pre-training from various aspects including feature extraction, feature representation, model architecture, pre-training objectives, datasets, downstream tasks, and existing representative works. Furthermore, we will expand the typical binary multi-modalities of vision and language to report on unified cognitive interaction models that encompass more modalities such as images, speech, and videos. We will explore the current state-of-the-art architectures, technical approaches, and challenges faced in supporting full modality in large-scale pre-training models for vision-language integration.

Workshops

Progress in Frontier Research of 3D Vision

Time	13:30-15:30 September 22, 2023	Location	308	Host	Jiaqi Yang
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Workshop Introduction: Three-dimensional (3D) vision is an essential research field within computer vision, encompassing a broad variety of topics, including depth imaging, 3D reconstruction, 3D object detection and recognition, as well as 3D scene understanding and content generation. In recent years, with the rapid development of 3D vision technology, the achievements in this domain have found extensive applications in intelligent systems such as autonomous vehicles, robotics, as well as content generation services.

The purpose of this forum is to bring together professionals engaged in 3D vision research from various fields, including computer vision, computer graphics, and robotics for facilitating the sharing of the latest technological developments in 3D vision, exploring the practical applications of 3D vision in different domains, and analyzing the challenges, difficulties, and potential opportunities encountered in 3D vision research. In general, this forum aims to provide a platform for experts, scholars, and practitioners in the field of 3D vision, both domestically and internationally, to exchange ideas and foster collaboration. This workshop is supported by Technical Committee on 3D Vision.

Time Table

Time	Presenter	Title
13:30-13:40	Introduction and Opening Remarks	
13:40-14:00	Qifeng Chen Hong Kong University of Science and Technology	Exploring Foundation Models for Video and 3D Synthesis
14:00-14:20	Zhen Li The Chinese University of Hong Kong-Shenzhen	Enhanced 3D Point Cloud Analysis and its Applications
14:20-14:40	Yifei Shi National University of Defense Technology	Geometry-Driven Robot Perception and Interaction
14:40-15:00	Qingyong Hu University of Oxford	Learning to Understand Large-Scale 3D Point Clouds
15:00-15:20	Kun Sun China University of Geosciences (Wuhan)	Robust Image Keypoint Matching and its Applications
15:20-15:30	Panel	

Organizer



Baoquan Chen

Professor, Peking University

Biography: Baoquan Chen is a Professor of Peking University, where he is the Associate Dean of the School of Artificial Intelligence. His research interests generally lie in computer graphics, computer vision, visualization, and human-computer interaction. He has published more than 200 papers in international journals and conferences, including 40+ papers in ACM Transactions on Graphics (TOG)/SIGGRAPH/SIGGRAPH_Asia. Chen serves as associate editor of ACM TOG/IEEE Transactions on Visualization and Graphics (TVCG), and has served as conference steering committee member (ACM SIGGRAPH Asia, IEEE VIZ), conference chair (SIGGRAPH Asia 2014, IEEE Visualization 2005), program chair (IEEE Visualization 2004), as well as program committee member of almost all conferences in the visualization and computer graphics fields for numerous times. Chen is the recipient of 2002 Microsoft Innovation Excellence Program, 2003 NSF CAREER award, 2004 McKnight Land-Grant Professorship at the University of Minnesota (Twin Cities), 2005 IEEE Visualization Best Paper Award, and 2014 Outstanding Achievement Award of Chinagraph. Prior to the current post, he was dean of the School of Computer Science and Technology and the School of Software and founding director of the Interdisciplinary Research Center, Shandong University (2013-2018), founding director of the Visual Computing Research Center and deputy director of the Institute of Advanced Computing and Digital Engineering, Shenzhen Institute of Advanced Technology (SIAT), Chinese Academy of Sciences (2008-2013), and a faculty member at the department of Computer Science and Engineering at the University of Minnesota at Twin Cities (2000-2008). Chen received an MS in Electronic Engineering from Tsinghua University, Beijing, China, and a second MS and then Ph.D. in Computer Science from the State University of New York at Stony Brook, New York, U.S.A. For his contribution to spatial data visualization, he was elected IEEE Fellow in 2020. He was inducted to IEEE Visualization Academy and was elected as CSIG Fellow in 2021.

Speaker



Qifeng Chen

Assistant professor, CSE and ECE at The Hong Kong University of Science and Technology

Biography: Qifeng Chen is an assistant professor in CSE and ECE at The Hong Kong University of Science and Technology. He received his Ph.D. in computer science from Stanford University in 2017. His research interests are image synthesis, computational photography, and autonomous driving. He was named one of 35 Innovators under 35 in China by MIT Technology Review and received the Google Faculty Research Award. He has served as an area chair for CVPR and NeurIPS. He won 2nd place worldwide at the ACM-ICPC World Finals and a gold medal in IOI.

Title: Exploring Foundation Models for Video and 3D Synthesis

Abstract: Recent generative AI technologies have transformed the paradigm in visual content creation and editing, which can generate photorealistic images in the wild based on text-to-image foundation models. However, video and 3D synthesis are yet to achieve the same visual quality as image synthesis. In this talk, I will share our recent research on video and 3D synthesis with foundation models, which includes creating a text-to-video foundation model, efficient text-guided video editing, 3D scene generation, and personalized 3D avatar generation. I will share the experiences of how we address the challenges in generative AI research, which is computation-demanding, data-hungry, and under accelerated development.

Speaker



Zhen Li

Assistant Professor, School of Science and Engineering, CUHKSZ

Biography: Dr. Zhen Li is currently an assistant professor at the School of Science and Engineering (SSE) of The Chinese University of Hong Kong, Shenzhen/Future Intelligent Network Research Institute (FNii) of The Chinese University of Hong Kong, Shenzhen. He is also a research scientist at the Shenzhen Institute of Big Data (SRIBD) and a special researcher at the South China Hospital Affiliated to Shenzhen University. Dr. Li Zhen was selected for the 2021-2023 Seventh China Association for Science and Technology Young Talent Support Project. Dr. Zhen Li received his Ph.D. in Computer Science from the University of Hong Kong (2014-2018), a MS in Communication and Information Systems from Sun Yat-Sen University (2011-2014), and a BS in Automation from Sun Yat-Sen University (2007-2011). He was also a visiting scholar at the University of Chicago in 2018 and a visiting student at the Toyota Technical Institute (TTIC) in Chicago in 2016. His research interests include interdisciplinary research in artificial intelligence, 3D vision, computer vision, and deep learning-assisted medical big data analysis. He has published more than 30 papers in top conferences and journals, such as top journals Cell Systems and Nature Communications, IEEE TNNLS, IEEE TMI, PLOS CB, etc. and top conferences CVPR, ICCV, ECCV, AAAI, IJCAI, ACL, ECAI, MICCAI, RECOMB, ISBI, etc. Meanwhile, Dr. Zhen Li is the contact map prediction champion in the Olympiad in protein structure prediction (CASP12) and serves as the baseline method for the DeepMind team's AlphaFold first version. The corresponding paper has won the PLOS CB Breakthrough and Innovation Award (one per year) and is a highly cited paper in Web of Science. As a mentor, Dr. Li Zhen led the students to win the SemanticKITTI championship in the large-scale point cloud analysis competition, the second place in the ICCV2021 large-scale urban street scene understanding competition, and the first place in the IEEE ICDM Global A.I. Weather Challenge (out of 1700 teams). Finally, Dr. Li Zhen also received scientific research funding from national, provincial, municipal and industrial circles.

Title: Enhanced 3D Point Cloud Analysis and its Applications

Abstract: Point clouds, as a fundamental 3D representation form, have found applications in various tasks such as autonomous driving, robot perception, and biomolecular structure prediction and design. Despite significant advancements in 3D point cloud analysis in recent years, algorithms for processing large-scale point clouds remain a focal point of research due to their massive data volume, unordered nature, lack of texture, and sparse features.

This report starts with the acquisition of point clouds and introduces a novel approach based on reversible networks for point cloud down-sampling and reconstruction, greatly improving the storage and communication efficiency of large-scale point cloud data. With effective point cloud data at hand, we then delve into classic tasks such as shape classification, 3D detection and tracking of point clouds, and semantic segmentation of large-scale 3D scenes. Our research spans from single-modal to multi-modal fusion and distillation techniques, and our algorithms have demonstrated outstanding performance in numerous public competitions, including first place in the SemanticKitti semantic segmentation challenge, first place in the CVPR2023 HOI4D segmentation challenge, second place in the ICCV21 Urban 3D competition, third place in the NuScenes semantic segmentation challenge, among others.

Finally, we extend our point cloud analysis algorithms to downstream applications, such as visual reasoning of 3D scenes, 3D scene description generation, AI-generated anchor faces for broadcasters, prediction of protein-small molecule binding, and binding site prediction, showcasing the versatility and broad impact of our research.

Speaker



Yifei Shi

Associate Professor, the College of Intelligence Science and Technology, National University of Defense Technology (NUDT)

Biography: Yifei Shi is an Associate Professor at the College of Intelligence Science and Technology, National University of Defense Technology (NUDT). He received his Ph.D. degree in computer science from NUDT. He was a visiting student research collaborator at Princeton University. His research interests mainly include 3D vision, computer graphics, and intelligent robots. He has published 30+ papers in top-tier journals and conferences, including IEEE T-PAMI, ACM TOG, SIGGRAPH, CVPR, ICCV, ECCV (Oral).

Title: Geometry-Driven Robot Perception and Interaction

Abstract: 3D vision is at the core of intelligent robot perception and interaction. Existing methods learn experience and knowledge directly from data, which suffer from lack of structural information, low precision and poor stability. To address this issue, we study methods for learning from 3D data with embedded geometric structure priors. In robot perception, we propose a learning-based 3D object symmetry detection method, achieving accurate symmetry detection and generalization on untrained objects. In robot interaction, we apply object symmetry and stacking scene structure analysis to robot grasping, improving the accuracy and reliability of grasping detection and planning.

Speaker



Qingyong Hu

Ph.D., the Cyber-Physical System (CPS) research group of Department of Computer Science at the University of Oxford

Biography: Qingyong Hu is a Ph.D. in the Cyber-Physical System (CPS) research group of Department of Computer Science at the University of Oxford, supervised by Niki Trigoni, Fellow of the Royal Academy of Engineering in the UK, and Professor Andrew Markham from Oxford University. His research interests lie in 3D computer vision, particularly in the semantic understanding of large-scale 3D point clouds, instance segmentation, and registration. He has published several papers in journals and international conferences including IEEE T-PAMI/IJCV/CVPR/NeurIPS. His papers have been cited by 3400+ times (Google Scholar), and the RandLA-Net paper has also been listed as the most influential paper in CVPR 2020 (PaperDigest). Additionally, he also chaired 2 International Workshops (Urban3D) at ICCV'21 and ECCV'22. He was fortunately awarded the Huawei UK AI Fellowship during 2021-2023, and received the World Artificial Intelligence Conference Youth Outstanding Paper Award, the outstanding student reviewer of ICCV 2021 (top 5%), and the Grand Prize and First Place in the 11th Chinese Graduate Electronic Design Competition (1/1400).

Title: Learning to Understand Large-Scale 3D Point Clouds

Abstract: Giving machines the ability to precisely perceive and understand the 3D visual world is the fundamental step to allow them to interact competently within our physical world. However, the research on large-scale 3D scene understanding and perception is still in its infancy, due to the complex geometrical structure of 3D shapes and limited high-quality data resources. This presentation will proceed from three aspects: data, efficiency, and learning in large-scale 3D point cloud semantic understanding, to systematically review and introduce the relevant research I engaged in during my doctoral period.

