18th International Symposium on Neural Networks

ISNN2024 Final Program

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Welcome Messages

On behalf of the Organizing Committee, we sincerely welcome you to join us at the 18th International Symposium on Neural Networks (ISNN 2024) being held in Weihai, China, during July 11-14, 2024. ISNN2024 aims to provide a high-level international forum for scientists, engineers, and educators to present the state of the art of neural network research and applications in related fields. The symposium features plenary speeches given by world-renowned scholars, regular sessions with broad coverage, and special sessions focusing on popular topics.

ISNN 2024 attracted about one hundred submissions, addressing the state-of-the-art development and research covering many topics of neural network related research, including optimization methods, learning systems, data processing and analysis techniques, robotics and autonomous systems, bioinformatics. Based on the rigorous peer reviews by the Program Committee members and reviewers, 59 papers were selected to be presented in the conference and included in the conference proceedings.

The symposium program is highlighted with two plenary talks. We would like to express our sincere appreciation and acknowledgement to the distinguished plenary speakers: Professor Yongduan Song (IEEE Fellow, AAIA Fellow, CAA Fellow), Professor Deliang Wang (IEEE Fellow, ISCA Fellow). Plenary talks are focused on neural network technology, learning systems.

Many organizations and volunteers made great contributions toward the success of this symposium. We would like to express our sincere gratitude to Harbin Institute of Technology and City University of Hong Kong for their sponsorship, as well as the International Neural Network Society and the Asian Pacific Neural Network Society for their technical co-sponsorship. We would also like to sincerely thank all the committee members for their great efforts in organizing the symposium. Special thanks to the Program Committee members and reviewers whose insightful reviews and timely feedback ensured the high quality of the accepted papers and the smooth flow of the symposium. We would also like to thank Springer for their cooperation in publishing the proceedings in the prestigious LNCS series. Finally, we would like to thank all the speakers, authors, and participants for their support.

We wish you to enjoy the symposium and stay in Weihai both academically and socially!

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Program at a Glance

July 11, 2024 Thursday

Haiyue Jianguo Hotel Weihai	
10:30 ~ 17:00	On-site Registration
18:00 ~ 20:00	Dinner Buffet

July 12, 2024 Friday

Multi-functional Hall A, Haiyue Jianguo Hotel Weihai			
9:10 ~ 9:20	Opening Ceremony		
9:20 ~ 10:20	Plenary Speech I: Yongduan Song 宋永端, Chongqing University		
10:20 ~ 10:50	Coffee Break		
10:50 ~ 11:50	Plenary Speech II: Deliang Wang 汪德亮, Ohio State University		
12:00 ~ 13:00	Lunch Break (Western Restaurant, 2F)		
	Parallel Sessions (Room E, 3F)	Parallel Sessions (Room F, 3F)	Parallel Sessions (Room B, 5F)
13:30 ~ 15:30	S1: Signal Processing I	S2: Generative Modeling	S3: Optimization
15:30 ~ 15:50	Coffee Break		
15:50 ~ 17:50	S4: Signal Processing II	S5: Deep Learning	S6: Image Processing
18:00~20:00	Banquet (Multi-functional Hall B)		

July 13, 2024 Saturday

	Forum I: Intelligent Unmanned Systems（Room C, 4F） Chair: Zhigang Zeng 曾志刚	Forum II: Brain-inspired Intelligence (Room B, 5F) Chair: Zhaoxiang Zhang 张兆翔	Forum III: Embodied Intelligence (Room F, 3F) Chair: Shuqiang Jiang 蒋树强	Forum IV: Continual Learning (Room E, 3F) Chair: Hang Su 苏航
9:00 ~ 9:40	Fang Deng 邓方	Guoqi Li 李国齐	Yanan Sui 眭亚楠	Weishi Zheng 郑伟诗
9:40 ~ 10:20	Guanghui Wen 温广辉	Zhaofei Yu 余肇飞	Xiaodan Liang 梁小丹	Yunchao Wei 魏云超
10:20 ~ 10:40	Coffee Break			
10:40 ~ 11:20	Xiwang Dong 董希旺	Qi Xu 徐齐	Shuqiang Jiang 蒋树强	Xiaopeng Hong 洪晓鹏
11:20 ~ 12:00	Hesheng Wang	Gang Wang	Shanghang Zhang	Xialei Liu

	王贺升	王刚	仉尚航	刘夏雷
12:00 ~ 13:30	Lunch Break (Western Restaurant, 2F)			
	Parallel Sessions (Room E, 3F)		Parallel Sessions (Room F, 3F)	
13:30 ~ 15:30	S7: Neural Networks I		S8: Control Systems	
15:30 ~ 15:50	Coffee Break			
15:50 ~ 17:50	S9: Neural Networks II		S10: Bioinformatics	

Forum I: Intelligent Unmanned Systems (Room C, 4F)

1. **Fang Deng,** Autonomous Decision and Game Theory of Intelligent Swarm Systems in Dynamic Environments
2. **Guanghui Wen,** Distributed Consensus and Optimization of Multi-Agent Systems with Switching Communication Topologies
3. **Xiwang Dong**, Cooperative Control Theory of Cluster System and Its Application in Aircraft Cluster
4. **Hesheng Wang**, Vision-Based Robot Localization, Navigation, and Control

Forum II: Brain-Inspired Intelligence (Room B, 5F)

1. **Guoqi Li,** Brain Inspired Large Models with Spiking Neural Networks
2. **Zhaofei Yu,** Learning Theory and Methods of Spiking Neural Networks
3. **Qi Xu,** Efficient Structure Design for Deep Spiking Neural Networks
4. **Gang Wang,** Bio-Inspired Visual Motion Saliency Estimation for Small Video Objects with Applications

Forum III: Embodied Intelligence (Room F, 3F)

1. **Yanan Sui,** Self Model for Embodied Intelligence: Modeling and Control of Full-Body Human Musculoskeletal System
2. **Xiaodan Liang,** Efficient Data Generation and Reasoning for Embodied Robot Navigation and Manipulation
3. **Shuqiang Jiang,** Embodied Navigation Combining Exploration and Imagination
4. **Shanghang Zhang,** Towards Generalizable Perception of Embodied AI in the Open World

Forum IV: Continual Learning (Room E, 3F)

1. **Weishi Zheng,** Continuous Image Recognition under Micromemory
2. **Yunchao Wei,** Continual Learning Meets Real-World Visual Perception
3. **Xiaopeng Hong,** Some Recent Advances in Incremental Learning
4. **Xialei Liu,** Research on Knowledge-Guided Continual Learning

Plenary Speech I

Title: Spiking Neural Networks: The Convergence of Biology and Artificial Intelligence in Modern Control Systems

Professor Yongduan Song, IEEE Fellow, AAIA Fellow, CAA Fellow

Bioskech: Yongduan Song is a Fellow of IEEE, Fellow of AAIA, Fellow of International Eurasian Academy of Sciences, and Fellow of Chinese Automation Association. He was one of the six Langley Distinguished Professors at National Institute of Aerospace (NIA), USA and register professional engineer (USA). He is currently the dean of Research Institute of Artificial Intelligence at Chongqing University. Professor Song is the Editor-in-Chief of IEEE Transactions on Neural Networks and Learning Systems (TNNLS) and the founding Editor-in-Chief of the International Journal of Automation and Intelligence.

