CSAI 2022

2022 6th International Conference on Computer Science and Artificial Intelligence

第六届计算机科学与人工智能国际会议

WORKSHOP ICIMT 2022

International Conference on Information and Multimedia Technology

信息与多媒体技术国际会议

2022

Dec. 9-11
12.9-12.11

virtual 线上会议

北京 Beijing

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UNIVERSITAS KRISTEN PETRA

T.I.P

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*All schedules will process in **Beijing Time (GMT+8)**   日程时间安排均为北京时间

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Time	Event	Tencent Room ID
10:00-17:00	Guests Speaker & Session Chair Test 报告嘉宾 & 分会主席测试	Room A: 890-9373-7630
10:00-12:00	Author(s) Test 作者测试	Room B: 405-8891-0458 Room C: 711-6571-4418

Day 2- December 10, Saturday | 12 月 10 日 星期六

Time	Event	Tencent Room ID
9:00-12:00	Conference Opening & Guest Speeches 会议开幕式 & 嘉宾报告	Room A: 890-9373-7630
14:00-17:30	Guest Speeches 嘉宾报告	Room A: 890-9373-7630

Day 3- December 11, Sunday | 12 月 11 日 星期日

Time	Event	Tencent Room ID
10:00-11:45	Session 1 & Session 2	Room A: 890-9373-7630 Room B: 405-8891-0458
14:00-16:00	Session 3 & Session 4	Room A: 890-9373-7630 Room B: 405-8891-0458
16:00-18:45	Session 5 & Session 6 & Session 7	Room A: 890-9373-7630 Room B: 405-8891-0458 Room C: 711-6571-4418

WELCOME 欢迎辞

We are pleased to welcome you to 2022 6th International Conference on Computer Science and Artificial Intelligence (CSAI 2022) and its workshop: International Conference on Information and Multimedia Technology (ICIMT 2022).

As an annual conference, the aim of CSAI is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Computer Science and Artificial Intelligence. This conference provides opportunities for the delegates to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration.

We truly believe that CSAI 2022 will achieve greater success and provide a better platform for all the participants to have fruitful discussions and to share ideas of researches. With high standard and high quality submissions and presentations in CSAI. With the three days' conference, there will be plenty of opportunities for you to showcase your work in front of professionals in the Computer Science and Artificial Intelligence sector at this hugely popular, one of a kind conference.

We'd like to express our sincere gratitude to everyone who has contributed to this conference. Additionally, our special thanks go to our fellow members of the organizing Committee for their excellent work in securing a substantial input of papers from all around the world and in encouraging participation. Much appreciation also goes to the technical committee, CSAI 2022 cannot be held successfully without their support and rigorous reviewing works.

A word of special welcome is given to our keynote and invited speakers who are pleased to make contributions to our conference and share their new research ideas with us. They are: Prof. Tao Xie; Prof. Ninghui Li; Prof. Chengwei Yang; Prof. Hongwei Mo; Prof. XiWen Zhang; Prof. Weishan Zhang; Assoc. Prof. Xinming Zhang; Assoc. Prof. Jing Teng; Assoc. Prof. Shuang Lai; Dr. Zhuowei Wang, We appreciate their idea and new findings sharing during CSAI 2022. Also, 55 papers and 2 abstracts will be presented in the conference, they were divided into 7 sessions. One best presentation will be chosen in each session, hope you could try your best in the conference.

Due to the impact of COVID-19, we have to hold the conference online, hope you can still have nice experience and learn a lot form CSAI 2022

We are dedicated to higher and better international conference experiences. We will sincerely listen to any suggestion and comments. Welcome any suggestions. We look forward to meeting you again next time!

CSAI 2022
Organizing Committee

COMMITTEE 委员会

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Dr. Md. Kamrul Hossain, Daffodil International University, Bangladesh

Dr. Qian Han, Dartmouth College, United States

Dr. Rocco Zaccagnino, University of Salerno, Italy

Dr. Simon Winberg, University of Cape Town, South Africa

Dr. Yuan Zheng, Inner Mongolia University, China

Dr. Zhuowei Wang, University of Technology Sydney, Australia

DETAILED AGENDA 详细日程

All schedules will process in **Beijing Time (GMT+8)** 日程时间安排均为北京时间

DAY 1

Dec. 9, Friday
12 月 9 日 星期五

Participants Test | 线上参会人员测试

Tencent Meeting | 腾讯会议
Room A: 890-9373-7630 Link: https://meeting.tencent.com/dm/fhckbLQS0W6x
Room B: 405-8891-0458 Link: https://meeting.tencent.com/dm/gxEVuLkjIsb0
Room C: 711-6571-4418 Link: https://meeting.tencent.com/dm/CAcv1cRlMaR4

Guests Speaker & Session Chair Test 报告嘉宾 & 分会主席测试		
Time	**Room ID**	**Presenter**
10:00-12:00	Room A	Prof. Xiangqun Chen Prof. Tao Xie Prof.Ninghui Li Prof. Chengwei Yang Prof. Hongwei Mo Prof. XiWen Zhang Prof. Weishan Zhang Assoc. Prof. Xinming Zhang Assoc. Prof.Jing Teng Dr. Zhuowei Wang Assoc. Prof. Shuang Lai
15:00-17:00	Room A	Prof. Songlei Jian Prof. Zhai Yuqing Prof. YunDong Li Assoc. Prof. Kun Liu Assoc. Prof. HaiCheng Qu Prof. Jinhua LI

Author(s) Test 作者测试		
Time	**Room ID**	**Presenter**
10:00-11:00	Room B	Session 1: CS1-023, CS1-003, CS1-004, CS1-016, CS1-052, CS1-083
		Session 2: CS1-027, CS1-037, CS1-1002, CS2-003, CS1-009, CS1-042
	Room C	Session 3: CS1-010, CS1-069, CS1-025, CS1-031, CS1-040, CS1-080, CS1-085, CS1-021-A
		Session 4: CS1-002, CS1-014, CS1-015, CS1-034, CS1-044, CS1-1001, CS1-068, CS1-011
11:00-12:00	Room B	Session 5: CS1-071, CS1-020, CS1-007, CS1-043, CS1-073, CS1-1006, CS1-030, CS1-086-A, CS1-089
		Session 6: CS1-001, CS1-012, CS1-028, CS2-002, CS1-058, CS1-090, CS1-061, CS1-1005, CS1-036
	Room C	Session 7: CS2-1001, CS1-013, CS1-019, CS1-041, CS1-024, CS1-046, CS1-049, CS1-1007, CS1-066

DETAILED AGENDA 详细日程

All schedules will process in **Beijing Time (GMT+8)** 日程时间安排均为北京时间

DAY 2
Dec. 10, Saturday
12 月 10 日 星期六

Conference Opening & Guest Speeches

会议开幕式 & 嘉宾报告

Tencent Meeting | 腾讯会议
Room A: 890-9373-7630 Link: https://meeting.tencent.com/dm/fhckbLQS0W6x

Time	Event	Presenter
09:00-09:10	Opening Remarks	Prof. Xiangqun Chen, Peking University, China, Executive director of Beijing Computer Federation, China 陈向群教授，北京大学；北京计算机学会理事长
09:10-09:50	Keynote Speech I	Prof. Tao Xie, Peking University, China Foreign Member of Academia Europaea, Fellow of ACM, Fellow of IEEE, Fellow of AAAS, Fellow of CCF, Peking University Chair Professor 谢涛教授，北京大学 *Speech Title: Artificial Intelligence for Software Engineering: Will It Be a "Silver Bullet" in Software Engineering?*
09:50-10:30	Keynote Speech II	Prof. Ninghui Li, Purdue University, USA Fellow of ACM, Fellow of IEEE Ninghui Li 教授，美国普渡大学 *Speech Title: TBA*
10:30-11:00	Break & Group Photo	
11:00-11:30	Invited Speech 1	Prof. Chengwei Yang, Beijing Institute of Technology, China 杨成伟教授，北京理工大学 *Speech Title: TBA*
11:30-12:00	Invited Speech 2	Prof. Hongwei Mo, Harbin Engineering University, China 莫宏伟教授，哈尔滨工程大学 *Speech Title: Research on Cooperative Method of Swarm Robots Inspired by Bacterial Intelligence*

Guest Speeches | 嘉宾报告

Room A: 890-9373-7630 Link: https://meeting.tencent.com/dm/fhckbLQS0W6x

Time	Event	Presenter
14:00-14:30	Invited Speech 3	Prof. Weishan Zhang, China University of Petroleum (East China), China 张卫山教授，中国石油大学（华东） *Speech Title: R2Fed: Resilient Reinforcement Federated Learning for Industrial Applications*
14:30-15:00	Invited Speech 4	Prof. XiWen Zhang, Beijing Language and Culture University, China 张习文教授，北京语言大学 *Speech Title: Three Views on Models as well as Homogeneity and Implementing for Intelligently Extracting and Generating Information from Multimedia*
15:00-15:30	Invited Speech 5	Assoc. Prof. Xinming Zhang, Harbin Institute of Technology(Shenzhen), China 张新明副教授，哈尔滨工业大学（深圳） *Speech Title: An Offline Weighted-bagging Data-Driven Evolutionary Algorithm with Data-Generation Based on Clustering*
15:30-16:00	Break,	
16:00-16:30	Invited Speech 6	Assoc. Prof. Jing Teng, North China Electric Power University,China 滕婧副教授，华北电力大学 *Speech Title: Survival Analysis for Breast Cancer based on Bayesian Method*
16:30-17:00	Invited Speech 7	Assoc. Prof. Shuang Lai, Northwestern Polytechnical University, China 来爽副教授，西北工业大学 *Speech Title: Analysis of Emergency System Optimization in the Nonprofit Sector from the View of Blockchain Empowerment*
17:00-17:30	Invited Speech 8	Dr. Zhuowei Wang, University of Technology Sydney, Australia Zhuowei Wang 博士，澳大利亚悉尼科技大学 *Speech Title: Collaborative Intelligence: A Human-Centered Framework of Weakly Supervised by Semi-Supervised Learning*

DETAILED AGENDA 详细日程

All schedules will process in **Beijing Time (GMT+8)** 日程时间安排均为北京时间

DAY 3
Dec. 11, Sunday
12月11日 星期日

Parallel Session | 作者平行分会 1-7

Room A: 890-9373-7630 Link: https://meeting.tencent.com/dm/fhckbLQS0W6x
Room B: 405-8891-0458 Link: https://meeting.tencent.com/dm/gxEVuLkjIsb0
Room C: 711-6571-4418 Link: https://meeting.tencent.com/dm/CAcv1cRlMaR4

Time	Room ID	Session & Presenter
10:00-11:45	Room A	**Session 1: Machine learning model and algorithm	机器学习模型与算法**
		CS1-023, CS1-003, CS1-004, CS1-016, CS1-052, CS1-051, CS1-083
10:00-11:30	Room B	**Session 2: Intelligent recommendation system and data analysis	智能推荐系统与数据分析**
		CS1-027, CS1-037, CS1-1002, CS2-003, CS1-009, CS1-042
14:00-16:00	Room A	**Session 3: Image detection and recognition	图像检测与识别**
		CS1-010, CS1-069, CS1-025, CS1-031, CS1-040, CS1-080, CS1-085, CS1-021-A
14:00-16:00	Room B	**Session 4: Image analysis and method	图像分析与方法**
		CS1-002, CS1-014, CS1-015, CS1-034, CS1-044, CS1-1001, CS1-068, CS1-011
16:30-18:30	Room A	**Session 5: Intelligent image processing and application	智能图像处理及应用**
		CS1-071, CS1-020, CS1-007, CS1-043, CS1-073, CS1-1006, CS1-030, CS1-086-A, CS1-089
16:30-18:30	Room B	**Session 6: Communication and signal processing	通信与信号处理**
		CS1-001, CS1-012, CS1-028, CS2-002, CS1-058, CS1-090, CS1-061, CS1-1005, CS1-036
16:30-18:30	Room C	**Session 7: Computer model, computing and analysis	计算机模型、计算与分析**
		CS2-1001, CS1-013, CS1-019, CS1-041, CS1-024, CS1-046, CS1-049, CS1-1007, CS1-066

ONLINE GUIDELINE 线上参会须知

☞ Time Zone | 时区

The whole program is based on **Beijing Time (GMT+8)**, please check on the program for your own test time and formal presentation time, and then convert it to the local time in your country.

