

ICAIBD

第五届 人工智能 与大数据

2022 The 5th International Conference
on Artificial Intelligence and Big Data

国际会议

May 27-30, 2022
2022年5月27-30日

中国·成都
Chengdu, China



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**2022 5th International Conference on
Artificial Intelligence and Big Data**
2022 年第五届人工智能与大数据国际会议

May 27-30, 2022 | Chengdu, China

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About ICAIBD

2022 5th International Conference on Artificial Intelligence and Big Data (ICAIBD 2022) is sponsored by IEEE and Sichuan Province Computer Federation. As an IEEE conference started in 2018, the conference has grown with the help and technically support from many local and international universities year by year. In 2020, ICAIBD was awarded the Most Influential Academic Activity of the 1st Sichuan and Chongqing Science and Technology Academic Conference, which was fully recognized by the industry. Subsequently, the "4th International Conference on Artificial Intelligence and Big Data (ICAIBD2022)" also won this honor at the 2nd Sichuan and Chongqing Science and Technology Academic Conference in 2021. ICAIBD focus on fostering international communication in the fields of Artificial Intelligence, and get the latest insights from every area of Artificial Intelligence and Big Data theory and practice. This conference has a rich schedule, which will include keynote speeches, invited speeches, and online oral presentations, providing a relaxing and multicultural conference atmosphere for experts and scholars.

第五届人工智能与大数据国际会议(ICAIBD 2022)由 IEEE 和四川省计算机协会主办。作为始于 2018 年的 IEEE 会议，ICAIBD 在许多四川本地和国际大学的帮助和技术支持下逐年发展壮大。在 2020 年，ICAIBD 荣获了首届川渝科技学术大会年度最具影响力学术活动奖，得到了行业内的充分认可，随后，“第四届人工智能与大数据国际会议（ICAIBD2022）”也在 2021 年第二届川渝科学技术大会上获此殊荣。ICAIBD 专注于人工智能领域的国际交流，获取人工智能和大数据理论与实践各个领域的最新见解。本次会议日程安排丰富，主题演讲、特邀演讲、在线口头演讲等，为专家学者提供了轻松、多元文化的会议氛围。

HONORARY CERTIFICATE 荣誉证书



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*All schedules will process in Beijing local time (GMT+8)

*日程时间安排均为北京时间

Day1- Friday, 27 May | 5月27日 (星期五)

9:30-16:15	Committee & Speakers' Test Session 委员会&演讲嘉宾会前测试	Zoom A: 824 2128 3210
14:00-18:00	Parallel Sessions Test 分会测试	Zoom B: 862 3655 9782 Zoom C: 873 4342 3113 Zoom D: 876 6131 8640

Day2- Saturday, 28 May | 5月28日 (星期六)

9:30-12:35	Opening and guests speeches 开幕式领导致辞&主旨报告	Zoom A: 824 2128 3210
14:00-16:30	Guests Speeches 专家报告	Zoom A: 824 2128 3210
17:00-19:00	Parallel Session1-2 分会报告 1-2	Zoom B: 862 3655 9782 Zoom C: 873 4342 3113

Day3- Sunday, 29 May | 5月29日 (星期日)

9:30-12:00	Invited Speeches 特邀专家报告	Zoom A: 824 2128 3210
14:00-16:15	Parallel Session3-6 分会报告 3-6	Zoom A: 824 2128 3210 Zoom B: 862 3655 9782 Zoom C: 873 4342 3113 Zoom D: 876 6131 8640
16:45-19:00	Parallel Session7-10 分会报告 7-10	Zoom A: 824 2128 3210 Zoom B: 862 3655 9782 Zoom C: 873 4342 3113 Zoom D: 876 6131 8640

Day4- Monday, 30 May | 5月30日 (星期一)

10:00-12:15	Parallel Session11-12 分会报告 11-12	Zoom A: 824 2128 3210 Zoom B: 862 3655 9782
14:00-16:30	Parallel Session13-14 分会报告 13-14	Zoom C: 873 4342 3113 Zoom D: 876 6131 8640
17:00-17:30	Closing Ceremony 闭幕式	Zoom A: 824 2128 3210

Dear distinguished delegates,

We are pleased to welcome you to 2022 The 5th International Conference on Artificial Intelligence and Big Data (ICAIBD 2022) and its workshop 2022 The 2nd International Workshop on Software Engineering and Applications (WSEA 2022) to be held online during May 27-30, 2022. Due to recent epidemic in China, the conferences were decided to be held online. We appreciate your generous support and kind understanding.

This conference provides opportunities for delegates to exchange new ideas and research findings. The evaluation of all the papers was performed based on the reports from anonymous reviewers qualified in their field.

We would like to express our sincere gratitude to everyone who has contributed to this conference as its success could have only been achieved through a team effort. A word of special welcome is given to our speakers who are pleased to contribute to our conference and share their new research ideas with us. They are

Prof. Hengtao Shen, IEEE Fellow, ACM Fellow, OSA Fellow, University of Electronic Science and Technology of China, China

Prof. Hui Xiong, Fellow of AAAS and IEEE, Rutgers, the State University of New Jersey, USA

Prof. Huiyu (Joe) Zhou, University of Leicester, UK

Prof. Simon X. Yang, University of Guelph, Canada

Prof. Fulian Yin, Communication University of China, China

Prof. Jun Sun, Jiangnan University, China

Prof. Su Chang, Chongqing University of Posts and Telecommunications, China

Prof. Jie Zhang, Southwest Jiaotong University, China

Assoc. Prof. Song Yang, Beijing Institute of Technology, China

Assoc. Prof. Yubo Yuan, East China University of Science and Technology, China

Assoc. Prof. Taohong Zhang, University of Science & Technology Beijing, China

Assoc. Prof. Zhirong Shen, Xiamen University, China

Assoc. Prof. Bo Wang, Dalian University of Technology, China

Assoc. Prof. Minghao Piao, Soochow University, China

Assoc Prof. Pengfei Chen, Sun Yat-Sen University, China

Assoc Prof. Meng Yang, Sun Yat-Sen University, China

Additionally, our special thanks also go to all committee members for their excellent work in reviewing the papers and their other academic support efforts.

With the strong support from the all of you, ICAIBD conference is more distinctive. We wish that all guests can gain benefits from this conference and improve their academic performance. Thank each of you for your efforts to make this conference successful.

We wish all of you will have an unforgettable and prefect experience in the conference.

Yours sincerely,

ICAIBD 2022 Conference Organizing Committee

»»» Honorary Chair 名誉主席

Dr. Zhang Jingzhong, Academician of Chinese Academy of Sciences, China
张景中 中国科学院院士、四川省计算机学会名誉理事长、中科院成都计算机应用研究名誉所长、研究员、博导

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Prof. Yang Yan, Southwest Jiaotong University, China
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Dan Tang, Chengdu University of Information Technology, China

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Chapter Chair

Jide Qian, Civil Aviation Flight University of China, China

钱基德 中国民用航空飞行学院



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Day 1- Friday, May 27 | 5月27日 (星期五)

Committee & Speakers' Test Session

委员会&嘉宾会前测试

Time	Presenter	Zoom Number
9:30-10:00	Committee Member (组委会领导测试)	Zoom A: 824 2128 3210
10:00-10:15	Prof. Hengtao Shen, 申恒涛教授 University of Electronic Science and Technology of China, China	
10:15-10:30 (US: 22:15-22:30)	Prof. Hui Xiong, 熊辉教授 Rutgers, the State University of New Jersey, USA	
15:45-16:00 (UK: 8:45-9:00)	Prof. Huiyu (Joe) Zhou, University of Leicester, UK	
10:30-10:45	Prof. Fulian Yin 殷复莲教授 Communication University of China, China	
10:45-11:00	Prof. Simon X. Yang, University of Guelph, Canada	
11:15-11:30	Prof. Su Chang, 苏畅教授 Chongqing University of Posts and Telecommunications, China	
11:30-11:45	Prof. Jie Zhang, 张洁教授 Southwest Jiaotong University, China	
11:45-12:00	Assoc. Prof. Song Yang, 杨松副教授 Beijing Institute of Technology, China	
Break Time		
14:00-14:15	Assoc. Prof. Yubo Yuan, 袁玉波副教授 East China University of Science and Technology, China	Zoom A: 824 2128 3210
14:15-14:30	Assoc. Prof. Taohong Zhang, 张桃红副教授 University of Science & Technology Beijing, China	
14:30-14:45	Assoc. Prof. Zhirong Shen, 沈志荣副教授 Xiamen University, China	
14:45-15:00	Assoc. Prof. Bo Wang, 王波副教授 Dalian University of Technology, China	
15:00-15:15	Assoc. Prof. Minghao Piao, 朴明浩副教授 Soochow University, China	
15:15-15:30	Assoc Prof. Pengfei Chen, 陈鹏飞副教授 Sun Yat-Sen University, China	
15:30-15:45	Assoc Prof. Meng Yang, 杨猛副教授 Sun Yat-Sen University, China	
16:00-16:15	Prof. Jun Sun, 孙俊教授 Jiangnan University, China	

Parallel Session Test

分会-会前测试

Time	Event	Paper ID	Zoom Number
14:00-14:30	Session 1	CB-154, CB-009, CB-013, CB-032 CB-078, CB-080, CB-100, CB-074	ZOOM B: 862 3655 9782
	Session 2	CB-091, CB-060, CB-072, CB-073 CB-076, CB-079, CB-081, CB-012	ZOOM C: 873 4342 3113
	Session 3	CB-1001, CB-042, CB-059, CB-084 CB-1021, CB-052, CB-057, CB-1010	ZOOM D: 876 6131 8640
15:00-15:30	Session 4	CB-019, CB-025, CB-039, CB-044, CB-046 CB-082, CB-083, CB-123, CB-129	ZOOM B: 862 3655 9782
	Session 5	CB-010, CB-030, CB-062, CB-102, CB-137 CB-151, CB-1007, CB-1011, CB-153	ZOOM C: 873 4342 3113
	Session 6	CB-058, CB-018, CB-050, CB-070, CB-089 CB-106, CB-145, CB-1017, CB-1022	ZOOM D: 876 6131 8640
16:00-16:30	Session 7	CB-001, CB-054, CB-138, CB-006, CB-055 CB-141, CB-043, CB-116, CB-144	ZOOM B: 862 3655 9782
	Session 8	CB-056, CB-087, CB-120, CB-143, CB-007 CB-108, CB-1003, CB-031, CB-005	ZOOM C: 873 4342 3113
	Session 9	CB2-001, CB-021, CB-028, CB-034 CB-017, CB-020, CB-093, CB-029	ZOOM D: 876 6131 8640
17:00-17:30	Session 10	CB-026, CB-121, CB-152, CB-065, CB-063 CB-117, CB-118, CB-061, CB-130	ZOOM B: 862 3655 9782
	Session 11	CB-004, CB-075, CB-077, CB-095, CB-1020 CB-104, CB-113, CB-1025, CB-133	ZOOM C: 873 4342 3113
	Session 12	CB-131, CB2-005, CB-1002, CB-1016, CB2-006 CB-1024, CB-150, CB-016, CB-1023	ZOOM D: 876 6131 8640
17:30-18:00	Session 13	CB-035, CB-047, CB-066, CB-071 CB-111, CB-115, CB-1005, CB-1014	ZOOM C: 873 4342 3113
	Session 14	CB-041, CB-048, CB-107, CB-142, CB-149 CB-1012, CB-011, CB-122, CB-090, CB-033	ZOOM D: 876 6131 8640



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Day 2- Saturday, May 28 | 5月28日 (星期六)

Opening & Guests Speeches

开幕致辞&主旨专家报告

Zoom A: 824 2128 3210

ZOOM Link: <https://us02web.zoom.us/j/82421283210>

Time	Event	Presenter
9:30-9:50	Opening Remarks	Dr. Zhang Jingzhong, Academician of Chinese Academy of Sciences, China 张景中, 中国科学院院士、四川省计算机学会名誉理事长、中科院成都计算机应用研究名誉所长、研究员、博导
		Dr. Wang Xiaoyu, Executive director of Sichuan Province Computer Society, China 王晓宇, 四川省计算机学会
		Prof. Zhou Jiliu, Chengdu University of Information Technology, China 周激流教授, 成都信息工程大学
		周利平, 四川省科学技术协会
9:50-10:30	Keynote Speech I	Prof. Hengtao Shen, IEEE Fellow, ACM Fellow, OSA Fellow University of Electronic Science and Technology of China, China 申恒涛教授, 电子科技大学, 中国 <i>Speech Title: Cross Media Intelligence</i>
10:30-11:10	Keynote Speech II	Prof. Hui Xiong, Fellow of AAAS and IEEE Rutgers, the State University of New Jersey, USA 熊辉教授, 新泽西州立罗格斯大学, 美国 <i>Speech Title: Human and Social Nature in AI Algorithms</i>
11:10-11:30	Break Time & Group photo	
11:30-12:10	Keynote Speech III	Prof. Simon X. Yang, University of Guelph, Canada Simon X. Yang 教授, 圭尔夫大学, 加拿大 <i>Speech Title: Intelligent Sensing and Multi-Sensor Fusion for Various Engineering Systems</i>
12:10-12:35	Invited Speech I	Prof. Fulian Yin, Communication University of China, China 殷复莲教授, 中国传媒大学, 中国 <i>Speech Title: A Series of Research on TV Program Recommendation Based on Neural Networks and Attention Mechanisms</i>
Guests Speeches 专家报告 Zoom A: 824 2128 3210		
14:00-14:40	Keynote Speech IV	Prof. Huiyu (Joe) Zhou, University of Leicester, UK Huiyu (Joe) Zhou教授, 莱斯特大学, 英国 <i>Speech Title: New artificial intelligence technologies in healthcare</i>
14:40-15:05	Invited Speech II	Prof. Su Chang, Chongqing University of Posts and Telecommunications, China 苏畅教授, 重庆邮电大学, 中国