Abstract: Artificial Intelligence (AI) has seen significant advancements in recent years, ushering in an era of innovation across diverse domains. Among these revolutionary developments, neural networks take center stage, powering a wide array of applications from computer vision and natural language processing to intelligent control systems. A burgeoning subset within the neural network landscape, known as spiking neural networks (SNNs), has garnered significant interest. Unlike other neural network types that process information continuously, SNNs incorporate time directly into their operations, using discrete events, referred to as spikes, for communication and information processing. These spikes, binary events occurring at specific intervals, mimic the electrical impulses utilized by neurons in the human brain. Designed to emulate the dynamic learning and information processing observed in biological systems, SNNs are particularly apt for tasks involving temporal patterns and real-world sensory data. As computational power has expanded, so has the interest in SNNs, attributed to their potential for heightened computational efficiency and their ability to model intricate, time-dependent problems. These potent computational models, known to closely mirror the functioning of the human brain, simulate elements like the neuron's membrane potential, resistance, and reset potential. Factors such as neuron communication through spikes are also replicated within SNNs, piquing the curiosity of researchers and engineers. Intelligent control systems are increasingly employing SNNs for their potential to offer real-time decisions, reduced energy consumption, and superior adaptability compared to traditional artificial neural networks (ANNs). This talk encapsulates the advantages of SNNs, their roles, applications, and challenges in intelligent control systems, providing a comprehensive perspective for future research.

Plenary Speech II

Title: Location-Based Training for Deep Learning Based Multi-Channel Speaker Separation and Diarization

Professor Deliang Wang, IEEE Fellow, ISCA Fellow

Bioskech: Deliang Wang received the B.S. degree and the M.S. degree from Peking (Beijing) University and the Ph.D. degree in 1991 from the University of Southern California all in computer science. Since 1991, he has been with the Department of Computer Science & Engineering and the Center for Cognitive and Brain Sciences at The Ohio State University, where he is a Professor and University Distinguished Scholar. He received the U.S. Office of Naval Research Young Investigator Award in 1996, the 2008 Helmholtz Award from the International Neural Network Society, the 2007 Outstanding Paper Award of the IEEE Computational Intelligence Society and the 2019 Best Paper Award of the IEEE Signal Processing Society. He is an IEEE Fellow and ISCA Fellow, and currently serves as the Editor-in-Chief of Neural Networks.

Abstract: Permutation ambiguity is a key issue in deep learning based talker-independent speaker separation. Permutation invariant training (PIT) is widely used for addressing the permutation ambiguity problem. In multi-channel scenarios, permutation ambiguity may be naturally resolved by leveraging the spatial relations of different speakers. We present location-based training (LBT), a new approach to achieve talker independency in multi-channel speaker separation. Unlike PIT that examines all possible permutations, LBT assigns speakers according to their positions in physical space. Specifically, we propose two training criteria: azimuth-based and distance-based training, using speaker azimuths and distances relative to a microphone array. Evaluation results show that LBT significantly outperforms PIT on two-speaker and three-speaker mixtures with different array geometries and in various acoustic conditions. In addition, LBT is employed in a new speaker diarization approach for meeting environments. This approach integrates speaker separation and allows multiple non-overlapped speakers to be assigned to the same output stream. As a result, the proposed approach is capable of processing long audio recordings involving many participating speakers. Evaluation results demonstrate that the new multi-channel diarization approach advances the state-of-the-art performance in speaker diarization and speaker-attributed speech recognition by a large margin.

Forum I

Title: Autonomous Decision and Game Theory of Intelligent Swarm Systems in Dynamic Environments

Professor Fang Deng, Beijing Institute of Technology, China

Bioskech: Fang Deng is now a full Professor with Beijing Institute of Technology. His research mainly focuses on autonomous intelligent systems and wearable ubiquitous systems. He has led numerous projects, including key projects funded by the National Natural Science Foundation of China and the National Science and Technology Major program of "New generation of artificial intelligence". He has now published over 160 academic papers, obtained 109 authorized invention patents, and published one monograph and one textbook. He has ever received several prestigious awards and honors, including the Distinguished Young Scholar of the National Science Foundation of China and selection as the National Youth Talent Support Program of China. He has ever been awarded the China Youth Science and Technology Award, Outstanding Youth Zhongguancun Award, the National Science and Technology Progress Award (Second Class), the National Teaching Achievement Award (Second Class) and etc. He serves as the Deputy Secretary-General of the Chinese Association of Automation, Deputy Director of the Youth Working Committee, Environmental Perception and Protection Automation Committee of the Chinese Association of Automation, and the Intelligent Wearable Technology Committee of the Chinese Association of Command and Control. He is an editorial board member for journals such as IEEE Transactions on Systems, Man, and Cybernetics: Systems, IEEE Transactions on Intelligent Vehicles, IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Fuzzy Systems, Acta Automatica Sinica, China and etc.

Abstract: Intelligent swarm systems, which encompass human groups, multi-CPHS systems and multiple heterogeneous intelligent robots, are diverse in their types and widely applicable, making them an integral part of the new generation of artificial intelligence. We explore whether and how intelligent swarm systems can achieve 1+1>2 especially in complex and adversarial environments. This report aims to present the latest research advancements in intelligent swarm systems. It will cover topics such as cross-domain multimodal collaborative intelligent perception, large-scale resource cluster task scheduling, and distributed multi-agent intelligent game theory. The goal is to promote foundational theories and key technological breakthroughs in human-machine coexistence and collective intelligence.

Forum I

Title: Distributed Consensus and Optimization of Multi-Agent Systems with Switching Communication Topologies

Professor Guanghui Wen, Southeast University, China

Bioskech: Guanghui Wen received the Ph.D. degree in mechanical systems and control from Peking University, Beijing, China, in 2012. He is currently an Endowed Chair Professor at Department of Systems Science, Southeast University, Nanjing, China. His current research interests include coordination control of autonomous intelligent systems, analysis and synthesis of complex networks, cyber-physical systems, resilient control, and distributed reinforcement learning. He has published more than 200 papers, including more than 180 publications in top-tier journals in the fields of systems and control (TAC, Automatica, TII, TIE, TSG, Tcyber, etc.). Prof. Wen was the recipient of the National Science Fund for Distinguished Young Scholars, Australian Research Council Discovery Early Career Researcher Award, and Asia Pacific Neural Network Society Young Researcher Award. He currently serves as an Associate Editor of the IEEE Transactions on Industrial Informatics, the IEEE Transactions on Neural Networks and Learning Systems, the IEEE Transactions on Intelligent Vehicles, the IEEE Journal of Emerging and Selected Topics in Industrial Electronics, the IEEE Transactions on Systems, Man and Cybernetics: Systems, the IEEE Open Journal of the Industrial Electronics Society, and the Asian Journal of Control. Prof. Wen has been named a Highly Cited Researcher by Clarivate Analytics since 2018. He is an IET Fellow.

Abstract: Modern engineering control systems are increasingly characterized by networked structures and intelligent units. Within this context, the concept of multi-agent systems (MASs) has emerged, and the distributed cooperative control and optimization of such systems have gradually become a research frontier in the fields of systems and control. In practice, due to factors such as the limited communication range of agents and interference in communication links, the communication topology of MASs often exhibits dynamic switching characteristics. This talk begins by discussing the key issues of consensus control in MASs under switching communication topologies, outlining the critical techniques for addressing these problems: the common Lyapunov function method and the multiple Lyapunov function method. For MASs with directed switching communication topologies, it presents the construction methods and consensus criteria of multiple Lyapunov functions based on nonsingular M-matrix theory, and further explores low-conservatism multiple Lyapunov function construction methods based on Lyapunov inequalities and optimization techniques. On this basis, the robust optimization problems of MASs with physical dynamics under switching communication topologies are discussed. Finally, the application of the related theoretical results in the formation control of unmanned surface vessels is shared, along with personal insights on related emerging research topics.