Speaker



Kun Sun

China University of Geosciences (Wuhan)

Biography: Kun Sun received his Ph.D. from School of Artificial Intelligence and Automation, Huazhong University of Science & Technology, under the supervision of Prof. Wenbing Tao. He is now working as an associate professor at School of Computer Science, China University of Geosciences (Wuhan). His research interests are multi-view image matching, large scale Structure from Motion (SfM), 3D point cloud processing. He has published over 30 publications on conferences and journals including CVPR, AAAI, ICME, T-PAMI, T-IP, TMM, Information Fusion and Information Sciences. He is a member of the CSIG Technical Committee on 3D Vision (CSIG-3DV).

Title: Robust Image Keypoint Matching and its Applications

Abstract: Finding matching pixels between two images captured at different views plays an important role in many 3D related vision tasks, such as panorama imaging, vision-based localization and structure from motion. However, due to variances such as viewpoint, illumination, texture, occlusion, rotation and scaling, finding robust correspondences that are friendly to downstream tasks still remains a challenging task. In this presentation, I will introduce some of my studies in image matching, descriptor learning and large-scale 3D reconstruction.

Workshops

Opportunities and Security Challenges of Large Visual Model

Time	13:30-15:30 September 22, 2023	Location	Yangzi Hall South (1F)	Host	Baoyuan Wu Xingxing Wei
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Workshop Introduction: In the past few months, the large AI models like ChatGPT have shown an astonishing level of general intelligence, and have set off a research wave of large models in various application fields. In the filed of computer vision, various large visual models like SAM have also emerged in endlessly. They not only perform well in classic visual tasks such as image segmentation and image generation, but also show amazing potential in various complex visual understanding tasks. AI large models bring in new opportunities for further breakthroughs of computer vision. Meanwhile, preliminary research in the community has found that the security and privacy issues commonly existed in regular AI models also exist in large visual models, and even more complex and may bring in more severe security threats. The current development of large visual models is still in its infancy. It is necessary to deeply explore the opportunities and the security challenges of large visual models. Therefore, this forum will invite well-known experts in the community to share the latest scientific research on large visual models, and conduct in-depth discussions on related security challenges. We hope to attract more researchers' attention, and work together with the research community to promote the rapid and healthy development of computer vision. This workshop is supported by The School of Data Science, Shenzhen Research Institute of Big Data, The Chinese University of Hong Kong, Shenzhen (CUHK-Shenzhen), Institute of Artificial Intelligence, Beihang University and Huawei 2012 Shield Lab.

Time Table

Time	Presenter	Title
13:30-14:00	Chao Shen Xi'an Jiaotong University	Security and Privacy Risks of AI Large Models
14:00-14:30	Wangmeng Zuo Harbin Institute of Technology	A Knowledge Perspective on Visual Learning and Opportunities in the Era of Pretrained Models
14:30-15:00	Yuan He Alibaba Group	Practice and Thinking: Application and Safety Governance of Generative Large Model
15:00-15:30	Panel: Xiaochun Cao, Chao Shen, Wangmeng Zuo, Yuan He, Huadi Zheng, Xingxing Wei, Baoyuan Wu	

Organizer



Xiaochun Cao

Professor and Dean of School, Cyber Science and Technology, Shenzhen Campus of Sun Yat-sen University

Biography: Xiaochun Cao is a Professor and Dean of School of Cyber Science and Technology, Shenzhen Campus of Sun Yat-sen University.

Co-organizer

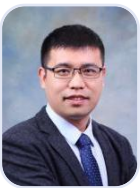


Baoyuan Wu

Associate Professor, The Chinese University of Hong Kong, Shenzhen

Biography: Dr. Baoyuan Wu is an Associate Professor of School of Data Science, the Chinese University of Hong Kong, Shenzhen (CUHK-Shenzhen). His research interests are AI security and privacy, machine learning, computer vision and optimization. He has published 70+ top-tier conference and journal papers, including T-PAMI, IJCV, NeurIPS, ICML, CVPR, ICCV, ECCV, ICLR, AAAI, and one paper was selected as the Best Paper Finalist of CVPR 2019. He is currently serving as an Associate Editor of Neurocomputing, Organizing Chair of PRCV 2022, Area Chair of NeurIPS 2022/2023, ICLR 2022/2023, ICML 2023, AAAI 2022/2024, and Deputy Secretary-General of the professional committee of CAA-PRMI. He was selected into the 2021 World's Top 2% Scientists List released by Stanford University.

Co-organizer



Xingxing Wei

Associate Professor, Beihang University

Biography: Wei Xingxing, Ph.D., is an associate professor and doctoral supervisor at the Institute of Artificial Intelligence, Beihang University. He was awarded the title of Young Elite Talent at Beihang University. From 2017 to 2019, he conducted postdoctoral research at the Department of Computer Science, Tsinghua University. Prior to that, he obtained his bachelor's and doctoral degrees from Beihang University and Tianjin University respectively. After graduation, he worked as a senior algorithm engineer in computer vision at Alibaba Group.

His main research interests lie in adversarial machine learning and computer vision. He has published over 30 academic papers in top conferences and journals in the field of artificial intelligence, including CVPR, ICCV, ECCV, IJCAI, AAAI, ACMMM, TCYB, TMM, and TGRS. He and his team won the championship in the CAAD CTF, an international evaluation competition for adversarial samples, hosted by DEFCON2018. He also guided students to achieve the second place in the robust logo detection competition at ACMMM2021 and the fourth place in the ImageNet unrestricted adversarial attack competition at CVPR2021. He has been invited multiple times to serve as a committee member for top international conferences in the field of artificial intelligence.

As a project leader, he has undertaken several projects, including the "New Generation Artificial Intelligence" 2030 major project of the Ministry of Science and Technology, the National Natural Science Foundation of China (NSFC) general and youth projects, the special funding and general projects of the China Postdoctoral Science Foundation, the CCF-Tencent Rhino Bird Fund, as well as several horizontal projects from well-known companies such as Huawei, Tencent, and Alibaba.

Speaker



Chao Shen

Professor, Xi'an Jiaotong University

Biography: Chao Shen is a full Professor of the Department of Electronics and Informatics, Xi'an Jiaotong University, Director of the University Talent Office, and Head of the Innovation Team of the Ministry of Education. He mainly engages in the research of trustworthy artificial intelligence, intelligent software testing, intelligent system security and control, and has published more than 100 academic papers. He has won 3 provincial and ministerial science and technology awards, Alibaba DAMO Academy Award, MIT TR35 China, and Fok Yingdong Young Teacher First Prize. He has presided over more than 20 projects of the NSF Outstanding Youth Science Foundation, the NSFC Key Project, the NSFC International (Regional) Cooperation Project, the National key R&D plans and enterprise projects, authorized/accepted more than 50 invention patents, and presided over/participated in the formulation of 4

international/industry/group standards. He serves as the editorial board member of 9 international journals including IEEE TDSC, and the deputy director of the Organization Working Committee of the Chinese Association for Artificial Intelligence.

Title: Security and Privacy Risks of AI Large Models

Abstract: In recent years, large model technology led by GPT has opened a new era of AI research. However, attackers may take advantage of the vulnerability of large models to carry out illegal activities such as identity forgery, telecom fraud, and secret theft, which poses a serious threat to personal security, social security, and even national security. Thus, studying and analyzing the security and privacy risks of large models is of great significance and needs to be solved urgently.

From the three perspectives of confidentiality, integrity and privacy of large models, this report will analyze various challenges of AI security and privacy in the era of large models, and discuss hot research issues such as privacy leakage, model theft, adversarial attacks, backdoor threats, output security, fairness and bias of large models. This report aims to discover and analyze the security and privacy risks of large models, and promote the development of AI large model.

Speaker



Wangmeng Zuo

Professor, Harbin Institute of Technology

Biography: Wangmeng Zuo is currently a Professor in the School of Computer Science and Technology, Harbin Institute of Technology. His research interests include low level vision, image/video generation, and multi-modality learning. He has published over 100 papers in top-tier academic journals and conferences. He was also served as Area Chairs of ICCV 2019, CVPR 2020/2021/2024, a Tutorial Organizer in ECCV 2016, and a program co-chair of ECCV workshop on AIM 2020. He is also served as an associate editor of IEEE T-IP and IEEE T-PAMI.

Title: A Knowledge Perspective on Visual Learning and Opportunities in the Era of Pretrained Models

Abstract: In recent years, with the emergence of multimodal pre-training models such as CLIP and Stable Diffusion, how to fully utilize large pre-trained models for efficient tuning in various downstream tasks has become a hot research topic and trend in computer vision. In this talk, we will first present a survey on visual learning from the knowledge perspective. Then we discuss the possible forms of knowledge in the era of pretrained models, and their potential applications in efficient visual learning.

Speaker



Yuan He

Senior Staff Engineer, Alibaba Group

Biography: Dr. Yuan He is a Senior Staff Engineer at Alibaba Group. He received his B.E. and Ph.D. degrees from Tsinghua University. Currently his works mainly focus on content moderation, intellectual property protection and AI safety. His research areas include machine learning, pattern recognition, computer vision and AI safety. Dr. He is the author of more than 70 journal and conference articles, such as T-PAMI, ICML, CVPR, ICCV and NeurIPS. He is also the inventor of more than 30 patents filed in China, Europe and US. In recent years, he served as the organizer or PC member of workshops and challenges related to adversarial examples and model robustness on several international conferences, such as the IJCAI 2019 workshop on Artificial Intelligence for Business Security (AIBS) and the CVPR 2021 workshop on Adversarial Machine Learning in Real-World Computer Vision Systems and Online Challenges (AML-CV). He is also the spec editor of IEEE and CCSA AI Robustness standards.

Title: Practice and Thinking: Application and Safety Governance of Generative Large Model

Abstract: Recently, generative AI represented by large language models (LLMs) has developed by leaps and bounds, bringing a new wave of intelligent applications and leading us towards general artificial intelligence. Generative AI of vision

has brought great opportunities for the applications of image and video content generation, but also brought greater challenges to the ethical governance of artificial intelligence. Compared with traditional artificial intelligence security governance, large generative models governance faces many problems such as generative quality and content controllability, possibility of technology abuse, data privacy protection, and ethical alignment. Therefore, application providers based on large generative models need to provide systematic security management measures. This talk will introduce our technological innovation and system practice in both the application and safety governance of large generative models.

Workshops

Image Perception and Its Oceanic Applications

Time	13:30-15:30 September 22, 2023	Location	312	Host	Tiesong Zhao Weiling Chen
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Workshop Introduction: Visual information processing aims to realize intelligent processing, analysis and understanding of visual information such as images and videos through machine learning, computer vision and other technologies. It is a key technology in the field of artificial intelligence and Internet of Things. The report of 20th National Congress on "developing marine economy, protecting marine ecosystems, and accelerating the construction of a strong marine country" has further clarified the new direction of visual information processing technology. In this context, it is of great significance to discuss the optimization and application of visual information processing technology in the background of "intelligent ocean". With the theme of visual information perception and featuring its application in the ocean, this workshop invites experts in related fields to discuss the focal issues of visual information quality perception, underwater imaging and compression around this theme. It provides a platform for scholars and postgraduates who are interested in research on visual information processing and ocean signal analysis to interact and exchange ideas. This workshop is supported by Technical Committee on Image and Video Communications.