		<i>Speech Title: Heterogeneous Social Recommendation Model with Network Embedding</i>	
15:05-15:15	Break Time		
15:15-15:40	Invited Speech III	Prof. Jie Zhang, Southwest Jiaotong University, China 张洁教授, 西南交通大学, 中国 <i>Speech Title: Blind Attention Geometric Restraint Neural Network for Single Image Dynamic/Defocus Deblurring</i>	
15:40-16:05	Invited Speech IV	Assoc Prof. Meng Yang, Sun Yat-Sen University, China 杨猛副教授, 中山大学, 中国 <i>Speech Title: Research of Weakly-supervised learning in object localization and Few-shot Learning</i>	
16:05-16:30	Invited Speech V	Assoc. Prof. Taohong Zhang, University of Science & Technology Beijing, China 张桃红副教授, 北京科技大学, 中国 <i>Speech Title: AI for Small Object Detection, Medical Image Analysis and Material Design</i>	
Parallel Session 1-2 平行分会1-2 TIME: 17:00-19:00			
Parallel Session 1 Topic: Next Generation Neural Network Theory and Technology ZOOM B: 862 3655 9782 https://us02web.zoom.us/j/86236559782		Parallel Session 2 Topic: Intelligent Image Analysis and Processing ZOOM C: 873 4342 3113 https://us02web.zoom.us/j/87343423113	
Time	Paper ID	Time	Paper ID
17:00-17:15	CB-154	17:00-17:15	CB-091
17:15-17:30	CB-009	17:15-17:30	CB-060
17:30-17:45	CB-013	17:30-17:45	CB-072
17:45-18:00	CB-032	17:45-18:00	CB-073
18:00-18:15	CB-100	18:00-18:15	CB-076
18:15-18:30	CB-078	18:15-18:30	CB-079
18:30-18:45	CB-080	18:30-18:45	CB-081
18:45-19:00	CB-074	18:45-19:00	CB-012



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* 日程时间安排均为北京时间。

Day 3- Sunday, May 29 | 5月29日 (星期日)

Invited Speeches

特邀报告

Zoom A: 824 2128 3210

Zoom Link: <https://us02web.zoom.us/j/82421283210>

Beijing Local Time	Event	Presenter
9:30-9:50	Invited Speech VI	Assoc. Prof. Song Yang, Beijing Institute of Technology, China 杨松副教授, 北京理工大学, 中国 <i>Speech Title: Optimal Resource Allocation in Network Function Virtualization</i>
9:50-10:10	Invited Speech VII	Assoc. Prof. Yubo Yuan, East China University of Science and Technology, China 袁玉波副教授, 华东科技大学, 中国 <i>Speech Title: Data Usability for Classification</i>
10:10-10:30	Invited Speech VIII	Assoc. Prof. Zhirong Shen, Xiamen University, China 沈志荣副教授, 厦门大学, 中国 <i>Speech Title: Boosting Full-Node Repair in Erasure-Coded Storage</i>
10:30-10:40	Break Time	
10:40-11:00	Invited Speech IX	Assoc. Prof. Bo Wang, Dalian University of Technology, China 王波副教授, 大连理工大学, 中国 <i>Speech Title: Source Camera Identification: From Laboratory to Real World</i>
11:00-11:20	Invited Speech X	Assoc. Prof. Minghao Piao, Soochow University, China 朴明浩副教授, 苏州大学, 中国 <i>Speech Title: Small Data-Centric Data Mining and Industrial Applications</i>
11:20-11:40	Invited Speech XI	Assoc Prof. Pengfei Chen, Sun Yat-Sen University, China 陈鹏飞副教授, 中山大学, 中国 <i>Speech Title: The Observability and Active Operation of Cloud Native Systems</i>
11:40-12:00	Invited Speech XII	Prof. Jun Sun, Jiangnan University, China 孙俊教授, 江南大学, 中国 <i>Speech Title: Effective Swarm Optimization Algorithms for Flexible Ligand Docking</i>

Parallel Session 3-6

平行分会3-6

TIME: 14:00-16:15

Parallel Session 3		Parallel Session 4	
Topic: Data Analysis and Computational Models ZOOM A: 824 2128 3210 https://us02web.zoom.us/j/82421283210		Topic: Algorithms and Intelligent Computing ZOOM B: 862 3655 9782 https://us02web.zoom.us/j/86236559782	
Time	Paper ID	Time	Paper ID
14:00-14:15	CB-1001	14:00-14:15	CB-019
14:15-14:30	CB-042	14:15-14:30	CB-025
14:30-14:45	CB-059	14:30-14:45	CB-039
14:45-15:00	CB-084	14:45-15:00	CB-044
15:00-15:15	CB-1021	15:00-15:15	CB-046
15:15-15:30	CB-052	15:15-15:30	CB-082
15:30-15:45	CB-057	15:30-15:45	CB-083
15:45-16:00	CB-1010	15:45-16:00	CB-123
		16:00-16:15	CB-129
Parallel Session 5		Parallel Session 6	
Topic: Big data technology and data management ZOOM C: 873 4342 3113 https://us02web.zoom.us/j/87343423113		Topic: Intelligent Transportation and System Management ZOOM D: 876 6131 8640 https://us02web.zoom.us/j/87661318640	
Time	Paper ID	Time	Paper ID
14:00-14:15	CB-010	14:00-14:15	CB-058
14:15-14:30	CB-030	14:15-14:30	CB-050
14:30-14:45	CB-062	14:30-14:45	CB-018
14:45-15:00	CB-102	14:45-15:00	CB-070
15:00-15:15	CB-137	15:00-15:15	CB-089
15:15-15:30	CB-151	15:15-15:30	CB-106
15:30-15:45	CB-1007	15:30-15:45	CB-145
15:45-16:00	CB-1011	15:45-16:00	CB-1017
16:00-16:15	CB-153	16:00-16:15	CB-1022

Parallel Session 7-10

平行分会7-10

TIME: 16:45-19:00

Parallel Session 7 Topic: Target Detection ZOOM A: 824 2128 3210 https://us02web.zoom.us/j/82421283210		Parallel Session 8 Topic: Machine learning ZOOM B: 862 3655 9782 https://us02web.zoom.us/j/86236559782	
Time	Paper ID	Time	Paper ID
16:45-17:00	CB-001	16:45-17:00	CB-056
17:00-17:15	CB-054	17:00-17:15	CB-087
17:15-17:30	CB-138	17:15-17:30	CB-120
17:30-17:45	CB-006	17:30-17:45	CB-143
17:45-18:00	CB-055	17:45-18:00	CB-007
18:00-18:15	CB-141	18:00-18:15	CB-108
18:15-18:30	CB-043	18:15-18:30	CB-1003
18:30-18:45	CB-116	18:30-18:45	CB-031
18:45-19:00	CB-144	18:45-19:00	CB-005
Parallel Session 9 Topic: Software and Information Technology ZOOM C: 873 4342 3113 https://us02web.zoom.us/j/87343423113		Parallel Session 10 Topic: Image and Signal Analysis ZOOM D: 876 6131 8640 https://us02web.zoom.us/j/87661318640	
Time	Paper ID	Time	Paper ID
16:45-17:00	CB2-001	16:45-17:00	CB-026
17:00-17:15	CB-021	17:00-17:15	CB-121
17:15-17:30	CB-028	17:15-17:30	CB-152
17:30-17:45	CB-034	17:30-17:45	CB-065
17:45-18:00	CB-017	17:45-18:00	CB-063
18:00-18:15	CB-020	18:00-18:15	CB-117
18:15-18:30	CB-093	18:15-18:30	CB-118
18:30-18:45	CB-029	18:30-18:45	CB-061
		18:45-19:00	CB-130



* All schedules will process in Beijing local time (GMT+8)

* 日程时间安排均为北京时间。

Day 4- Monday, May 30 | 5月30日 (星期一)

Parallel Session 11-12

平行分会11-12

TIME: 10:00-12:15

Parallel Session11 Topic: Pattern recognition ZOOM A: 824 2128 3210 https://us02web.zoom.us/j/82421283210		Parallel Session12 Topic: Computer Vision and Image Processing ZOOM B: 862 3655 9782 https://us02web.zoom.us/j/86236559782	
Time	Paper ID	Time	Paper ID
10:00-10:15	CB-004	10:00-10:15	CB-131
10:15-10:30	CB-075	10:15-10:30	CB2-005
10:30-10:45	CB-077	10:30-10:45	CB-1002
10:45-11:00	CB-095	10:45-11:00	CB-1016
11:00-11:15	CB-1020	11:00-11:15	CB2-006
11:15-11:30	CB-104	11:15-11:30	CB-1024
11:30-11:45	CB-113	11:30-11:45	CB-150
11:45-12:00	CB-1025	11:45-12:00	CB-016
12:00-12:15	CB-133	12:00-12:15	CB-1023

Parallel Session 13-14

平行分会13-14

TIME: 14:00-16:30

Parallel Session13 Topic: Knowledge Engineering ZOOM C: 873 4342 3113 https://us02web.zoom.us/j/87343423113		Parallel Session14 Topic: Artificial Intelligence Technology and Application ZOOM D: 876 6131 8640 https://us02web.zoom.us/j/87661318640	
Time	Paper ID	Time	Paper ID
14:00-14:15	CB-035	14:00-14:15	CB-041
14:15-14:30	CB-047	14:15-14:30	CB-048

14:30-14:45	CB-066	14:30-14:45	CB-107
14:45-15:00	CB-071	14:45-15:00	CB-142
15:00-15:15	CB-111	15:00-15:15	CB-149
15:15-15:30	CB-115	15:15-15:30	CB-1012
15:30-15:45	CB-1005	15:30-15:45	CB-011
15:45-16:00	CB-1014	15:45-16:00	CB-122
		16:00-16:15	CB-090
		16:15-16:30	CB-033
Closing Ceremony 闭幕式 Time: 17:00-17:30 Zoom A: 824 2128 3210 Zoom Link: https://us02web.zoom.us/j/82421283210			

Tips for Online Attendance | 网络参会

Before the conference | 网络会议前

Time Zone | 时区

Beijing, China (GMT+8)

You're suggested to set up the time on your computer in advance.

Platform: ZOOM | 线上参会平台: ZOOM

Download

1. <https://zoom.com.cn/download> (Chinese authors' option)
2. <https://zoom.us/download>

Zoom Guideline | ZOOM 操作指南:

<http://icaibd.org/zoom/>

Equipment Needed | 设备及环境需求

- A computer with internet connection and camera
- Headphones
- Stable internet connection
- A quiet place and Proper background

Test Your Presentation | 网络测试

Date: Friday, May 27, 2022

Prior to the formal meeting, presenters shall join the test room to ensure everything is on the right track. Please check your test time on this program.

Every presenter or listener enter the ZOOM, please rename as **SESSION NUMBER+PAPER ID+YOUR NAME**.

For example:

Presenters: **S1+ TB1-001+Tom**

Listeners: **L001+Tom**

If you have any question during the conference, you could add the Wechat, our staff will help to solve the questions. 如果您对会议有其他问题可以添加微信。



During the conference | 网络会议中

Voice Control Rules | 会议声控规则

- The host will mute all participants while entering the meeting.
- Speakers can unmute microphone when it is turn for his or her presentation.
- Q&A goes after each speaker, the participant can raise questions.

Oral Presentation | 报告注意事项

- Timing: a maximum of 15 minutes in total, including 2-3 minutes for Q&A. Please make sure your presentation is well timed.
- Please join the meeting room 10 minutes in advance.
- ICAIBD encourages all presenters to make live oral presentations. For technical problems such as network instability, we suggest you email a record video/slide to conference secretary as backup before/on **May 25, 2022**.

Conference Recording | 会议录制声明

- The whole conference will be recorded. We appreciate you proper behavior and appearance.
- The recording will be used for conference program and paper publication requirements. The video recording will be destroyed after the conference and it cannot be distributed to or shared with anyone else, and it shall not be used for commercial nor illegal purpose. It will only be recorded by the staff and presenters have no rights to record. If you don't want to be recorded, please inform us ahead of time.



Keynote Speaker | 大会主讲报告人

Prof. Hengtao Shen (IEEE Fellow, ACM Fellow, OSA Fellow)
University of Electronic Science and Technology of China, China

Presentation Time: Day-2 | May 28 | 9:50-10:30

ZOOM A: 824 2128 3210

Speech Title: Cross Media Intelligence

Abstract: Nowadays applications typically acquire and analyse data of different media types together for intelligent process and decision making, such as robotics, self-driving, medical diagnose, smart city, meta universe, and so on. It has been shown that heterogeneous multimedia data gathered from different sources in different media types can be often complementary and correlated in the knowledge space. Towards cross-media intelligence, cross-media accessibility, connectivity, interactivity and reliability have attracted huge amount of attention due to its significance in both research communities and industries. In this talk, we will introduce the state of the art on this topic and discuss its future trends.