☞ Platform: Tencent Meeting | 线上会议平台：腾讯会议

Download Link: | 下载链接：

*https://voovmeeting.com/download-center.html?from=1001 (Tencent Meeting)

*https://meeting.tencent.com/download/ (For Chinese Author(s) only)

☞ Video Tutorials | 视频教程

https://intl.cloud.tencent.com/document/product/1054?lang=en&pg=

☞ Meeting Rooms | 线上会议房间号

Room A: 890-9373-7630   https://meeting.tencent.com/dm/fhckbLQS0W6x

Room B: 405-8891-0458   https://meeting.tencent.com/dm/gxEVuLkjIsb0

Room C: 711-6571-4418   https://meeting.tencent.com/dm/CAcv1cRlMaR4

☞ Equipment needed | 设备及环境需求

*A computer with internet connection and camera　　带有摄像头的电脑设备

*Headphones　　　　　　　　　　　　　　　　　　耳机

*Stable internet connection　　　　　　　　　　　　稳定的网络连接

*A quiet place and Proper background　　　　　　　安静的地方，合适的背景

☞ How to USE Tencent Meeting | 腾讯会议使用指南

Step 1: Download Tencent Meetings

Step 2: Sign up for an account. (If you cannot sign up, no worry, when you join the conference after pasting the Meeting ID, it will require you enter your phone number for verification, and then you can join it successfully.)

Step 3: You can set up the languages and do some basic test.

Step 4: How to join the conference online:

1. Open the program, search with your paper ID, find your presentation, you will see there is a meeting ID in each session.

2. Open the Tencent Meeting app, click the join (choose JOIN MEETING), paste the meeting ID in

the blank, then you can join the conference.

3. If you don't have an account, you may be required to enter your phone number for verification first.

Step 5: Get familiar with the basic functions: Rename, chat, raise hands, and screen share, etc.

Step 6:

On **November 9**, we will have test session, on that day, we will teach you how to use Tencent Meeting and the functions mentioned above, so please download Tencent Meeting first.

Step 7:

Every time you enter the conference or the session, please rename as PAPER ID+YOUR NAME, for example: CS1-001+Tom

☞ Presentation Tips | 报告提示

1. Get your presentation PPT/Video files prepared. To effectively control the time and avoid some unexpected situations, we suggest you send us the recorded video in advance as a backup.

2. Regular oral presentation: 15 minutes (including Q&A). The presentation/video should be within 12 minutes, 3 minutes for Q&A.

3. Your punctual arrival and active involvement in each session will be highly appreciated. Please join in the room at least 15 minutes before your session.

SPEAKERS 报告嘉宾

Speech Time 报告时间	9:10-9:50 Dec. 10 Saturday | 12 月 10 日 星期六	Room ID	Room A: 890-9373-7630

Keynote Speaker I

Prof. Tao Xie, Peking University, China

Foreign Member of Academia Europaea; Fellow of ACM, Fellow of IEEE, Fellow of AAAS, Fellow of CCF; Peking University Chair Professor

谢涛教授，北京大学，中国

Tao Xie is a Peking University Chair Professor, a Deputy Director of the Key Lab of High Confidence Software Technologies (PKU), Ministry of Education, and the Deputy Secretary General of the Emerging Engineering Development Committee of Peking University. He was a Full Professor at the Department of Computer Science, the University of Illinois at Urbana-Champaign (UIUC), USA. He is a Foreign Member of Academia Europaea, a Fellow of ACM, IEEE, AAAS, and CCF. He won an Xplorer Prize, NSFC Overseas Distinguished Young Scholar Award and its Extension Category, NSF Faculty CAREER Award, ACM SIGSOFT Distinguished Service Award, IEEE TCSE Distinguished Service Award, MSR Foundational Contribution Award, TSE 2018 Best Paper Award, ASE 2021 Most Influential Paper Award, etc. He serves as a Deputy Director of CCF TCSE, Chair of CCF-IEEE CS Young Scientist Award Committee, Program Chair of China National Computer Congress (CNCC 2020), Program Co-Chair of ICSE 2021, Co-Editor-in-Chief of Wiley Journal of Software Testing, Verification and Reliability (STVR), etc. His main research interests include software engineering, system software, software security, trustworthy AI.

Speech Information

Artificial Intelligence for Software Engineering: Will It Be a "Silver Bullet" in Software Engineering?

Turing Award awardee Fred Brooks stated in the 80s that there is no "silver bullet" in software engineering: "there is no single development, in either technology or management technique, which by itself promises even one order of magnitude [tenfold] improvement within a decade in productivity, in reliability, in simplicity." In the past 20 years, AI technologies have been increasingly adopted in the field of software engineering, instilling intelligence in techniques developed to address various software engineering tasks, giving birth to the subfield of intelligent software engineering (ISE). In recent years, large-model-based code generation systems such as Microsoft's Copilot have emerged, producing surprisingly good results on specific datasets. This talk will discuss whether ISE techniques such as automatic code generation based on large models can become a "silver bullet" in software engineering in the near future.

SPEAKERS 报告嘉宾

Speech Time 报告时间	9:50-10:30 Dec. 10 Saturday | 12 月 10 日 星期六	**Room ID**	**Room A: 890-9373-7630**
Presenter's Local Time	20:50-21:30 On Dec. 9 Friday		

Keynote Speaker II
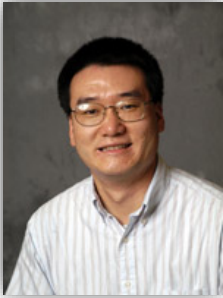
Prof. Ninghui Li, Purdue University, USA

Fellow of ACM, Fellow of IEEE

Ninghui Li 教授，美国普渡大学

Ninghui Li is a Samuel D. Conte Professor of Computer Science at Purdue University. He received a Bachelor's degree from the University of Science and Technology of China (USTC) in 1993, and a Ph.D. in Computer Science from New York University in 2000. His research interests are in security and privacy, and he has published over 200 referred papers in these areas. His 2007 paper ``t-Closeness: Privacy Beyond k-Anonymity and l-Diversity'' received the ICDE 2017 Influential Paper award.

He is Editor-in-Chief for ACM Transactions On Privacy and Security since October 2020, and has served as Program Chair for several leading conferences in the field, including ACM CCS, ESORICS, ACM ASIACCS, ACM SACMAT, and IFIP TM. He served as Chair of ACM Special Interest Group on Security, Audit and Control (SIGSAC) from 2017 to 2021, and Vice Chair from 2013 to 2017. He is ACM Fellow and IEEE Fellow.

Prof. Li's research has been supported by multiple NSF grants, including an NSF CAREER award in 2005. His research has also been supported by Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO), National Security Agency (NSA), IBM Research, Google, and Samsung. He collaborated with Dr. Bertino on NSF and AFOSR funded projects.

Speech Information

TBA

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SPEAKERS 报告嘉宾

Speech Time 报告时间	11:00-11:30 Dec. 10 Saturday | 12 月 10 日 星期六	Room ID	Room A: 890-9373-7630

Invited Speaker 1

Prof. Chengwei Yang

Beijing Institute of Technology, China

杨成伟教授，北京理工大学

Chengwei Yang is a professor, doctoral supervisor and Dean Assistant of the School of Mechatronical Engineering of Beijing Institute of Technology. He was jointly trained by Chinese Academy of Sciences and McGill University of Canada during his doctoral degree. His main research area is swarm Intelligent unmanned systems. He has published more than 30 academic papers, been authorized 12 patents, completed 2 scientific and technological achievements, and published 1 academic monograph. Now he is the member of the Swarm Intelligence and Collaborative Control Professional Committee of the China Command and Control Society and a standing member of the Youth Work Committee. He is also a reviewer of the National Natural Science Foundation and has participated in the demonstration work of several national major key projects. He presides over a number of National Natural Science Fund projects, national special major sub-projects, pre-research projects and some other fund projects.

Speech Information

TBA

SPEAKERS 报告嘉宾

Speech Time 报告时间	11:30-12:00 Dec. 10 Saturday | 12 月 10 日 星期六	Room ID	Room A: 890-9373-7630

Invited Speaker 2

Prof. Hongwei Mo

Harbin Engineering University, China

莫宏伟教授，哈尔滨工程大学

Mo Hongwei is a professor, doctoral supervisor, and director of the Brain-inspired Computing and Artificial Intelligence Research Center at the School of Intelligent Science and Engineering, Harbin Engineering University. Director of Heilongjiang Provincial Key Laboratory of Multidisciplinary Cognitive Cognitive Artificial Intelligence Technology and Application. Deputy Director of the Natural Computing and Digital Intelligence City Special Committee of the Chinese Artificial Intelligence Society, Standing Committee Member of the Aerospace Intelligence System Special Committee of the Chinese Artificial Intelligence Society, and member of the Intelligence Medical Special Committee of the Chinese Artificial Intelligence Society. Expert Committee of Brain-like Computing of Chinese Society of Neuroscience. He undertook and completed 26 projects of the National Natural Science Foundation of China, the National Defense Pre-research, the New Generation Artificial Intelligence 2030 Major Project of the Ministry of Science and Technology, and the Heilongjiang Provincial Key R&D Program Artificial Intelligence Special Project, published more than 90 papers, and published 6 monographs, "Artificial Intelligence". 4 textbooks including "Introduction", and 10 authorized invention patents. Received 4 provincial and ministerial level science and technology awards. Author of Outstanding Papers in "Journal of Intelligent Systems" in 2021. He is the co-chair of the 2013 International Conference on Swarm Intelligence, the co-chair of the 2017 International Conference on Biologically Inspired Computation Theory and Applications (BICTA2017), and the chairman of the organizing committees and program committee members of more than 40 international conferences. He is on the editorial board of many international and domestic journals such as Chinese Journal of Electronics.

Speech Information

Research on Cooperative Method of Swarm Robots Inspired by Bacterial Intelligence

The swarm robotic system is a typical representative of artificial intelligence systems, inspired by complex natural social beings , such as bird flocks, fish schools and ant colony, etc., showing collective behavior through local interactions between individuals or between individuals and the environment. With the wide application of swarm robot systems in various fields, future robotic systems, such as ground mobile robots, water(underwater) robots or

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unmanned aerial vehicles (UAVs), are bound to develop in the direction of intelligence and swarming.

Compared with single robot system, swarm robotic system has parallel processing ability and high robustness. In view of the characteristics of simple individual structure, local communication, small storage unit memory and limited computing power in the swarm robot system, how to design effective and efficient cooperative control methods under these constraints to achieve complex collective behavior to complete more tasks is a key problem in the study of swarm robots. This paper focuses on the robot motion control and swarm robot cooperation inspired by bacterial intelligence, and carries out a series of studies on multi-source search, the deployment and aggregation, and pattern generation of swarm robots.

SPEAKERS 报告嘉宾

Speech Time 报告时间	**14:00-14:30** **Dec. 10 Saturday | 12 月 10 日 星期六**	**Room ID**	**Room A: 890-9373-7630**

Invited Speaker 3

Prof. Weishan Zhang

China University of Petroleum (East China), China

张卫山教授，中国石油大学（华东）

Weishan Zhang, professor of China University of Petroleum (East China). His main research directions are big data intelligent processing, artificial intelligence, etc. He is the head of the intelligent big data processing team of Huangdao District. He initiated the West Coast Artificial Intelligence Technology Innovation Center in 2019. He has published more than 60 SCI articles and more than 80 international conference papers. Currently H index is 25, i10 index is 65. He is the PI/Co-PI of a number of projects such as the National Natural Science Foundation of China and the National Key R&D Program. For his research on federated intelligence, he won the second prize of Shandong Province Science and Technology Progress Award, the third prize of Wu Wenjun Artificial Intelligence Science and Technology Progress Award and some other awards.

Speech Information

R2Fed: Resilient Reinforcement Federated Learning for Industrial Applications

Federated learning has become an emerging hot research field in industry because of its ability to perform large-scale distributed learning while preserving data privacy. However, recent studies have shown that in the actual use of federated learning, there are device heterogeneity and data Non-IID (Not Identically and Independently Distributed) characteristics between client nodes, which will affect the effect of federated learning. In this work we propose R2Fed (Resilient Reinforcement Federated Learning), a resilient reinforcement federated learning method, which applies reinforcement learning to federated learning and uses reinforcement learning for weighted fusion of client models instead of average fusion. We conduct experiments on object detection, object classification, and sentiment classification tasks in the context of Non-IID and heterogeneity, and the experimental results show that the R2Fed method outperforms traditional federated learning, increasing the average accuracy by 4.7%. Experiments also demonstrate that R2Fed is resilient to federation attacks.

SPEAKERS 报告嘉宾

Speech Time 报告时间	14:30-15:00 Dec. 10 Saturday | 12 月 10 日 星期六	Room ID	Room A: 890-9373-7630

Invited Speaker 4

Prof. XiWen Zhang

Beijing Language and Culture University, China

张习文教授，北京语言大学

XiWen Zhang is currently a Professor of Digital Media Department, School of Information Science, in the Beijing Language and Culture University.