Time Table

Time	Presenter	Title
13:30-14:00	Liquan Shen Shanghai University	Underwater image enhancement and compression
14:00-14:30	Leida Li Xidian University	Visual Quality Perception and Evaluation in the Open Environment
14:30-15:00	Runmin Cong Shangdong University	Full-Scene Visual Saliency Computing
15:00-15:30	Chongyi Li Nankai University	Underwater Image Enhancement --Opportunities and Challenges

Organizer



Tiesong Zhao

Professor, Fujian Key Lab for Intelligent Processing and Wireless Transmission of Media Information, College of Physics and Information Engineering, Fuzhou University

Biography: Tiesong Zhao received the B.S. degree in electrical engineering from the University of Science and Technology of China, Hefei, China, in 2006, and the Ph.D. degree in computer science from the City University of Hong Kong, Hong Kong, in 2011. He served as a Research Associate with the Department of Computer Science, City University of Hong Kong (2011-2012), a Postdoctoral Fellow with the Department of Electrical and Computer Engineering, University of Waterloo (2012-2013), and a Research Scientist with the Ubiquitous Multimedia Laboratory, The State University of New York at Buffalo (2014-2015). He is currently a Minjiang Distinguished Professor in the College of Physics and Information Engineering, Fuzhou University, China. His research interests include multimedia signal processing, coding, quality assessment, and transmission. Due to his contributions in video coding and transmission, he received the Fujian Science

and Technology Award for Young Scholars in 2017. He has also been serving as an Associate Editor of IET Electronics Letters since 2019.

Co-organizer

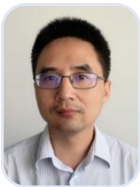


Weiling Chen

Associate Professor, Fujian Key Lab for Intelligent Processing and Wireless Transmission of Media Information, College of Physics and Information Engineering, Fuzhou University

Biography: Weiling Chen received the B.S. and Ph.D. degrees in communication engineering from Xiamen University, Xiamen, China, in 2013 and 2018, respectively. She is currently a Associate Professor with the Fujian key lab for intelligent processing and wireless transmission of media information, Fuzhou University, China. From Sep. 2016 to Dec. 2016, she was visiting at the School of Computer Science and Engineering, Nanyang Technological University, Singapore. Her current research interests include image quality perception, computer vision and underwater acoustic transmission.

Speaker



Liquan Shen

Research Fellow, Shanghai University

Biography: Liquan Shen is with the Faculty of the School of Communication and Information Engineering, Shanghai University, where he is currently a Professor. He has authored or coauthored more than 100 refereed technical papers in international journals and conference proceedings, such as IEEE T-PAMI, IEEE T-IP, IEEE T-CSVT, IEEE T-MM, IEEE T-GRS, ICCV, AAAI, IJCAI. His research interests include underwater imaging, video coding, video quality assessment and 3DTV.

Title: Underwater Image Enhancement and Compression

Abstract: As a direct and effective method to obtain Marine information, underwater imaging has advantages of small disturbance to underwater environment and large observation area compared with other exploration technologies and its development has attracted much attention. Due to scattering and absorption of light transmission in water, underwater images have low contrast, low definition, color distortion and other problems. Meanwhile, the bandwidth of underwater acoustic wireless transmission is only about 15-30kbit/s, which is difficult to achieve high rate data transmission by existing methods. Core technologies such as underwater image quality enhancement and compression will play an increasingly important role in future marine exploration. The content of this report mainly includes the following aspects: (1) underwater image quality assessment database for machine measurement and human vision; (2) underwater image enhancement for machine measurement; (3) underwater image enhancement for human vision; (4) underwater image enhancement with artificial light; (5) underwater image compression.

Speaker



Leida Li

Professor, Xidian University

Biography: Leida Li received the B.Sc. and Ph.D. degrees from Xidian University in 2004 and 2009, respectively. From 2014 to 2015, he was a Research Fellow with the Rapid-rich Object Search (ROSE) Lab, Nanyang Technological University (NTU), Singapore, where he was a Senior Research Fellow from 2016 to 2017. Currently, he is a Full Professor with the School of Artificial Intelligence, Xidian University, China. His research interests include

image/video quality evaluation, computational aesthetics and visual emotion analysis. His research is funded by NSFC, OPPO, Huawei and Tencent, etc. He has published more than 100 papers in these areas. He is on the editor board of Journal of Visual Communication and Image Representation (Best Associate Editor Award 2021), EURASIP Journal on Image and Video Processing and Journal of Image and Graphics (Excellent Editor Award 2022). He is a senior member of CCF and CSIG.

Title: Visual Quality Perception and Evaluation in the Open Environment

Abstract: Visual quality evaluation has important applications in many fields, such as the design of imaging systems, optimization of image and video processing algorithms, and image big data screening, and has received extensive attention in recent years. However, the existing visual quality evaluation models are typically built based on deep networks and limited training data, which carries a significant risk of over fitting. Therefore, it is extremely challenging for these models to deal with visual quality perception and evaluation task in the open environment. To address the above issues, the talk will focus on exploring visual quality perception and evaluation for open environments, including image quality evaluation and video quality evaluation, focusing on the model generalization. Specifically, I will detail the latest research progress and open problems from multiple perspectives, such as transfer learning, domain adaptation, domain generalization, as well as model pre-training.

Speaker



Runmin Cong

Professor, Shandong University

Biography: Runmin Cong (IEEE/CCF/CSIG/CIE Senior Member, ACM/APSIPA/IVM Member) is currently a Professor with the School of Control Science and Engineering, Shandong University (SDU), Jinan, China. His research interests include computer vision, machine learning, multimedia processing and understanding, saliency computation, remote sensing image interpretation and analysis, and visual content enhancement in an open environment, etc. He has published more than 70 papers in prestigious international journals and conferences, including 60 IEEE/ACM Trans/CCF-A-papers, 2 ESI hot papers, 12 ESI highly cited papers, and 16 China patents have been authorized. He serves/served as an Associate Editor/Editorial Board Member of the Neurocomputing, the IEEE Journal of Oceanic Engineering, and the AC/SPC/PC of NeurIPS, CVPR, ICML, ICCV, ECCV, SIGGRAPH, ACM MM, AAAI, IJCAI, etc. Dr. Cong was a recipient of the Young Elite Scientist Sponsorship Program by the China Association for Science and Technology, the Beijing Nova Program, the The World's Top 2% Scientists (2020, 2021), IEEE ICME Best Student Paper Award Runner-Up, First Prize for Scientific and Technological Progress Award of Tianjin Municipality, ACM SIGWEB China Rising Star Award, Excellent Doctorial Dissertation Award from CSIG and BSIG, Excellent Scientific Paper Award for Beijing Youth.

Title: Full-Scene Visual Saliency Computing

Abstract: Inspired by human visual attention mechanisms, the goal of visual saliency detection is to extract the most conspicuous regions or objects from the given input data. It has been widely applied to research fields including object tracking, content editing, compression coding, quality assessment, as well as engineering applications like smart photography, smart healthcare, autonomous driving, and earth observation. The big data era has not only brought a huge increase in the quantity of data, but also breakthroughs in the quality of data. With the development of imaging devices and hardware technologies, diverse types of data across different modalities, spaces, and dimensions are emerging, providing rich data resources for better understanding the objective world, while also bringing new challenges. With visual saliency detection as the basic task, this report will introduce our work on cross-modal saliency detection, saliency detection on associative data, and remote sensing saliency detection.

Speaker



Chongyi Li

Professor, Nankai University

Biography: Chongyi Li, a professor and doctoral supervisor at Nankai University, is a recipient of the National Excellent Youth (Overseas) Fund. His primary research areas are computer vision and computational imaging. He has published over 80 academic papers in top international journals and conferences, such as T-PAMI, T-IP, NeurIPS, ICML, ICLR, CVPR, ICCV, and ECCV. Among these publications, 13 papers are highly cited according to the Essential Science Indicators (ESI), and 3 papers are considered ESI hot papers. One of his papers received a nomination for the Best Paper Award in Pattern Recognition. His technical achievements have been applied in core products of companies like Huawei and SenseTime. He has been recognized as one of the top 2% global scientists by Stanford University on two occasions. He has served or is currently serving as an editorial board member for SCI journals including IEEE TCSVT, IEEE Journal of Oceanic Engineering, and Neurocomputing. Additionally, he has been a guest editor for IJCV. Furthermore, he has taken on important roles in the academic community, such as chairing or being a senior committee member for NeurIPS Datasets and Benchmarks, AAAI, and BMVC. He has also organized workshops for CVPR and ECCV. Furthermore, he is an IEEE Senior Member.

Title: Underwater Image Enhancement -- Opportunities and Challenges

Abstract: The application of underwater images in various fields is of great significance for advancing scientific research, protecting the marine environment, developing marine resources, and ensuring marine safety. These images provide valuable data and visual information, helping us to better understand and utilize marine resources, while also protecting the marine ecological balance and maintaining the health of ecosystems. However, the acquisition and processing of underwater images are relatively difficult, mainly due to issues such as light attenuation, light scattering, color loss, water flow interference, and the complexity of the underwater environment. In this report, I will briefly review the series of work conducted by our research group in the field of underwater image enhancement in recent years, explore the challenging issues currently faced in this research field, and conclude by providing a brief overview of the main research directions our research group plans to pursue in this area, along with some reflections on existing problems.

Workshops

Machine Vision and Learning

Time	15:45-18:00 September 22, 2023	Location	308	Host	Zhouchen Lin Yisen Wang
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Workshop Introduction: Machine learning is the art of exploring unknown laws and patterns from known data, and how to achieve better learning results with less cost has always been a core problem to be solved. With the development and application of machine learning technology in the field of vision, traditional learning algorithms are gradually pushing forward, while various deep learning methods are also evolving, in this workshop we will invite domain experts as speakers, share their latest work in this field, summarize the recent progress in the field of machine vision and learning and look forward to the future research directions. This workshop is supported by Technical Committee on Machine Vision.

Time Table

Time	Presenter	Title
15:45-16:15	Weiming Hu Institute of Automation, Chinese Academy of Sciences	Brain-like Intelligent Sensing Technology for Low, Slow and Small Targets
16:15-16:45	Jianru Xue Xi'an Jiaotong University	Research of Driving Policy Learning
16:45-17:15	Xiaofeng Liao Chongqing University	Distributed Machine Learning and Security
17:15-17:45	Yisen Wang Peking University	Towards Theoretical Understanding of Self-Supervised Learning
17:45-18:00	Jiahui Huang Key account manager, Kunqian Computer	Under the Era of Big Models, GPU Accelerated AI+Edge Computing

Organizer



Zhouchen Lin

Professor, Peking University

Biography: Zhouchen Lin, Professor of Peking University, IAPR/IEEE/CSIG Fellow. His research interests include machine learning and numerical optimization. He has published more than 230 papers and 2 books in English. He has won the first prize of the 2020 CCF Science and Technology Award. He has served as the (Senior) Area chair of CVPR, ICCV, NIPS/NeurIPS, ICML, IJCAI, AAAI and ICLR, former associate editor of IEEE T. Pattern Analysis and Machine Intelligence, current associate editor of International J. Editorial Board Member of Computer Vision, Optimization Methods and Software.

Co-organizer

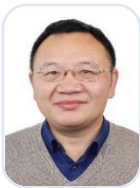


Yisen Wang

Assistant Professor, Peking University

Biography: Yisen Wang is an assistant professor at Peking University. His research interests include machine learning theory and algorithms, focusing on adversarial robustness, graph learning, and weak/self-supervised learning theory. He has published more than 50 top papers in the field of machine learning, including ICML, NeurIPS, ICLR, etc., and many of them have been selected as Oral or Spotlight. He has won the Best Paper Award of ECML 2021.