BIO: Distinguished Professor Heng Tao Shen, Fellow of ACM/IEEE/OSA and Clarivate Highly Cited Researcher, is Dean of School of Computer Science and Engineering at UESTC, Dean of Sichuan AI Research Institute, and Chief Scientist of Vision Intelligence at Peng Cheng Laboratory. He obtained his BSc with First Class Honours and PhD from Department of Computer Science at National University of Singapore in 2000 and 2004 respectively. He was a professor at the University of Queensland before joining UESTC. His research has made contributions to the field of hashing big multimedia data, from hashing theory, to algorithms and applications, and he has led the charge to address the challenging problem of cross-media intelligence. He has published 350+ peer-reviewed papers, including 130+ IEEE/ACM Transactions, and 250+ CCF-A ranked papers. He has received 8 Best Paper Awards, including ACM Multimedia 2017, ACM SIGIR 2017, and IEEE Transactions on Multimedia 2020. He is General Co-Chair of ACM Multimedia 2021, TPC Co-Chair of ACM Multimedia 2015, Associate Editor-in-Chief of Journal of Computer Applications, Associate Editor of ACM Transactions of Data Science, IEEE Transactions on Image Processing, IEEE Transactions on Multimedia, IEEE Transactions on Knowledge and Data Engineering, Pattern Recognition, and Journal of Software.

**Keynote Speaker | 大会主讲报告人**

Prof. Hui Xiong (Fellow of AAAS and IEEE)
Rutgers, the State University of New Jersey, USA

Presentation Time: Day-2 | May 28 | 10:30-11:10
The United States Local Time: May 27 | 22:30-23:10

ZOOM A: 824 2128 3210

Speech Title: Human and Social Nature in AI Algorithms

BIO: Dr. Hui Xiong received his Ph.D. in Computer Science from the University of Minnesota - Twin Cities, USA, in 2005, the B.E. degree in Automation from the University of Science and Technology of China (USTC), Hefei, China, and the M.S. degree in Computer Science from the National University of Singapore (NUS), Singapore. He is currently a Distinguished Professor at Rutgers, the State University of New Jersey, where he received the 2018 Ram Charan Management Practice Award as the Grand Prix winner from the Harvard Business Review, RBS Dean's Research Professorship (2016), two-year early promotion/tenure (2009), the Rutgers University Board of Trustees Research Fellowship for Scholarly Excellence (2009), the ICDM-2011 Best Research Paper Award (2011), the Junior Faculty Teaching Excellence Award (2007), Dean's Award for Meritorious Research (2010, 2011, 2013, 2015) at Rutgers Business School, the 2017 IEEE ICDM Outstanding Service Award (2017), and the AAAI-2021 Best Paper Award (2021). Dr. Xiong is also a Distinguished Guest Professor (Grand Master Chair Professor) at the University of Science and Technology of China (USTC). For his outstanding contributions to data mining and mobile computing, he was elected an ACM Distinguished Scientist in 2014, an IEEE Fellow and an AAAS Fellow in 2020.

Dr. Xiong's general area of research is data and knowledge engineering, with a focus on developing effective and efficient data analysis techniques for emerging data intensive applications. His research has been supported in part by the National Science Foundation (NSF), IBM Research, SAP Corporation, Panasonic USA Inc., Awarepoint Corp., Citrix Systems Inc., and Rutgers University. He has published prolifically in refereed journals and conference proceedings, such as IEEE Transactions on Knowledge and Data Engineering, the VLDB Journal, INFORMS Journal on Computing, Machine Learning, IEEE Transactions on Mobile Computing (TMC), and ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD). His book, titled "Encyclopedia of GIS", has been recognized as the Top 10 Most Popular Computer Science Book authored by Chinese Scholars at Springer.

Dr. Xiong currently serves as a co-Editor-in-Chief of Encyclopedia of GIS (Springer) and an Associate Editor of IEEE Transactions on Data and Knowledge Engineering (TKDE), IEEE Transactions on Big Data (TBD), ACM Transactions on Knowledge Discovery from Data (TKDD) and ACM Transactions on Management Information Systems (TMIS). He has served regularly on the organization and program committees of numerous conferences, including as a Program Co-Chair of the Industrial and Government Track for the 18th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), a Program Co-Chair for the IEEE 2013 International Conference on Data Mining (ICDM), a General Co-Chair for the IEEE 2015 International Conference on Data Mining (ICDM), and a Program Co-Chair of the Research Track for the 24th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD2018).



Keynote Speaker | 大会主讲报告人

Prof. Simon X. Yang
Head of Advanced Robotics and Intelligent Systems (ARIS)
Laboratory University of Guelph, Canada

Presentation Time: Day-2 | May 28 | 11:30-12:10
Canada Local Time: May 27 | 23:30-00:10

ZOOM A: 824 2128 3210

Speech title: Intelligent Sensing and Multi-Sensor Fusion for Various Engineering Systems

Abstract: Real-time sensing, monitoring and control are fundamentally important issues for various engineering systems. Intelligent real-time data acquisition, effective signal processing, smart decision making, and efficient control would achieve high value and productivity for the agricultural and agri-food systems; and efficient real-time navigation and operation of autonomous robotic systems. In this talk, I will start with a very brief introduction of the various intelligent approaches. Then I will present our research on several innovative applications of advanced intelligent systems to various agricultural, agri-food and robotic systems, such as an electronic nose system for real-time livestock odor monitoring and control, which is based on novel e-noses and wireless sensor networks; a real-time intelligent system for flue-curing barns, which is based on the image features of tobacco leaves from a camera, smells from an e-nose system, and a neuro-fuzzy control system; and an advanced intelligent monitoring and control system for meat drying process with efficient energy consumption, where an improved psychrometer is developed for accuracy relative humidity measurement and a neuro-fuzzy system is developed for decoupled temperature and humidity control. Finally, I will talk about the intelligent real-time sensing and navigation of a harvesting robotic system.

BIO: Prof. Simon X. Yang received the B.Sc. degree in engineering physics from Beijing University, China in 1987, the first of two M.Sc. degrees in biophysics from Chinese Academy of Sciences, Beijing, China in 1990, the second M.Sc. degree in electrical engineering from the University of Houston, USA in 1996, and the Ph.D. degree in electrical and computer engineering from the University of Alberta, Edmonton, Canada in 1999. Prof. Yang joined the School of Engineering at the University of Guelph, Canada in 1999. Currently he is a Professor and the Head of the Advanced Robotics and Intelligent Systems (ARIS) Laboratory at the University of Guelph in Canada.

Prof. Yang has diversified research expertise. His research interests include artificial intelligence, robotics, control systems, sensors and multi-sensor fusion, wireless sensor networks, machine learning, fuzzy systems, intelligent communication and transportation, and computational neuroscience. Prof. Yang he has been very active in various professional activities. He serves as the Editor-in-Chief of Intelligence & Robotics, and International Journal of Robotics and Automation, and an Associate Editor of IEEE Transactions on Cybernetics, IEEE Transactions of Artificial Intelligence, and several other journals. He has involved in the organization of many international conferences.

**Keynote Speaker | 大会主讲报告人**

Prof. Huiyu (Joe) Zhou
University of Leicester, UK

Presentation Time: Day-2 | May 28 | 14:00-14:40
The United Kingdom Local Time: May 28 | 7:00-7:40

ZOOM A: 824 2128 3210

Speech Title: New artificial intelligence technologies in healthcare

Abstract: Artificial intelligence has significantly influenced the health sector for years by delivering novel assistive technologies from robotic surgery to versatile biosensors that enable remote diagnosis and efficient treatment. While the COVID-19 pandemic is devastating, the uses of AI in the healthcare sector are dramatically increasing and it is a critical time to look at its impact in different aspects. In this talk, I will introduce the application of new deep learning models in medical image understanding. Then, I will discuss Parkinson's disease (PD) whilst investigating the behaviour analysis of PD mice. I also present the use of machine learning technologies in sentiment analysis, followed by the discussion on several challenges.

BIO: Dr. Huiyu Zhou received a Bachelor of Engineering degree in Radio Technology from Huazhong University of Science and Technology of China, and a Master of Science degree in Biomedical Engineering from University of Dundee of United Kingdom, respectively. He was awarded a Doctor of Philosophy degree in Computer Vision from Heriot-Watt University, Edinburgh, United Kingdom. Dr. Zhou currently is a full Professor at School of Computing and Mathematical Sciences, University of Leicester, United Kingdom. He has published over 380 peer-reviewed papers in the field. He was the recipient of "CVIU 2012 Most Cited Paper Award", "MIUA 2020 Best Paper Award", "ICPRAM 2016 Best Paper Award" and was nominated for "ICPRAM 2017 Best Student Paper Award" and "MBEC 2006 Nightingale Prize". His research work has been or is being supported by UK EPSRC, MRC, EU, Royal Society, Leverhulme Trust, Puffin Trust, Alzheimer's Research UK, Invest NI and industry.
Homepage: <https://www2.le.ac.uk/departments/informatics/people/huiyu-zhou>.

**Invited Speaker | 特邀报告嘉宾**

Prof. Fulian Yin, Communication University of China, China

Presentation Time: Day-2 | May 28 | 12:10-12:35

ZOOM A: 824 2128 3210

Speech Title: A Series of Research on TV Program Recommendation Based on Neural Networks and Attention Mechanisms

Abstract: In the era of big data, the amount of information on broadcasting and television platforms is growing exponentially, making people waste time on many programs that they are not interested in or have already watched. However, the presence of TV program recommendation solves the problem of information overload, which can help users find the programs they are interested in and improve users' interaction satisfaction. Hence, we propose a series of researches on TV program recommendation based on neural networks and attention mechanisms, which can be divided into recommendation based on auxiliary information, recommendation based on graph and recommendation based on sequence. Meanwhile, we also study the interpretability of recommendation system considering the black-box characteristics of neural networks. Experiment results on real dataset verify the effectiveness of our proposed models.

BIO: Fulian Yin, female, graduated with a Ph.D., is now a professor and doctoral supervisor. She graduated from Harbin Engineering University in 2010. She has been teaching at the College of Information and Communication Engineering, Communication University of China until now. She is currently the deputy director of the Department of Artificial Intelligence, the director of the Chinese Information Society, and the deputy director of the Open Source Intelligence Technology Professional Committee of the Chinese Information Society. She visited York University in Canada for 1 year from 2018 to 2019. She is engaged in teaching and research of big data analysis and mining in cross-disciplinary fields such as public opinion and media.

She has presided more than 20 national or scientific research projects, including the National Natural Science Foundation of China, the State Administration of Press, Publication, Radio, Film and Television of China, the Beijing Municipal Education Commission, and the Bureau of Network Social Work of the State Internet Information Office, etc. She has published more than 70 SCI and EI retrieved papers, among which Unfolding the Determinants of COVID-19 Vaccine Acceptance in China was awarded the 2021 ESI Highly Cited Paper. She has obtained more than 20 national invention patents as the first author. She has received many distinguished awards including the third prize of the 2017 Beijing Science and Technology Award, the Outstanding Contribution Award and the first prize of the Broadcast Film and Television Science and Technology Innovation Award, the first prize and the second prize of the Scientific Progress Award of the China Film and Television Technology Society, etc.

**Invited Speaker | 特邀报告嘉宾**

Prof. Su Chang, Chongqing University of Posts and Telecommunications, China

Presentation Time: Day-2 | May 28 | 14:40-15:05

ZOOM A: 824 2128 3210

Title: Heterogeneous Social Recommendation Model with Network Embedding

Abstract: Due to the number of users and items increasing sharply, data sparsity has become an extremely serious problem for recommendation systems. Social relations consist of complex and rich information, which have a good alleviation effect on sparsity problems. Heterogeneous Information Network (HIN) is excellent in modeling the complex and structural information. Hence, we integrate HIN into the social recommendation. In this paper, we propose a model named Heterogeneous Social Recommendation model with Network Embedding(HSR). The social relations are divided into direct social relations and indirect social relations. We design a novel social influence calculation method to evaluate the influence of direct social relations. Based on the heterogeneous information network embedding method, we represent indirect social relations as feature embeddings and transform the learned embeddings into user-item feature interaction matrix by outer product. The final item list for a user is generated by the method of the convolutional neural network combined with the list of items generated by direct social relations. Extensive experiments on three real-world datasets show significant improvements of our proposed method over state of-the-art methods. Additionally, experiments show that using heterogeneous network embedding can obtain better recommendation performance.

BIO: Dr. Chang Su is currently a Full Professor with the School of computer science and technology, Chongqing University of Posts and Telecommunications, China. She received her Doctor of Philosophy degree from Department of Computer Science, the University of Liverpool, U.K. She did her postdoc in Department of Computer Science, the University of Cornell, USA. She is an expert of Chinese Standardization Administration and International Standard Organization. Her research interests include Artificial Intelligence, Machine Learning, Resource Management and QoS. She has published dozens of peer-reviewed papers and national patents in the field.