Prof. Zhang worked as an associated professor from 2002 to 2007 at the Human-computer interaction Laboratory, Institute of Software, Chinese Academy of Sciences. From 2005 to 2006 he was a Post doctor advised by Prof. Michael R. Lyu in the Department of Computer Science and Engineering, the Chinese University of Hong Kong. From February to April in 2001 he was a Research Assistant by Dr. KeZhang Chen in the Department of Mechanical Engineering, the University of Hong Kong. From 2000 to 2002 he was a Post doctor advised by Prof. ShiJie Cai in the Computer Science and Technology department, Nanjing University.

Prof. Zhang 's research interests include pattern recognition, computer vision, and human-computer interaction, as well as their applications in digital image, digital video, and digital ink. Prof. Zhang has published over 60 refereed journal and conference papers in his research areas. His SCI papers are published in Pattern Recognition, IEEE Transactions on Systems, Man, and Cybernetics - Part B: Cybernetics, Computer-Aided Design. He has published more than twenty EI paper.

Prof. Zhang received his B.E. in Chemical equipment and machinery from Fushun Petroleum Institute (became Liaoning Shihua University since 2002) in 1995, and his Ph.D. advised by Prof. ZongYing Ou in Mechanical manufacturing and automation from Dalian University of Technology in 2000.

Speech Information

Three Views on Models as well as Homogeneity and Implementing for Intelligently Extracting and Generating Information from Multimedia

Thanks to digitizing sensors and computing devices, there are various digital media, such as image, video, ink, audio, point cloud, and so on. Due to machine learning, deep learning, pattern recognition, and computer vision, various information can be extracted and generated from these media. Our work has focused on image, video, and ink, as well as extracted and generated various information using the proposed hierarchy and matrix models, local homogeneity,

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implementing ways with evolution operations and adversarial generation.

In our work, various digital images are processed, such as ones scanned from mechanical paper drawings and paper text, face images, portrait ones with line drawings, and microscopic bone marrow images. Various digital inks are processed, such as Chinese characters inks, text inks (namely handwriting), graphics inks (namely sketch). Hand and body video is also processed.

In our work, various information is extracted from these media using the proposed hierarchy models. Graphics and their multi-levels compounded objects are extracted and recognized from images scanned from mechanical paper drawings using a hierarchy model of engineering drawings. Digital ink Chinese characters are recognized using a hierarchical model of Chinese characters. Faces and their components are extracted from photos using a facial model. Deformable human hand gestures from digital video are recognized and tracked combining model and appearance. 3D clothing in virtual fitting is transferred based on human body UV mapping. Digital ink tables are extracted from digital ink compounded documents and segmented into cells, rows, and columns using a matrix model.

In our work, various information is extracted from these media using the proposed local homogeneity. Karyocytes and their components from microscopic bone marrow images based on regional color features. Strokes drawn by freehand are segmented and recognized from digital ink graphics as line segments and circular arcs based on segmental homogeneity features.

In our work, various information is extracted and generated from these media using the proposed implementing ways with genetic algorithms and cycle-Consistent adversarial networks. Digital curves are segmented and recognized as line segments and circular arcs using genetic algorithms. Handwriting strokes in one digital ink Chinese character are matched with the character's ground truth strokes using genetic algorithms. Text is separated from grid background using cycle-Consistent adversarial networks. Digital images of Chinese classical upper-class ladies paintings are generated from images with line drawings using conditional generative adversarial networks.

SPEAKERS 报告嘉宾

Speech Time 报告时间	**15:00-15:30** **Dec. 10 Saturday | 12 月 10 日 星期六**	**Room ID**	**Room A: 890-9373-7630**

Invited Speaker 5

Assoc. Prof. Xinming Zhang

Harbin Institute of Technology(Shenzhen), China

张新明副教授，哈尔滨工业大学（深圳）

Zhang Xinming, associate professor, doctoral supervisor. In September 2006, he obtained a PhD in Science and Technology of Harbin Institute of Technology. 2006.10-2008.10 was engaged in post-doctoral research at Harbin Institute of Technology Shenzhen Graduate School, and has joined Harbin Institute of Technology (Shenzhen) to this day in 2008.10. 2016.8-2017.8 as a visiting scholar at Michigan State University (Michigan State University). As a host, 7 items of scientific research projects, including the National Natural Science Foundation (Youth Fund), Chinese Postdoctoral Fund, Guangdong Natural Science Foundation Scientific research projects, as the main participants participating in the four scientific research projects, including the National Natural Science Foundation of China, have published more than 50 related papers in important academic journals at home and abroad, including more than 30 SCI retrieval.

Speech Information

An Offline Weighted-bagging Data-Driven Evolutionary Algorithm with Data-Generation Based on Clustering

In recent years, a variety of data-driven evolutionary (DDEAs) algorithms have been proposed to solve time-consuming and computationally intensive optimization problems. DDEAs are usually divided into offline DDEAs and online DDEAs, with offline DDEAs being the most widely studied and proven to receive excellent performance. However, most offline DDEAs suffer from three disadvantages. First, they require many surrogates to build a relatively accurate model that is redundant and time-consuming. Second, when the available fitness evaluations (FEs) are insufficient, their performance tends to be not entirely satisfactory. Finally, to cope with the second problem, many algorithms use data generation methods, which instead significantly increases the algorithm runtime. To overcome these problems, we propose a brand-new DDEA with RBFN networks as its surrogates. First, we invent a fast data-generation algorithm based on clustering to enlarge the dataset and reduce fitting errors. Afterward, we train RBFNs and carry out adaptive design for their parameters. We then aggregate RBFNs using a unique model management framework and demonstrate its accuracy and stability. Finally, FEs are obtained and used for optimization. Through numerical experiments and comparisons with other algorithms, this algorithm has been proven to be an excellent DDEA that suits data optimization problems.

SPEAKERS 报告嘉宾

Speech Time 报告时间	16:00-16:30 Dec. 10 Saturday | 12 月 10 日 星期六	Room ID	Room A: 890-9373-7630

Invited Speaker 6

Assoc. Prof. Jing Teng

North China Electric Power University, China

滕婧副教授，华北电力大学

Jing TENG is an associate professor, director of the Artificial Intelligence and Internet of Things Teaching and Research Center at the School of Control and Computer Engineering, North China Electric Power University. She is an IEEE Senior member and Expert Committee of Hybrid Artificial Intelligence of Chinese Association of Automation. She undertook and completed 12 projects of the National Natural Science Foundation of China, the National Defense Pre-research, the National Key R&D Plan Foundation of China, the Ministry of Education of the People's Republic of China, and the Fundamental Research Funds for the Central Universities, published more than 50 papers, and 10 authorized invention patents. She received 2 ministerial higher education awards. She is the Program Committee member of Australasian Joint Conference on Artificial Intelligence (AJCAI) 2022. She is the reviewer of many international and domestic journals, including IEEE Transactions on Information Theory, IEEE Transactions on Industrial Electronics, IEEE Transactions on Signal Processing, IEEE Transactions on Mobile Computing, IEEE Transactions on Vehicular Technology, IEEE Transactions on Parallel and Distributed Systems, ACTA AUTOMATICA SINICA.

Speech Information

Survival Analysis for Breast Cancer based on Bayesian Method

Survival analysis is a commonly used statistical methodology in the medical community for outcome estimation, identification of high-risk patients, and allocation of medical resources. Traditional survival analysis is largely based on the nonparametric Kaplan-Meier estimator and the semi-parametric Cox proportional hazard model when the proportional assumption holds. Owing to the recent technological advances and real-world applications, survival analysis has received significant interest from the machine learning research community. According to the characteristics of the patient data, survival analysis can be viewed as a kind of supervised learning problem.

In practice, the particular distribution form of assumptions often suffers from the generalization problem. Bayesian approaches, on the other hand, can flexibly describe non-proportional hazard rates while incorporating complex interactions between covariates and survival times, and have been adopted to extend survival analysis in recent

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publications. A fully Bayesian based approach to survival analysis can provide new insights into breast cancer prognosis, as well as commonly encountered statistical challenges in clinical data such as missing data, data sparsity, and heterogeneous data. We built a Bayesian Stratified Cox (BSCox) model to estimate the impact of lymph node ratio (LNR) in breast cancer survival. The BSCox model modifies the conventional Cox regression model by dividing the entire data into subgroups, when a continuous predictor does not satisfy the PH assumption.

Due to the soaring of the high-dimensional medical data sets, feature selection algorithms have been increasingly applied recently. In our recent study, we implemented four different types of feature selection methods. After that, we adopted the Bayesian Dynamic Cox (BDCox) model to develop survival prediction model and compare different models built with the Bayesian framework. The BDCox model can better capture the impact of predictors on survival rates at different time intervals. We developed and validated breast cancer prognosis predictive models for 5-year overall survival using data of the SEER Cancer Registry and the Shanghai Breast Cancer Survival Study. The diagnostic value of the predictive factors and the effectiveness of the proposed models were evaluated by comparisons with existing prediction models.

SPEAKERS 报告嘉宾

Speech Time 报告时间	16:30-17:00 Dec. 10 Saturday | 12 月 10 日 星期六	Room ID	Room A: 890-9373-7630

Invited Speaker 7

Assoc. Prof. Shuang Lai

Northwestern Polytechnic University, China

来爽副教授，西北工业大学

Shuang Lai received his Ph.D. in Control Science and Engineering from Northwestern Polytechnical University in 2009 and was a visiting scholar at the University of Technology Sydney, Australia. He is currently an associate professor at the School of Public Policy and Administration, Northwestern Polytechnical University. He has presided over and participated in several national, provincial, and ministerial scientific research projects, and has published many academic papers in domestic and foreign academic conferences and various journals. His main research interests are network information security, e-commerce, e-government, and emergency management. He is dedicated to applying computer-related technologies to the field of public administration.

Speech Information

Analysis of Emergency System Optimization in the Nonprofit Sector from the View of Blockchain Empowerment

Based on the practical background of the charity field in pandemic prevention and control and the theory of collaborative governance and empowerment, this paper examines the core technical elements and characteristics of the blockchain. This study proposes the internal mechanism of blockchain-empowered charity emergency management from three levels and creates a six-layer basic system architectural model of a blockchain-empowered charity emergency management system based on the three dimensions of blockchain empowerment theory. Finally, this paper establishes the "five corners" model of the construction and realization path of the blockchain-enabled charity emergency system, introduces the five major subjects into the model, and offers emergency digital transformation offers orchestrated design from the perspective of multi-collaborative governance.

SPEAKERS 报告嘉宾

Speech Time 报告时间	17:00-17:30 Dec. 10 Saturday | 12 月 10 日 星期六	Room ID	Room A: 890-9373-7630

Invited Speaker 8

Dr. Zhuowei Wang

University of Technology Sydney, Australia

Zhuowei Wang 博士，澳大利亚悉尼科技大学

Dr Zhuowei Wang is with the Australian Artificial Intelligence Institute (AAII), Faculty of Engineering and Information Technology, University of Technology Sydney. He received his Ph.D. degree in Computer Science from University of Technology Sydney (2018-2022) and his bachelor's degree from South China University of Technology (2013-2017). His research interest focuses on noisy label learning, federated learning, and weakly supervised learning. He has served as Editorial Manage of Expert Systems with Applications and Technical Committee of BDAI and WSPML. He has served as a member of program committees of CVPR, ICML, ECCV, and KDD.

Speech Information

Collaborative Intelligence: A Human-Centered Framework of Weakly Supervised by Semi-Supervised Learning

The success of deep learning depends on the correct annotation of all training samples for training robust models, where samples are difficult and expensive to obtain. The incorrect or incomplete information brought by wrongly annotated labels may cause catastrophic effects depending on the real-world applications. Therefore, this talk introduces a framework using semi-supervised learning to tackle two different kinds of weakly supervised learning, noisy label learning (NLL) and positive unlabelled learning (PUL), to improve the model robustness under incorrect labels in the dataset. Moreover, in real-world scenarios, most data are not collected and stored in a centralized way. Instead, data are distributed over various institutions protected by privacy restrictions. Federated learning (FL) has been proposed to leverage isolated data without violating privacy. However, data labels in different institutions are not annotated according to the same criterion so they inevitably contain different noises across silos. The frame can also be applied to tackle NLL problem in the FL setting.