Forum I

Title: Cooperative Control Theory of Cluster System and Its Application in Aircraft Cluster

Professor Xiwang Dong, Beijing University of Aeronautics and Astronautics, China

Bioskech: Xiwang Dong, Professor of Beijing University of Aeronautics and Astronautics, Dean of Unmanned Systems Research Institute of Beijing University of Aeronautics and Astronautics, Deputy Chief Engineer of Shenyang Aircraft Design and Research Institute of Aviation Industry Corporation of China in the field of artificial intelligence, Deputy Secretary General of Chinese Institute of Command and Control, National Leading Talent, Beijing Outstanding Youth, National Outstanding Youth. He has been engaged in cluster intelligence, collaborative guidance and control, collaborative decision planning and aircraft cluster research for a long time, and attaches equal importance to theory and practice. As the first and corresponding author, he has published more than 100 SCI papers in IEEE TAC, TCST and other journals and Automatica and other internationally renowned journals, with a total of more than 5,000 citations, and has been selected as a highly cited scholar in China and the top 2% of top scientists in the world by Elsevier for a long time. He has published 3 English monographs in Springer and Taylor Francis, and authorized/accepted more than 30 national invention patents. He has won the first prize of Military Technology invention, the third prize of National Defense Technology invention, the first prize of Scientific and Technological Progress of the Chinese Institute of Command and Control, the first prize of Innovation Award, the Young Scientist Award, the first prize of Technological invention of the China Invention Association, the second prize of the China Industry-academy-Research Cooperation Innovation and Promotion Achievement Award, and the Wu Wenjun Artificial Intelligence Outstanding Youth Award.

Abstract: Cluster intelligence is an important research field of the new generation of artificial intelligence. Aircraft is a typical object in the cluster system, which has a broad application prospect in both military and civil fields. Cooperative control is the guarantee and way of intelligent emergence of the cluster system. The cluster system represented by the aircraft cluster has the typical application characteristics of large scale, openness, high dynamic and strong robustness. These features enable distributed implementation of related algorithms for cluster system collaborative control. This report mainly introduces the distributed time-varying formation control technology, formation tracking control technology and formation-containment control technology in cluster system collaborative control, and demonstrates the effectiveness of the proposed technology combined with a series of flight tests on the UAV cluster. Finally, the application of the competition of intensive formation crossing race in the Air Force Unmanned Aerial Vehicle Cluster System Challenge is demonstrated as an example, and the possible development direction of the future is summarized.

Forum I

Title: Vision-Based Robot Localization, Navigation, and Control
Professor Hesheng Wang, Shanghai Jiao Tong University, China

Bioskech: Hesheng Wang is a Distinguished Professor of Shanghai Jiao Tong University, China. He has published more than 200 papers in refereed journals and conferences. Dr. Wang is an Associate Editor of IEEE Transactions on Automation Science and Engineering, IEEE Robotics and Automation Letters, Robotic Intelligence and Automation and the International Journal of Humanoid Robotics, a Senior Editor of the IEEE/ASME Transactions on Mechatronics, an Editor of Conference Editorial Board (CEB) of IEEE Robotics and Automation Society. He served as an Associate Editor of the IEEE Transactions on Robotics from 2015 to 2019, a Technical Editor of the IEEE/ASME Transactions on Mechatronics from 2020 to 2023. He was the General Chair of IEEE ROBIO 2022 and IEEE RCAR 2016, and the Program Chair of the IEEE ROBIO 2014 and IEEE/ASME AIM 2019. He will be the General Chair of IEEE/RSJ IROS 2025.

Abstract: This report focuses on the two core functions of service robots: mobility and manipulation. First, an overview of the current status of the service robot industry and technological development, along with the challenges faced, is provided. Next, the report introduces the key achievements of the team's long-term efforts in addressing the core technical challenges of mobility and manipulation. To tackle the issue of velocity perception and localization failure caused by the complex dynamics of non-holonomic mobile robots and dynamic environmental interferences, a computation method that integrates attention-based back-end optimization and explicit occlusion handling is proposed. This method achieves robust perception and localization of mobile robots through visual fusion in complex and large scenes. To address the problem of traditional calibrated control algorithms being prone to failure in uncalibrated environments, an adaptive visual servoing framework is developed that entirely relies on visual feedback without prior environmental information. This framework solves the challenge of high-precision robotic operations without calibration. A practical and versatile vision-based method system has been established, elevating the critical technological level of service robots.

Forum II

Title: Brain Inspired Large Models with Spiking Neural Networks

Professor Guoqi Li, Institute of Automation, Chinese Academy of Sciences, China

Bioskech: Guoqi Li is currently a Full Professor with the Institute of Automation, Chinese Academy of Sciences. His research focuses on Brain-inspired Computing and Brain Inspired Intelligence. He has authored or co-authored over 200 papers in prestigious journals and top AI conferences. His papers have been cited more than 11000 times according to Google Scholar. Prof. Li has actively contributed to various professional services, including serving as a Tutorial Chair, an International Technical Program Committee Member, a PC member, a Publication Chair, a Track Chair, and a Workshop Chair for several international conferences. He holds positions as an Associate Editor for IEEE TNNLS, IEEE TCDS, Neuromorphic Computing and Engineering. He was honored with the Outstanding Young Talent Award from the Beijing Natural Science Foundation in 2021, and was selected to participate in the Hundred Talents Program of the Chinese Academy of Sciences in 2022. In 2023, Prof. Li was awarded the National Science Foundation for Distinguished Young Scholars of China.

Abstract: Brain-inspired intelligence focuses on technologies inspired by the information processing mechanism of the human brain, based on the structure and function of neurons and neural circuits, and it aims to build computing systems with more general artificial intelligence. In recent years, spiking neural networks (SNNs) have approached the mainstream network performance of traditional deep learning in general scenarios, showing the potential to lead future intelligent technologies. This report introduces the models, algorithms of SNNs and their deployment on brain inspired chips, as well as the research progress of large models based on SNNs.

Forum II

Title: Learning Theory and Methods of Spiking Neural Networks

Professor Zhaofei Yu, Peking University, China

Bioskech: Zhaofei Yu is currently an Assistant Professor at Peking University, where he leads the Spike Vision Lab. He received the PhD degree from Tsinghua University in 2017. His research interests are neuromorphic computation, computational neuroscience, and computer vision. He has published more than 60 papers in Nature Biomedical Engineering, Science Advances, Cell Patterns, PloS Computational Biology, IEEE Transactions on Pattern Analysis and Machine Intelligence and NeurIPS/ICML/ICLR/CVPR/ICCV/ECCV/AAAI/IJCAI. He has served as an editor of Frontiers in Neuroscience and an area chair of ICML/ACMMM.

Abstract: Spiking Neural Networks (SNNs) are considered as the third generation of artificial neural networks, which incorporate temporal dynamics in addition to neuron and synapse states. Compared to the previous two generations of artificial neural networks, SNNs possess features such as high biological plausibility, low power consumption, and efficiency. This report aims to introduce the basic principles of spiking neural networks, analyze the current research status and development trends, and present the latest advancements in the study of learning theory and methods of spiking neural networks, based on the recent research work conducted by our team.