**Invited Speaker | 特邀报告嘉宾**

Prof. Jie Zhang, Southwest Jiaotong University, China

Presentation Time: Day-2 | May 28 | 15:15-15:40

ZOOM A: 824 2128 3210

Title: Blind Attention Geometric Restraint Neural Network for Single Image Dynamic/Defocus Deblurring

Abstract: Exposure of a camera image is related to shutter speed and aperture size. In aperture-priority mode, a slow shutter speed can cause dynamic blur due to object motion and/or camera vibration; in shutter-priority mode, a wide aperture can cause defocus blur in scene regions outside the depth of field. The success of learning-based deblurring is mainly attributed to the specialized network architectures, including encoder-decoder, generative adversarial networks, expanding of receptive field, multi-scale RNN, attention mechanism, etc. In this talk, I will introduce the use of these deep learning models in image deblurring.

BIO: Jie Zhang received the B.S. and M.S. degrees in measuring and controlling technology and the Ph.D. degree in vehicle application engineering from Southwest Jiaotong University in 1997, 2000, and 2004, respectively. Since then, she has been engaged in scientific research and professional education at Southwest Jiaotong University. She is currently a Full Professor with the Department of Measuring and Controlling Technology, School of Mechanical Engineering, Southwest Jiaotong University. She is the Project Director of scientific research projects supported by the National Natural Science Foundation of China. She has authored more than 50 articles and the national key book Monitoring Technology of High-Speed Vehicle. Her research interests include intelligence networks, signal processing, and machine vision.

**Invited Speaker | 特邀报告嘉宾**

Assoc Prof. Meng Yang, Sun Yat-Sen University, China

Presentation Time: Day-2 | May 28 | 15:40-16:05

ZOOM A: 824 2128 3210

Title: Research of Weakly-supervised learning in object localization and Few-shot Learning

Abstract: Weakly-supervised learning is a promising research direction in computer vision and machine learning. In this talks, how to effectively explore coarse annotation in object localization and unlabeled data in few-shot learning are reported. For weakly-supervised learning object localization, we propose erasing integrated learning (EIL), which explores the high response class-specific area and the less discriminative region simultaneously, thus maintains high performance in classification and jointly discover the full extent of the object. For semi-supervised few-shot learning, we propose a Clustering-based method to solve the problem that the relationship between unlabeled and labeled data is not well exploited in generating pseudo labels. By using multi-factor collaborative representation, a novel Multi-Factor Clustering (MFC) is designed to fuse the information of few-shot data distribution, which can generate soft and hard pseudo-labels for unlabeled samples based on labeled data. Experimental results verifies the effectiveness of our proposed methods.

BIO: Meng Yang is currently an associate professor and a Ph.D tutor at School of Computer Science and Engineering, Sun Yat-sen University, Guangzhou, China. He is a senior member of IEEE and CCF. He received his Ph.D degree from The Hong Kong Polytechnic University in 2012. He worked as a Postdoctoral fellow in the Computer Vision Lab of ETH Zurich. His research interest includes computer vision, sparse coding and dictionary learning, natural language processing, and machine learning. He has developed several representative reserach works, such as collaborative and robust semantic representation and discriminative dictionary and deep learning. He has published more than 80 academic papers, including 16 CVPR/ICCV/AAAI/IJCAI/ICML/ECCV/EMNLP/NAACL papers and several IJCV, IEEE TNNLS, TIP, and TIFs journal papers. Now his Google citation is nearly 10000.

**Invited Speaker | 特邀报告嘉宾**

Assoc. Prof. Taohong Zhang, University of Science & Technology Beijing, China

Presentation Time: Day-2 | May 28 | 16:05-16:30

ZOOM A: 824 2128 3210

Title: AI for Small Object Detection, Medical Image Analysis and Material Design

Abstract: Artificial intelligence has had a far-reaching impact on different domains of our lives. This report introduces three aspects of work: defect detection in industry, medical image analysis, and material attribute prediction for material discovery. Aiming at the tiny oxidation corrosion spots, the micro CMOS shooting system combined with computer vision is used for intelligent automatic detection of small targets. A detection model (CMOD) based on yolov3 is proposed, the backbone network combines with spatial pyramid (SPP) to fuse local features, and CBAM attention mechanism is introduced to improve the detection accuracy. Aiming at the problems of small abrasive particle size and lack of texture features in online abrasive particle image, an abrasive particle detection model based on the integration of image extraction features and deep learning features, attention mechanism and semantic segmentation mechanism is constructed to improve the feature extraction ability of the model, realize the intelligent detection of abrasive particles, and provide an effective method for fault monitoring of mechanical equipment; In view of the fact that the ordinary convolutional neural network can not fuse the condition information of multiple patients, a network model integrating the patient's lung image features and the doctor's clinical diagnosis information is constructed to realize the preliminary judgment of the patient's condition and provide auxiliary diagnosis for intelligent medical treatment; Aiming at the detection of COVID-19, a low rank tensor self attention reconstruction module is proposed based on tensor decomposition theory to obtain long-range semantic information. A semantic segmentation model is established for CT image aided diagnosis of COVID-19, which reduces the computational complexity of the model. For small molecular materials, the multi-modal attribute prediction model is built by using graph structure, descriptor and spectrums. Combined with graph neural network and transformer models, the prediction results of actual data can be achieved by integrating theoretical data and experimental data.

BIO: Taohong Zhang, Associate Professor, Department of computer science, University of science and technology Beijing; She received her PhD degree from the Graduate School of the Chinese Academy of Sciences; She visited Harvard MIT HST (Health Science and Technology) in the United States and Loughborough University in the United Kingdom; She is currently a member of the Intelligent Medical Committee of the Chinese Society of Artificial Intelligence, deputy director of the Female Scientists and Technicians of Beijing Graphics and Imaging Society, and a member of CCF; Her research interests include machine learning, computer vision, computer modeling and simulation, and the application of deep learning; As a main person, she undertook a number of scientific research projects such as study abroad return fund, national key R & D plan for intelligent auxiliary diagnosis service system, National Science and technology support plan, National Natural Science Foundation of China, enterprise cooperation and so on. She has published more than 50 research papers including the SCI I and II areas. There are 7 national invention patents authorized and 2 teaching books published.

**Invited Speaker | 特邀报告嘉宾**

Assoc. Prof. Song Yang, Beijing Institute of Technology, China

Presentation Time: Day-3 | May 29 | 9:30-9:50

ZOOM A: 824 2128 3210

Title: Optimal Resource Allocation in Network Function Virtualization

Abstract: Network Function Virtualization (NFV) refers to that the complicated network function can be implemented by transforming the traditional hardware into the software instance. Resorting to the distinct advantages, such as flexibility, high efficiency, scalability, short deployment cycle, well-suited service upgrade, etc., NFV is broadly regarded as the next-generation paradigm for network service provision. In this report, I will first analyze and summarize the common assurance model for quality of network service in NFV, such as the service delay model, service stability model, etc. Virtualization Network Function (VNF) placement and traffic routing are representative issues of resource optimization deployment in NFV. Subsequently, I will demonstrate how to resolve these problems respectively by approximate algorithms and deep reinforcement learning algorithms. In the end, I will attempt to explore the potential research issues in this field for our future work.

BIO: Dr. Song Yang received the B.S. degree in software engineering and the M.S. degree in computer science from Dalian University of Technology, Dalian, China, in 2008 and 2010, respectively, and the Ph.D. degree from Delft University of Technology, Delft, The Netherlands, in 2015. From August 2015 to July 2017, he worked as postdoc researcher for the EU FP7 Marie Curie Actions CleanSky Project in Gesellschaft fur wissenschaftliche Datenverarbeitung mbH Goettingen (GWDG), Goettingen, Germany. He is currently an associate professor at School of Computer Science and Technology in Beijing Institute of Technology, China. Dr. Song Yang's research topic revolves optimization algorithms including routing, placement issues and network designing in terms of energy-efficiency, survivability, reliability and network/traffic stochastics. He is currently applying combinatorial optimization, deep machine learning, federated learning/analytics to cloud/edge computing, NFV, etc. So far, he has published over 50 papers in the peer-reviewed journals and conferences such as IEEE TPDS, TMC, TSC, INFOCOM, IWQoS. He is a reviewer of IEEE TON, IEEE TPDS, IEEE TMC and TPC of IEEE/IFIP networking 2020, IEEE IPCCC 2019, 2020, 2021. He is an IEEE member and ACM member.



Invited Speaker | 特邀报告嘉宾

Assoc. Prof. Yubo Yuan, East China University of Science and Technology, China

Presentation Time: Day-3 | May 29 | 9:50-10:10

ZOOM A: 824 2128 3210

Title: Data Usability for Classification

Abstract: In the surging wave of artificial intelligence today, big data-driven intelligent classification system has become a hot topic in the industry. As we all know, the data quality of training samples will directly affect the learning efficiency of classification system, and the evaluation of data usability is the technical difficulty. Domestic and foreign scholars have contributed a lot of data usability evaluation methods, but there are still few achievements in the field of subdivision, such as the usability evaluation of data classification. Based on the theory of information granularity and data convex hull, this lecture will deeply explore the evaluation method of data classification usability, and try to apply it to select features. This method first maps the high-dimensional data to the low-dimensional subspace, and then rapidly solves the approximate convex hull of each class in the subspace through convex hull decomposition. Finally, according to the weighted average of information entropy and class purity in the sub-convex hulls, the approximate classification usability score of the high-dimensional data set is given. In order to show the importance of usability, with the maximum-usability and minimum-correlation criterion, the classification usability is used to measure the dependency between condition attribute and decision attribute, and the normalized mutual information is used to measure the redundancy of condition attribute set, and the optimal features is selected in an incremental way.

BIO: Yu-Bo Yuan received the B.Sc. and M.Sc. degrees in information and computational science from Lanzhou University, P R China, in 1997 and 2000, and Ph.D. degree information and computational science from Xi'an Jiaotong University, P R China, in 2003. From November 2003 to June 2006, he worked as lecture and Associate Professor in University of Electronic Science and Technology of China. From July 2006 to August 2008, he worked as research assistant professor in mathematics department of Virginia Tech, USA. From July 2011 to February 2012, he worked as visiting professor in school of mathematics and information sciences of Federation University, Australia. From February 2012, he has been working as director in the Big-Data and Multidisciplinary Sciences, East China University of Science and Technology. His current research include data science, big data analysis, optimization, data mining, machine learning and computational intelligence.

**Invited Speaker | 特邀报告嘉宾**

Assoc. Prof. Zhirong Shen, Xiamen University, China

Presentation Time: Day-3 | May 29 | 10:10-10:30

ZOOM A: 824 2128 3210

Title: Boosting Full-Node Repair in Erasure-Coded Storage

Abstract: As a common choice for fault tolerance in today's storage systems, erasure coding is still hampered by the induced substantial traffic in repair. A variety of erasure codes and repair algorithms are designed in recent years to relieve the repair traffic, yet we unveil via careful analysis that they are still plagued by several limitations, which restrict or even negate the performance gains. We present RepairBoost, a scheduling framework that can assist existing linear erasure codes and repair algorithms to boost the full-node repair performance. RepairBoost builds on three design primitives: (i) repair abstraction, which employs a directed acyclic graph to characterize a single-chunk repair process; (ii) repair traffic balancing, which balances the upload and download repair traffic simultaneously; and (iii) transmission scheduling, which carefully dispatches the requested chunks to saturate the most unoccupied bandwidth. Extensive experiments on Amazon EC2 show that RepairBoost can accelerate the repair by 35.0-97.1% for various erasure codes and repair algorithms.



Invited Speaker | 特邀报告嘉宾

Assoc. Prof. Bo Wang, Dalian University of Technology, China

Presentation Time: Day-3 | May 29 | 10:40-11:00

ZOOM A: 824 2128 3210

Title: Source Camera Identification: From Laboratory to Real World

Abstract: Source Camera Identification (SCI) plays an important role in improving the security of digital images, resolving copyright disputes, preventing false publicity and combating cyber crimes, especially, it can provide favourable technical support for judicial authentication and criminal investigations such as child pornography and insurance claims.

In the perspective of camera model identification, the SOTA of identification accuracy is considered as over 98% on popular datasets, in the laboratory scenario. In traditional laboratory scenario, the camera model identification is typically modeled as a classification issue, which could be solved in a supervised learning framework using pattern recognition and deep learning techniques. However, the situation in the real world is usually much more complex and complicated, which means that the images could be manipulated such as double compressed, resized and undergoing adversarial attacked. Also the new camera models are challenging the close-set supervised learning strategy.

We investigate the popular source camera identification algorithms in this talk. Furthermore, the complicated and uncontrolled issues of SCI in real world are discussed. Several new approaches, which aim to solve the camera model identification issues of few-shot scenario, open-set scenario, and adversarial attack scenario, are also explained and demonstrated.