Speaker



Weiming Hu

Researcher, Institute of Automation, Chinese Academy of Sciences

Biography: Weiming Hu, researcher at Institute of Automation, Chinese Academy of Sciences, leader of the video content security research team. His research direction is the sensitive content identification in network multimedia, etc. He has published more than 300 papers in international journals such as PAMI and IJCV, and international academic conferences such as ICCV, ECCV, CVPR, etc., and has been authorized more than 50 invention patents. The sensitive multimedia recognition and other technologies completed by the team have been practically applied to more than 100 enterprises and institutions, and have played a role in actual combat and achieved significant economic and social benefits. He won the second prize of National Natural Science Award, the first prize of Beijing Science and Technology (Technical Invention Category), the first prize of Beijing Invention Patent Award and the first prize of Wu Wenjun Artificial Intelligence Science and Technology Award.

Title: Brain-like Intelligent Sensing Technology for Low, Slow and Small Targets

Abstract: In this talk, we analyze the relationship between neuroscience and computer vision. The enlightenment points of neuroscience for computer vision are summarized in several aspects: A) the characteristics of the basic visual cortex; B) the principle of the primary visual cortex extends to higher regions; C) Forward, reverse and lateral connections; D) cognitive mechanisms of visual nerve stratification; E) selective attention mechanisms of the visual nervous system; F) Selective memory mechanisms of dynamic information. This talk introduces our team's research work in infrared image low-slow target tracking based on modal transfer and fusion perception, low-slow object tracking based on object size attention, online learning and target tracking based on recurrent least squares estimation inspired by brain-like continuous learning, detection-segmentation integration based on multi-task reciprocal dual-flow neural network, distillation learning based on neural center regulation and model compression and object classification with unified neuronal clipping mode, and single-stage online real-time multi-target tracking without anchor frames.

Speaker



Jianru Xue

Professor, Xi'an Jiaotong University

Biography: Jianru Xue, professor of Xi'an Jiaotong University. His research interests include computer vision, pattern recognition, machine learning, and autonomous driving. He and his team won the IEEE ITSS Institute Lead Award in 2014, and the best application paper award in Asian Conference on Computer Vision 2012. He has published 100+ papers in top cited journals and conferences including IEEE T-PAMI/T-IP/TSMCB, CVPR, ICCV, ECCV, ICRA etc.

Title: Research of Driving Policy Learning

Abstract: At present, applications of autonomous systems can be found in many fields. However, traditional pipeline of implementing sensing-action is found difficult to cope with open and dynamic environments, showing problems such as weak adaptability, poor self-learning ability and low efficiency. How to achieve human-like level autonomous behavior generation still faces great challenging problems. Based on the research experience of my research group for many years, I will talk about autonomous behavior generation of intelligent physical agent from the perspective of machine learning, in particular focusing on the two core topics, long-term situation prediction and policy learning, as well as latest progress we have made.

Speaker

Xiaofeng Liao

Professor, Chongqing University

Biography: Xiaofeng Liao, professor, IEEE Fellow, AIAA Fellow. He has been engaged in the research of dynamic system theory, chaotic cryptography, cloud security and big data privacy protection of artificial neural networks. In the past 30 years, he has published more than 400 journal papers with more than 30,000 citations (Google Scholar). For 8 consecutive years, he has been selected as the highly cited scholars in computer science in China by Elsevier. He is the associate editor of international journals such as IEEE Transactions on Cybernetics, IEEE Transactions on Neural Networks and Learning Systems, and Electronic Journal.

Title: Distributed Machine Learning and Security

Abstract: This talk explores the optimization and security issues of distributed machine learning. With the popularity of big data and machine learning applications, distributed machine learning has become one of the key technologies to solve large-scale data processing and modeling. However, distributed machine learning also faces many optimization and security challenges. In terms of optimization, distributed machine learning requires processing of large-scale data, as well as the complexity of synchronization and communication between different compute nodes. In order to solve these problems, the team proposes many optimization strategies and algorithm frameworks, such as gradient tracing, stochastic gradient, asynchronous execution, etc., which can effectively improve the efficiency and performance of distributed machine learning. On the security side, distributed machine learning faces threats such as data privacy leakage, model leakage, and malicious attacks. In order to protect the security of data and models, the team proposes many security technologies and mechanisms, such as cryptography, differential privacy, multi-party computing, etc., which can effectively protect the privacy and security of data and models. Overall, the optimization and security of distributed machine learning are two important issues in the field. Through continuous research and innovation, we can better solve these problems and provide better support and guarantee for the application of distributed machine learning.

Speaker

Yisen Wang

Assistant Professor, Peking University

Biography: Yisen Wang is an assistant professor at Peking University. His research interests include machine learning theory and algorithms, focusing on adversarial robustness, graph learning, and weak/self-supervised learning theory. He has published more than 50 top academic papers in the field of machine learning, including ICML, NeurIPS, ICLR, etc., and many of them have been selected as Oral or Spotlight. He has won the ECML 2021 Best Paper Award.

Title: Towards Theoretical Understanding of Self-Supervised Learning

Abstract: Self-supervised learning (SSL) is an unsupervised approach for representation learning without relying on

human-provided labels. It creates auxiliary tasks on unlabeled input data and learns representations by solving these tasks. SSL has demonstrated great success on various tasks. The existing SSL research mostly focuses on improving the empirical performance without a theoretical foundation. While the proposed SSL approaches are empirically effective on benchmarks, they are not well understood from a theoretical perspective. In this talk, I will introduce a series of our recent work on theoretical understanding of SSL, particularly on contrastive learning and masked autoencoders.

Speaker



Jiahui Huang

Key account manager, Kunqian Computer

Biography: Huang Jiahui is a key account manager for Kunqian Computer. She has been engaged in the server industry for many years, with a customer base focused on numerous well-known universities and research institutes, and rich industry experience.

Title: Under the Era of Big Models, GPU Accelerated AI+Edge Computing

Abstract: With the release of GPT-4, the big language model has officially entered the era of multimodality, and the number of parameters has further expanded. SAM Altman, the founder of openAI, stated that "future AI progress will not come from making models bigger", which represents how more development directions for openAI will be to make existing large models more useful and penetrate more scenarios. Nowadays, the AI big model is in a critical iteration period of rapid evolution from "usable" to "user-friendly". How to infiltrate large models into various vertical scenarios, how to use large models at a lower cost, and how to expose more scenarios and users to AI have become the next focus of development. As AI moves towards practical scenarios, the importance of edge computing power becomes increasingly prominent. Edge computing power has natural advantages in cost, latency, and privacy, and can also serve as a bridge for preprocessing massive and complex requirements, guiding it towards large models. Kunqian has made efforts in the field of AI customization, with multiple GPU edge hardware, delving into thousands of application scenarios and accelerating AI applications.

Workshops

Youth Forum for Trustworthy Visual Computing

Time	15:45-17:45 September 22, 2023	Location	Yangzi Hall South (1F)	Host	Peng Hu Lei Zhu
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Workshop Introduction: Artificial intelligence technology is advancing at a fast pace, and trustworthy visual computing is emerging as a key research area in image and graphics. Trustworthy visual computing aims to use trustworthy computing techniques to ensure that image and video processing is private, secure, reliable and trustworthy. This research area has great implications for protecting personal privacy, preventing image and video data from being manipulated, enhancing the accuracy and reliability of image and video processing, and offering reliable visual information services for various domains such as smart city, smart healthcare, smart transportation, smart security and more. However, trustworthy visual computing also faces many challenges and issues, such as data quality, data security, data privacy, data ethics and more. This forum is designed to provide a platform for young scholars in trustworthy visual computing to share and learn from each other, to foster the research and development of trustworthy visual computing, and to promote the application and dissemination of related technologies. Moreover, this forum will also give participants a chance to present their research achievements, which will benefit their academic exchange and career development. This workshop is supported by CSIG Youth Working Committee.

Time Table

Time	Presenter	Title
15:45-16:15	Weihong Deng Beijing University of Posts and Telecommunications	Trustworthy Visual Feature Learning
16:15-16:45	Hang Su Tsinghua University	Towards Robust and Secure Artificial Intelligence Methods in the Era of Large Models
16:45-17:15	Quanshi Zhang Shanghai Jiao Tong University	Proof of the Emergence of Symbolic Concepts in DNNs Based on Theoretical System of Interactions
17:15-17:45	Jitao Sang Beijing Jiaotong University	A Glimpse into Trends of Trustworthy AI Through the Lens of Human-AI Alignment

Organizer



Peng Hu

Associate Researcher, Sichuan University

Biography: Peng Hu is currently an associate researcher at the College of Computer Science, Sichuan University. From 2019 to 2020, he was a research scientist at Institute for Infocomm, Research Agency for Science, Technology, and Research (A*STAR) Singapore. He received his Ph.D. degree in computer science and technology from Sichuan University, China, in 2019. His current interests mainly focus on multi-view learning, cross-modal retrieval, and network compression. On these areas, he has authored more than 20 articles in the top-tier conferences and journals.

Co-organizer

Lei Zhu

Professor, Shandong Normal University

Biography: Zhu Lei is a professor at Shandong Normal University. His main research focus is on cross-modal analysis and retrieval. He has published over a hundred papers in CCF A-class conferences and ACM/IEEE journals. Additionally, he has authored two academic monographs and has eight highly cited papers in the ESI database, with over 6300 Google citations. Zhu Lei's research has received Best Paper Nominations at ACM SIGIR 2019 and ACM MM 2019, as well as the Best Paper Award at CCF C-class conference ADMA 2020 and the Best Student Paper Award at ChinaMM 2022. One of his papers was selected as one of China's top 100 most influential international academic papers in 2019. He also holds 22 authorized patents. Zhu Lei serves as an Associate Editor for international journals such as ACM TOMM, IEEE TBD, and Information Sciences. He is the Area Chair for ACM MM and a Senior Program Committee member for SIGIR, CIKM, and AAAI. He is also the Deputy Secretary-General of the Youth Working Committee of the China Society of Image and Graphics (CSIG). Zhu Lei has led or participated in over 10 cross-disciplinary research projects, including projects funded by the National Natural Science Foundation of China. He has received several awards, including the ACM China SIGMM Rising Star Award, the Outstanding Master's Supervisor Award from the China Automation Society, the Returned Overseas Chinese Entrepreneurship Award from Shandong Province, and the Outstanding Service Award from CSIG's Youth Working Committee.

Co-organizer

Meina Kan

Associate Professor, the Institute of Computing Technology (ICT), Chinese Academy of Sciences (CAS)

Biography: Meina Kan is an Associate Professor and Ph.D supervisor with the Institute of Computing Technology (ICT), Chinese Academy of Sciences (CAS). She received the Ph.D degree in computer vision from the Institute of Computing Technology of the Chinese Academy of Sciences (ICT, CAS) in 2013. She has won the 1st Place of IEEE FG'15 "Point and Shoot Face Recognition Challenge (PaSC)", 2nd Place of IEEE ICCV'15 "Apparent Age Estimation Track of ChaLearn Looking at People", and 2nd Place of IEEE CVPR'17 "Landmark Detection Track of Faces in-the-wild Challenge". Besides, her research is / was supported by National Science Fund for Excellent Young Scholars and Beijing Nova Program.