Session 1 | 平行分会 1

Machine learning model and algorithm | 机器学习模型与算法

Chaired by: Prof. Songlei Jian, National University of Defense Technology, China

分会主席：蹇松雷教授，国防科技大学

Time 时间	10:00-11:45 (GMT+8) Dec. 11 Sunday	12 月 11 日 星期日	Room ID	Room A: 890-9373-7630
10:00-10:15 **CS1-023**	Title: Policy Transfer via Skill Adaptation and Composition Author(s): Benhui Zhuang, Chunhong Zhang, Zheng Hu Presenter: Benhui Zhuang Affiliation: Beijing University of Posts and Telecommunications, China While reinforcement learning is generally powerful on decision making, it usually suffers from slow convergence rate on complex problems. Enlightened by human experience, transfer learning that reuses skills learned from the source task to a new target task is desirable to speed up the learning process. However, most existing works achieve policy transfer by reusing fixed skills learned from the source task and simply recomposing them linearly in the target task, which is inefficient to adapt skills to the differences between source and target tasks. To address this issue, we propose a framework, Pre-Trained Hierarchical Recurrent Independent Mechanisms (PHRIM), that optimizes a hierarchical policy for selective composition of modular skills and learns adaptive skills in addition to the transferred skills for the adaptation of task differences. The experiment conducted on MiniGrid maze game demonstrates that the PHRIM outperforms the fixed-skill baselines on adapting to the source-to-target differences from aspects of state, action, and task complexity respectively.		
10:15-10:30 **CS1-003**	Title: Analyzing Truck Driver's Behavior on the Road Using YOLO v4 Tiny Algorithm Author(s): Gerald tomelden cayabyab, Felizardo Calma Reyes Jr, Paula Jean Castro Mendoza Presenter: Gerald T. Cayabyab Affiliation: Technological Institute of the Philippines Quezon City, Philippines The Philippine logistics industry is always in need of competent and qualified truck drivers to meet the increasing demands of the country's economic operations. Thus, this research paper investigates the driving competency of truck drivers driving behaviour. The industry plays a critical part in the country's economy, and any trucking accident creates a significant problem for the parties involved that causes a decline in productivity and loss of revenue. This research paper discusses the creation of a system which utilizes machine learning, data analytics, and internet-of-things for easy monitoring and assessment of the truck driver's driving behaviour. In collaboration with the Department of Science and Technology and the Technological Institute of the Philippines, the project aims to integrate various technologies and use it to assess the roadworthiness of truck drivers and use the YOLO v4 algorithm to train the model. It provides all		

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	the necessary details covering the statistics needed to assess the truck driver that aligns with the standards set required by the Land Transportation Office (LTO) administration. The Agile methodology was used throughout the development as there are constant changes being made which adds flexibility and puts fewer risks for the system development. Based on the model compiled and the results of the iteration on Yolov4-tiny the classes average precision has a minimum value of 75.45% and a maximum value of 99.89%. The results showed a high accuracy performance of the model created in information retrieval and object detection.
10:30-10:45 CS1-004	Title: Research on Sentiment Analysis of Online Product Reviews Based on Deep Learning Author(s): GUANXING CHEN Presenter: GUANXING CHEN Affiliation: Hainan College of Software Technology, China In order to fully extract online users' product reviews, the deep learning model combining TF-IDF (Term Frequency-Inverse Document Frequency) and LSTM (Long Short-Term Memory) is used to perform sentiment analysis of product reviews. Firstly, it uses Python for data collection. Secondly, applies TF-IDF to eliminate duplicate data and obtain key data, and then converts text into word vectors. Finally, performs sentiment analysis of online reviews by use of LSTM. The group comparison experiments show that the model has good performance with the average precision and average F1 value reaching 0.823 and 0.846 respectively.
10:45-11:00 CS1-016	Title: Continuous Self-adaptive Calibration by Reinforcement Learning Author(s): Mengfei Yu, Zheng Zheng, Delu Zeng Presenter: Mengfei Yu Affiliation: School of Mathematics, South China University of Technology,China It is well-known that hand-eye calibration plays an important role in the application of vision-based robot systems. Despite traditional calibration methods achieved huge success, the reduction in calibration accuracy whenever the relative hand-eye position changes reflects the fact that such methods are only suitable for scenarios where the components of the robot system are relatively fixed. To tackle this problem, a continuous self-adaptive calibration approach is proposed by applying the deep reinforcement learning algorithm to the calibration task. The experimental results demonstrate that our method can calibrate accurately in more flexible situations where the relative position of the hand and eye changes frequently.
11:00-11:15 CS1-052	Title: Credit Risk Models using Rule-Based Methods and Machine-Learning Algorithms Author(s): Presenter: Hualin Li Affiliation: Nanfang College Guangzhou,China This study applies machine-learning techniques and rule-based methods to construct nonlinear nonparametric models to forecast retail consumer and medium-sized enterprises (SMEs) credit risk. By combining customer transactions and enterprise data from 2018 to 2020 sampled from a major business district in the People's Republic of China, forecasts were constructed that significantly improved the classification rates of customer and enterprise delinquencies and defaults. Moreover, the time-series patterns of the estimated delinquency rates and credit scores over multiple dimensions produced by this model suggest that aggregated credit risk analytics

	may have important applications in forecasting systemic risk, which might shed some light on obtaining prospective insights regarding consumer credit that can be gleaned from historical data especially pandemic period.
11:15-11:30 **CS1-051**	Title: Graph Neural Network with Item Life Cycle for Social Recommendation Author(s): Jianwen Wang, zhaogong zhang Presenter: Jianwen Wang Affiliation: Heilongjiang University, China Recommendation system is a strategy to provide users with better decisions and help them make decisions. The sequence based recommendation system is to predict the probability of users clicking on the next item, or to score something, and help users make decisions. However, for these prediction work, most models or works in recent years only connect many models, ignoring the order of user behavior, and the location information is not taken into account. Secondly, most of the modeling is based on the interests of users, which just ignores the changes of the life cycle of the item itself. In addition, in the previous work, the model based on graph neural network obtains the potential information of users by aggregating the information of their neighbors' nodes. However, these neighbors may not interact with users in reality and have no impact on the changes of users' preferences. Therefore, we take the real friends of users into account and speculate the impact of friends on the changes of users' preferences through social networks, And we also take into account the short-term and long-term interests of users, and model users at the same time. At the same time, for the item, its own life cycle is changing, and the possible changes of similar items are also similar. Aiming at this point, we capture the short-term and long-term changes of the item life cycle, and jointly predict the short-term and long-term information. A large number of experiments on real data sets show that several methods are compared to verify the effectiveness of our model.
11:30-11:45 **CS1-083**	Title: A Novel Transfer Learning Model for Cross-Subject Emotion Recognition using EEGs Author(s): Yuan Wang, Qiang Li, Jian Jia, Rui Zhang Presenter: Yuan Wang Affiliation: Northwest University (China),China There have been many transfer learning models to solve the problem of individual differences in cross-subject emotion recognition using electroencephalogram (EEG) signals. However, the existing work consider little of the complexity of the class structure in the source domain, and may break the class structure in the target domain. In this paper, we propose a novel transfer learning model (CL-PSR-TL) based on the traditional domain-adversarial training of neural networks (DANN) in three aspects: 1) an inter-subject contrastive loss is additionally introduced in the source domain to extract the subject-irrelevant information; 2) a pairwise similarity mechanism with the effective pair selection is developed in the target domain to achieve a stable explore for the class structure; 3) a stepwise optimization strategy is applied to train the model. Then we evaluate the proposed model on two datasets (SEED and SEED-IV). Experimental results show that our proposed model achieves good performances compared with the state-of-the-art models.

Session 2 | 平行分会 2

Intelligent recommendation system and data analysis	智能推荐系统与数据分析
Chaired by: Prof. Zhai Yuqing, Southeast University, China
分会主席：翟玉庆教授，东南大学

Time 时间	10:00-11:30 (GMT+8) Dec. 11 Sunday | 12 月 11 日 星期日	Room ID	Room B: 405-8891-0458
10:00-10:15 **CS1-027**	Title: An Integrated Recommendation Model based on SMOTE, Denoising Auto Encoder and Multi-label Deep Forest Author(s): Yong Shuai, Chuan Yang, Yong Jun Li, Zheng Xie, Bing Li, Xin Yi Su Presenter: Yong Shuai Affiliation: Chongqing CEPREI Industrial Technology Research Institute Co., Ltd, China Aiming at the problem about the low recommendation performance, low training efficiency and too much parameter adjustment processes in the current recommendation models for multi-label long-tail distribution data, this paper proposed a recommendation model based on Synthetic Minority Over-Sampling Technique(SMOTE), Denoising Auto Encoder(DAE) and Multi-label Deep Forest(MLDF). Firstly, we used the SMOTE model for data oversampling or undersampling to generate new samples for minority data, and then used DAE model for feature transformation and feature reduction. Secondly, we introduced a multi-label learning method to solve the problem of data imbalance, and transformed the recommendation model into a multi-label classification problem by data-based learning and prediction, and established a multi-label deep forest recommendation model. Finally, through case analysis, it was proved that the integrated recommendation model established in this paper had better precision and applicability.		
10:15-10:30 **CS1-037**	Title: FAER: Fairness-aware Event-participant Recommendation in Event-based Social Networks Author(s): Yuan Liang Presenter: Yuan Liang Affiliation: Beihang University, China An event-based social network (EBSN) is a new type of social network that combines online and offline networks. In recent years, an important task in EBSN recommendation systems has been to design better and more reasonable recommendation algorithms to improve the accuracy of recommendation and enhance user satisfaction. However, the current research seldom considers how to coordinate fairness among individual users and reduce the impact of individual unreasonable feedback in group event recommendation. In addition, while considering the fairness of individuals, the accuracy of recommendation is less improved by fully combining the context key information. To solve these problems, we propose a prefiltering algorithm to filter the candidate event set, a multidimensional context recommendation to provide personalized event		

	recommendations for each user in the group, and a group consensus function fusion strategy to fuse the recommendation results of members in the group. Finally, we verify the effectiveness of our proposed algorithm in real data sets and find that FAER is superior to the latest algorithms in terms of global satisfaction, distance satisfaction and user fairness.
10:30-10:45 CS1-1002	Title: Efficient Contrast Subspace Mining Method for Categorical Data Author(s): Florence Sia Fui Sze, Rayner Alfred Presenter: Florence Sia Fui Sze Affiliation: Universiti Malaysia Sabah,Malaysia Mining contrast subspace has recently received attention to identify contrast subspace where a query object is most likely similar to a target class but least likely similar to other class. It has many important applications in various domain such as healthcare, security, finance, and business. Tree-based contrast subspace mining method (TB-CSMiner) has been introduced that is capable to identify contrast subspace of query object in categorical data set. However, the effectiveness of the method has not been evaluated thoroughly. Besides, the efficiency of the method in finding contrast subspace has not yet been examined. Real world data sets more often than not containing large amount of data. It is important to have a method that can identify contrast subspace of query object not only effectively but also efficiently on large data set. This paper uses various classification methods to further evaluate the effectiveness of the TB-CSMiner and assesses the execution speed of the method in mining contrast subspace. TB-CSMiner is experimentally shown to be significantly faster and as effective in identifying contrast subspace of query object on real world categorical data sets.
10:45-11:00 CS2-003	Title: The Cognitive Effect of Animal Popular Science Video after shifting from long to short Author(s): Jia - yin ZHANG, Zheng-qing JIANG Presenter: Jia - yin ZHANG Affiliation: 1/2-East China University of Science and Technology, China Animal popular science short video has the characteristics of short and concise, limited information and weak narrative. In the era of excessive entertainment, animal popular science video is expected to spread scientific influence on the short video platform with a large number of users to ensure the ideal transmission effect of animal knowledge. In the process of editing from a long video to a short video, instantly meet the cognitive needs of the audience and transfer structured knowledge to the audience. In order to explore a systematic way of converting long videos of popular science into short videos, this paper refers to the dual-route mode, multimedia screen linguistics method. The visual and audio channel in the short videos carry the content of knowledge. After the illustrations, images, subtitles and titles, as well as the design of the video commentary and soundtrack with concentrated emotions, three comparison experiments were carried out. This systematic method of changing from long to short can provide a reference for the creation of short popular science videos. In the context of fragmentation and excessive entertainment, animal science has adapt form to meet the audience's reading habits, and at the core, it must adhere to the authenticity and accuracy of popular science knowledge.
11:00-11:15 CS1-009	Title: Research on Pedestrian Interaction Based on AgentNet Author(s): Kang Li, Zining Li, Lei Wang Presenter: Kang Li

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	Affiliation: University of Science and Technology of China,China Pedestrian interaction is a key issue in virtual crowd simulation research. Most existing researches describe multi-agent interaction through empirical rules, while pedestrian interaction in crowd is difficult to be modeled simply by several rules or simple models. In this paper, the pedestrian interaction model is automatically extracted from the datasets and the simulation results of the model are evaluated by the method of data-driven modeling of complex systems based on AgentNet. The pedestrian interaction map is established and complex features are introduced to evaluate the real crowd and compare the simulation results. Experimental results show that the complex system modeling method used in this paper can better realize crowd simulation in general scenarios, and the established pedestrian interaction graph can evaluate the complex system characteristics of crowd.
11:15-11:30 CS1-042	Title: A Density Peak Clustering algorithm based on Adaptive K-nearest Neighbors with Evidential Strategy Author(s): FENGJUN JI, LIN LI, ZHANG ZHANG, BIN ZHANG, JUNBO YANG, JIE YIN, PEIHONG WANG Presenter: FENGJUN,JI Affiliation: Jiangsu University of Science and Technology, China A novel clustering method based on density peaks(DPC) was published on the journal Science. However, for DPC, it is a challenge to choose an appropriate cutoff distance dc, which can affect local density distribution of the datasets. Additionally, the assigning strategy in DPC may cause a domino effect: Many following points might be wrongly assigned once a point is assigned erroneously. To overcome these drawbacks, we introduce a density peak clustering method based on adaptive K-nearest neighbors with evidential assigning strategy (named as AKE-DPC). Firstly, we introduce an adaptive K-nearest neighbors strategy to find a proper K which can form a reasonable local density distribution and find cluster centers simultaneously; secondly, after the cluster centers are found, we introduce a strategy based on evidential rules to assign the remaining points. The advantages of AKE-DPC are obvious that negate the need for decision graph and input parameter such as p, a percentage which is used to computer the cutoff distance dc in DPC. Experiments on both synthetic and real-world datasets are conducted to compare our algorithm with both DPC and some DPC-KNN algorithms such as ADPC-KNN, FKNN-DPC and DPC-KNN. The clustering results demonstrate that our algorithm is not only effective but also outperforms other algorithms on most cases.