BIO: Dr. Bo Wang received the B.S. degree in electronic and information engineering, and the M.S. and Ph.D. degrees in signal and information processing from the Dalian University of Technology, Dalian, China, in 2003, 2005, and 2010, respectively. He is currently an Associate Professor with the School of Information and Communication Engineering. During 2017 to 2019, he served as a visiting scholar in State University of New York at Buffalo, the U.S. His current research interests focus on the areas of artificial intelligence security, multimedia processing and security, digital image processing and forensics for instance. So far, he has published over 70 papers in journals and conferences, IEEE TCSVT, Pattern Recognition, Computers & Security, IJCAI for instance. He is a reviewer of IEEE TIFS, TCSVT, TIP and the other international journals. In addition, he serves as a committee in ICSIP 2022, IWEICT 2021, MilCom 2017 and IWDCF 2017.

**Invited Speaker | 特邀报告嘉宾**

Assoc. Prof. Minghao Piao, Soochow University, China

Presentation Time: Day-3 | May 29 | 11:00-11:20

ZOOM A: 824 2128 3210

Title: Small Data-Centric Data Mining and Industrial Applications

Abstract: Over the past decade or so, the great advances in deep learning have been powered by ever-bigger models crunching ever-bigger amounts of data. However, do you have ever-bigger amounts of data? Do you have the computing power to support ever-bigger models? In this talk, I will focus on small data-centric data mining to introduce how to solve real-world industrial application problems. The talk is in two fields, i.e., electricity consumption pattern analysis, and wafer map failure pattern analysis.

BIO: Minghao Piao received the Master degree in Bioinformatics in 2009, Ph.D. degree in Computer Science in 2014, from Chungbuk National University, Republic of Korea, respectively. He worked as a Research Professor at the Department of Computer Engineering, Dongguk University Gyeongju Campus, Republic of Korea, from Sep. 2015 to Jun. 2017. He also worked as a Visiting Professor at the Department of Computer Science, Chungbuk National University, Republic of Korea, from Jul. 2017 to Mar. 2020. He is currently an Associate Professor at the Department of Artificial Intelligence, School of Computer Science and Technology, Soochow University, China, from Sep. 2020. So far, he has published over 70 papers in the peer-reviewed journals and conferences. He is a reviewer of Elsevier Knowledge based Systems, IEEE Transactions on Semiconductor Manufacturing, Springer Journal of Intelligent Manufacturing, etc. His research interests include Data Mining, Pattern Recognition, Big-data analysis, and data mining-based applications.

**Invited Speaker | 特邀报告嘉宾**

Assoc Prof. Pengfei Chen, Sun Yat-Sen University, China

Presentation Time: Day-3 | May 29 | 11:20-11:40

ZOOM A: 824 2128 3210

Title: The Observability and Active Operation of Cloud Native Systems**Abstract:** Recently, cloud native architecture have been the mainstream architecture of IT systems. This kind of architecture shows a great power in fast development and delivery. Thus, the time to market is significantly reduced. Generally speaking, cloud native systems primarily comprise microservice, service mesh, CI/CD and DevOps. Although, these techniques make the development more agile, the complexity and dynamics also increase significantly, which brings many challenges on management and operation of cloud native systems. To tackle these challenges, this topic introduces how to observe and operate cloud native systems actively. The eBPF based monitoring active learning based anomaly detection method will be presented in this topic.**BIO:** Prof. Chen is working in the School of Data Science and Computer, Sun Yat-Sen University, doctoral supervisor. In June 2016, he received his Ph.D. from the Department of Computer Science and Technology, Xi'an Jiaotong University. From July 2012 to November 2012, he worked as an intern in Microsoft Asia Research as a "rising star". From June 2016 to January 2018, he worked as a researcher in the cloud computing department of IBM China Researcher. From February 2017 to April 2017 Working as a visiting researcher at IBM TJ Watson Research Center. The main directions are: distributed systems, computer networks, intelligent operation and maintenance (AIOps), microservices, cloud computing, serverless computing, software reliability, blockchain, etc. In recent years, he has published more than 50 high-level papers in international conferences and journals, and served as a reviewer for many international journals and conferences.

If you are interested in cloud computing (IaaS, PaaS, SaaS, FaaS), distributed systems, computer networks, intelligent operation and maintenance (AIOps), software autonomous driving, and blockchain, and can do research, you can contact me Do a PhD or a Postdoc! Recently, the research group is studying the automatic driving of software systems, namely self-perception, self-recovery, self-optimization, self-management, etc., the "operation and maintenance cube" for large-scale distributed computing systems, and the function distribution network (FDN) in heterogeneous computing environments.), and hope that more students can join together to build the next-generation cloud computing platform.

**Invited Speaker | 特邀报告嘉宾**

Prof. Jun Sun, Jiangnan University, China

Presentation Time: Day-3 | May 29 | 11:40-12:00

ZOOM A: 824 2128 3210

Title: Effective Swarm Optimization Algorithms for Flexible Ligand Docking

Abstract: Computer-aided protein-ligand docking has emerged as a particularly important tool in drug design and development, and flexible ligand docking is a widely used method for docking simulations. Generally, flexible ligand docking can be abstracted as an optimization problem, that is, the binding energy between the protein and the ligand is regarded as the optimization objective, and the search algorithms are used to find the optimal solution of the objective function. Based on different energy functions and different search algorithms, many docking software packages have been developed. However, most of them still far from high-performance docking programs due to the following limitations, such as poor accuracy for dockings with highly flexible ligands, useless for blind docking, and low docking efficiency.

One reason for aforementioned drawbacks is the low performance of the search algorithm applied in the software packages. In our work, based on the widely-used AutoDock and AutoDock Vina docking programs, several strategies were proposed in conjunction with the RDPSO (Random Drift Particle Swarm Optimization) algorithm to make these swarm optimization algorithms more effective for the flexible ligand docking problems. First, diversity-guided strategies can control the search behavior of the swarm in an explicit way, which can not only improve the search performance of the algorithms, but also allow the algorithms to cope with different kinds of problems. Second, the multi-swarm strategy mainly focuses on the balance between the search performance and the search efficiency of the algorithm by adopting a novel information-exchange method between subswarms. Third, the hybridization of RDPSO and MCMC (Markov Chain Monte Carlo) enables the algorithm to search in a more global way, which can significantly enhance the robustness of the docking program. All the above modifications make our proposed algorithms be competitive candidates for flexible ligand docking problems, since they outperform many kinds of docking methods in most cases, and each of them shows obvious advantages in at least one specific aspect, including search performance, normal docking accuracy, blind docking accuracy and docking efficiency.

BIO: Sun Jun, Ph.D., is from Wuxi, Jiangsu. In March 2009, he graduated from Jiangnan University with a doctoral degree in control theory and control engineering and obtained a doctorate in engineering; from January 2012 to January 2013, he worked as a postdoctoral researcher in the Department of Computer Science, Oxford University, UK; from October 2013 to August 2015 Funded by the Royal Society, he is a senior visiting researcher at Oxford University and Coventry University. In July 2008, he was promoted to associate professor exceptionally, and in July 2015, he was promoted to professor. He is currently a professor and doctoral supervisor at the School of Artificial Intelligence and Computer, Jiangnan University. Mainly engaged in artificial intelligence, computational intelligence, machine learning, big data analysis, bioinformatics research and teaching of artificial intelligence, algorithm design and analysis, and high-performance computing.

Parallel Session 1 - Next Generation Neural Network Theory and Technology

分会报告 1 - 下一代神经网络理论与技术

Session Chair: Assoc.Prof. Haizhou Du, Shanghai University of Electric Power, China

May 28, 2022 | 17:00-19:00

ZOOM B: 862 3655 9782

<https://us02web.zoom.us/j/86236559782>

<p>17:00-17:15 CB-154</p>	<p>Title: Research on Water Content Prediction Method Based on LSTM Neural Network Authors: Hongtao Hu,Chen Dang,Min Li Presenter: Chen Dang Presenter’s Organization: Xi’an Shiyou University,China</p> <p>Abstract: In the development of oilfields, water cut is an important indicator to reflect the development of oilfields. At present, most oilfields are derived by mathematical formulas or predicted by a single neural network, and the accuracy is not high. In order to improve the prediction accuracy of water content, this paper proposes a water content prediction model PSO-LSTM, which uses particle swarm algorithm to optimize the hyperparameters of long-term and short-term memory neural network. Taking the long-term and short-term memory neural network as the backbone of the model, the PSO algorithm is used to find its hyperparameters. Through experiments, the prediction accuracy R2 of the PSO-LSTM model proposed in this paper can reach 0.91. Compared with the LSTM neural network model and the BP neural network model, the accuracy is the highest, and the expected goal is achieved.</p>
<p>17:15-17:30 CB-009</p>	<p>Title: A Intrusion detection model based on convolutional neural network and feature selection Authors: Liang Zhang and Chengxin Xu Presenter: ChengXin Xu Presenter’s Organization: Chongqing University of Posts and Telecommunications, China</p> <p>Abstract: With the rapid development of the Internet, the network security situation has become increasingly severe. Attackers around the world have caused thousands of economic losses to government and enterprises. Novel attack methods have brought huge challenges to traditional intrusion detection systems. This paper proposes an intrusion detection model based on deep learning. First it uses the Sigmoid pigeon optimization algorithm(SPIO) to select the features of the data samples, then uses a Three-layer convolutional neural network trains and validates the dataset. The model is tested on NSL-KDD dataset. Experimental results show that this model has a higher accuracy rate than the existing traditional detection models.</p>
<p>17:30-17:45 CB-013</p>	<p>Title: Pork price prediction using Bi-RNN-LSTM artificial neural network Authors: Junjiong Chen, Limei Lin and Xiaomin Li Presenter: Junjiong Chen Presenter’s Organization: Zhongkai University of Agriculture and Engineering, China</p> <p>Abstract: Pork is one of the main methods for human intake of animal protein, and</p>

	<p>its price level will directly affect people’s daily lives. In order to realize the prediction of the prices in the live pig (mid-term) market, based on monthly data provided by China National Database, in this paper we propose a combination of artificial neural network models based on bidirectional recurrent neural network and bidirectional long short-term memory as the backbone network. The prediction errors achieved on our data set for Mean Square Error (MSE), Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE) and Symmetric Mean Absolute Percentage Error (SMAPE) are 0.48 , 0.69 , 0.53, 3.37%, 3.37% respectively. Compared with other deep learning models, the error of this method is small, which shows that it has the ability to predict the time series of pork price.</p>
<p>17:45-18:00 CB-032</p>	<p>Title: Complete synchronization of delayed fractional-order complex-valued neural networks via adaptive control Authors: Ning Yao, Meng Hui, Jiahuang Zhang, Jiefei Yan and Weizhe Wu Presenter: Meng Hui Presenter’s Organization: Chang’an University, China</p> <p>Abstract: In this paper, without separating the complex-valued neural networks into two real-valued systems, the complete synchronization of delayed fractional-order complex-valued neural networks (FOCVNNs) is investigated. Firstly, a new fractional differential inequality with time delays is established, which can be regarded as the generalization of Halanay inequality. Secondly, some synchronization criteria are established based on this inequality and an adaptive controller. Finally, a numerical simulation is presented to demonstrate feasibility of the theoretical results.</p>
<p>18:00-18:15 CB-100</p>	<p>Title: Research on life prediction of oxygen concentrator based on improved VMD-NAR neural network Authors: Jie Bao, Bo Jing, Sheng Long, Jinxin Pan Wang, Xiaojuan Zhang, Qingyi Zhang, Yu Zhang, Songlin Huang Presenter: Jie Bao Presenter’s Organization: Air Force Engineering University, China</p> <p>Abstract: The airborne oxygen concentrator is an important part of the aircraft life support system. The degraded signal has the characteristics of nonlinearity, non-stationary, and high-noise. In view of the above characteristics in the life prediction including low accuracy, poor traceability, poor authenticity and other problems, an improved VMD-optimized NAR neural network life prediction method is proposed. The oxygen partial pressure signal is decomposed by the VMD method optimized by the gray wolf algorithm to remove the noise in the original signal. Then input the decomposed components into the NAR neural network for prediction. The prediction results of each component are superimposed to obtain the prediction of oxygen partial pressure signal. Comparing the results with methods such as EMD-NAR neural network and BP neural network, the life prediction method has better effect.</p>
<p>18:15-18:30 CB-078</p>	<p>Title: Densely Convolutional Neural Network for Transcription Factor Binding Sites Prediction Using DNA Sequence and Histone Modification</p>