Speaker

Weihong Deng

Professor, School of Artificial Intelligence, Beijing University of Posts and Telecommunications

Biography: Professor of the School of Artificial Intelligence, Beijing University of Posts and Telecommunications, Young Changjiang Scholar of the Ministry of Education, research direction is biometric identification, affective computing, multimodal learning. In recent years, he has presided over more than 20 national key research and development projects and projects of the National Natural Science Foundation of China. He has published more than 100 papers in international journals and conferences such as IEEE T-PAMI, IJCV, T-IP, ICCV, CVPR, and ECCV, and has been cited by Google Scholar for more than 13,000 times. He has served as the field chairman of CVPR, ECCV, ACM MM, IJCAI and other conferences for many times. He has been selected as Beijing Excellent Doctoral Dissertation, Beijing Science and Technology Rising Star, New Century Outstanding Talent of the Ministry of Education, and Elsevier China Highly Cited Scholar.

Title: Trustworthy Visual Feature Learning

Abstract: Massive labeled data and deep learning technology have promoted the widespread application of visual recognition, and the performance of existing models on data sets has surpassed that of human eyes. However, in the real world, challenges such as data noise, environmental and regional differences, forgery and adversarial attacks lead to unsatisfactory stability of most visual recognition applications, and even cause ethical issues such as racial bias and security issues such as forged images. At the same time, privacy protection and data security have also aroused widespread concerns. Facing the above safe and credible identification problems, this report will report recent research progress in the following areas: 1) Stability feature learning under noisy labels; 2) Feature decoupling and confrontation robust feature learning for weak signals; 3) Fairness and adaptive feature learning under data bias. 4) Federated and incremental feature learning under privacy-preserving conditions.

Speaker

Hang Su

Associate Researcher, the Department of Computer Science at Tsinghua University

Biography: Su Hang, Associate Researcher in the Department of Computer Science at Tsinghua University.

His main research focuses on adversarial machine learning and robust visual computing and other related fields. He has published more than 100 papers in CCF recommended A-class conferences and journals, with over 6,000 citations on Google Scholar. He has received many academic awards, including the Wu Wenjun Artificial Intelligence Natural Science First Prize, ICME Platinum Best Paper, MICCAI Young Scholar Award, and AVSS Best Paper. He has led his team to win championships in various international academic competitions, such as the adversarial attack and defense at NeurIPS2017.

Title: Towards Robust and Secure Artificial Intelligence Methods in the Era of Large Models

Abstract: With the rapid development of large models such as GPT, artificial intelligence systems are accelerating technological revolution and industrial progress, gradually integrating into human daily life. In this context, it is particularly important to ensure the safety and reliability of artificial intelligence systems. The current artificial intelligence generally lacks robustness, is easily deceived and misled, bringing security risks to its large-scale application and deployment. This report will focus on the challenges in the security of deep learning algorithms, starting from the basic principles of adversarial robustness, and introduce in detail the risk identification methods of deep learning models based on adversarial attacks. At the same time, the report will elaborate on the robust deep learning algorithms developed on this basis to enhance the safety and stability of the model. Finally, we will discuss the real risks of adversarial attacks in the physical world, providing inspiration for future research on safe artificial intelligence.

Speaker

Quanshi Zhang

Associate professor, Shanghai Jiao Tong University

Biography: Dr. Quanshi Zhang is an associate professor at Shanghai Jiao Tong University, China. He received the Ph.D. degree from the University of Tokyo in 2014. From 2014 to 2018, he was a post-doctoral researcher at the University of California, Los Angeles. His research interests are mainly machine learning and computer vision. In particular, he has made influential research in explainable AI (XAI) and received the ACM China Rising Star Award. He was the co-chairs of the workshops towards XAI in ICML 2021, AAAI 2019, and CVPR 2019. He is the speaker of the tutorials on XAI at IJCAI 2020 and IJCAI 2021.

Title: Proof of the Emergence of Symbolic Concepts in DNNs Based on Theoretical System of Interactions

Abstract: Although the interpretability of deep neural networks has received increasing attention in recent years, some fundamental problems have not been well formulated. For example, people still do not know (1) whether we can prove or disprove that a DNN inference can be explained as symbolic logic, and (2) what is the first principal that determines the robustness and generalization power of a DNN. Clarifying such fundamental problems will provide more alternative roads for the development of artificial intelligence. Therefore, in this talk, the speaker will mainly introduce new progresses in the theoretical system of interactions, which are developed by the research group of the speaker in recent two years, including the proof of the emergence of symbolic interactive concepts in DNNs, the proof of the mathematical connection between interactive concepts and a DNN's generalization power and robustness, how to reformulate the various attribution-explanation methods into the unified paradigm of re-allocating interactions, etc.

Speaker



Jitao Sang

Professor and Head, the Computer Science Department at Beijing Jiaotong University

Biography: Sang Jitao is a professor and the director of the Department of Computer Science at Beijing Jiaotong University. He is also a selected participant in the National Talent Youth Program. His main research interests include social media computing, multi-source data mining, and trustworthy machine learning. He has received awards such as the Special Award from the President of the Chinese Academy of Sciences and the ACM China Rising Star Award. As the principal investigator, he has undertaken key projects funded by the National Natural Science Foundation of China, the (first batch) Next Generation Artificial Intelligence Major Project, and the Beijing Outstanding Youth Foundation. He has received paper awards at international conferences recommended by the China Computer Federation (CCF) seven times as the first or second author. He has also received the first prize in Natural Science from the Chinese Institute of Electronics and the Beijing Science and Technology Award as the second contributor.

Title: A Glimpse into Trends of Trustworthy AI Through the Lens of Human-AI Alignment

Abstract: Human-AI alignment aims to ensure that AI systems meet human needs and conform to ethical values. The development of deep neural networks has initially achieved the alignment of AI capabilities. However, for large-scale applications in broader and deeper scenarios, further value alignment is needed. This is the goal of trustworthy AI, which includes reliability - interpretability, algorithmic fairness, and safety - adversarial robustness, and data privacy protection. With the rise of large models, machine learning models are transitioning from specialized tools to general-purpose intelligent agents. The study of value alignment and trustworthy AI is undergoing changes in research objects, alignment goals, and application scopes. However, the realization of value alignment might lead to an "alignment tax" problem, where AI capabilities may decline. How to maintain capability alignment while ensuring value alignment, or even achieving capability surpass, is an important issue in future trustworthy AI research.

Workshops

Remote Sensing Image Processing

Time	15:45-17:45 September 22, 2023	Location	312	Host	Xian Sun Renlong Hang
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Workshop Introduction: In the past few decades, remote sensing image processing technology has been widely used in military, meteorology, agriculture, geology, environment and other fields. In recent years, with the continuous development of remote sensing technology and sensor technology, the spectral resolution, spatial resolution and temporal resolution of remote sensing images have been improved significantly, and the types of data available are also rich, covering visible light, infrared and radar, making traditional remote sensing image processing methods face new challenges. This workshop intends to invite four well-known experts in the field of remote sensing image processing as speakers to share their latest research progress in this field, and look forward to the future direction worth exploring. This workshop is supported by Technical Committee on Remote Sensing Image and Graphics.

Time Table

Time	Presenter	Title
15:45-15:55		Introduction and Opening Remarks of the Workshop
15:55-16:20	Yanfeng Gu Harbin Institute of Technology	Progress in Hyperspectral Remote Sensing Image Processing
16:20-16:45	Zhenwei Shi Beihang University	Research on Change Detection Based on Optical Remote Sensing Images
16:45-17:10	Hongyan Zhang University of Geosciences	SinoLC-1: the First 1-meter Resolution National-scale Land-cover Map of China Created with the Deep Learning Framework and Open-access Data
17:10-17:35	Xiangtao Zheng Fuzhou University	Heterogenous Interpretation for Cross-Domain Remote Sensing Scene
17:35-17:45		Panel & Summary

Organizer



Xian Sun

Professor, Aerospace Information Research Institute, Chinese Academy of Sciences

Biography: Xian Sun is a Professor and doctoral supervisor at the Aerospace Information Research Institute, Chinese Academy of Sciences. He has been engaged in key technology research of intelligent analysis of remote sensing data in China for a long time. He won 1 first prize of National Science and Technology Progress (Sequence 5) and 4 provincial and ministerial awards such as the Outstanding Achievement Award of the Chinese Academy of Sciences. He has published more than 70 SCI papers, 12 ESI highly cited papers, published 2 monographs, and authorized 24 invention patents. He was selected for the National Young Talent Program and the Young Scientist Award of the Chinese Command and Control Society. He is the co-chair of IEEE GRSS IADF-MIA, the secretary-general of Remote Sensing Image Committee of China Society of Image and Graphics, and the deputy editor/editorial board member of IEEE

GRSL, PRL, TVCJ, ISPRS Journal, JSTARS, RS and other international remote sensing and artificial intelligence academic journals.

Co-organizer



Renlong Hang

Associate Professor, Nanjing University of Information Science and Technology

Biography: Renlong Hang is an associate professor at the School of Computer, Nanjing University of Information Science and Technology. He is mainly engaged in pattern recognition, remote sensing image analysis, and intelligent interpretation of meteorological big data. He has published more than 40 papers in the international journals and conferences such as IEEE TGRS/T-IP/TCSVT and AAAI, which have been cited more than 2800 times in total, and many papers have been selected as ESI highly cited papers. His research has been supported by many projects such as the National Natural Science Foundation of China and the Natural Science Foundation of Jiangsu Province. He has won the Jiangsu Province Excellent Doctoral Dissertation Award, PRCV 2018 Best Student Paper Award, and CCCV 2017 Best Student Paper Nominate Award. Now, he serves as a Topical Editor of IEEE-JSTARS journal.

Speaker



Yanfeng Gu

Professor, Harbin Institute of Technology

Biography: Hosting Project of the National Science Fund for Distinguished Young Scholars, winner of national high-level talents, young and middle-aged scientific and technological innovation leader of the Ministry of Science and Technology, vice president of the School of Electronic and Information Engineering of Harbin Institute of Technology, second-class professor, doctoral supervisor, member of China Remote Sensing Application Association, director of Heilongjiang Key Laboratory of Sky Earth Integration Intelligent Remote Sensing Technology, IEEE Earth Science and Remote Sensing Journal Associate Editor, Young editorial board member of Science in China: Technical Science. Long term commitment to space intelligent information processing and space intelligent remote sensing research, and has won provincial and ministerial level scientific and technological awards multiple times.

Title: Progress in Hyperspectral Remote Sensing Image Processing

Abstract: Hyperspectral remote sensing detection has become one of the key technologies in the fields of high-resolution earth observation, deep space exploration, aerospace and national defense, with its outstanding advantages of high Spectral resolution and spectrum integration. As a branch of optical remote sensing, hyperspectral imaging is still affected by factors such as atmospheric conditions, environmental lighting, and spatial information degradation, resulting in difficulties in interpretation and application. The report will briefly introduce hyperspectral remote sensing image processing technologies around the removal of hyperspectral image uncertainty, multispectral to hyperspectral super-resolution reconstruction, and stereo hyperspectral interpretation.

Speaker



Zhenwei Shi

Professor, Beihang University

Biography: Zhenwei Shi is a Professor of Beihang University, the Director of Aerospace Information Engineering Department (Image Processing Center), School of Astronautics, a winner of National Outstanding Youth Science Fund (2021). In the field of remote sensing image processing and computer vision, he has

published more than 200 scientific research papers (including 100 IEEE journal papers and more than 100 SCI papers as the first or corresponding author). His research work has been funded by more than 50 projects such as the National Natural Science Foundation and the National Key R&D Program of China. To meet the major needs of aerospace defense and livelihood protection, the research results have been applied to a total of 20 types of military/civilian satellites. He is the editorial board member of seven domestic and foreign journals, including IEEE Transactions on Geoscience and Remote Sensing and Pattern Recognition. He was a member of the board of the Chinese Association of Image and Graphics.