Forum II

Title: Efficient Structure Design for Deep Spiking Neural Networks

Professor Qi Xu, Dalian University of Technology, China

Bioskech: Qi Xu received his B.Eng. degree in the College of Computer Science and Technology from Zhejiang University of Technology in 2015, and Ph.D. degree in the College of Computer Science and Technology from Zhejiang University in 2021. Since 2021, he has been an associate professor at School of Computer Science and Technology, Dalian University of Technology. He was granted an honorary visiting fellow in the Centre for Systems Neuroscience, University of Leicester, U.K. in 2019. His research interests include brain-inspired computing, neuromorphic computing, neural computation, computational neuroscience, and cyborg intelligence.

Abstract: Spiking neural networks (SNNs) are brain-inspired models based on biological neural mechanisms, acclaimed as the third generation of neural network models, with advantages such as low power consumption, strong real-time capabilities, and high biological interpretability. However, most SNNs adopt the fixed structures of artificial neural networks (ANNs), which fail to fully exploit the characteristics and advantages of SNNs in representing spatiotemporal features through spike sequences. Therefore, inspired by the synaptic plasticity mechanisms of biological neural synapses involving growth, pruning, and regeneration, we design and implement a structurally efficient spiking neural network model. We propose an adaptive learning approach to simultaneously learn weight parameters and network connections. This approach constructs structures at different granularities, including weights, convolutional kernels, and layers, that can be pruned and grown to adapt to various task types and data characteristics. By leveraging neural excitation-inhibition mechanisms to dynamically adjust the network's connectivity state, we facilitate a hybrid of local and global learning. Additionally, we introduce SNNs learning algorithms utilizing knowledge distillation methods, where the hidden knowledge of a teacher network drives the high-performance learning of SNNs, enhancing the network's feature extraction capabilities with prior knowledge and experience. By merging the biological inspirations and computational advantages of spiking neural networks, we pave the way for new possibilities in the development and application of SNNs.

Forum II

Title: Bio-Inspired Visual Motion Saliency Estimation for Small Video Objects with Applications

Professor Gang Wang, Beijing Institute of Basic Medical Sciences, China

Bioskech: Gang Wang is an associate professor with the Center of Brain Sciences, Beijing Institute of Basic Medical Sciences, China, a Young Professor with the Chinese Institute for Brain Research, Beijing, China, and an Associate Professor with the University of Electronic Science and Technology of China. He is also serving as the Deputy Secretary-General of Chinese Neuroscience Society, Brain-inspired Intelligence Branch. He received the Ph.D. degree from Ghent University, Belgium in 2019. He is the first/corresponding author of more than 30 papers published in conference proceedings and journals (TPAMI, TIP, CVPR, ICCV, NeurIPS, etc.). He won the CVPR'23 Anti-UAV Challenge, and obtained the best student paper nomination prizes at the EUSFLAT'17 and BNAIC'19. He has received the “Young Talent on Science and Technology” fund from the Chinese government, the “Beijing Nova Program” fund from the Beijing government and the “Young Scholar” fund from CIBR, Beijing. His research interests include computer vision and brain-inspired vision computing.

Abstract: Detecting small objects against complex backgrounds is highly required yet extremely challenging. Traditional methods mainly characterize the appearance features or the spatially contextual information, suffering from high false alarms and missing rates. The biological visual system has an astonishing ability to quickly select visually important regions in its visual field, using visual motion information to lead the object detection process. Inspired by the mechanism of the biological retina and primary visual cortex, we propose to establish a computational model to simulate the magnocellular pathway, computing the preliminary visual motion saliency cheaply. The spatial-temporal saliency information can help enhance tiny-size objects and faintly discernible targets. We further apply the visual motion computational model as a plug-and-play module to advanced object detection methods. Experimental results have validated the superiority of the proposed scheme.

Forum III

Title: Self Model for Embodied Intelligence: Modeling and Control of Full-Body Human Musculoskeletal System

Professor Yanan Sui, Tsinghua University, China

Bioskech: Yanan Sui, associate professor at Tsinghua University, is committed to the research of human neuro-musculo-skeletal modeling and control, with applications in embodied intelligence and brain-machine interaction. He received bachelor's degree from Tsinghua University, PhD from Caltech, and engaged in postdoc work at Caltech and Stanford University. His work on safe optimization was written into textbooks of Stanford and other universities. He got the Best Conference Paper Award and Best Paper Award on Human-Robot Interaction at the 2020 International Conference on Robotics and Automation. His work was successfully applied to the clinical treatment of neural injuries in China and the United States. He has served as area chair of artificial intelligence conferences including AAAI, AISTATS, ICLR, ICML, NeurIPS. For his contribution in the interdisciplinary field of artificial intelligence and neural engineering, he was selected as the MIT Technology Review's Innovators Under 35 in China.

Abstract: Modeling and control of the human musculoskeletal system is important for understanding human motor functions, developing embodied intelligence, and optimizing human-robot interaction systems. However, current models are restricted to a limited range of body parts and often with a reduced number of muscles. There is also a lack of algorithms capable of controlling over 600 muscles to generate reasonable human movements. To fill this gap, we build a musculoskeletal model with 90 body segments, 206 joints, and 700 muscle-tendon units, allowing simulation of full-body dynamics and interaction with various devices. We develop a new algorithm using low-dimensional representation and hierarchical deep reinforcement learning to achieve state-of-the-art full-body control. We validate the effectiveness of our model and algorithm in simulations with real human locomotion data. This work promotes a deeper understanding of human motion control and better design of interactive robots.

Forum III

Title: Efficient Data Generation and Reasoning for Embodied Robot Navigation and Manipulation

Professor Xiaodan Liang, Sun Yat-sen University, China

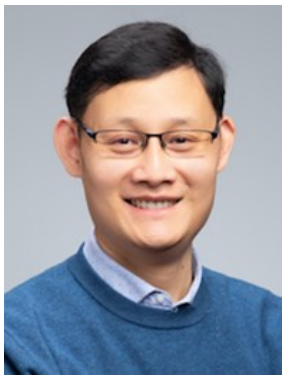
Bioskech: Xiaodan Liang, associate professor at Sun Yat-sen University, YiXian Scholar, National Ten Thousand Talent Program Young Top-notch Talent, IEEE Senior Member. Her research interests include multimodal vision-language understanding, digital human generation and animation, interpretable AI, and causal inference in machine learning models. She has been cited over 24,000 times on Google Scholar. Currently serving as Associate Editor for Image and Vision Computing and Neural Networks journals, She serves as Area Chairs for top conferences such as CVPR, ICML, ICCV, NeurIPS, ICLR, ECCV, ACM MM and served as Ombud Chair of CVPR 2023. She has received numerous awards including ACM China Rising Star Nomination Award, Alibaba DAMO Academy Orange Award, CSIG Shi Qingyun Young Female Scientist Award, Wu Wenjun Artificial Intelligence Outstanding Youth Award, China Association for Science and Technology Young Talent Nurturing Program Awardee, First Prize of China Graphics Society Science and Technology, CCF Outstanding Doctoral Dissertation Award, and ACM China Outstanding Doctoral Dissertation Award.