Session 3 | 平行分会 3

Image detection and recognition | 图像检测与识别

Chaired by: Prof. YunDong Li, North China University of Technology, China

分会主席：李云栋教授，北方工业大学

Time 时间	14:00-16:00 (GMT+8) Dec. 11 Sunday	12 月 11 日 星期日	Room ID	Room A: 890-9373-7630
14:00-14:15 **CS1-010**	Title: Crowd Behavior Intervention Based on Emotional Contagion Author(s): Li Guodong, Wang Lei, Wu Minzhong Presenter: Li Guodong Affiliation: University of Science and Technology of China,China Identifying abnormal behaviors in the crowd and taking corresponding intervention measures in time can prevent the occurrence of dangerous events. Due to this problem, we propose the crowd behavior intervention model based on emotional contagion, and use dynamic ways of emotional intervention to intervene group behavior. In the model, crowd behavior recognition module is introduced into crowd behavior intervention, which obtains the state of crowd behavior to support intervention decisions, improving the timeliness of interventions. Based on the identified behavior state of crowd, the problem of optimising the intervention strategy is transformed into the problem of maximising the ratio of the benefits to the costs of the intervention, when we use Intervention Optimization-Genetic Algorithm(IO-GA) to improve the efficiency of interventions. Experiments on the Motion Emotion Dataset(MED) demonstrate the effectiveness, timeliness and superiority of the crowd behavior intervention model.		
14:15-14:30 **CS1-069**	Title: A Progressive Vehicle Re-Identification Method Based on Multiple Attributes Features Fusion Author(s): Shuimin Mo, Chen Li, Yuanbo Li, Baoqing Zhang Presenter: Shuimin Mo Affiliation: North China University of Technology, China Along with the continuous increase of vehicles, various demands of vehicle recognition tasks have emerged for intelligent transportation systems construction. Vehicle re-identification, targeting on vehicle recognition under cross-cameras, has attracted many research interests. As a rigid object, greater similarity exists between different vehicles of the same model, and information-gaps caused by various shooting angles, occlusion, illumination appear between different images of the same vehicle, which will lead to smaller inter-class distance and larger intra-class distance. To address these above problems, we propose a novel Vehicle re-identification algorithm called AFN, which is based on attribute features fusion. Firstly, we introduce a feature extraction module to obtain the global features as well as the attribute features, including vehicle color and model respectively. Secondly, we propose an improved		

	feature fusion module that combines global and attribute features of the vehicle, which helps obtain strong discriminative features for re-id. Extensive experiments conducted on the VeRi-776 and Veri-Wild datasets show that our proposed method achieves promising improvement compared to other existing methods.
14:30-14:45 **CS1-025**	Title: Agricultural Pest Detection based on Improved Yolov5 Author(s): LOU LIJUN, ZHOU XIN, YANG ZHEN, LIU JUNYA, YIN ZHIJIAN Presenter: LIJUN LOU Affiliation: Jiangxi Science and Technology Normal University, NanChang Agricultural pest detection is an important research direction in image detection. Due to the high similarity between many pests and the extremely similar color of pests and background, agricultural pest detection has always been a difficulty. In the early work, many methods were made to improve the detection accuracy by fusing gray space, YUV and HSV. In recent years, with the development of neural networks, the Yolo series began to show better performance in agricultural pest detection. In order to further improve the performance of Yolo series, the method of combining EIOU with Yolov5 is applied in this paper, and the accuracy on IP102 is improved.
14:45-15:00 **CS1-031**	Title: Detection of CT Pulmonary Nodule Based on Improved Yolo Using Attention Mechanism Author(s): Haoyu Qi, Jian Jia, Rui Zhang Presenter: Haoyu Qi Affiliation: Northwest University, China Lung cancer is a leading malignant tumor in morbidity and mortality. Early diagnosis of lung cancer can effectively improve the prognosis. Pulmonary nodules are an essential feature of early symptoms of lung cancer. Therefore, the detection of pulmonary nodules is of great practical significance. On the basis of previous work, this paper proposes an improved Yolo network, which combines two attention mechanisms including CBAM (Convolutional Block Attention Module)and Multi-Head Self-Attention with yolov3 network to detect lung nodules in chest CT images. Experiments show that these attention mechanisms optimize the detection effect and make the performance of our method significantly better than the previous work.
15:00-15:15 **CS1-040**	Title: PUPose:Real-Time Pose Estimation for Push-up on Device Author(s): Guangqi Wang, Haixia Pan, Hongqiang Wang, Haotian Geng, Jiahua Lan, Linfeng Han Presenter: Guangqi Wang Affiliation: beihang university,China There is typically a need for physical training and assessment of the physical exercise poses of students in schools or members of fitness centers. However, few studies have been conducted on physical exercise poses, and no relevant dataset is available. We introduce a new dataset built for the particular physical fitness action of pushups called the push-up dataset. We propose a new real-time and device-friendly pose estimation model named PUPose. The tradeoff between accuracy and efficiency in human pose estimation has been challenging. In this paper, some recent studies have extended object detectors to unify person detection and pose estimation. Our PUPose combines top-down and bottom-up approaches to get bounding boxes for multiple individuals and their corresponding poses. We investigate the applicability of methods for

	extending object detectors to estimate human pose to lightweight pose estimation models. We strengthen the backbone structure and design an efficient neck structure, improving the feature extraction capability of the network. We optimize the loss function so that training becomes more stable and efficient. With the above optimizations, our model achieves a better trade-off between accuracy and efficiency on the push-up dataset. With only 4.02 M parameters, PUPose achieves 94.2% mAP.
15:15-15:30 CS1-080	Title: VAE-based anomaly detection for embedded computer electronic components Author(s): Shuda Gao, Zhong Ma, Zhanzhuang He, Yuanhong Mao Presenter: Shuda Gao Affiliation: Xi'an Microelectronic Technology Institute, China The current maintenance of aerospace equipment generally uses regular maintenance, scheduled maintenance, seasonal maintenance, after-the-fact maintenance, and replacement maintenance. These methods are ill-timed, time-consuming, and wasteful of materials. Monitoring the reliability and healthy operating status of each embedded computer electronic component is essential, and maintenance staff will benefit greatly from a data-driven approach to anomaly detection. It can be altered from "repair afterward" to "repair as necessary" and from " repair regularly" to "repair at any time" to solve the practical problems arising from maintenance. The Variational Autoencoder (VAE), which is based on the component storage aging acceleration data, is used in this paper to model the component's normal operating status and perform anomaly detection. The precision and recall of this anomaly detection method are 0.950 and 0.977. This method evaluates the operating status and reliability of each component, improves the reliability and service life of the computer, and establishes the technological framework for the next generation of computer Prognostics and Health Management (PHM) systems.
15:30-15:45 CS1-085	Title: Drone-YOLOX: Improved YOLOX for SmallObject Detection in UAV Author(s): Presenter: Hamza Faraji Affiliation: Dalian University of Technology,China In recent years, object detection in the context of UAV images has seen tremendous progress. However, small object detection still presents a great challenge. The poor performance of detectors on small objects can be attributed to multiple reasons, on one hand deep network's abilities are inherently limited due to having multiple layers of abstractions, on the other hand, most training datasets suffer from class and size imbalance which hinders the model's ability to generalize over a wide range of scales. To overcome these limitations, and improve the accuracy of detection for small objects, we introduce an improved feature pyramid structure based on attentive feature fusion factor, a lightweight joint attention to guide multi-scale feature fusion across multiple FPN layers to avoid small object information loss. We also propose a novel copy-paste data augmentation scheme to mitigate the size imbalance issue across datasets allowing better small objects contribution to the overall training loss. We evaluate our model on both MS COCO and VisDrone datasets, experiments result on MS COCO show an improvement of 1.4% and 2.7% on mAPsmall and AP respectively compared to baseline. On VisDrone we achieve competitive results compared to SOTA detectors.
15:45-16:00	Title: Grapevine (Vitis spp.) leafroll disease high-throughput phenotyping using UAV-based

CS1-021-A	imagery with improved YOLOv7
	Author(s): Yixue Liu, Zhuowei Wang, Yuyang Song, Baofeng Su
	Presenter: Yixue Liu
	Affiliation: Northwest A&F University,China
	Grapevine leafroll disease (GLD) is by far the most widespread and economically damaging viral disease of grapevines worldwide. However, the insufficient efficiency of GLD detection the information lag of GLD field phenotyping affects implementation of management decisions. The emergence of affordable UAV platforms provides opportunities for deploying deep learning algorithms in GLD high-throughput phenotyping. GLD high-throughput phenotyping, however, is challenging due to the limitation of algorithm operation device and the planting range of the vineyards. Therefore, we proposed a high-throughput and lightweight GLD phenotyping method. We create a new dataset for GLD phenotyping in UAV-based imagery. The dataset provides 3878 grapevines with 1128 grapevines infected by GLD. In this work, we evaluate existing lightweight one-stage objective detection methods and offer a benchmark for this task based on the dataset. We propose a new attention module, Chanel Attention with Transformers (CAT), for accuracy infected grapevine detection. We conducted a series of ablation experiments based on YOLOv7 and redesigned YOLOv7-CAT object detector to make it more precise. The effectiveness of YOLOv7-CAT to attribute to three modules including the ASPP, the simAM, and the CAT. YOLOv7-CAT object detector outperforms both YOLOv7-tiny by 3.1% and YOLOv6-tiny by 6.5% in accuracy. Comparing to several one-stage object detectors such as YOLOv5s, YOLO-RepLKNet, YOLO-ConvNeXT, YOLOX, PPYOLOE and YOLO-FaceV2, YOLOv7-CAT obtained the best detection results quantitatively and qualitatively. Comparing to convolutional-based detector Faster-RCNN and transformer-based detector SwinT, YOLOv7-CAT performs better in speed and accuracy. Furthermore, we generated the distribution map of infected grapevines in the vineyard using YOLOv7-CAT detection results to realize GLD high-throughput phenotyping, providing key information for the implementation of accurate decision in the vineyard.