Title: Research on Change Detection Based on Optical Remote Sensing Images

Abstract: Mastering land use and land cover and analyzing land change are important contents of geographical monitoring. Efficient acquisition of accurate and objective land changes can provide decision-making support for relevant government departments. The popularization of multi-temporal high-resolution remote sensing images provides data guarantee for large-scale and fine land analysis. In recent years, the rise of artificial intelligence technologies such as image recognition based on deep learning has promoted changes in the field of remote sensing. Compared with traditional visual interpretation methods, remote sensing interpretation technology based on deep learning can automatically analyze the types of ground objects in images, showing great potential in terms of accuracy and efficiency. This report will focus on the topic of optical remote sensing image change detection. Starting from the background of remote sensing image change detection, it will introduce relevant traditional methods and give some change detection methods based on deep learning. The relevant technologies involved include network structure design (deep convolutional networks, Transformer), data augmentation methods (style transfer, image synthesis) and so on. The report also involves the preliminary exploration of the author's team in the practical implementation of large-scale change monitoring of multi-temporal remote sensing images, and finally gives the prospect of the direction of change detection.

Speaker



Hongyan Zhang

Professor, University of Geosciences

Biography: Prof. Hongyan Zhang received the Ph.D. degree in photogrammetry and remote sensing from Wuhan University in 2010, and was appointed as Full Professor there in 2016. He is currently the dean of Computer School, China University of Geosciences. His research interests mainly focus on image reconstruction for quality improvement, hyperspectral information processing and agricultural remote sensing. Dr. Zhang has authored/co-authored 98 journal citation report (JCR) papers, including 3 ESI Hot Papers and 16 ESI Highly Cited Papers. Prof. Zhang is a Senior Member of IEEE, and has been recognized as the 2021 and 2022 Chinese Highly Cited Scholar by Elsevier. Meanwhile, he has served as the Associate Editor for IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Computers & Geoscience and Photogrammetric Engineering & Remote Sensing.

Title: SinoLC-1: the First 1-meter Resolution National-scale Land-cover Map of China Created with the Deep Learning Framework and Open-access Data

Abstract: In China, the demand for a more precise perception of the national land surface has become most urgent given the pace of development and urbanization. Constructing a high-resolution (HR) land-cover dataset for China with national coverage, however, is a non-trivial task and thus, an active area of research impeded by the challenges of various landforms, manual annotation, and computational complexity. To fill this gap, we established a weakly supervised-based deep learning framework for large-scale cross-resolution land-cover mapping, which utilized the 10-m resolution land-cover products and Open Street Maps to construct training labels for the 1-m resolution national-scale Google Earth imagery. The framework resolved the label noise problem stemming from a resolution mismatch between images and labels by combining a resolution-preserving backbone, a weakly supervised module, and an unsupervised loss function. Based on the structures, the framework enables to capture the reliable information from the 10-m resolution labels and

complete the 1-m resolution national-scale land-cover mapping process. We took about 10 months to finish the first 1-m resolution national-scale land-cover map of the entire China (SinoLC-1) by processing over 73 TB of remote sensing data. The SinoLC-1 product was validated using a visually interpreted validation set including over 100,000 random samples and a statistical validation set from the 3rd national land resource survey report provided by the government. The validation results showed SinoLC-1 achieved an overall accuracy of 73.61% throughout the whole country.

Speaker



Xiangtao Zheng

Professor, Fuzhou University

Biography: Xiangtao Zheng is currently a Professor with Fuzhou University. His main research interest is cross-domain scene interpretation. He has published 52 SCI papers, 14 papers were selected as ESI highly cited papers, and 13 national invention patents were authorized. He is an Associate Editor for IEEE Geoscience and Remote Sensing Letters, Youth Editorial Board Member for CAAI Transactions on Intelligence Technology, Editorial Board Member for Mathematics, Guest Editor for Remote Sensing and National Remote Sensing Bulletin.

Title: Heterogenous Interpretation for Cross-Domain Remote Sensing Scene

Abstract: The remote sensing images are observed by multi-scale, multi-platform, and multi-view. This report focuses on the heterogenous interpretation technology for cross-domain remote sensing images. We aim to explore challenges faced by remote sensing images such as multi-scale, model solidification, and spatial-spectral representation. To tackle the issue of multi-scale in remote sensing images, we present a scale-independent multi-scale pooling representation and a scale-dependent cross-scale difference representation. Furthermore, a multi-task learning framework and a co-training framework are proposed to exploit the model's dependence during training. Finally, a rotation-invariant network is proposed to extract rotation invariant spectral-spatial features from HSI patches.

CSIG Image and Graphics Challenge

Time	13:30-17:30 September 22, 2023	Location	309	Host	Liu Si
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Abstract: The CSIG Image and Graphics Challenge is a series of events sponsored by the China Society of Image and Graphics (CSIG). It aims to promote the development and application of image and graphics technology and related industries in China, solve technical problems faced by enterprises, expand the scale of corporate publicity, and help them attract more talents.

The forum is the final scene of the 4th CSIG Image Graphics Challenge. The champions from each sub-track will participate in the finals, where they will be evaluated by the judges and compete for the ultimate titles of first, second, and third place. Additionally, award ceremonies for certain tracks will also take place at the final event.

Time Table

Time	Activities	Instructions
13:30-13:35	Opening Ceremony	
13:35-13:53	The organizer introduces and awards the race track	AMD
13:53-14:11	The organizer introduces and awards the race track	China Telecom Cloud
14:11-14:29	The organizer introduces and awards the race track	Qihoo 360
14:29-14:47	The organizer introduces and awards the race track	Baidu Paddle
14:47-15:05	The organizer introduces and awards the race track	iFLYTEK
15:05-15:23	The organizer introduces and awards the race track	National Engineering Laboratory for Intelligent Video Analysis and Application
15:23-15:41	The organizer introduces and awards the race track	Xiamen University Technical Committee on 3D Vision
15:41-15:53	Sub-track champion defense: AMD 1st	Real-Time Rendering and optimization with HW Ray Tracing
15:53-16:05	Sub-track champion defense: AMD 2nd	Real-time fluid particle physics simulation and optimization
16:05-16:17	Sub-track champion defense: China Telecom Cloud	Pedestrian attribute recognition
16:17-16:29	Sub-track champion defense: Qihoo 360	Open Vocabulary Detection Contest 2023
16:29-16:41	Sub-track champion defense: Baidu Paddle	Modeling and visual analysis of quantitative stock-selection investment strategy based on AI
16:41-16:53	Sub-track champion defense: iFLYTEK	CSIG 2023 Competition on Table Structure Recognition
16:53-17:05	Sub-track champion defense: National Engineering Laboratory for Intelligent Video Analysis and Application	CSIG FAT-AI 2023 FACE ANTI-SPOOFING CHALLENGE
17:05-17:17	Sub-track champion defense: VI-Slam	VI-SLAM
17:17-17:29	Sub-track champion defense: LiDAR-Slam	LiDAR-SLAM
17:29-17:40	The judges vote and announce the results	

Women in Technology Elite Salon

Time	15:00-17:00 September 22, 2023	Location	East Building 101	Host	Jing Dong
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Abstract: The Women in CSIG Committee will hold the "Women in Technology Elite Salon" event during the ICIG 2023 conference from September 22nd to 24th, 2023. This event is open to all women in technology and aims to facilitate exchange and sharing, support the development and growth of female technology talent. We invite women in technology from academic and industrial sectors to participate in presentations, fostering communication and collaboration, and encouraging participation of female members in the society's development to enhance the role of women in scientific and technological innovation.

This event provides a platform for women in technology to communicate and share their experiences. The organizer has prepared a special activity of "Ancient National Style - Cheongsam Show Ceremony" for the attendees. We welcome women scientists and technologists to meet and talk about women's development.

Activities

"Ancient National Style - Cheongsam Show Ceremony"
Presentation (Unit/Team Introduction)
Open Discussion

Guest



Nasir Memon

Dean of Computer Science, Data Science, and Engineering, IEEE Fellow



Yanling Zhang

Northwestern Polytechnical University



Yunhong Wang

Beijing University of Aeronautics and Astronautics



Xiangwei Kong

Zhejiang University



Hongxun Yao

Harbin Institute of Technology



Bingkun Bao

Nanjing University of Posts and Telecommunications



QirongMao

Jiangsu University

Moderator



Dong Jing

Researcher of Institute of Automation, Chinese Academy of Sciences

Oral Sessions

Best Paper Session

Time	13:00-14:30 September 23, 2023	Location	307	Host	Wanli Ouyang
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Time Table

Time	Paper ID	Title	Author Names
13:00-13:20	24	Multi-semantic Fusion Model for Generalized Zero-shot Skeleton-based Action Recognition	Ming-Zhe Li, Zhen Jia, Zhang Zhang, Zhanyu Ma, and Liang Wang
13:20-13:40	50	TANet: Adversarial Network via Tokens Transformer for Universal Domain Adaptation	Hong Wu, Zhanxiang Feng, Quan Zhang, Jiang Wu, and Jianhuang Lai
13:40-14:00	64	Enhanced Frequency Information for Image Dehazing	Fei Guo, Junkai Fan, Jun Li, and Jian Yang
14:00-14:20	249	Synthesizing a Large Scene with Multiple NeRFs	Shenglong Ye, Feifei Li, and Rui Huang

Oral Sessions

Oral Session 1

Time	14:00-16:00 September 23, 2023	Location	308	Host	Jianfang Hu
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Time Table

Time	Paper ID	Paper Title	Author Names
14:00-14:15	7	Attention-based Global-Local Graph Learning for Dynamic Facial Expression Recognition	Ningwei Xie, Jie Li, Meng Guo, Lei Yang, and Yafei Gong
14:15-14:30	11	HQFS: High-quality Feature Selection for Accurate Change Detection	Yan Xing, Qi'ao Xu, Qingyi Zhao, Rui Huang, and Yuxiang Zhang
14:30-14:45	36	Weakly Supervised Image Matting via Patch Clustering	Yunke Zhang, Chi Wang, Yu Zhang, Hujun Bao, and Weiwei Xu
14:45-15:00	74	Uncover the Body: Occluded Person Re-identification via Masked Image Modeling	Kunlun Xu, Yuxin Peng, and Jiahuan Zhou
15:00-15:15	131	A Novel Semantic Segmentation Method for High-Resolution Remote Sensing Images Based on Visual Attention Network	Wentao Wang and Xili Wang
15:15-15:30	188	U-TEN: An Unsupervised Two-branch Enhancement Network for Object Detection under Complex-Light Condition	Xiaolei Luo, Xiaoxuan Ma, Song Hu, Kejun Wu, Jiang Tang, and You Yang
15:30-15:45	219	BRMR : TAL Based on Boundary Refinement and Multi-scale Regression	Jing Jiang, Jiankun Zhu, Lining Wang, and Hongxun Yao
15:45-16:00	223	Learning Discriminative Proposal Representation for Multi-Object Tracking	Yeja Huang, Xianqin Liu, Yijun Zhang, and Jian-Fang Hu

Oral Sessions

Oral Session 2

Time	16:00-18:00 September 23, 2023	Location	307	Host	Yongjie Li
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Time Table