Abstract: Large language models (LLMs) have shown great potential in reasoning and interpretability for embodied intelligent robot navigation and manipulation tasks. This presentation focuses on the development of large-scale models for embodied robot navigation and manipulation in general scenarios. We will discuss novel strategies within the Navigation Chain-of-Thought (NavCoT) designed by our research group, enabling LLMs to make autonomous navigation decisions, thereby significantly reducing domain gaps. Moreover, understanding and following natural language instructions in complex real-world environments pose significant challenges for robots designed for general purposes. Autonomous agents must possess the ability to self-correct their planning based on feedback from the surrounding environment. We introduce a novel zero-shot framework called CorNav, which utilizes large-scale language models for decision-making. Additionally, the research group has developed a 3D simulator based on UE5 rendering of real scenes and a benchmark called NavBench to evaluate the effectiveness and generalization capability of navigation agents in zero-shot multi-task settings. Finally, the report discusses the future development trends of embodied intelligent agents.

Forum III

Title: Embodied Navigation Combining Exploration and Imagination

Professor Shuqiang Jiang, Institute of Computing Technology, Chinese Academy of Sciences, China



Bioskech: Shuqiang Jiang is a professor with the Institute of Computing Technology (ICT), Chinese Academy of Sciences (CAS) and a professor in the University of CAS. He is also with the Key Laboratory of Intelligent Information Processing, CAS. His research interests include multimedia analysis and multimodal intelligence. He leads the food computing research group in ICT, CAS. He has authored or coauthored more than 200 papers on the related research topics. He was supported by National Science Fund for Distinguished Young Scholars in 2021. He won the CAS International Cooperation Award for Young Scientists, the CCF Award of Science and Technology, Wu Wenjun Natural Science Award for Artificial Intelligence, CSIG Natural Science Award, and Beijing Science and Technology Progress Award. He is the Associate Editor of ACM ToMM, vice Chair of IEEE CASS Beijing Chapter, vice Chair of ACM SIGMM China chapter. He has served as an organization member of more than 20 academic conferences, including the general chair of ICIMCS 2015, program chair of ICIMCS2010, PCM2017, ACM Multimedia Asia2019, He has also served as an area chair or TPC member for many conferences, including ACM Multimedia, CVPR, ICCV, IJCAI, ICME, ICIP, etc.

Abstract: Embodied navigation refers to the ability of the agent to perceive and understand the environment based on task objectives (such as language instructions), then predict and execute movement actions, thereby progressively completing tasks. It is the key technology for embodied intelligent systems to interact with the real world. Existing methods for embodied navigation largely rely on current and past visual observations for short-term and single-step action prediction, lacking the capability for evaluating unobserved environments and conducting long-term action planning. Physiological studies have indicated that humans not only depend on current observations but can also imagine unobserved environments from prior memories, constantly refining and enhancing their understanding of the environment combining exploration and imagination. Thus, endowing agents with the ability to "imagine" thereby aiding them in predicting the layout of unobserved environments, assessing the long-term value of navigation actions, and realizing more efficient and accurate navigation decisions, emerges as a significant research challenge. This report will first introduce the research background of embodied AI and embodied navigation and then report on the research progress in embodied navigation combining exploration and imagination, including self-supervised generative map and lookahead exploration with neural radiance representation, and finally introduce the adaptation of embodied navigation from the simulator to the real world and provide demonstrations.

Forum III

Title: Continuous Image Recognition under Micromemory

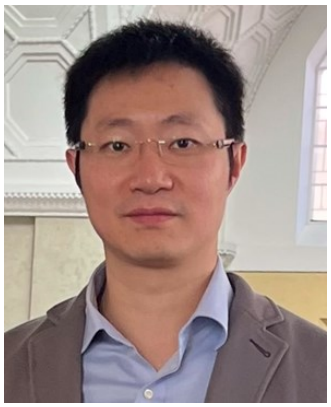
Professor Shanghang Zhang, Peking University, China

Bioskech: Shanghang Zhang is a Tenure Track Assistant Professor at the School of Computer Science, Peking University. She has been the postdoc research fellow at Berkeley AI Research Lab (BAIR), UC Berkeley. Her research is about OOD Generalization that enables the machine learning systems to generalize to new domains using limited labels, as reflected in over 80 papers on top-tier journals and conference proceedings. She has been the author and editor of the book "Deep Reinforcement Learning" published by Springer Nature. Its Electronic Edition has been downloaded 200,000 times worldwide. She has received the AAAI 2021 Best Paper Award, several Champions on international competitions, and has been selected to "2018 Rising Stars in EECS, USA". Dr. Zhang has been the chief organizer of several workshops on ICML/NeurIPS, the special issue on ICMR, and been the Senior PC of AAAI 2023/2024. Dr. Zhang received her Ph.D. from Carnegie Mellon University in 2018, and her Master from Peking University.

Abstract: Although machine vision has brought great success to various fields, embodied perception is often trained in closed environments, with limitations such as closed-set hypothesis and large-sample hypothesis. However, embodied agents in the real world often face the open environment, and there are the following key challenges: 1) There are a lot of data domain offset in the open environment, and it is difficult for existing schemes to adapt to the new data domain and accurately understand the new scenario; 2) New categories appear dynamically in the open environment, and annotations cannot be obtained in time, and it is difficult for existing schemes to accurately identify new things under a small amount of annotations. In response to these challenges, this talk will introduce a series of research efforts to enhance the generalization ability of open world embodied perception, so that it can automatically adapt to new environments and recognize new things. In particular, a new continual generalization learning paradigm and multi-modal large model solution are proposed for corner case and other problems.

Forum IV

Title: Continuous Image Recognition under Micromemory
Professor Weishi Zheng, Sun Yat-sen University, China



Bioskech: Weishi Zheng is now a full Professor with Sun Yat-sen University. His research interests include person/object association and activity understanding, and the related weakly supervised/unsupervised and continuous learning machine learning algorithms. He has now published more than 200 papers, including more than 150 publications in main journals (TPAMI, IJCV, SIGGRAPH, TIP) and top conferences (ICCV, CVPR, ECCV, NeurIPS). He has ever served as area chairs of ICCV, CVPR, ECCV, BMVC, NeurIPS and etc. He is associate editors/on the editorial board of IEEE-TPAMI, Artificial Intelligence Journal, Pattern Recognition. He has ever joined Microsoft Research Asia Young Faculty Visiting Programme. He is a Cheung Kong Scholar Distinguished Professor, a recipient of the Excellent Young Scientists Fund of the National Natural Science Foundation of China, and a recipient of the Royal Society-Newton Advanced Fellowship of the United Kingdom.

Abstract: For a long time, we hope that deep learning models can continue to learn for new problems, new categories, new data, etc. However, due to the catastrophic forgetting problem, when the deep learning model is optimized for the new task, the classification performance of the original task will be seriously degraded. For this reason, many novel continuous learning algorithms have been proposed in recent years. On continuous learning, we have recently investigated this problem, mainly about how to use unlabeled data to solve the continuous learning modeling problem under small memory and how to use prompt modeling to solve the continuous learning problem under zero memory environment to quickly adapt to downstream tasks. We will present these recent explorations and look forward to discussing them with you.