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Session 4 | 平行分会 4

Image analysis and method | 图像分析与方法

Chaired by: Assoc. Prof. Kun Liu, Hebei University of Technology, China

分会主席：刘坤副教授，河北工业大学

Time 时间	14:00-16:00 (GMT+8) Dec. 11 Sunday	12 月 11 日 星期日	Room ID	Room B: 405-8891-0458

14:00-14:15 CS1-002	Title: Thangka Image Inpainting Algorithm Based on Edge Constraint Author(s): Jiale Ren, Wei Shi, Yiyuan Han, Rui Wu, Bokai Zhang, Tangzhi Wang Presenter: Rui Wu Affiliation: Ningxia University,China Thangka images have the characteristics of rich content, complex textures and bright colors. The existing deep learning inpainting algorithms have some problems in inpainting incomplete Thangka images, such as blurred boundary, distorted structure and unclear texture. To solve the above problems, this paper proposes a two-stage Thangka image inpainting model based on edge constraint, which consists of edge prediction model and texture generation model. First, the edge of incomplete Thangka is reconstructed by the generative adversarial network based on U-Net structure. In order to increase the ability of feature extraction, a hierarchical residual structure is constructed in U-NET. Second, with the constraint of filling edge, a texture generation model combining gated convolution and multi-scale attention is used to reconstruct Thangka texture. Here, multi-scale attention can effectively capture multiscale features to generate images consistent with the texture details of the ground truth images. Experiments demonstrate that the proposed model can achieve better results, and its subjective and objective evaluation indicators are superior than the current image inpainting algorithms.
14:15-14:30 CS1-014	Title: A Low-light Image Enhancement Method Balancing Brightness Boosting and Noise Smoothing Author(s): Zekun Cui, Weikang Wang, Ziwei Xu, Chao Wang Presenter: Zekun Cui Affiliation: Nankai University, China Images captured in low-light or uneven lighting environments need to use low-light image enhancement techniques to boost brightness and contrast for high-quality improved results. Some existing low-light image enhancement methods over-enhance the image and ignore the noise processing. While other methods do smooth the noise, the brightness and contrast of the result image are not significantly improved. Based on JED, we improve and introduce a low-light image enhancement method balancing brightness boosting and noise smoothing.We simplify and improve the optimization functions for estimating illumination and reflectance map. After that, a Gamma matrix is proposed for illumination correction, and we conduct multi-scale detail

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	enhancement on the reflectance map. Finally, we get the enhanced result image by the Retinex model. Our method can boost the brightness and contrast of the image while effectively smoothing the noise and preserving the details; that is, a balance is achieved between brightness improvement and noise smoothing. The final comparative experiment results show that the proposed method has better performance on qualitative and quantitative evaluations than some classic low-light image enhancement algorithms.
14:30-14:45 CS1-015	Title: DiffGAR: Model-Agnostic Restoration from Generative Artifacts Using Image-to-Image Diffusion Models Author(s): Yueqin Yin, Lianghua Huang, Yu Liu, Kaiqi Huang Presenter: Yueqin Yin Affiliation: Chinese Academy of Sciences, China Recent generative models show impressive results in photo-realistic image generation. However, artifacts often inevitably appear in the generated results, leading to downgraded user experience and reduced performance in downstream tasks. This work aims to develop a plugin post-processing module for diverse generative models, which can faithfully restore images from diverse generative artifacts. This is challenging because: (1) Unlike traditional degradation patterns, generative artifacts are non-linear and the transformation function is highly complex. (2) There are no readily available artifact-image pairs. (3) Different from model-specific anti-artifact methods, a model-agnostic framework views the generator as a black-box machine and has no access to the architecture details. In this work, we first design a group of mechanisms to simulate generative artifacts of popular generators (i.e., GANs, autoregressive models, and diffusion models), given real images. Second, we implement the model-agnostic anti-artifact framework as an image-to-image diffusion model, due to its advantage in generation quality and capacity. Finally, we design a conditioning scheme for the diffusion model to enable both blind and non-blind image restoration. A guidance parameter is also introduced to allow for a trade-off between restoration accuracy and image quality. Extensive experiments show that our method significantly outperforms previous approaches on the proposed datasets and real-world artifact images.
14:45-15:00 CS1-034	Title: Adder Wavelet for Better Image Classification under Adder Neural Network Author(s): Guangping Li, Dingkai Liang Presenter: Guangping Li Affiliation: Guangdong University of Technology, China Adder neural network (AdderNet) is a new kind of deep learning model in which the original massive multiplications in convolutions are replaced by additions. The overall energy consumption using adder network is reduced significantly. However, there is a classification accuracy drop when using AdderNet in image classification task. In this paper, we present an adder wavelet transform (AWT) layer instead of the existing down-sampling operations. Based on the AWT layer, we propose a novel adder neural network (AddWaveNet) to improve classification accuracy. Experimental results on CIFAR-10 and CIFAR-100 datasets show that our proposed AddWaveNets achieves significant improvements in classification accuracy and powerful ability of feature learning compared to state-of-the-art quantization networks. Specifically, based on ResNet-32 backbones, AddWaveNet achieves 0.24% accuracy

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	improvement on the CIFAR-10 benchmark and 0.52% accuracy improvement on the CIFAR-100 benchmark.
15:00-15:15 **CS1-044**	Title: SepFormer: Selective Patch Transformer for Image Classification Author(s): YANG ZHANG, ZHAOGONG ZHANG Presenter: zhangzhaogong Affiliation: heilongjiang university, china Although vision transformers have achieved great success in computer vision, the lack of ability to extract multi-scale features hinders their applications to downstream tasks such as image classification. Using the embedding of equal scales as input to the model is the main reason. Such a constraint inevitably limits the ability of each self-attention layer in capturing multi-scale features, thereby leading to performance degradation in handling images with multiple objects of different scales. In this paper, we propose a general vision backbone that can effectively extract and selectively fuse multiscale features, named Selective Patch Transformer(SepFormer). It is composed of Patch Pyramid Module and Selective Scale Module. Patch Pyramid Module takes patches from different scales as input, allowing multi-head self attention to model attention on different scales. Then, the feature is selectively fused by assigning different weights to the multi-scale branches in Selective Scale Module. This noval strategy goes beyond the model that using a single scale embedding and enables attention to learn the relationship between objects of different scales. It obtains more powerful feature expression ability with a small to moderate increase in FLOPs and model parameters. Extensive experiments the superiority of SepFormer. On the ImageNet-1k dataset, SepFormer-Base achieves top-1 accuracy of 83.8%, which is 0.5% and 2% more accurate than Swin transformer-Base and DeiT-Base for a similar parameters and computational costs.
15:15-15:30 **CS1-1001**	Title: A Single Image Deraining Network Based on Global Feature Perception Author(s): Bo Fu, Hongguang Wang Presenter: Bo Fu Affiliation: Chinese Academy of Sciences, China Rainy weather can degrade the quality of image captured outdoors, which in turn reduces the effectiveness of the subsequent computer vision algorithm. Therefore, as a way to improve the performance of subsequent visual tasks, single image deraining has become an important research topic. In this paper, a single image deraining method based on global feature perception is proposed, which can effectively locate the rain streak and estimate corresponding background content via Swin Transformer mechanism. Different from convolutional neural network and traditional Transformer, the proposed network can extract the global features of an image while reducing the amount of computation. Combing advantages of Swin Transformer and convolutional network, a three-stage deraining network is proposed. First, the coarse features of an image are extracted through the convolutional layer. Then, using the feature refining module based on Swin Transformer, global features are extracted and fused. Finally, through the image reconstruction module, the clean image is generated by using residual learning. The experimental results show the superiority of the proposed network.
15:30-15:45 **CS1-068**	Title: An Image Segmentation and Transfer Learning based Prediagnosis of Melanoma beyond pathological

	Author(s): Menghan Bai, Chen Li, Qianqian Kong, Xinghao Wen Presenter: Menghan Bai Affiliation: North China University of Technology, China Globally, for every three cancer patients, one is diagnosed as skin cancer. During which, melanoma is regarded as the most lethal one. Accurate and timely diagnosis of melanoma is crucial for effective treatment and life quality improvement of patients. Pathological diagnosis has always been regarded as the gold standard of diagnosis Clinically. However extra risks come with biopsy or operation for Pathological diagnosis should also be concerned. Hence, deep-learning based image classification becomes an alternative and effective way for melanoma diagnosis beyond Pathological. However, due to melanoma images have the characteristics of uneven color, fuzzy boundary, and low contrast. Besides, compared to datasets for other visual classification tasks, the number of data samples in melanoma diagnosis is relatively low. To combat these challenges, in this paper, we propose a two-step melanoma classification framework. Firstly, we propose to abstract the lesion area through image segmentation with XBound-Former. Secondly, a transfer learning-based network architecture is proposed to conduct melanoma classification on the obtained lesion area. We introduce EfficientNet B0 as the backbone network and change its activation function to the Mish activation function for improving accuracy. Finally, through extensive experiments on ISIC2018 and ISIC2020 Dataset, our proposed method achieves a promising result compared with other state-of-art algorithms, which have validated the effectiveness of our proposed method.
15:45-16:00 **CS1-011**	Title: Classification of Alzheimers disease by combining dynamic and static brain network features Author(s): Yu Feng, Jian Jia, Rui Zhang Presenter: Yu Feng Affiliation: Northwest University, China Alzheimers disease (AD) is an irreversible chronic neurodegenerative disease whose pathogenesis has not been fully elucidated so far. More and more studies are using functional magnetic resonance imaging (fMRI) to construct functional connectivity brain networks to explore brain changes in AD patients. However, most of the previous methods are limited to only constructing static or dynamic brain networks for analysis. The present study proposes a new method to identify AD patients by combining dynamic and static brain network features. Entropy features and graph theory features were extracted from dynamic brain network and static brain network, respectively, and the stepwise-accurate method was used to select features. Then the features of the two types of networks were fused and combined with machine learning for classification analysis. Under the action of linear SVM classifier, the accuracy, sensitivity, and specificity were 93.62%, 91.30%, and 95.83%, respectively. Results show that the proposed framework can distinguish AD patients from normal cognitive controls better than using static or dynamic brain networks alone, and provide a new idea for exploring the neuropathogenesis of AD.

Session 5｜平行分会 5

Intelligent image processing and application｜智能图像处理及应用
Chaired by: Assoc. Prof. HaiCheng Qu, Liaoning Technical University, China
分会主席：曲海成副教授，辽宁工程技术大学

Time 时间	16:30-18:45 (GMT+8) Dec. 11 Sunday｜12 月 11 日 星期日	Room ID	Room A: 890-9373-7630
16:30-16:45 CS1-071	Title: Discriminative information learning with Feature Erasing for Video-Based Person Re-Identification Author(s): Xiaoxuan Fan, Chen Li, Hongyu Zhu, Wei Song Presenter: Xiaoxuan Fan Affiliation: North China University of Technology, China Person re-identification can be a promising non-intrusive way for individual identification in real scenario application, due to the widespread surveillance camera. It has awoke increasing research interests. Comparing with image-based method, video-based person re-identification (ReID) has shown many advantages, due to its abundant movement and temporal information. However, in the real scenario, due to long capture distance, low resolution of the video, similar clothing, etc., different individuals can appear quite similar. This leads to very small inter-class distance as well as false matching, which is now the most challenging issue in person re-identification. To combat with this, a dual-branch network, containing a feature erasing branch and a global branch, is proposed in this paper. Since global feature extraction branch usually pay attention to the obvious but similar regions among different pedestrians, which will ignore the subtle but critical discriminative information among different pedestrian, especial for those with similar appearance, and therefore decline the performance of the re-id network. The feature erasing branch is proposed as a promising complement. It can drive the network to learn more comprehensive and subtle information through-randomly erasing features in different regions of the frame sequences. While the global branch are introduced to acquire global feature as well as supervise the training of the erasing branch. We perform comparative experiments on three representative datasets, MARS, DukeMTMC-VideoReID, and iLIDS-VID datasets, and the experiment results show that our method has good performance.		
16:45-17:00 CS1-020	Title: Attention-based Multi-scale ViT Fine-grained Visual Classification Author(s): Rujia Li, Junya Liu, Zhen Yang, Xin Zhou, Zhijian Yin Presenter: Rujia Li, Junya Liu, Zhen Yang, Xin Zhou, Zhijian Yin Affiliation: Jiangxi Science and Technology Normal University, China Fine-grained visual classification (FGVC) is a challenging task in image classification due to the small differences between classes and the large differences within subclasses. In the early works, some methods mainly rely on constructing bounding box annotations and integrating attention		

	mechanisms based on CNN methods for fine-grained visual classification. In recent years, the Vision Transformer (ViT) has begun to show better performance in image classification, object detection, and object tracking. To further investigate the performance of ViT in FGVC, this paper proposes to combine the CNN method with ViT and introduce a dual-path hierarchy into the pyramid structure - top-down feature path and bottom-up channel-spatial attention path; DropBlock is used to accurately localize discriminative regions; SENet and global covariance pooling (GCP) measures are used to further enhance the ability of the network model to extract feature maps information. The Attention-based Multi-scale ViT Fine-grained Visual Classification (AMViT-CNN) proposed in this work has achieved good classification results on public fine-grained datasets (CUB-200-2011, Stanford-Cars).
17:00-17:15 CS1-007	Title: VMD-CNN：Dual Feature Extraction for Detection of Turn-to-Turn Short Circuit Faults in Permanent Magnet Synchronous Motors.docx Author(s): SHUAIWEI HUAN, JINHUA LI, YUJIE ZHANG, QI WANG Presenter: shuaiwei huan Affiliation: Qingdao university,china A fault detection method based on VMD-CNN dual feature extraction is proposed to address the problems of inaccurate feature extraction information and inappropriate signal analysis methods in permanent magnet synchronous motor turn-to-turn short circuit. The current signal and torque signal extracted by Simulink are added with noise to simulate the data information in real environment. VMD decomposes the signal and determines the number of decomposition layers according to running time, MSE and Pearson correlation coefficient. The poles and peaks of the noisy signals and decomposition coefficients are calculated and rearranged into data feature sets. A three-layer CNN network model is built for feature re-extraction of the data feature set, and this network model is used as the basis for fault diagnosis. The experimental results show that the detection accuracy of this method for noise-containing fault signals is 99.4%, which is higher than that of traditional methods.
17:15-17:30 CS1-043	Title: BAGNet: Branch Attention Guided Decoder for Semantic Segmentation Author(s): Zhengtan Wang, Yuan Zheng Presenter: Zhengtan Wang Affiliation: Inner Mongolia University, China The effectiveness of encoder-decoder structures for semantic segmentation has been demonstrated. Given the importance of decoders, we propose a branch attention guided decoder for semantic segmentation, called BAGNet. The proposed decoder exploits the multi-scale feature maps generated by the backbone and adaptively selects the important feature information. Attention mechanism and multipath representation are important for semantic segmentation. The existing methods mostly introduce the attention mechanisms into the encoder, while we observe that decoder also need the attention module to select important information when using lateral connections. To solve this problem, we present a Branch Attention Unit(BAU), which applies the channel-wise attention on different branches to reduce the semantic gap and leverage their success in capturing cross-feature interactions and learning diverse representations to select important information in branches. To validate the performance of the proposed BAU and BAGNet, we conduct extensive experiments and achieve consistently improved performances on