	<p>Authors: Beichen Li,Zixuan Wang,Shuwen Xiong,Yongqing Zhang Presenter: Beichen Li Presenter’s Organization:Chengdu University of Information Technology, China</p> <p>Abstract: Transcription factor binding sites (TFBSs) prediction is crucial for decoding cis-regulation. However, current deep learning methods fail to simultaneously consider the multi-scale features from DNA sequences and histone modifications in an efficient manner. To this end, we propose a novel Densely Convolutional Neural Network using DNA Sequence and Histone Modification, dubbed as DCNN-SH, for TFBSs prediction. Our model adopts densely convolutional blocks to reuse multi-length motifs and multi-order dependencies of nucleotides. This unique design allows our model to consider the multi-scale features using smaller convolutional kernels compared to current methods. Our work is the first to apply densely network for TFBSs prediction. Extensive experiments over 300 ChIP-seq datasets demonstrate that our model significantly outperforms several state-of-the-art prediction methods in terms of accuracy, ROC-AUC and PR-AUC.</p>
<p>18:30-18:45 CB-080</p>	<p>Title: Effective Crude Oil Trading Techniques Using Long Short-Term Memory and Convolution Neural Networks Authors: Wisaroot Lertthaweedeche, Pittipol Kantavat and Boonserm Kijisirikul Presenter: Wisaroot Lertthaweedeche Presenter’s Organization: Chulalongkorn University, Thailand</p> <p>Abstract: Crude oil plays a vital role in the global economy and forecasting crude oil prices is crucial for both government and private sectors. However, the crude oil price is high volatility, influenced by various factors and challenging to predict. Thus, various machine learning techniques have been proposed to predict crude oil prices for decades. In this study, we propose an artificial neural network (ANN) with different combinations of convolutional neural networks (CNN) and long short-term memory (LSTM) to improve the trend forecasting of crude oil prices for better trading signals compared to traditional strategies. As the crude oil price is a time series data, it is appropriate to apply CNN and LSTM for forecasting. The concept of our model is that CNN could detect features or patterns in different locations of time series data, while LSTM could maintain both short-term and long-term memory along with time series data. The collaboration of their abilities could help the neural network model understand complex relationships of historical data and trends of crude oil prices. Our study found that the combination of CNN and LSTM could significantly enhance trading performance in the long run.</p>
<p>18:45-19:00 CB-074</p>	<p>Title: Quasi-synchronization for Complex-valued Neural Networks with Leakage delay and Mixed delay Authors: Meng Hui,Jiahuang Zhang,Jiefei Yan,Ning Yao,Weizhe Wu Presenter: Meng Hui Presenter’s Organization: Chang'an University, China</p> <p>Abstract:Recently, quasi-synchronization, a special dynamic behavior, has emerged as a new hot topic of neural networks (NNs). In order to complete and expand the</p>

content of quasi-synchronous theory, complex-valued neural network (CVNNs) should be considered to investigate, which is more complicated and has enriched performance. In this paper, the problem of quasi-synchronization of CVNNs with leakage delay and mixed delay is discussed. Based on separating techniques, two equivalent real-valued systems are obtained for further study. Then, utilizing Lyapunov function and novel proposed controller, several quasi-synchronization criteria of CVNNs are established. Finally, numerical simulation results are given to show the validity of our theoretical results.

Parallel Session 2 - Intelligent Image Analysis and Processing

分会报告 2 -智能图像分析与处理

Session Chair: Prof. Zhang Hui, Southwest University of Science and Technology, China

May 28, 2022 | 17:00-19:00

ZOOM C: 873 4342 3113

<https://us02web.zoom.us/j/87343423113>

<p>17:00-17:15 CB-091</p>	<p>Title: A Recommendation Model with Attention-aware Graph Matching Authors: Xinxin Ma, Zhendong Cui Presenter: Xinxin Ma Presenter’s Organization: Yantai University, China</p> <p>Abstract: Under the background of information overload, recommendation system can provide decision-making tools for information producers to promote information and information consumers to obtain personalized preference information. Use user-item attribute information for interaction can effectively improve the performance of the recommendation model. Existing work models and aggregates the attribute interaction of users and items in the same way, without effectively distinguishing them. However, this can't express the feature interaction between attributes well. In this work, we propose Attention-aware Graph Matching Recommendation model (AGMRec), which convert the recommendation process into a graph matching problem. In particular, we design internal-node message passing and externalnode matching to model different orders feature interactions between attributes. Then the proposed model uses an attention approach to fuse different aspects of the nodes. Experimental results on two real-world datasets show its superiority over the state-of-the-arts.</p>
<p>17:15-17:30 CB-060</p>	<p>Title: Single Image Reflection Removal Based on Reflection Region Authors: Lan Zhou, Lu Qin, Zheng Zhang and Bochuan Zheng Presenter: Lan Zhou Presenter’s Organization: China West Normal University, China</p> <p>Abstract: Images taken through transparent glass usually contain reflections, which will produce visual noise and reduce image quality. Aiming at the problem of reflection affecting image quality, we propose a method based on reflection region to remove reflections. Firstly, according to the feature of small gradient in the reflection region, the initial reflection region marker map is obtained by gradient image; Then, the more accurate reflection region marker map is obtained by using both the background region marker map and the maximum chromaticity difference binary map; Finally, according to the reflection region marker map to suppress the reflection in the reflection region. The comparison experiments with objective and subjective evaluations show that our method is better at removing reflection and retaining background details than several state-of-the-art methods.</p>
<p>17:30-17:45 CB-072</p>	<p>Title: Imbalanced Image Classification by An Enhanced Depthwise Separable Convolutions Network Authors: Lulu Qu, Haiqing Zhang, Daiwei Li, Xi Yu, Dan Tang, Lei He Presenter: Lulu Qu</p>

	<p>Presenter’s Organization: Chengdu University of Information Technology, China</p> <p>Abstract: The field of image recognition is developing rapidly, and many high-performance models have been proposed. However, these models encounter some problems when dealing with imbalanced data, which are, the minority classes have low accuracy and the majority classes have high accuracy. This paper proposes an enhanced depthwise separable convolutions network (called EXception), which takes into account both the learning of the minority classes and the majority classes. EXception contains three components. The data augmentation component improves the generalization by cutting and flipping the pictures. The transfer learning component is a pre-trained model (i.e., Xception) on ImageNet. This paper reuses part of the pre-trained parameters of Xception to reduce training time. And the sampling component contains a novel sampling algorithm that can samples the training data. Before the next iteration, according to F1-scores of the previous iteration, the algorithm dynamically changes the number of samples for each class in the next iteration. To a certain extent, the algorithm ensures that the model can fairly learn the features of the majority classes and the minority classes.</p>
<p>17:45-18:00 CB-073</p>	<p>Title: Recruitment Fraud Detection Method Based on Crowdsourcing and Multi-feature Fusion Authors: Wang Junling, Liu Bo Presenter: Liu Bo Presenter’s Organization: Jiangxi University of Science and Technology, China</p> <p>Abstract:Regarding the problem that false recruitment information is difficult to identify, an online recruitment fraud detection method based on crowdsourcing and multi-feature fusion is proposed. Firstly, the keywords in the recruitment text are extracted through a data crowdsourcing platform; Secondly, a text classification model merged Bidirectional Encoder Representation from Transformers (BERT), Bi-directional Long Short-Term Memory (BiLSTM), Convolutional Neural Network (CNN) and Attention mechanism is constructed. The model can fuse the contextual features and local features of recruitment text, at the same time assign different weights to the words in the text, and focus on important words; Finally, the keywords extracted by the crowdsourcing platform are integrated into the model to guide its training and highlight the role of keywords in classification. Compared with other network models, the experimental results show that the classification accuracy of the proposed model is increased by 5.3% on average, and can effectively detect online recruitment fraud.</p>
<p>18:00-18:15 CB-076</p>	<p>Title: Utilizing Text-based Augmentation to Enhance Video Captioning Authors: Shanhao Li, Bang Yang, Yuexian Zou Presenter: Shanhao Li Presenter’s Organization: Peking University, China</p> <p>Abstract:Video captioning (VC) is a challenging cross-modality task that requires the model to capture the visual information in the video and to automatically generate the captions accordingly. Literature shows that</p>

	<p>Transformer-based deep neural networks (DNN) achieve the state-of-arts. Without exception, such DNN models are data-hungry, which hinders the development of the VC models since large-scale VC training datasets need to pay a much higher cost to build compared to the datasets for other tasks such as image recognition or neural machine translation. As a result, data augmentation is a valuable approach to improving the performance of VC models. In this work, we propose two text-based augmentation methods to enlarge the scale of VC datasets, so as to develop better VC models. Our basic ideas lie that when a video is given, a different person may give different descriptions, which leads to a better understanding of the given video. From another view of point, language has flexible and versatile expression properties which can be used to augment training corpora. Specifically, in our work, the pre-training Transformer-based language models, i.e., PEGASUS from Google and translator WMT19 from FAIR, have been employed to generate “new captions.” The various ways to select the proper captions and training strategies have also been fully explored to capitalize on data augmentation. Extensive experiments are conducted on the mainstream VC training datasets: MSVD and MSR-VTT. It is encouraged to see that our data augmentation method consistently boosts LSTM-based and Transformer-based VC models, with improvements of an average of 3.8 and up to 7.9 CIDEr scores.</p>
<p>18:15-18:30 CB-079</p>	<p>Title: Classification of Fir Seeds Based on Feature Selection and Near-infrared Spectroscopy Authors: Jing Lu, Yan Zhang, Shanshan Xie, Jiang Liu, Danjv Lv, Biaosheng Huang, Yue Yin Presenter: Jing Lu Presenter’s Organization: Southwest Forestry University, China</p> <p>Abstract: Fir trees account for about a quarter of the country's building materials. Fir trees grow quickly, and have certain economic, social, ecological and other benefits. Different fir trees require different growth environments, so it is necessary to accurately identify the fir seeds to cultivate them more specifically, so as to maximize the various benefits of the fir trees. In this paper, six kinds of fir seeds, namely <i>Abies fabri</i>, <i>Cryptomeria japonica</i>, <i>Metasequoia glyptostroboides</i>, <i>Cathaya argyrophylla</i>, <i>Keteleeria fortune</i>, <i>Picea asperata</i>, were used as experimental samples. The spectral data of six fir seeds were measured by Fourier transform near-infrared spectrometer. To reduce the high dimensions of spectra data, four different feature selection methods (InfoGain, Symmetric Uncert, Gainratio and ReliefF) were used to select effective feature subset for random forest classification. Experiments compared performances of the original data and the selected features cascade data with standard normal variate (SNV) method to preprocessing. The results show that the accuracy rate of the selected feature subset through SNV processing reaches 98.90%, 1.1% higher than that of the original data and the rate of dimensionality reduction reaches 97.7%. The study provides an effective classification method for fir seeds of NIRS data.</p>
<p>18:30-18:45 CB-081</p>	<p>Title: Generation of Enhanced CT Image of Thyroid Based on Transformer and Texture Branching</p>

	<p>Authors: Ning Xiao, Zhenyu Li, Shaobo Chen, Liangtian Zhao, Yuer Yang, Hao Xie, Yang Liu, Yujuan Quan, Junwei Duan Presenter: Ning Xiao Presenter’s Organization: Jinan University, China</p> <p>Abstract: Thyroid cancer is one of the most common cancers in young women, but due to the noise and artifacts of ultrasound images, there is still a certain misdiagnosis rate in clinical practice, and it is often combined with plain and Contrast-enhanced CT for further diagnosis. Compared with plain CT, Contrast-enhanced CT has better contrast with reflecting the erosion of organ margins, which is an important symptom for diagnosing thyroid cancer. Contrast-enhanced CT, however, relies on the patient being injected with a contrast agent and exposed to ionizing radiation. Our work proposes an improved Unet architecture. To generate enhanced CT images with clear texture and higher quality, we use the convolutional Transformer module to learn the global information of high-dimensional features, and then fuse the texture feature module to extract the local texture information of plain CT and the edge information extracted by superpixels as a priori knowledge to restore texture details. Experimental results show that our framework outperforms state-of-the-art generative networks and can generate higher-quality Contrast-enhanced CT.</p>
<p>18:45-19:00 CB-012</p>	<p>Title: Real-time Face Structure Reproduction Model for Generative Adversarial Networks Authors: Fan Yang, Fang-chen Ju, Qiao-xi Zhang, Meng Han and Yu-xing Yong Presenter: Fan Yang Presenter’s Organization: Nanjing University of Finance and Economics, China</p> <p>Abstract: In this paper, the image to image translation algorithm based on generative countermeasure network is used to capture and extract the face features in the source image and target image, obtain the mapping function after training the target image model, and transfer the features of the original face image to the face model of the target image. The conditional generative adversarial networks is selected as the solution to the face to face mapping problem. At the same time, a novel method for real-time face reconstruction of single target video sequence is proposed. When studying the selected loss function, we find that the system has wide applicability and strong ease of use, and there is no need to adjust the parameters. The results show that in addition to face capture and feature migration, in many tasks that need to process highly structured images, the pix2pix algorithm based on cGAN is also a highly expected method. This means that this system can not only be more perfect in face feature migration, but also have the possibility to expand the function in other fields of image processing.</p>

Parallel Session 3 - Data Analysis and Computational Models

分会报告 3 - 数据分析与计算模型

Session Chair: Prof. M. Ali Akcayol, Gazi University, Turkey; Assoc. Prof. Xiao Luan, Chongqing University of Posts and Telecommunications, China