Forum IV

Title: Continual Learning Meets Real-World Visual Perception

Professor Yunchao Wei, Beijing Jiaotong University, China

Bioskech: Yunchao Wei, Professor and Vice Dean of the School of Computer Science, Beijing Jiaotong University. He has conducted research at the National University of Singapore, the University of Illinois at Urbana-Champaign, and the University of Technology Sydney. He has been selected as MIT TR35 China, a Baidu Global High-Potential Chinese Young Scholar, and one of the "Top 40 Rising Stars" by The Australian. He has received the Pioneering Science and Technology Award at the World Internet Conference (2023), the First Prize of the Ministry of Education's Natural Science Award for Higher Education Institutions (2022), the First Prize of the China Society of Image and Graphics Science and Technology Award (2019), the Young Researcher Award from the Australian Research Council (2019), the Best Research Award from IBM C3SR (2019), the ILSVRC-Object Detection Championship (2014), and several CVPR competition championships. He has published over 100 papers in top journals/conferences such as TPAMI and CVPR, with over 20,000 citations on Google Scholar. His current research interests include visual perception for imperfect data, multimodal data analysis, and generative artificial intelligence, etc.

Abstract: Continual learning for visual perception focuses on how to continuously adapt models to new environments, identify new categories, and ultimately enhance the model's self-awareness. In this talk, Professor Wei will discuss how to conduct continual learning based on pre-trained models, how to address background drift issues in fine-grained visual perception tasks, the necessity of conducting continual learning in the era of large multimodal models, and how to empower embodied intelligence through continuous learning.

Forum IV

Title: Some Recent Advances in Incremental Learning

Professor Xiaopeng Hong, Harbin Institute of Technology, China

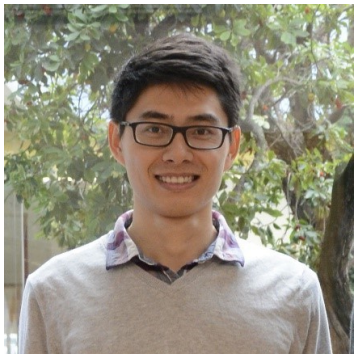
Bioskech: Xiaopeng Hong received his Ph.D. degree in computer application technology from Harbin Institute of Technology, P. R. China, in 2010. He is a professor at the Harbin Institute of Technology (HIT), P. R. China. He had been a distinguished research fellow at Xi'an Jiaotong University, P. R. China, and an adjunct professor at the University of Oulu, Finland. Xiaopeng has been a PI of over 10 projects such as the National Key R&D Program Projects, PRC, and Infotech Oulu Postdoctoral funding project. He has authored over 80 articles in journals and conferences such as IEEE T-PAMI, CVPR, ICCV, and AAAI. His studies about subtle facial movement analysis were reported by International media like MIT Technology Review. He was the co-author of a “top paper award” paper in ACM Multimedia 2023 and also the 2020 “IEEE Finland Section best student conference paper”. His current research interests include incremental learning, visual surveillance, and micro-expression analysis.

Abstract: This talk focuses on the problem of “catastrophic forgetting” faced by deep neural networks when learning new tasks and knowledge, and aims to explore how to retain old knowledge to achieve continual knowledge accumulation. The talk will briefly introduce the mainstream incremental learning approaches, including replay-based forgetting suppression mechanisms, pre-trained model based incremental learning approaches with prompting, and new trends in the era of big models.

Forum IV

Title: Research on Knowledge-Guided Continual Learning

Professor Xialei Liu, Nankai University, China



Bioskech: Xialei Liu is currently an associate professor at the School of Computer Science, Nankai University, specializing in open-environment visual continual learning. He holds a Ph.D. from the Autonomous University of Barcelona, Spain, and worked as a postdoctoral researcher at the University of Edinburgh, UK. He engaged in machine learning and computer vision research in open environments, including continual learning, unsupervised learning, and few-shot learning. He has published over 30 academic papers, with over 3000 citations on Google Scholar, including top international journals and conferences such as TPAMI, NeurIPS, CVPR, and ICCV. One paper was selected as a CVPR 2022 Best Paper Finalist. He serves as a committee member of VALSE 2022-2024, and organized the CVPR 2023 Continual Learning Workshop.

Abstract: Continual learning is one of the key skills for the next generation of artificial intelligence systems, aiming to enable systems to continuously acquire new knowledge in dynamically changing environments while avoiding catastrophic forgetting of old knowledge, simulating human learning. This report will introduce, from the perspective of knowledge guidance, how to utilize model knowledge, attribute knowledge, textual knowledge, and external data knowledge to resist forgetting while enhancing knowledge transferability. A series of continual learning methods can be applied to various computer vision tasks, including image classification, image generation, image segmentation, and object detection. Finally, a summary and outlook on the progress in the field of continual learning will be provided.

July 12, 2024 Friday

Opening Ceremony & Plenary Lecture

Multi-functional Hall A	
9:10 ~ 9:20	Opening Ceremony
9:20 ~ 10:20	Plenary Speech I: Prof. Yongduan Song Spiking Neural Networks: The Convergence of Biology and Artificial Intelligence in Modern Control Systems
10:20 ~ 10:50	Coffee Break
10:50 ~ 11:50	Plenary Speech II: Prof. Deliang Wang Location-Based Training for Deep Learning Based Multi-Channel Speaker Separation and Diarization
12:00 ~ 13:30	Lunch Break (Western Restaurant, 2F)

S1: Signal Processing I

Chairs: Nian Zhang, Tieshan Li (Room E, 3F)	
13:30 ~ 13:50	*Research on Fault Diagnosis of Surge Arresters Based on Support Vector Recurrent Neural Network* Ying Jin, Xiaodong Zhang, Lingfeng Qiu, Yong Ding, Yamei Luo, Zhijun Zhang, Yongxia Han, Jiantao Zhang, Lin Yang
13:50 ~ 14:10	*A Novel Method Based on Particle Swarm Optimization Support Vector Neural Network for Transformer Fault Diagnosis* Jiantao Zhang, Yong Ding, Xiaodong Zhang, Zhijun Zhang, Xing Yang, Feng Jiang, Lin Yang, Yongxia Han, Yamei Luo
14:10 ~ 14:30	*Excavating Emotional Cues and Flows Within Conversations for Emotion Detection Under Multimodal Scenario* Jiang Li, Xiaoping Wang, Zhigang Zeng
14:30 ~ 14:50	*Transfer Learning-Based Deep Learning Model for Corn Leaf Disease Classification* Justin An, Nian Zhang, Wagdy H. Mahmoud
14:50 ~ 15:10	*Path Planning for Unmanned Surface Vehicle Considering Risks in the Marine Environment* Haoran Liu, Qihe Shan, Tieshan Li, Fei Teng
15:10 ~ 15:30	*Audio-LLM: Activating the Capabilities of Large Language Models to Comprehend Audio Data* Dongting Li, Chenchong Tang, Han Liu
15:30 ~ 15: 50	Coffee Break

S2: Generative Modeling

Chairs: Dongxing Wei, Long Cheng (Room F, 3F)	
13:30 ~ 13:50	*DiffMoCa: Diffusion Model Based Multi-Modality Cut and Paste* Junjie Zhang, Shaojin Wu, Junbin Gao, Fusheng Yu, Hao Xu, and Zhigang Zeng
13:50 ~ 14:10	*HiFi-WaveGAN: Generative Adversarial Network with Auxiliary Spectrogram-Phase Loss for High-Fidelity Singing Voice Generation* Chunhui Wang, Chang Zeng, Jun Chen, Xue Ouyang
14:10 ~ 14:30	*Efficient 3D View Synthesis from Single-Image Utilizing Diffusion Priors* Yifan Wen, Zitong Wang, Zhuoyuan Li, Dongxing Wei, Yi Sun
14:30 ~ 14:50	*3D Multi-scene Stylization Based on Conditional Neural Radiance Fields* Sijia Zhang, Ting Liu, Zhuoyuan Li, Yi Sun
14:50 ~ 15:10	*A Novel Entropy-Based Regularization for NeRF to View Synthesis in Few-Shot Scenarios* Ting Liu, Sijia Zhang, Zhuoyuan Li, Yi Sun
15:10 ~ 15:30	*Boosting Personalized Musculoskeletal Modeling with Deep Transfer Learning：A Case Study* Lijun Han, Long Cheng, Houcheng Li, Yongxiang Zou
15:30 ~ 15: 50	Coffee Break