Time	Paper ID	Paper Title	Author Names
16:00-16:15	26	Toward Better SSIM Loss for Unsupervised Monocular Depth Estimation	Yijun Cao, Fuya Luo, and Yongjie Li
16:15-16:30	47	Patch-wise LiDAR Point Cloud Geometry Compression Based on Autoencoder	Runnan Huang and Miaohui Wang
16:30-16:45	48	Ar3dHands: A Dataset and Baseline for Real-time 3D Hand Pose Estimation from Binocular Distorted Images	Mengting Gan, Yihong Lin, Xingyan Liu, Wenwei Song, Jie Zeng, and Wenxiong Kang
16:45-17:00	244	Distance-Aware Vector-field and Vector Screening Strategy for 6D Object Pose Estimation	Lichun Wang, Chao Yang, Jianjia Xin, and Baocai Yin
17:00-17:15	342	Neural Implicit 3D Shapes from Single Images with Spatial Patterns	Yixin Zhuang, Yujie Wang, Yunzhe Liu, and Baoquan Chen
17:15-17:30	370	Residual Inter-slice Feature Learning for 3D Organ Segmentation	Junming Zhang, Jian Su, Tao Lei, Xiaogang Du, Yong Wan, Chengxia Li, Sijia Wen, and Weiqiang Zhao
17:30-17:45	417	Structure-aware Point Cloud Completion	Zhihua Cheng and Xuejin Chen

Oral Sessions

Oral Session 3

Time	16:00-18:00 September 23, 2023	Location	308	Host	Xiushen Wei
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Time Table

Time	Paper ID	Paper Title	Author Names
16:00-16:15	8	Implicit Representation for Interacting Hands Reconstruction from Monocular Color Images	Binghui Zuo, Zimeng Zhao, Wei Xie, and Yangang Wang
16:15-16:30	156	Motion-Scenario Decoupling for Rat-Aware Video Position Prediction: Strategy and Benchmark	Xiaofeng Liu, Jiaxin Gao, Yaohua Liu, Nenggan Zheng, and Risheng Liu
16:30-16:45	179	A Noval Intelligent Assessment Based on Audio-visual Data for Chinese Zither Fingerings	Wenting Zhao, Shigang Wang, Yan Zhao, Jian Wei, and Tianshu Li
16:45-17:00	256	Pixel-Correlation-Based Scar Screening in Hypertrophic Myocardium	Bin Lu, Cailing Pu, Chengjin Yu, Yuanting Yan, Hongjie Hu, and Huafeng Liu
17:00-17:15	278	Learning to Fuse Residual and Conditional Information for Video Compression and Reconstruction	Ran Wang, Zhuang Qi, Xiangxu Meng, and Lei Meng
17:15-17:30	413	Flexible Hierarchical Parallel Processing for AVS3 Video Coding	Hannong Zheng, Yuhuai Zhang, Jian Zhang, Hengyu Man, Xuan Deng, and Siwei Ma
17:30-17:45	416	Content-Adaptive Block Clustering for Improving VVC Adaptive Loop Filtering	Fan Ye, Li Li, and Dong Liu
17:45-18:00	441	Audio-visual Saliency for Omnidirectional Videos	Yuxin Zhu, Xilei Zhu, Huiyu Duan, Jie Li, Kaiwei Zhang, Yucheng Zhu, Li Chen, Xiongkuo Min, and Guangtao Zhai

Oral Sessions

Oral Session 4

Time	14:00-16:00 September 24, 2023	Location	307	Host	Tianyang Xu
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Time Table

Time	Paper ID	Paper Title	Author Names
14:00-14:15	34	Edge-Guided Interpretable Neural Network for Image Compressive Sensing Reconstruction	Xinlu Wang, Lijun Zhao, Jinjing Zhang, Yufeng Zhang, and Anhong Wang
14:15-14:30	101	Attention-based RGBD FuserNet for Monocular 3D Body Geometry and Pose Reconstruction	Pengle Jin, Miaopeng Li, and Xinguo Liu
14:30-14:45	104	Distortion-Aware Mutual Constraint for Screen Content Image Quality Assessment	Ye Yao, Jintong Hu, Wengming Yang, and Qingmin Liao
14:45-15:00	229	A Novel Attention-DeblurGAN-Based Defogging Algorithm	Xintao Hu, Xiaogang Cheng, Zhaobin Wang, Jie Ni, Bo Zhang, Bo Gao, Yan Zhang, Xin Geng, and Limin Song
15:00-15:15	233	GAN-based Image Compression with Improved RDO Process	Fanxin Xia, Jian Jin, Lili Meng, Feng Ding, and Huaxiang Zhang
15:15-15:30	258	Semantic and Gradient Guided Scene Text Image Super-Resolution	Chengyue Shi, Wenbo Shi, Jintong Hu, and Wenming Yang
15:30-15:45	261	Inscription-Image Inpainting with Edge Structure Reconstruction	Haonan Liu, XueLei He, Jiaxin Zhu, and Xiaowei He
15:45-16:00	282	Single Image Dehazing with Deep-Image-Prior Networks	Hongyan Wang, Xin Wang, and Zhixun Su

Oral Sessions

Oral Session 5

Time	14:00-16:00 September 24, 2023	Location	308	Host	Lifang Wu
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Time Table

Time	Paper ID	Paper Title	Author Names
14:00-14:15	27	SECT: Sentiment-Enriched Continual Training for Image Sentiment Analysis	Lifang Wu, Lehao Xing, Ge Shi, Sinuo Deng, and Jie Yang
14:15-14:30	29	ACLM: Adaptive Compensatory Label Mining for Facial Expression Recognition	Chengguang Liu, Shanmin Wang, Hui Shuai, and Qingshan Liu
14:30-14:45	81	Enhancing Adversarial Transferability From the Perspective of Input Loss Landscape	Yinhu Xu, Qi Chu, Haojie Yuan, Zixiang Luo, Bin Liu, and Nenghai Yu
14:45-15:00	197	TPM: Two-stage Prediction Mechanism for Universal Adversarial Patch Defense	Huaize Dong, Yifan Jiao, and Bing-Kun Bao
15:00-15:15	234	Causality-Inspired Source-Free Domain Adaptation for Medical Image Classification	Suo Qiu
15:15-15:30	285	Learning Sparse Neural Networks with Identity Layers	Mingjian Ni, Guangyao Chen, Xiawu Zheng, Peixi Peng, Li Yuan, and Yonghong Tian
15:30-15:45	415	MGP-Net: Margin-Global information optimization-Prototype Network For few-shot Ancient Inscriptions Classification	Jiaxin Zhu, Xuelei He, Haonan Liu, and Xiaowei He

Poster Sessions

Poster Session 1: Computer Vision

Time

14:00-16:00
September 23, 2023

Location

309

Papers and Authors

Poster Order	Paper ID	Paper Title	Author Names
1	17	FAFormer: Foggy Scene Semantic Segmentation by Fog-invariant Auxiliary Domain adaptation	Ziquan Wang and Zhipeng Jiang
2	21	Video-based Person Re-identification with Long Short-Term Representation Learning	Xuehu Liu, Pingping Zhang, and Huchuan Lu
3	28	Learn to Enhance the Negative Information in Convolutional Neural Network	Zhicheng Cai, Chenglei Peng, and Qiu Shen
4	31	Task-Agnostic Generalized Meta-Learning Based on MAML for Few-shot Bearing Fault Diagnosis	Xitao Yang, Lijun Zhang, and Jinjia Wang
5	38	Attention-guided Motion Estimation for Video Compression	Siru Zhang and Pengrui Duan
6	45	Cloud Detection from Remote Sensing Images by Cascaded U-shape Attention Networks	Ao Li, Jing Yang and Xinghua Li
7	54	GLM: A Model Based on Global-Local Joint Learning for Emotion Recognition from Gaits using Dual-Stream Network	Feixiang Zhang and Xiao Sun
8	56	HuMoMM: A Multi-Modal Dataset and Benchmark for Human Motion Analysis	Xiong Zhang, Minghui Wang, Ming Zeng, Wenxiong Kang, and Feiqi Deng
9	71	Energy-Efficient Robotic Arm Control Based on Differentiable Spiking Neural Networks	Xuanhe Wang, Jianxiong Tang, and Jianhuang Lai
10	85	Local-Fusion Diffusion Model for Enhancing Few-Shot Image Generation	Jishuai Hou, Lei Luo, and Jian Yang
11	86	Table Structure Recognition of Historical Dongba Documents	Jingcheng Zhang, Hongjian Zhan, Xiao Tu, and Yue Lu
12	90	LE2Fusion: A Novel Local Edge Enhancement Module for Infrared and Visible Image Fusion	Yongbiao Xiao, Hui Li, Chunyang Cheng, and Xiaoning Song
13	91	Complex Glyph Enhancement for License Plate Generation	Yu-Xiang Chen, Qi Liu, Song-Lu Chen, Fang Zhou, Yan Liu, Feng Chen, and Xu-Cheng Yin
14	93	High Fidelity Virtual Try-On via Dual Branch Bottleneck Transformer	Xiuxiang Li, Guifeng Zheng, Fan Zhou, Zhuo Su, and Ge Lin

15	94	A Road Damage Segmentation Method for Complex Environment Based on Improved Unet	Pengyu Liu , Jing Yuan, and Shanji Chen
16	97	Structural Reparameterization Network on Point Cloud Semantic Segmentation	ZhiJian Li, Kebin Jia, YuXuan Zhao, and WeiWei Huang
17	98	Physical Key Point Detection Algorithm Based on Multi-Scale Feature Fusion	Xiao Wang, Pengyu Liu, Peng Zhao, and Jiancui A
18	99	Skeleton Based Dynamic Hand Gesture Recognition Using Short Term Sampling Neural Networks (STSNN)	Aamrah Ikram and Yue Liu
19	100	Face Anti-spoofing Based on Client Identity Information and Depth Map	Yu Wang, Mingtao Pei, Zhengang Nie, and Xinmu Qi
20	105	Visual Realism Assessment for Face-swap Videos	Xianyun Sun, Beibei Dong, Caiyong Wang, Bo Peng, and Jing Dong
21	109	360° Omnidirectional Salient Object Detection with Multi-scale Interaction and Densely-connected Prediction	Haowei Dai, Liuxin Bao, Kunye Shen, Xiaofei Zhou, and Jiyong Zhang
22	115	Temporal Global Re-Detection Based on Interaction-Fusion Attention in Long-Term Visual Tracking	Jingyuan Ma, Zhiqiang Hou, Ruoxue Han, and Sugang Ma
23	118	VLNet: A Multi-task Network for Joint Vehicle and Lane Detection	Aiqi Feng, Haodong Liu, Tianyang Xu, Donglin Zhang, and Xiao-Jun Wu
24	130	Adaptive Cost Aggregation in Iterative Depth Estimation for Efficient Multi-View Stereo	Xiang Wang, Xiao Bai, and Chen Wang
25	133	Efficient Few-shot Image Generation via Lightweight Octave Generative Adversarial Networks	Sihao Liu, Yuanbo Li, and Cong Hu
26	135	Incorporating Global Correlation and Local Aggregation for Efficient Visual Localization	Dong Xie, Jianfeng Lu, Zhenbo Song, and Xuanzhu Chen
27	138	Deep Interactive Image Semantic and Instance Segmentation	Xuzijing Wu, Pengfei Yang, Wenteng Shao, Tao Wang, and Quansen Sun
28	140	Learning High-Performance Spiking Neural Networks With Multi-Compartment Spiking Neurons	Xinjie Li, Jianxiong Tang, and Jianhuang Lai
29	146	Attribute Space Analysis for Image Editing	Yiping Chen, Shuqi Yang, Baodi Liu, and Weifeng Liu
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Poster Session 2: Multi Modality

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Introduction to Host

China Society of Image and Graphics (CSIG)



China Society of Image and Graphics (CSIG) was founded in 1990 and is a nationally recognized premier society, officially approved by the Ministry of Civil Affairs of China. It also holds the status of an official affiliated member organization within the China Association for Science and Technology (CAST).