	popular segmentation benchmarks, namely 80.33%, 42.30% and 44.66% mIoUs on Cityscapes, ADE20K and Pascal Context validation sets with ResNet-50 backbone, respectively. Furthermore, we verify their generalization ability using different baseline models.
17:30-17:45 **CS1-073**	Title: Optimization Method of 3D Point Cloud Generation for Underwater Target Author(s): HAO QIN, RENYOU YANG, KAIJIAN ZHENG, LIANG YANG, RIFU LI Presenter: Hao Qin Affiliation: Southern Marine Science and Engineering Guangdong Laboratory (Zhanjiang), China Due to the influence of machine movement, environmental interference and other factors in ROV remote control operation, it is difficult to identify the image features collected underwater, feature points are difficult to extract, and the quality of 3D reconstruction of underwater target 3D model is low. Therefore, an optimization method of underwater target 3D point cloud generation is proposed. The experimental results of underwater data set based on this method show that the detection amount of underwater target image feature points is nearly doubled, the error rate of feature matching is low, the high-quality point cloud data is doubled, and the effect of 3D model reconstruction is remarkable.
17:45-18:00 **CS1-1006**	Title: Cross-Modal Relation and Sketch Prototype Learning for Zero-Shot Sketch-Based Image Retrieval Author(s): Yuanping Song, Yanwei Yu, Hao Tang, Junyuan Guo, Yibo Wang Presenter: Yuanping Song Affiliation: University Of Science And Technology Of China, China Zero-Shot Sketch-Based Image Retrieval (ZS-SBIR) is a innovative cross-modal task that utilizes a sketch to retrieve corresponding images in a zero-shot learning scenario. Most existing algorithms treat ZS-SBIR as a traditional classification problem, using image-level features with cross-entropy or triplet loss to achieve retrieval, but ignore the correspondence between sketches and images on local features. To this end, we propose a novel Local Feature Contrastive Network (LFCN) for ZS-SBIR from the perspective of contrastive learning. More specifically, a local feature contrastive method is proposed to establish the cross-modal relations between images and sketches with creatively applying transformers to extract similarity representation from sketch-image pairs to narrow the domain gap. Furthermore, a feature prototype memory bank is designed to learn sketch prototypes to address the intra-class diversity problem in sketch domain. Extensive experiments show that our method notably outperforms the state-of-the-art algorithms in both TU-Berlin and Sketchy datasets.
18:00-18:15 **CS1-030**	Title: Monocular depth estimation using synthetic data with domain-separated feature alignment Author(s): Guan Wang, YunDong Li Presenter: Guan Wang Affiliation: North China University of Technology, China Depth estimation is a research hotspot in today's computer vision tasks, and its depth information is of great significance for many applications such as autonomous driving, 3D reconstruction, and object tracking. Although supervised depth estimation based on deep learning has high prediction accuracy, it is difficult to obtain a large amount of labeled data. Therefore, self-supervised monocular depth estimation methods that do not require labeled data have become the

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	mainstream of research. Self-supervised learning utilizes the constraints of objects on spatial geometry, reducing the need for labeled data, but the problems of dynamic objects, shooting angles, and visibility weaken the effect of self-supervision. Using the accurate depth information of synthetic datasets to assist the self-supervised training of real datasets can improve the accuracy of self-supervised depth estimation, but most methods do not consider the distribution difference between synthetic data and real data, which affects the estimation effect. Aiming at this problem, this paper proposes a domain-separated Monocular Depth Estimation (DsMDE) algorithm based on domain separation network, which uses orthogonal loss to separate the public and private features of each domain, and then uses the maximum mean difference to The common features are aligned to reduce the difference between the synthetic domain and the real domain. The experimental results show that the DsMDE method proposed in this paper improves the depth estimation effect, and the depth estimation accuracy is better than that of the mainstream algorithms.
18:15-18:30 CS1-086-A	Title: Evaluation and identification of properties in a set of information through non-monotonic and qualitative reasoning Author(s): José Luis Vilchis Medina Presenter: José-Luis Vilchis Medina Affiliation: Ecole Navale,France In this research topic, we are fundamentally interested to study a new methodology in order to evaluate and identify properties in a set of information (knowledge), from a logical point of view. Firstly, for the evaluation of properties over a knowledge K, we assume a declarative form (formally a logic program) that models K. Next, we prove for each predicate a mode of attraction or repulsion. Intuitively, this is inspired by physics involving two particles that are charged either positively or negatively. In other words, attraction or repulsion predicates could provide core information properties of a given knowledge. In particular, when a predicate has positive consequences, and these are related to other positive predicates, i.e., there is no negation, an attraction mode could be referred to in this case. Otherwise, for a negative consequence (with negation), it would be a repulsion mode. Once attraction or repulsion modes/properties are known, a categorization of all predicates is performed. This would be done on the basis of identical, similar, or different predicates, thanks to the comparison between the body and head of predicates. After sorting this information according to the attraction/repulsion mode, the resilience part can be studied. Thus, the goal of this research is to quantify the impact of different properties over a knowledge K in order to have an analysis, prevention, and/or prediction of behaviors.
18:30-18:45 CS1-089	Title: Ship Fusion Recognition Based on AIS Data and Remote Sensing Image Author(s): Fan Guang Lei Presenter: Fan Guanglei Affiliation: National University of Defense Technology, China Data fusion is the process of integration multiple information sources to obtain more consistent, accurate location and identity estimates than that provided by any individual information source. In the context of multi-source data fusion, it is an important research direction to use the rich ship dynamic and static information in AIS data to assist remote sensing images to classify and

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identify ships. The ship information obtained by different sensors differs in content and form, this paper proposes the feature-level fusion recognition method of AIS data and remote sensing images n-time table lookup method, and experiments show that the n-time table lookup method is an efficient and accurate fusion recognition method.

Session 6 | 平行分会 6

**Communication and signal processing	通信与信号处理**	
Chaired by: TBA	
分会主席：TBA	

Time 时间	16:30-18:45 (GMT+8) Dec. 11 Sunday	12 月 11 日 星期日	Room ID	Room B: 405-8891-0458

16:30-16:45 CS1-001	Title: Decision-based adversarial attack for speaker recognition models Author(s): Xueyang Cao, Shanshan Wang, Zhenxiang Chen, Xiaoqing Jiang, Weiliang Zheng, Yadi Han Presenter: Shanshan Wang Affiliation: University of Jinan, China As a biometric technology, speaker recognition is widely used in finance, criminal investigation, and other fields due to its convenience and high accuracy. Speaker recognition models are vulnerable to spoofing attacks and adversarial attacks. Thus, the security of speaker recognition models has received much attention. However, few works focus on the decision-based adversarial attacks for speaker recognition systems (SRS), in which the adversary can only access the final decisions of the black-box models. In this paper, we proposed Biased-Aha, a decision-based attack method that combined query history information and prior gradient from the substitution model to launch an efficient attack. Specifically, to generate the adversarial example, the perturbation is determined by following the sampling direction for successful queries and avoiding the sampling direction for failed queries, combined with the gradient direction from the substitution model. The experiment results show that Biased-Aha takes a high attack success rate and high efficiency. For the speaker recognition models, Gaussian Mixture Models (GMM) and ivector, Biased-Aha outperforms the state-of-the-art decision-based adversarial attacks.
16:45-17:00 CS1-012	Title: High Quality and Similarity One-Shot Voice Conversion Using End-to-End Model Author(s): Renmingyue Du, Jixun Yao Presenter: Renmingyue Du Affiliation: Xi'an Jiaotong-liverpool University, China Voice Conversion (VC) is becoming increasingly popular in speech synthesis applications. Most methods focus on many-to-many VC which can not be used for unseen speakers. One-shot (any-to-any) VC allows the source and the target speakers can be both unseen in the inference phase. This relies on an additional model to disengage linguistic information and speaker information. Most previous works were based on two-stage VC, which can lead to mismatches between the acoustic model and the vocoder, and the generated speech has poor quality or similarity. In this work, we proposed a novel method trained end-to-end for one-shot voice conversion. Unlike other one-shot methods, we use a combination of multiple ASV models to

	obtain more accurate and robust speaker embedding that can achieve high quality and similarity conversion. Experiment results demonstrate that our proposed method outperforms all considered baselines in different gender setups.
17:00-17:15 **CS1-028**	Title: Research on classification of motor imagery EEG signals based on TQWT-CSP Author(s): Han Wu, Jian Jia, Rui Zhang Presenter: Han Wu Affiliation: Northwest University, China In this paper, a novel feature extraction method called TQWT-CSP based on sliding time window is proposed, which can extract the spatial features of multiple time-frequency blocks, so as to select different optimal feature sets for different individuals before motor imagery classification is completed. Firstly, the linear discriminant criterion is used to select channels of the signal after preprocessing; Secondly, the signal is decomposed and reconstructed into multiple subbands by using TQWT, and each subband is divided into 11 time periods which are overlap by using the sliding time window, so as to get several time-frequency blocks; Next, the CSP algorithm is used to obtain the feature set; Finally, the random forest feature selection algorithm is used to select the optimal feature subset and support vector machine is used for classification. In the experiment, 10 subjects in the of GigaDB Motor Dataset are used to verify the performance of the proposed method. The average accuracy，kappa coefficient, sensitivity and specificity using 5-fold cross validation were 82.14%、64.11%、80.60% and 83.71% respectively. The results of experiment show that the proposed method improve the classification performance and is at a high level among the numerical measurement indicators given in the state-of- the-art research literature.
17:15-17:30 **CS2-002**	Title: AquaMZ: New Lightweight Authenticated Encryption with Generalized Feistel Network Based Primitive for IoT Protocols Author(s): Chenqingshui Huang Presenter: Chenqingshui Huang Affiliation: Beijing City University,China This paper displays AquaMZ, an authenticated encryption with associated data (AEAD) algorithm for IoT protocols. It mainly focusing on the new cross field of IoT and symmetric cryptography and we optimized the algorithm by the lightweight idea. Unlike other AEAD schemes using conventional generalized Feistel network, AquaMZ improved its underlying primitive with the diffusion switching mechanism (DSM) to upgrade its 336-bit internal state such that it can provide sufficient security range for IoT devices. The permutation of AquaMZ has a unique symmetrical structure, hence, the encryption and decryption of AquaMZ are completely consistent and only require a low cost. Furthermore, AquaMZ has a low footprint on hardware and can be implement easily on RFID, FGPA or other resource-constrained platforms. AquaMZ is a duplex-structure-based algorithm and is efficiency for software, suitable for real-time and online communications. All family numbers of AquaMZ can not only encrypt plaintext and protect data integrity, but also provide high robustness to resist vulnerable implementation, and has satisfactory flexibility. We listed the features of the AquaMZ family and substantiate its security.
17:30-17:45	Title: Coded Distributed Computing Schemes with Fewer Output Functions