S3: Optimization

Chairs: Jin Hu, Wenwen Jia (Room B, 5F)	
13:30 ~ 13:50	*A Continuous-Time Algorithm with Quantified Event-Triggered for Distributed Resource Allocation Optimization* Wenwen Jia, Sikai Qiu, Sitian Qin
13:50 ~ 14:10	*A Novel Neurodynamic Approach to Bilevel Quadratic Programming* En Ran, Jin Hu
14:10 ~ 14:30	*Energy Storage Scheduling Optimization Strategy Based on Deep Reinforcement Learning* Shixi Hou, Jienan Han, Xiangjiang Liu, Ruoshan Guo, Yundi Chu
14:30 ~ 14:50	*A Penalty-like Neurodynamic Approach to Convex Optimization Problems with Set Constraint* Yiyao Xu, Sitian Qin

14:50 ~ 15:10	*Doubly Accelerated Proximal Gradient for Nonnegative Tensor Decomposition* Deqing Wang
15:10 ~ 15:30	*A Collaborative Neurodynamic Optimization Algorithm Based on Boltzmann Machines and 2-Opt Heuristic for Solving the Traveling Salesman Problem* Hongzong Li, Jun Wang
15:30 ~ 15: 50	Coffee Break

S4: Signal Processing II

Chairs: Xinrui Jiang, Yang Liu (Room E , 3F)	
15:50 ~ 16:10	*KeyAtNet: Keystroke Signal Real-time Eavesdropping based on Fourier Neural Operator* Seng-Hong Lee, Zixun Yu, Keke Chen, Xiao Li
16:10 ~ 16:30	*Root Sparse Bayesian Learning-Based 2-D Off-Grid DOA Estimation Algorithm for Massive MIMO Systems* Chaoyang Du, Huimin Zhang, Shun Na, Rihan Wu, Yang Liu
16:30 ~ 16:50	*Watermark-Based Replay Attack Detection for Unmanned Marine Vehicles* Guangrui Bian, Tieshan Li, Yue Long, Hanqing Yang
16:50 ~ 17:10	*A Visual Inertial SLAM Method for Fusing Point and Line Features* Yunfei Xiao, Huajun Ma, Shukai Duan, Lidan Wang
17:10 ~ 17:30	*Research on Optimal Control Strategy for Infectious Disease Prevention and Control* Na Liu, Xinrui Jiang
18:00 ~ 20:00	Banquet (Multi-functional Hall B)

S5: Deep Learning

Chairs: Shenshen Gu, Zhijun Zhang (Room F, 3F)	
15:50 ~ 16:10	*Beyond Universal Transformer: Block Reusing with Adaptor in Transformer for Automatic Speech Recognition* Haoyu Tang, Zhaoyi Liu, Chang Zeng, Xinfeng Li
16:10 ~ 16:30	*Improve Adversarial Robustness of MNIST Classification via Topological Data Analysis* Yining Liu, Xiao Li, Sitian Qin, Xiaolin Hu

16:30 ~ 16:50	*PhonHuBERT: a Phoneme Transcription Tool for Song Datasets* Amaury Prat, Runxuan Yang, Xiaolin Hu
16:50 ~ 17:10	*CSFuser: A Cascade Siamese Fusion Architecture for RGB-Infrared Object Detection* Ziyi Li, Gang Zhang, Zhigang Zeng, Xiaolin Hu
17:10 ~ 17:30	*An Improved YOLOv8 Target Detection Algorithm and its Application in Tennis Ball Picking Robot* Ruining Lei, Yikai Wu, Yulong Ren, Shenshen Gu
17:30 ~ 17:50	*Deep Learning Based K-Line Chart Recognition for Financial Quantitative Investment Analysis* Yamei Luo, Zhijun Zhang, Rongzhun Jiang, Yu Liu
18:00 ~ 20:00	Banquet (Multi-functional Hall B)

S6: Image Processing

Chairs: Xinzhe Wang, Quan-Yong Fan (Room B, 5F)	
15:50 ~ 16:10	*A Temporal Consistency Learning Framework for Face Forgery Detection* Xiaopeng Wang, Feng Zhu, Lei Li, Xiaoyang Tan
16:10 ~ 16:30	*Enhancing Fruit and Vegetable Image Classification with Attention Mechanisms in Convolutional Neural Networks* Faidat Adekemi Akorede, Man-Fai Leung, Hangjun Che
16:30 ~ 16:50	*Contraband Detection Based on YOLOv7-Tiny X-Ray Image* Huiting Fang, Yuelan Xin, Shenghui Deng
16:50 ~ 17:10	*DCFNet: Dense Complementary Fusion for RGB-Thermal Urban Scene Perception* Yu-Wen Michael Zhang, Gang Zhang, Xiaolin Hu
17:10 ~ 17:30	*An Improved YOLOv3-SPP Algorithm for Image-Based Pothole Detection* Tianxin Liu, Xiangyun Meng, Jiaxuan Li, Meiying Cai, Yuyong Cui, Quan-Yong Fan
17:30 ~ 17:50	*Co-YOLOv7: An Efficient Oil Spill Identification Network Based on SAR Images* Zitai Sui, Shan Jiang, Xinzhe Wang, Jianchao Fan
18:00 ~ 20:00	Banquet (Multi-functional Hall B)

July 13, 2024 Saturday

Forum I: Intelligent Unmanned Systems

Chair: Zhigang Zeng (Room C, 4F)	
9:00 ~ 9:40	Professor Fang Deng *Autonomous Decision and Game Theory of Intelligent Swarm Systems in Dynamic Environments*
9:40 ~ 10:20	Professor Guanghui Wen *Distributed Consensus and Optimization of Multi-Agent Systems with Switching Communication Topologies*
10:20 ~ 10:40	Coffee Break
10:40 ~ 11:20	Professor Xiwang Dong *Cooperative Control Theory of Cluster System and Its Application in Aircraft Cluster*
11:20 ~ 12:00	Professor Hesheng Wang *Vision-Based Robot Localization, Navigation, and Control*
12:00 ~ 13:30	Lunch Break (Western Restaurant, 2F)

Forum II: Brain-Inspired Intelligence

Chair: Zhaoxiang Zhang (Room B, 5F)	
9:00 ~ 9:40	Professor Guoqi Li *Brain Inspired Large Models with Spiking Neural Networks*
9:40 ~ 10:20	Professor Zhaofei Yu *Learning Theory and Methods of Spiking Neural Networks*
10:20 ~ 10:40	Coffee Break
10:40 ~ 11:20	Professor Qi Xu *Efficient Structure Design for Deep Spiking Neural Networks*
11:20 ~ 12:00	Professor Gang Wang *Bio-Inspired Visual Motion Saliency Estimation for Small Video Objects with Applications*
12:00 ~ 13:00	Lunch Break (Western Restaurant, 2F)