The aim of CSIG is to coordinate scientists and engineers in the field of image and graphics, facilitating theoretical research and the development of new and advanced technologies, as well as promoting technical applications across various sectors of China's economy. The main areas of expertise include digital image processing, image understanding, computer vision, image compression and transmission, scientific computing visualization, virtual reality, multimedia technology, pattern recognition, computer graphics, medical image processing, computer animation, and spatial information systems.

CSIG has 14 working committees and 30 technical committees. It publishes three journals: Visual Intelligence, Journal of Image and Graphics, and Communications of CSIG.

Based on the field of image and graphics, CSIG has been striving to meet the national strategic needs of China. It has been dedicated to actively organizing academic exchange and technical training, holding exhibitions, propagating scientific ideas and methods, providing consultations on decision-making, organizing evaluations of scientific and technological (S&T) achievements, facilitating the transfer of S&T achievements, recommending talented people, and strengthening international exchange and cooperation. CSIG has effectively fulfilled its role in coordinating scientists and engineers within the realm of image and graphics, emerging as a significant driving force in promoting innovative development in this field.

Introduction to Organizer

Nanjing University of Posts and Telecommunications (NJUPT)



Nanjing University of Posts and Telecommunications (NJUPT) is located in Nanjing, a historically and culturally rich city, and owns four campuses, namely Xianlin campus, Sanpailou campus, Suojincun campus and Jiangning campus.

NJUPT was established in 1942. It is a National World First-class Discipline University and High Level University of Jiangsu Province; Double first-class university developed jointly by Ministry of Education

and Jiangsu Province. NJUPT is engineering-oriented with a focus on information technology, integrating such disciplines as science, engineering, economics, management, literature, education, art and law, and offers multi-layered educational programs leading to bachelor's, master's, and doctor's degrees, as well as post-doctor's positions.

NJUPT has a well-structured faculty of over 2600 people, including 984 supervisors to doctoral and master students. Among full-time faculty, 60.67% have advanced professional titles, and 95.70% possess doctoral or master's degrees. A Nobel laureate has joined NJUPT faculty, taking the lead among universities in Jiangsu Province. NJUPT boasts no lack of high-end talents on its faculty team.

Centering on the goals set by the university, the university will accelerate the development of world-class disciplines and high-level university in Jiangsu province, comprehensively improve the development quality, and steadily improve its educational level and general strength.

Introduction to Co-organizers

Nanjing University of Science & Technology (NJUST)



Situated in Nanjing, the ancient capital of six dynasties in Chinese history, Nanjing University of Science and Technology (NJUST) was founded in 1953, and it is one of the seven universities affiliated to the Ministry of Industry and Information Technology. As a key university of "Project 211" and a member of the "Double First-class" construction universities and disciplines, NJUST ranks the 36th on the latest Academic Ranking of World Universities (ARWU) and the 41st among all the Chinese Universities on QS ranking. The university boasts 2 gorgeous scenic

campuses: Nanjing Campus and Jiangyin Campus, covering an area of 288 hectares.

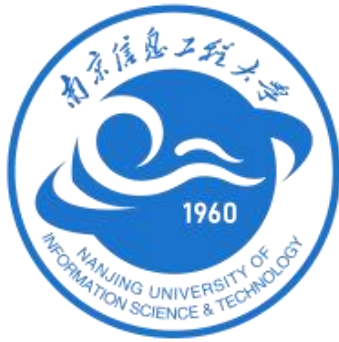
NJUST is home to a total of 20 schools, with an enrollment of more than 30,000 students, including around 800 international students. Furthermore, NJUST has more than 2000 full-time faculty members, of whom 20 are Academicians of Chinese Academy of Sciences or Chinese Academy of Engineering. NJUST has annual research funding which exceeds 1.5 Billion RMB.

At present, NJUST has 9 national key disciplines, 6 provincial first-level disciplines and 12 provincial key disciplines. The 6 disciplines of Engineering, Chemistry, Materials Science, Computer Science, Environment and ecology, physics have been listed among the top 1% of ESI and Engineering has entered 1‰. NJUST offers a diverse curriculum including such subjects as engineering, science, management, economics, humanities, law, education, and many more. NJUST carries out pioneering research in the fields of Advanced Materials, Applied Chemistry, Optical Engineering, Optoelectronic Information, Electromagnetic and Microwave Technology, Pattern Recognition and Intelligent System, etc.

NJUST has established cooperative relationships with more than 100 universities and institutions from 31 countries and regions, including UCLA, UCSB, McMaster University, University of Oxford, University of Coventry, University of Leuven, University of Lorraine, University of Stuttgart, Australian National University, University of Queensland, etc. Apart from pushing forward joint programs with these international partners from renowned educational establishments, NJUST has established the Sino-French Engineer School, which is a joint institution cultivating CTI certified tri-lingual engineers. NJUST also retains the Confucius Institute at the Gomel State University, Belarus, which is engaged in Sino-Belarus cultural exchange.

Introduction to Co-organizers

Nanjing University of Information Science & Technology (NUIST)



Nanjing University of Information Science & Technology (NUIST), founded in 1960 and renamed from Nanjing Institute of Meteorology in 2004, was designated as one of the national key institutions of higher education in 1978. NUIST is co-constructed by the Jiangsu Provincial People’s Government, the China Meteorological Administration (CMA), the State Oceanic Administration (SOA) and the Ministry of Education. In 2017, NUIST is on the list of China’s “Double First-class” construction universities and disciplines as well as Jiangsu high level universities. In recent years, NUIST's comprehensive ranking in the international mainstream university rankings has risen rapidly. In 2022, it ranked around 50th among Chinese mainland universities and 900th among world universities in the four major global university rankings of Times, U.S. News, ARWU, and QS.

NUIST has a complete higher education system with undergraduate, postgraduate, doctoral programmes as well as post-doctoral research centers. The eight disciplines of Geoscience, Engineering, Computer Science, Environmental Science & Ecology, Chemistry, Agricultural Science, Materials Science and Social Science have entered top 1% ESI rankings, among which Geoscience and Computer Science have entered top 1‰. The discipline of Atmospheric Science ranks No.1 in the discipline evaluation conducted by the Ministry of Education of China and the 6th in the world according to Shanghai Ranking's Global Ranking of Academic Subjects.

Currently, NUIST has about 35800 full-time students, including 28,300 undergraduate students, 6,200 postgraduate students and 1,300 international students. There are more than 2,000 full-time faculty members, with more than 120 high-end scholars including academicians of Chinese, EU, French, and Russian Academies of Sciences, MOE Special Professors and National Distinguished Young Scholars. 85% of the full-time teachers have doctorates and 67% of them have experiences of studying or working abroad for no less than one year.

NUIST has established cooperative relationship with over 100 overseas universities and colleges from over 30 countries and regions including Yale University, Harvard University, the University of Reading, the University of Manchester, South East Technological University, Carlton University, Delft University of Technology, Macquarie University and Monash University. NUIST was admitted to such programmes as Chinese Government Scholarship, the Confucius Institute Scholarship and Jiangsu

Government Scholarship. To date, the WMO Regional Training Centre Nanjing at NUIST has trained over 4,300 senior meteorological and hydrological professionals for 158 countries and regions and become the world's largest training center of top quality.

Diversified cooperation modes with worldwide first-class universities is a characteristic of NUIST's international cooperation, among which to establish joint research institutes is the most effective one. Typical examples include the NUIST- Harvard Joint Laboratory for Air Quality and Climate (JLAQC) and Yale - NUIST Atmospheric Environment Research Centre. JLAQC has gained a large number of creative scientific achievements. In recent 3 years, 12 papers from the JLAQC research fellows were published in top international academic journals such as Nature Climate Change, Nature Geoscience, Nature Communications, PNAS, Advanced Materials. The cooperation with Yale University was reported as a model of Sino-US scientific research cooperation in the article titled Science superpowers find common ground by Nature.

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Kunqian Computer Co., Ltd.



Kunqian Computer Co., Ltd. was established in 2012, specializing in the research, design, and manufacture of servers. It is committed to providing customers with highly customized server solutions and "butler-style" full-process services. The company currently has established branches in Nanjing, Beijing, Shanghai, Shenzhen, Wuhan, Chengdu, Hangzhou, Yangzhou, and other places, with sales and service networks covering the whole country. Kunqian adheres to customer demand as the guide, customized services as the starting point, domestic information innovation as the breakthrough, and R & D innovation as the driving force. With strong product strength and strong market performance, it has been rated as a stalwart supporter of IDC digital transformation, a leader in 2021 information innovation servers, a top 100 technology company in 2021, a 2022 best server brand award, the second in IDC China's accelerated computing server market, and a 2023 server innovation enterprise award. Kunqian's product line includes AI servers, domestic servers, high-density servers, storage servers, edge computing servers, and various customized server products. From the foundation of computing power in data centers, to the improvement of artificial intelligence computing power, to the sinking of computing power in the intelligent edge, multiple series of server hardware, together with the company's self-developed AI management platform, big data mining, distributed storage and other software, create an integrated solution with industry competitiveness. Kunqian has accumulated rich practical experience in the application fields of artificial intelligence, domestic information innovation, high-performance computing, edge computing, cloud computing, etc., which are widely used in the fields of Internet, science and education, finance, medical treatment, manufacturing, energy, transportation, security and other industries.

Introduction to Sponsors

Maicro Technology Co., Ltd.



Maicro Technology Co., Ltd., jointly incubated by the Institute of Automation, Chinese Academy of Sciences (CASIA) and Nanjing Artificial Intelligence Innovation Research Institute, CAS (AiRiA), is specialized in deep learning, intelligent analysis of images and videos, and intelligent chip architecture design. As a national high-tech enterprise, Maicro is one of the few companies in the world that have independently developed and owned software and hardware products and solutions for "AI chip-platform-algorithm". The key members of R&D came from well-known research institutes like CASIA, Alibaba, Huawei and NARI. Maicro has applied for 32 patents for inventions and 26 software copyrights, and has been awarded by several domestic and international competitions including three provincial-level Sci-Tech prizes. With rich experience in R&D and marketing of artificial intelligence algorithms and chip design, Maicro independently developed unmanned aerial vehicle adaptive inspection technology, which is widely used in power inspection fields, and serving more than half of China's provinces.

Introduction to Sponsors

Beijing Paratera Co., Ltd.



Beijing Paratera Co., Ltd. (hereinafter referred to as Paratera, stock code: 839493) was established in 2007, and it is a leading supercomputing cloud and operation service provider in China, providing supercomputing cloud, intelligent computing cloud, industry cloud, design simulation cloud and computing resource construction and operation services.

Adhering to the corporate mission of "assisting the strategy of strengthening China through science and technology", Paratera has laid out the construction of a national "computing network" and integrated a large number of domestic high-quality computing resources. It has accessed more than 80,000 servers, with a total computing power of over 1,000PFlops and storage resources of over 800PB, providing users in more than 20 industries with abundant computing resources, fast computing speed, and high-quality and low-cost computing services, to promote the computing resource from being usable to becoming user-friendly.

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