CS1-058	Author(s): jing jiang, shengpeng ji Presenter: shengpeng ji Affiliation: Guangxi Normal University, China Li et al. proposed coded distributed computing (CDC) to reduce the communication load between servers by increasing the computational load of each server. They have shown that this scheme achieves the fundamental trade-off between computational and communication load. However, with the increase of the number of servers in this scheme, the output function and input file also increase exponentially. In this paper, we propose a new scheme to solve this problem. We show that when the number of servers increases, 1) the number of output functions of the proposed scheme is much smaller than that of Li et al., and the number of output functions required decreases exponentially; 2) the ratio of the communication load of our new scheme to that of Li et al. is less than 1.9981.
17:45-18:00 **CS1-090**	Title: Link quality estimation method based on convolutional ladder network Author(s): Hui Lv, JieBin Fan, LinLan Liu Presenter: Hui Lv Affiliation: Nanchang Hangkong University Jiangxi, China Accurate and effective estimation of link quality can make nodes choose a more suitable node as the next hop when transmitting data and reduce the probability of packet retransmission to prolong the life of network. A link quality estimation method is proposed, which is based on convolutional ladder network. According to the asymmetry of the link, the uplink and downlink link quality indicators of links, signal-tonoise ratio, and received signal strength indicators, are used as the link quality parameters. The link quality is graded by the partitioning around medoids algorithm based on high density point optimization algorithm to improve the grading effect. The one-dimensional convolution is introduced to improve the ladder network to extract temporal features. Experimental results demonstrate that the proposed method can more accurately estimate link quality under different interferences.
18:00-18:15 **CS1-061**	Title: ABMLP:Attention-Based Multi-Layer Perceptron Prefetcher Author(s): Juan Fang, Xin Lv, Huayi Cai Presenter: Juan Fang Affiliation: Beijing University of Technology, China Cache prefetching is a traditional way to reduce memory access latency. Machine learning algorithms have shown the potential to accurately predict the future addresses of memory accesses. The existing approach is rule-based prefetchers. Rule-based prefetchers are effective at predicting common access patterns, but they are inefficient in complex cross-page access patterns. Therefore, we propose ABMLP prefetcher, which uses the attention method to learn the mapping relationship between network input and output, and assigns the corresponding weight. We used two prefetchers, MLP prefetcher and BO prefetcher, to cope with different access patterns. Overall, ABMLP prefetcher improved 19.85% overall coverage accuracy and 18.5% IPC improvement over baseline.
18:15-18:30 **CS1-1005**	Title: FOLADRC For ship-borne Photoelectric Tracking Platform Author(s): Zhihao Zhang, Runmin Hou, Yuanlong Hou, Difen Shi

	Presenter: Zhihao Zhang Affiliation: Nanjing University of Science and Technology,China The tracking accuracy and stability of the ship-borne photoelectric tracking platform are affected by the platform interference moments, sensor noise and sea conditions during the stable operation. In order to realize stable tracking with high precision under uncertain disturbance conditions, aiming at a series of disturbing problems in servo system of ship-borne photoelectric tracking equipment, considering the strong anti-disturbance performance of active disturbance rejection controller(ADRC) and the fast response of fractional order controller, a new fractional-order linear active disturbance rejection controller(FOLADRC) was designed. The simulation results show that compared with PID controller, FOLADRC has no overshoot and improves the response time about three seconds and anti-interference ability about seven times, and has a good control performance.
18:30-18:45 CS1-036	Author(s): Defu Liang, Xiaoguang Zhang, Yuheng Zhang, Qing Liu Presenter: Defu Liang Affiliation: Heilongjiang University, China At present, microservice architecture has become the mainstream architecture of software system implementation. In the system built by microservices, multiple microservices must frequently communicate on the network. Due to the high network communication delay, frequent communication between microservices will reduce the system's quality of service (QoS). The long connection can effectively reduce the delay of network communication. However, the traditional static long connection management mechanism can not effectively meet the requirements of frequently changing microservice communication links. This paper proposes an adaptive dynamic connection pool management method based on prediction to solve this problem. Based on the queuing model, this method can predict the number of communication connections in real time, thus effectively realizing the dynamic management of long connections in the connection pool under frequent link changes. The experimental results show that compared with the widely used working connection pool management method, this method effectively improves the communication performance between services.

Session 7 | 平行分会 7

	Computer model, computing and analysis	计算机模型、计算与分析

Chaired by: Prof. Jinhua Li, Qingdao University, China

分会主席：李劲华教授，青岛大学

Time 时间	16:30-18:45 (GMT+8) Dec. 11 Sunday	12 月 11 日 星期日	Room ID	Room C: 711-6571-4418
16:30-16:45 CS2-1001	Title: Family Financial Planning based on Probabilistic Planners Author(s): Dongning Rao and Zijing Yang Presenter: Zijing Yang Affiliation: Guangdong University of Technology, China Financial planning is a step-by-step guiding approach to meet financial goals in life, such as controlling income, expenses, and investments to manage money and estate, which is beneficial for both organizations and families. The functionality of family financial planning is reflected in its charges, which motivated automated family financial planning both from scholars and finance practitioners. However, previous papers and tools rely excessively on linear programming, are hard to explain and interpret, and are incompatible with probabilistic and paralleled natures of financial actions. In the meantime, a recently developed subarea of planning based on the Relational Dynamic Influence Diagram Language (RDDL) happened to model probabilistic and paralleled natures of actions. I.e., probabilistic planning, whose models are explainable and transparent but with few applications. Therefore, this paper proposed a simulation-based approach called the F2P3 (Family Financial Planning based on Probabilistic Planner), whose first action is collecting family information through interactions. Then, the F2P3 models the family financial planning as a probabilistic planning problem and translates it into an RDDL file. At last, it runs probabilistic planners with the RDDL file as a new paradigm of the planning application. Experiments showed that the F2P3 could model the probabilistic and paralleled natures of financial actions and be more comprehensive than existing academic methods and cost-effective than business approaches.		
16:45-17:00 CS1-013	Title: Emotion-Based Crowd Model Evaluation Method Based on Features Distribution Distance Author(s): Zhi Huang, Lei Li, Lei Wang Presenter: Zhi Huang Affiliation: University of Science and Technology of China,China In recent years, crowd simulation studies have increasingly focused on the role of emotion, but there are shortcomings in the evaluation of emotion-based models. Most studies use pedestrian features such as pedestrian trajectory differences or entropy values as the measure of emotion-based models, ignoring the randomness of pedestrian movements and the fact that crowd is essentially a complex system. In this paper, we propose a quantitative evaluation method for		

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	emotion-based models. First, we introduce a multi-feature distribution distance algorithm that considers dynamic time regularization to measure the similarity of the simulated crowd to the real-world crowd from the macro level. Then, the parameters of model are optimized by a multi-objective evolutionary algorithm. The experiments show that our proposed algorithm is more effective in the evaluation of emotion-based crowd models and gives guidance on parameters optimization.
17:00-17:15 CS1-019	Title: W-prize-collecting scheduling problem on a single machine Author(s): Ruiqing Sun, Bin Deng Presenter: Ruiqing Sun Affiliation: Yunnan University, China In this paper, we consider the W-prize-collecting scheduling problem on a single machine, where each job has a profit. The objective is to minimize the makespan of the accepted jobs plus the total penalty cost of the rejected jobs, conditional on their total profit no less than a given threshold. We first discuss the special case of this problem when some parameters are the same and analyze the computational complexities of them. Then, we present a 2-approximation algorithm. Furthermore, we provide two pseudo-polynomial time algorithms. Finally, a fully polynomial time approximation scheme (FPTAS) is given for the problem. Our numerical tests indicate that both dynamic programming algorithms can easily solve large-size problems.
17:15-17:30 CS1-041	Title: A Model for Measuring Performance of Organizational Websites Author(s): Hamidreza Amiri, Esmaeil Bagheri Presenter: TBA Affiliation: Islamic Azad University, Iran
17:30-17:45 CS1-024	Title: EarlyWork Maximization Problem on Two Machines Under a Grade of Service Provision Author(s): Presenter: Ran Ding Affiliation: Yunnan University, China We consider the early work maximization scheduling problem on two identical parallel machines under a grade of service (GoS) provision. In this problem, we are given a set of jobs, two machines and a common due date, where each job and machine are labeled with the GoS level. First, we prove that the modified longest processing time first algorithm is a 65 -approximation algorithm. Furthermore, we propose a dynamic programming with running time $O(nd)$ according to the properties of the optimal solution. Finally, we give a lower bound on the time complexity of the studied problem based on the strong exponential time hypothesis, indicating the optimality of the proposed dynamic programming algorithm.
17:45-18:00 CS1-046	Title: Improving Chinese Named Entity Recognition Based on Lexical Information Adjustment Author(s): Jinshang Luo, Mengshu Hou Presenter: Jinshang Luo Affiliation: University of Electronic Science and Technology of China, China Lexical enhancement has been proven effective for Chinese Named Entity Recognition (NER), allowing for the use of word boundary information and the reduction of segmentation errors.

	Most present methods incorporate the lexical information by lattices but neglect the impact of candidate lexicon conflicts. The conflicts may misguide the model to make different predictions. In the work, a novel Long Short-Term Memory (LSTM) model based on the lexical information adjustment strategy (LIA-LSTM) is proposed. Firstly, all potential words are categorized into corresponding word sets. To lessen the influence of lexicon conflicts, the lexical features are introduced for the character sequence via elaborate weight adjustment. Then the LSTM and self-attention mechanism are applied to improve contextual awareness. Experiments on benchmark datasets demonstrate that LIA-LSTM outperforms the state-of-the-art methods compared. LIA-LSTM improves F1 score by 1.4% over baseline Lattice-LSTM on the MSRA dataset.
18:00-18:15 **CS1-049**	Title: Selective Context Network With Neighbourhood Consensus for Aerial Image Registration Author(s): Jiayu Zhang, Shengjie Zhao, Bing Li Presenter: Jiayu Zhang Affiliation: TongJi University, China Image registration for aerial images is an essential task with several applications, including change detection, unmanned aerial vehicle (UAV) -specific localization, etc. Considering aerial images' high resolution, significant variations, and repetitive patterns, specific methods for aerial image registration are high on the agenda. In this paper, firstly, we propose a novel neural network structure named selective context network (SC-Net) which preserves context and neighborhood information to estimate the affine transformation between aerial image pairs. Secondly, we develop a selective fusion strategy based on an attention-based mechanism to fuse local and spatial features selectively, thus improving registration accuracy for images with repetitive patterns. Thirdly, we introduce a lightweight neighborhood consensus module for enforcing neighborhood consensus to enhance the accuracy of aerial image registration at a low time cost. The experimental results demonstrate that our approach achieves superior performance compared to conventional methods for aerial image registration on the google earth dataset, especially when dealing with scenarios with repetitive patterns. The accuracy is increased by 14 % under 0.1 PCK and 50.4% under 0.05 PCK compared to the efficient neighborhood consensus network (SNCNET).
18:15-18:30 **CS1-1007**	Author(s): Xiao Peng, Jixian Zhang Presenter: Xiao Peng Affiliation: Yunnan University, China Real-time resource allocation has become a hot topic in vehicular edge computing environment. However, vehicle equipment with limited computing capability cannot meet the Quality of service of computation intensive and delay sensitive vehicle applications. Moreover, in most studies, the deployment constraints in edge computing and users' resource demand are static, which is inconsistent with real scenarios. In this paper, an online auction mechanism with double time-varying constraints is proposed to solve the resource allocation problem in a vehicular edge computing environment. Specifically, we first formulate the resource allocation problem between edge computing servers (ECSs) and vehicles as a novel integer programming model with time-varying deployment constraint and time-varying resource demand. Then, we design an

	online auction mechanism based on heuristics. In the resource allocation algorithm, a matching model and dominant-resource-proportion strategy are adopted to improve the resource utilization and social welfare. Simultaneously, a payment pricing algorithm based on the dichotomy is proposed. Finally, we prove that the online mechanism is individually rational and truthful. The experimental results demonstrate that our online mechanism has higher social welfare and resource utilization than existing research.
18:30-18:45 CS1-066	Author(s): Hailun Liu, Bo Cheng Presenter: Hailun Liu Affiliation: Beijing University of Posts and Telecommunications, China Logistics order distribution is an important part of the sales process of finished steel products, and plays a vital role in the overall experience of the sales process and the virtuous cycle of the whole process. In the actual production process, the manual order distribution model maintained for a long time seems to have a richer accumulation of experience and knowledge, but in reality it has become difficult to adapt to the development requirements of a long time dimension. In order to fully consider the lowest logistics cost of sales in a time cycle as well as the higher revenue of the carrier driver, while ensuring the long-term revenue of the enterprise, this paper considers multi-objective constraints, establishes Markov decision model, introduces km algorithm to perform dichotomous graph matching, based on the multi-objective optimization for maximizing driver revenue and minimizing enterprise cost, with the long-term ultimate goal of maximizing total steel commodity transaction volume, and finally Combining the value function and the multi-objective optimization function of multiple attributes to form a complete matching decision of vehicles and goods. Using real business data of steel enterprises as an example, the data is pre-processed and then suitable features are screened for model training and the correctness and usability of the algorithm is verified. The results show that the model can better address the needs of steel companies in order allocation scenarios compared to traditional order allocation methods.