May 29, 2022 | 14:00-16:00

ZOOM A: 824 2128 3210

<https://us02web.zoom.us/j/82421283210>

<p>14:00-14:15 CB-1001</p>	<p>Title: A Position Representation Method Based on the Localization Mechanism of Rat Hippocampus Authors: Li Weilong, Wu Dan, Dai Chuanjin and Wu Dewei Presenter: Li Weilong Presenter's Organization: Air Force Engineering University, China</p> <p>Abstract: The current methods for autonomous positioning cannot realize the integration of perception, composition and behavior. In order to solve this problem, inspired by the navigation and localization mechanism of the rat brain, this paper links the spatial information with the discharge characteristics of brain navigation cells, and proposes a position representation method based on the localization mechanism of rat hippocampus. The supervised learning mechanism is introduced to establish the spatial location memory model. We use the radial basis function (RBF) network to link the extracted landmarks with the place cells map. The location of the agent in space can be determined by the firing cells of the current location. The simulation experiment results show that the method in this paper is feasible to represent the position of the agent. The average positioning error between the estimated position and the real position is 2.35m, and the positioning error gradually decreases as the exploration time increases. Compared with the traditional methods, our method can directly judge the position and take the next action by using the place cells map after identifying the landmarks, which realizes the integration of the perception, composition and behavior to some extent.</p>
<p>14:15-14:30 CB-042</p>	<p>Title: Prediction of protein post-translational modifications in rice based on multi-head self-attention Authors: Qiankun Wang and Hui Gao Presenter: Qiankun Wang Presenter's Organization: University of Electronic Science and Technology of China, China</p> <p>Abstract: Post-translational modification of protein refers to the covalent addition of some functional groups or protein molecules to the amino acid residues of the protein that has completed the translation process, which will largely change the original structure of the protein and the functional properties of the protein, increasing the protein Diversity of functional groups. Post-translational modification of proteins is involved in almost all cellular regulatory processes and pathogenesis in organisms, and has a very important regulatory role in this process. Determining whether these lysine undergo some kind of post-translational modification could help researchers better understand cellular processes and pathogenesis. In this</p>

	<p>paper, we propose a lysine acylation predictor called Att-Lys based on a multi-head self-attention mechanism. The substrate composition features of the amino acid sequence of rice protein and the word vector features of twenty amino acids in rice protein trained based on the Word2vec method are used as data input. Att-Lys learns deep features from these two inputs through a stacked multi-head attention mechanism module, and then implements the prediction function through a linear neural network. The Att-Lys model proposed in this paper is compared with five traditional machine learning models of SVM, Random Forest, XGboost, Decision Tree and Bayesian model on six different post-translational modification type datasets. Among them, Att-Lys obtained the best AUC. Especially in the prediction experiment of acetylation type, Att-Lys achieved an AUC value of 0.85, which exceeded the other control methods from 0.69 to 0.82.</p>
<p>14:30-14:45 CB-059</p>	<p>Title: IAVT: Anomalous Vessel Trajectory Detection Using AIS Data Authors: Yingchun Huan, Xiaoyong Kang, Yafen Wang, Yuju Wang Presenter: Yingchun Huan Presenter’s Organization: China Transport Telecommunications & Information Center (CTTIC), China</p> <p>Abstract: With the mandatory installation of automatic identification system (AIS) equipment on various vessels, a large amount of vessel trajectory data is collected. It has been widely used for maritime data mining in practice. In this paper, we aim to discover anomalous trajectory patterns from AIS-based vessel trajectories, for example, automatically detecting vessel frauds, and recognizing the vessels navigating in the wrong direction. To achieve the objective, we first reconstruct the vessel trajectories using cubic splines interpolation. We then group all vessel trajectories crossing the same source-destination cell and represent each vessel trajectory as a sequence of symbols. The Isolation-Based Anomalous Vessel Trajectory (IAVT) detection method is proposed in this work, which could achieve remarkable detection performance. Finally, we propose to implement visualization experiments on realistic and simulated datasets to illustrate the superior performance of the proposed method.</p>
<p>14:45-15:00 CB-084</p>	<p>Title: Underwater Acoustic Target Classification with Joint Learning Framework and Data Augmentation Authors: Liang Chen, Feng Liu and Daihui Li, Tongsheng Shen, Dexin Zhao Presenter: Liang Chen Presenter’s Organization: Zhejiang University, China</p> <p>Abstract: As speech recognition technologies have garnered increasing attention recently, the possibility of integrating related technologies into the field of underwater acoustic target classification (ATC) has piqued researchers’ curiosity. However, the classification of underwater acoustic targets confronts several obstacles due to the time-varying and complicated nature of the underwater environment,, such as the low signal-to-noise ratio and background interference. To address these concerns, this paper proposes a combined feature extraction framework and a deep convolutional neural network learning framework. This</p>

	<p>combination features include MFCC, CQT, Gammatone, Log-mel which are extracted from the underwater acoustic signal and fed into the joint learning framework. The classifier has a deep learning architecture, which is a deep neural network system that can learn differentiating features from physical feature representations to abstract concepts in a hierarchical pattern. Multiple datasets under diverse settings have been used to verify the performance of our proposed architecture. Using the acoustic data gathered in several underwater experiments conducted in a shallow sea setting, the proposed framework achieves a recognition rate of 89.9% and a competitive classification accuracy in the underwater scenario.</p>
<p>15:00-15:15 CB-1021</p>	<p>Title: Development and verification of multi- class data in artificial intelligence model group based on cloud computing Author: Qian Xiang Presenter: Qian Xiang Presenter’s Organization: Sichuan Sino-Tech College of Information Technology, China</p> <p>Abstract: Artificial intelligence (AI) has been widely studied. Due to the increasingly wide application of multi-class data, with the characteristics of rapid arrival, rapid change, huge quantity, and potential infinity, the original classification algorithm for the static database cannot adapt to the reality of multi-class data. In order to achieve reliable and accurate data dependency analysis by loop-level parallelism detection in large programs, this paper firstly designs and implements a parallel Naive Bayes (NB) multi-class data analysis algorithm. Then, we adjust the number and weight of classifiers as needed to maintain high classification accuracy and reduce the cost. Meanwhile, this paper establishes an optimal complexity model by realizing the self-organizing control of the data mining process. The results show that the parallel NB classification algorithm can bring excellent performance improvement and good scalability and can meet individuals’ performance requirements for massive data classification to a certain extent.</p>
<p>15:15-15:30 CB-052</p>	<p>Title: Application of Blockchain Technology in Asset Securitization Author: Wenchuan SUN Presenter: Wenchuan SUN Presenter’s Organization: Xiamen University, China</p> <p>Abstract: Asset securitization is a structured financial product, and its risks exist in the complexity of the deal structure and the extension of the transaction chain, and simultaneously amplify the information asymmetry between the parties to the final transaction. This situation can lead to exogenous shocks that multiply risk. Companies often engage in asset securitization activities with specific portfolios of assets or cash flows they hold, such as accounts receivable, bank loans, etc., in order to obtain more funds for growth. The current blockchain technology has become an important technology choice for asset securitization with its advantages of decentralization, smart contracts, and tamper-proof. This paper introduces and analyzes the basic technical features of blockchain, and discusses the feasibility of blockchain application in asset securitization and the application process of</p>

	<p>blockchain securitization. The application of blockchain technology in the example of accounts receivable asset securitization is exemplified to clarify the effect of using blockchain technology and to provide design ideas and references for enterprises to apply blockchain technology to asset securitization.</p>
<p>15:30-15:45 CB-057</p>	<p>Title: Health assessment and fault warning method for elevator door system Authors: Qing Mao, Yaming Dong and Jiarong Yang Presenter: Qing Mao Presenter’s Organization: Shanghai Electric Group Central Academe, China</p> <p>Abstract: The elevator door is the most malfunctioning part of an elevator. A regular health assessment of the elevator door system can help elevator maintenance personnel detect abnormalities in time. In this paper, we first sort out common elevator door system faults and then propose a method of elevator door health assessment and fault warning based on the Gaussian Mixture Model. Finally, we design a series of elevator door failure experiments and use experimental data to verify the effectiveness of the proposed method.</p>
<p>15:45-16:00 CB-1010</p>	<p>Title: Research on the Relation of the Risk and Resilience Factors of Power Infrastructure Authors: Ying Chen, Shuqi Li, Ling Chen, Jie Wu, Mingju Chen, Hong Wang Presenter: Zhengxu Duan Presenter’s Organization: Sichuan University of Science & Engineering, China</p> <p>Abstract: This paper deals with the resilience of power infrastructure. It studies the composition and mutual influence mechanism of the risk and resilience factors of power infrastructure. The natural, technical and man-made hazards that affect the power infrastructure are analyzed. The resilience elements and properties of power infrastructure are then built, from the aspects of engineering, economy, organization and environment. Using questionnaire surveys, a mathematical model for the mechanism of power infrastructure risk and resilience factors is developed. The resilience evaluation of power infrastructure is performed, and the built resilience model is verified using calculation examples. The results show that the proposed power infrastructure resilience evaluation model can efficiently evaluate the resilience of power infrastructure, and can be applied in several application domains.</p>

Parallel Session 4 - Algorithms and Intelligent Computing

分会报告 4 -算法与智能计算

Session Chair: Assoc. Prof. Razali Yaakob, Universiti Putra Malaysia, Malaysia

May 29, 2022 | 14:00-16:15

ZOOM B: 862 3655 9782

<https://us02web.zoom.us/j/86236559782>

<p>14:00-14:15 CB-019</p>	<p>Title: A Novel Multi-objective Neural Architecture Search Algorithm via Gaussian Progress Sampling Authors: Xuehui Chen, Jingfei Jiang, Xin Niu, Hengyue Pan, Peijie Dong and Zimian Wei Presenter: Xuehui Chen Presenter’s Organization: National University of Defense Technology, China</p> <p>Abstract: Multi-objective neural architecture search (NAS) algorithms aim to automatically search the neural architecture suitable for different computing power platforms by using multi-objective optimization methods. The LEMONADE algorithm, which is a representative algorithm of multi-objective NAS algorithms, maintains a population of networks on an approximation of the Pareto front of the multiple objectives, such as predictive performance, number of parameters or FLOPs. To address the irrationality and repeatability of only sampling based on cheap objectives in LEMONADE, we propose a novel multi-objective neural architecture search algorithm via Gaussian Process sampling, dubbed GP-LEMONADE. Meanwhile, to make the sampling process more efficient, we design the online predictor based on Gaussian Process to predict expensive objectives, and sample candidate networks by combining cheap objectives and expensive objectives, so as to ensure the rationality and efficiency of sampling. Experiments show that the GP-LEMONADE algorithm evolves 100 generations and obtains the SOTA model with 3.98% test error. This process only takes 7.38 GPU days, which is 26.75 GPU days shorter than that of LEMONADE. Our methods have improved the performance of the LEMONADE algorithm and ensured the rationality and efficiency of sampling during the evolution, which effectively improving the search efficiency of multi-objective NAS algorithms.</p>
<p>14:15-14:30 CB-025</p>	<p>Title: A Realization of Self-face Diagnosis Algorithm Based on Chinese Medicine Theory Authors: Runqi Nan, Xiubin Zhu and Dan Wang, ZiYue Ma Presenter: Runqi Nan Presenter’s Organization: Xidian University, China</p> <p>Abstract: Face recognition is a popular research direction in the field of artificial intelligence. Neural networks are trained on the basis of high-dimensional data characterizing the images to be analyzed and used to extract the important features of the image with the aim of detecting abnormal surface of human faces. The facial anomaly recognition algorithm, which can effectively identify human faces, the acne, moles and dark circles on the face, proposed in this study is realized using the Tensorflow and Keras frameworks. The proposed method has significant application</p>

	<p>prospects in face diagnosis of Chinese medicine. Experimental studies demonstrated that the proposed method achieves higher recognition accuracy and faster recognition speed in comparison with other existing methods.</p>
<p>14:30-14:45 CB-039</p>	<p>Title: APRSR: Adversarial Personalized Ranking Modeling for Sequential Recommendation Authors: Liwei Pan, Yi Gao, Shixing Zhou and Jianxia Chen Presenter: Liwei Pan Presenter’s Organization: Hubei University of Technology, China</p> <p>Abstract: In recent years, the sequential recommendation achieves excellent results. But it also meets many challenges. For example, when we add adversarial perturbations to the input, the model’s performance might be weakened. To solve this problem, we propose a novel model named APRSR, Adversarial Personalized Ranking Modeling for Sequential Recommendation in short. APRSR model is designed based on a self-attention sequential recommendation model by adding adversarial perturbations. First, APRSR can learn local representation and the global representation respectively, then it can get the final representation by balancing the local representation and the global representation. In the meantime, it considers the influence of candidate items on user’s intent. To enhance the robustness and learn more expressive features, APRSR utilizes the idea of the adversarial matrix factorization which can generate the adversarial perturbations to reduce the loss as much as possible. Extensive experiments on five public real-world datasets demonstrate the effectiveness of APRSR and outperform those of other state-of-the-art models.</p>
<p>14:45-15:00 CB-044</p>	<p>Title: Evolution Analysis of Large-scale Spatiotemporal Configuration of Provincial Birth Rate in China Authors: Liyun Su, Wen Guo, Shengli Zhao and Jing Quan Presenter: Liyun Su Presenter’s Organization: Chongqing University of Technology, China</p> <p>Abstract: Population issues have a direct impact on economic development and social stability. Solving population problems requires long-term regulation and implementation of effective measures, so it is necessary to have an accurate understanding of the Chinese population. To more comprehensively reveal the static spatial distribution and dynamic evolution of the Chinese birth rate, this paper conducts a spatial statistical analysis of spatial-temporal characteristics of the changes in birth rate at the provincial level, which investigates the period from 1978 to 2018, and the time is as long as 40 years. The result is the birth rate of each province in China has a non-random distribution in space, gradually decreasing from west to east. The birth rate shows a positive spatial aggregation in China’s provinces with an overall upward trend. Spatial stratified heterogeneity among the four regions of east, middle, west and northeast shows an overall increasing trend. From the local aggregation characteristics, it can be seen that the HH aggregation is mainly in Xinjiang, Tibet, Qinghai, Yunnan, and Guangxi in the western and central and southern regions, and the LL aggregation is mainly in Heilongjiang, Jilin, and Liaoning</p>