Forum III: Embodied Intelligence

Chair: Shuqiang Jiang (Room F, 3F)	
9:00 ~ 9:40	Professor Yanan Sui *Self Model for Embodied Intelligence: Modeling and Control of Full-Body Human Musculoskeletal System*
9:40 ~ 10:20	Professor Xiaodan Liang *Efficient Data Generation and Reasoning for Embodied Robot Navigation and Manipulation*
10:20 ~ 10:40	Coffee Break
10:40 ~ 11:20	Professor Shuqiang Jiang *Embodied Navigation Combining Exploration and Imagination*
11:20 ~ 12:00	Professor Shanghang Zhang *Towards Generalizable Perception of Embodied AI in the Open World*
12:00 ~ 13:00	Lunch Break (Western Restaurant, 2F)

Forum IV: Continual Learning

Chair: Hang Su (Room E, 3F)	
9:00 ~ 9:40	Professor Weishi Zheng *Continuous Image Recognition under Micromemory*
9:40 ~ 10:20	Professor Yunchao Wei *Continual Learning Meets Real-World Visual Perception*
10:20 ~ 10:40	Coffee Break
10:40 ~ 11:20	Professor Xiaopeng Hong *Some Recent Advances in Incremental Learning*
11:20 ~ 12:00	Professor Xialei Liu *Research on Knowledge-Guided Continual Learning*
12:00 ~ 13:30	Lunch Break (Western Restaurant, 2F)

S7: Neural Networks I

Chairs: Hangjun Che, Mingxin Kang (Room E, 3F)	
13:30 ~ 13:50	*3W-SLP: A Conceptual Model of Three-Way Single Layer Perceptrons* Mengjun Hu, Zhen Wang
13:50 ~ 14:10	*Mean Square Exponential Stability of Neutral Stochastic Delay Neural Networks* Han Yu, Song Zhu
14:10 ~ 14:30	*Circuit Implementation of Fixed-time Zeroing Neural Network for Time-varying Equality Constrained Quadratic Programming* Ruiqi Zhou, Xingxing Ju, Hangjun Che, Qian Zhang
14:30 ~ 14:50	*Optimized VLSI Circuit Partitioning and Testing Using ACO and BIST Architectures* M. R. Ezilarasan, D. Preethi, Man-Fai Leung, Hangjun Che, Xiangguang Dai
14:50 ~ 15:10	*Boundary Stabilization of Complex Coupled Hyperbolic Stochastic Systems* Yu Gao, Peining Jia, Kai-Ning Wu, Mingxin Kang
15:10 ~ 15:30	*New Results on Input-to-State Stability of Memristor-Based Inertial Neural Networks* Yuxin Jiang, Song Zhu
15:30 ~ 15: 50	Coffee Break

S8: Control Systems

Chairs: Zhongying Chen, Jiqiang Feng (Room F, 3F)	
13:30 ~ 13:50	*Distributed Optimal Consensus Control for Heterogeneous Multi-agent System with Disturbance* Yiyuan Chai, Sitian Qin, Jiqiang Feng, Chen Xu
13:50 ~ 14:10	*A Collaborative Neurodynamic Optimization Algorithm of Ecorouting with Electricity Allocation for PHEVs* Qixing Liu, Zhongying Chen, Yuhu Wu, Tielong Shen
14:10 ~ 14:30	*A Learning-Powered Model Predictive Control for Hybrid Electric Vehicles with Real-World Driving Data* Fuguo Xu, Mazen Alamir, Tielong Shen
14:30 ~ 14:50	*nuScenesComplex: A More Rigorous Evaluation Framework for End-to-End Autonomous Driving Planning*

	Dung Nguyen, Gang Zhang, Hujie Pan, Xiaolin Hu
14:50 ~ 15:10	*Dual-Criteria Robot Control: Optimization with End-Effector Orientation Constraints* Zhengkun Feng, Zining Su, Yuheng Qian
15:10 ~ 15:30	*Fuzzy Finite-Time Leader-Following Consensus Control for Nonlinear Multi-Agent Systems Subject to Input Delay* Yancheng Yan, Tieshan Li, Yue Long, Hanqing Yang
15:30 ~ 15: 50	Coffee Break

S9: Neural Networks II

Chairs: He Huang, Binbin Qiu (Room E, 3F)	
15:50 ~ 16:10	*A Modified Hopfield Model with Adjustable Activation Function for Buridan's Assay* Xingjian Liu, Chuangyi Du, Lingyi Tao
16:10 ~ 16:30	*Simplified GZN (Gradient-Zhang Neurodynamic) Continuous-Model and Discrete-Algorithms Handling Temporally-Varying ODLMVE (Over-Determined Linear Matrix-Vector Equation)* Yunong Zhang, Ziying Song, Binbin Qiu
16:30 ~ 16:50	*Simplified Gradient-Zeroing Neuronet for Temporally-Variant Convex Objective Function Minimization* Qianlong Yu, Fan Chen, Mingzhi Mao, Yunong Zhang
16:50 ~ 17:10	*Improved Memristive Binarized Neural Networks using Transformer DCBNN Architecture with CBAM Attention Mechanism* Yi Guo, Shukai Duan, and Lidan Wang
17:10 ~ 17:30	*Conditional Sliding Mode Control-Based Fixed-Time Stabilization of Fuzzy Uncertain Complex System* Fangmin Ren
17:30 ~ 17:50	*Temporal Difference Enhancement Network for Driving Behavior Recognition* Jianuo Yu, Zhen Xue, Wenbo Yu, He Huang

S10: Bioinformatics

Chairs: Jefferson R. Souza, Zhishan Guo (Room F, 3F)	
15:50 ~ 16:10	*A Deep Learning Approach for Single-Cell Perturbation Prediction Using Small Molecule Chemical Structures* Chaoran Zhang, Feifan Bi, Junyao Zhang, Guo Chen

16:10 ~ 16:30	*To Distinguish Internal Infestation in Wheat Kernels Using Biophoton Technology and CS-BP Algorithm* Weiya Shi
16:30 ~ 16:50	*Study of Segmentation Networks in the Detection of Ringspot Virus* Matheus Moura, Arlene Oliveira, Bilzã Araújo, Jefferson Souza
16:50 ~ 17:10	*Neural Networks for Classification of Immunofixation Electrophoresis Tests* Alexandre C. Vilarinho Filho, Leandro N. Couto, Jefferson R. Souza
17:10 ~ 17:30	*CardiacRT-NN: Real-Time Detection of Cardiovascular Disease Using Self-Attention CNN-LSTM for Embedded Systems* Yixin Li, Ning Sui, Anil Gehi, Chengan Guo, Zhishan Guo
17:30 ~ 17:50	*Classification of Coffee Leaves Using Smartphone Images and Convolutional Neural Networks* Fellipe A. Prates, Jefferson R. Souza, Marcelo P. Silva

Venue and Transportation

Conference registration： Haiyue Jianguo Hotel Weihai

Plenary lecture room： Multi-functional Hall A

Forum room： Room E, 3F & Room F, 3F & Room B, 5F & Room C, 4F

Parallel sessions room： Room E, 3F & Room F, 3F & Room B, 5F

Lunch： Western Restaurant, 2F

Banquet： Multi-functional Hall B

Transportation：

1. From Weihai Dashuibo Airport to the Hotel, it takes about 60 minutes by taxi.
2. From Weihai Railway Station to the Hotel, it takes about 30 minutes by taxi.

Registration contact： isnn@cs.cityu.edu.hk

Accommodation contact：

Shally Wang +86 15666311918, 15666311918@163.com