	<p>in the northeast region. The HH clustering area gradually migrated from the west to the central and southern part.</p>
<p>15:00-15:15 CB-046</p>	<p>Title: An Improved Particle Filter Target Tracking Algorithm using Online Learning Model Authors: Wenjian Ying Presenter: Wenjian Ying Presenter’s Organization: Naval University of Engineering, China</p> <p>Abstract: An improved particle filter target tracking algorithm is proposed which using optimization observation likelihood and Online Learning Model in this paper. Focusing on uncertain features, the detection of dynamic targets is realized by laser range finder observation, and an online learning algorithm of the proposed geometry model of the vehicle can automatically adapt to the dimensions of various vehicle body targets without any prior information. The experiment results on the Navlab and Standford Campus datasets show that the proposed method can achieve good autonomous navigation performance.</p>
<p>15:15-15:30 CB-082</p>	<p>Title: Deep hash model for similarity text retrieval Authors: Zhiwen Li, Dan Zhang, XiaoGuang Yuan, Jun Zheng Presenter: Zhiwen Li Presenter’s Organization: Beijing Institute of Computer Technology and Application, China</p> <p>Abstract: Text hashing transforms a text into a binary hash code, making similar texts have similar hash codes. Text hashing can reduces storage and improves retrieval efficiency of similar texts retrieval, but integrating semantic characteristics into hash code of text is difficult and is a hot topic. A deep hashing network model based on SE-Inception + Bi-LSTM + Attention mechanism is proposed in this paper. The Bert pre-training language model is used to preprocess text content to obtain the input vector, and the hash layer is added to generate the binary hash code of the text. The proposed model deeply combines semantic information to generate hash code and adds SE module with attention mechanism to improve the performance of neural network. The experimental results showed that the proposed model is superior to other model in extraction accuracy and classification accuracy</p>
<p>15:30-15:45 CB-083</p>	<p>Title: Improvement and experimental evaluation based on ORB-SLAM-VI algorithm Authors: Rui Wang; Guangfu Wu; Yue Deng Presenter: Rui Wang Presenter’s Organization: Jiangxi University of Science and Technology,China</p> <p>Abstract: With the development of science and technology in recent years, SLAM technology as the intersection of robotics and computer vision has also made great progress. Based on the simultaneous localization and mapping technology of visualinertial (ORB-SLAM-VI) tight coupling feature point information, the number of feature points that can be extracted by robots in actual scenes or low-texture environments is small, and the application scenarios are not rich enough. As well as the problem that the algorithm initialization speed is not fast enough, a tightly</p>

	<p>coupled SLAM system based on the step-by-step joint initialization of point characteristics and IMU information is proposed. The improved algorithm has been experimentally proved on the EuRoC dataset sequence to initialize the system more quickly and stably. The time is shortened by at least 2 seconds; experiments on 11 different sequences of the dataset show that compared with the VINS-Fusion and ORB-SLAM-VI algorithms, the improved algorithm is less robust for localization in stereoIMU scenarios, but the accuracy of pose tracking and positioning is the highest.</p>
<p>15:45-16:00 CB-123</p>	<p>Title: Source-Load Joint Probability Prediction Based on Transformer Model Authors: Pingzhao Hu, Xin Shan, Diangang Hu, Jiayu Fu, Chen Wang, Kaifeng Zhang Presenter: Pingzhao Hu Presenter’s Organization: Southeast University,China</p> <p>Abstract: Renewable energy power generation prediction, including wind and photovoltaic power prediction, is usually performed separately from load prediction, while there are significant internal relationships between renewable energy power generation and load consumption. Therefore, exploring the relationship between source and load, and implementing source-load joint prediction may improve the accuracy of source-load prediction simultaneously. This paper proposes a source-load joint probability prediction method, PCMDT (Probability-CNN-Multi-Decoder-Transformer), based on Transformer model. Firstly, we analyze the possible aspects of the relationship between renewable and load. Then the CMDT(CNN-Multi-Decoder-Transformer) model is used to realize the point prediction of renewable energy power generation and load power. Next, the conditional quantile is obtained by optimizing the quantile loss function (Pinball Loss) to realize the joint probability prediction of source and load. Finally, the model is tested on a public state-level dataset. Comparing the results of source-load joint prediction with non-joint prediction, the proposed model can improve the accuracy of renewable energy and load prediction.</p>
<p>16:00-16:15 CB-129</p>	<p>Title: CM-Predict: A Classification Model to Predict Cancer Metastasis Based on Co-expression Network Authors: Jingbo He, Boyang Yu, Zhaonian Cai Presenter: Jingbo He Presenter’s Organization: Jilin University, China</p> <p>Abstract: Cancer metastasis is a complex process that usually shows a preference for certain organs, with the brain, bone, liver, and lung being the four most common metastatic organs. Studying the metastatic characteristics of cancer with great importance for the clinical diagnosis of cancer and the treatment of patients with advanced cancer. In this paper, we propose CM-Predict, a method for predicting metastatic organs in cancer. Take advantage of the feature that the co-expression network of genes with the same type of cancer is consistent, build a framework for feature extraction using reference networks and perturbation networks, and use the extracted features to classify samples with cancer metastasis. We compared CM-Predict with other classification models, for the cancer metastasis classification</p>

task, CM-Predict significantly outperformed the four machine learning methods in the other models in the BLCA, ESCA, and LIHC datasets. We also used a new statistical analysis method for enrichment analysis of the features screened by CM-Predict, which provides a new means to elucidate the mechanisms of cancer metastasis.

Parallel Session - Big Data Technology and Data Management

分会报告 5 -大数据技术及数据管理

Session Chair: Dr. Md. Altab Hossin, University of Electronic Science and Technology of China, China

May 29, 2022 | 14:00-16:15

ZOOM C: 873 4342 3113

<https://us02web.zoom.us/j/87343423113>

<p>14:00-14:15 CB-010</p>	<p>Title: Industrial Cyber Intelligent Control Operating System that Hybrid with IEC 61499 and Big Data on Edge Computing Authors: Weibin Su, Ivy Kim Machica, Gang Xu, Zhengfang He and Yanchun Kong Presenter: Weibin Su Presenter’s Organization: Yunnan Technology and Business University, China</p> <p>Abstract: IEC 61499 and Big Data systems, which are also distributed architecture, but they belong to two independent and unrelated platforms due to different network and control concepts. With the development of intelligent manufacturing factories, the big data generated by the process of industrial production is facing unprecedented challenges of storage and data processing. The current approach is to put industrial big data on cloud computing and the industrial automation control program on the side that is close to physical equipment. This architecture has the problems of low efficiency, insufficient security and poor real-time performance. The purpose of this paper is to design an architecture for intergration IEC61499 and Big Data. It can not only reduce the cost of building a smart factory, but also increase the security and data access velocity. More importantly, it can meet the real-time performance of industrial control.</p>
<p>14:15-14:30 CB-030</p>	<p>Title: Dynamic data partitioning strategy based on heterogeneous Flink cluster Authors: Chenglong He, Yan Huang, Chaoyong Wang and Nian Wang Presenter: Chenglong He Presenter’s Organization: Xi'an Jiaotong University, China</p> <p>Abstract: As a popular big data stream processing engine, Apache Flink has obvious advantages in stream data processing. The data partitioning strategy of Flink stream processing jobs ignores metrics such as heterogeneous cluster, real-time computational resources of nodes and communication delays between nodes, which can easily cause load imbalance problems. In this paper, we propose a dynamic data partitioning strategy for stream processing jobs based on heterogeneous Flink cluster for adjusting the data load among nodes. The strategy dynamically adjusts the ratio of data processed by each node according to the real-time resource information, communication delay and hardware information of each node, so that the data load among nodes is at a relatively balanced level after multiple rounds of feedback adjustment. The experimental results show that the strategy can effectively improve the throughput and reduce latency of the job.</p>
<p>14:30-14:45 CB-062</p>	<p>Title: Missing Values for Classification of Machine Learning in Medical data Authors:Lijuan REN, Tao Wang, AICHA SEKHARI SEKLOULI,HAIQING ZHANG and ABDELAZIZ BOURAS Presenter: Haiqing Zhang</p>

	<p>Presenter’s Organization: Chengdu University of Information Technology, China</p> <p>Abstract: Missing values are an unavoidable problem for classification tasks of machine learning in medical data. With the rapid development of the medical system, large scale medical data is increasing. Missing values increase the difficulty of mining hidden but useful information in these medical datasets. Deletion and imputation methods are the most popular methods for dealing with missing values. Existing studies ignored to compare and discuss the deletion and imputation methods of missing values under the row missing rate and the total missing rate. Meanwhile, they rarely used experiment data sets that are mixed-type and large scale. In this work, medical data sets of various sizes and mixed-type are used. At the same time, performance differences of deletion and imputation methods are compared under the MCAR (Missing Completely At Random) mechanism in the baseline task using LR (Linear Regression) and SVM (Support Vector Machine) classifier for classification with the same row and total missing rates. Experimental results show that under the MCAR missing mechanism, the performance of two types of processing methods is related to the size of datasets and missing rates. As the increasing of missing rate, the performance of two types for processing missing values decreases, but the deletion method decreases faster, and the imputation methods based on machine learning to have more stable and better classification performance on average. In addition, small data sets are easily affected by processing methods of missing values.</p>
<p>14:45-15:00 CB-102</p>	<p>Title: Using big data for a comprehensive evaluation of urban vitality: A case study of Guangzhou, China Authors: Zhaohua Deng, Yaqin Zhu, Mingxin Liu, Shifu Wang Presenter: Yaqin Zhu Presenter’s Organization: South China University of Technology, China</p> <p>Abstract: Urban vitality is a key concern for contemporary urban development. Existing studies have mainly focused on the impact of the built environment on urban vitality, while sociodemographic factors have been largely overlooked. There are also few studies on the typology of urban vitality in different urban settings. This study develops a new comprehensive indicator system to evaluate the influence of urban form, urban function and sociodemographic factors on urban vitality. Guangzhou is used as a case study, since it is a historical and commercial city with diverse vibrant urban areas. Big Datasets used in this research include Baidu Huiyan dataset, OSM road network data, building information data, and the POI dataset. Spatial autocorrelation analysis and regression analysis have also been conducted to understand the impact of key factors (urban form, urban function, and sociodemographic) on urban vitality in different types of neighborhoods. The study identifies a weak correlation between urban function and vitality, but a strong relationship between urban form, sociodemographic and vitality. Key indicators such as building density, floor area ratio, intersection density and high-income population density are positively correlated with vitality, while they have different effects on various vibrant neighborhoods. This research provides planning implications for the</p>

	<p>improvement in urban vitality.</p>
<p>15:00-15:15 CB-137</p>	<p>Title: Review of Panel Data Clustering Methods and Applications Authors: Xiqin Ao , Erbao Wei Presenter: Xiqin Ao Presenter’s Organization: Anhui Xinhua University, China</p> <p>Abstract: Panel data has the dual characteristics of cross-sectional data and time series. Cluster analysis with panel data can better reflect the dynamic development trend and development state of indicators. This paper aims to study panel data clustering methods and application scenarios. Based on the analysis of relevant literatures retrieved from Chinese and English databases, the clustering methods of panel data are summarized. Based on the existing research results, the clustering methods of panel data are summarized into three categories: the method based on dimension reduction, the method based on similarity measure index design and the method based on grey correlation analysis. The advantages and disadvantages of each method are compared and analyzed. Then its application in economic analysis, air quality monitoring and other fields is introduced. Finally, the potential research directions in this field are proposed.</p>
<p>15:15-15:30 CB-151</p>	<p>Title: Research on Intelligent Management Technology of Project Reserve Data in Enterprise Digital Transformation Authors: Fang Shao, Jie Cai, Wei Peng, XianFeng Shi , HongLiang Han Presenter: Fang Shao Presenter’s Organization: State Grid Hubei Electric Power Co., Ltd WuHan, China</p> <p>Abstract: The project reserve of power grid enterprises is related to the company's future development focus and the creation of key products, and is a key step in the construction and development of enterprises. However, due to the large amount of project data in the reserve stage, the data sorting, screening, and value evaluation of the reserve project are huge, and the human processing is time-consuming and labor-intensive. Therefore, it is urgent to study the intelligent processing of enterprise reserve project data based on artificial intelligence technology to improve the quality and efficiency of enterprise reserve project management. Aiming at the needs of intelligent evaluation of enterprise project data value, this paper studies the reserve project clustering algorithm based on improved k-means algorithm technology, and realizes the automatic classification of project types, thereby improving the management efficiency of reserve projects.</p>
<p>15:30-15:45 CB-1007</p>	<p>Title: Deep Reinforcement Learning Scheduling of Container Cloud Workflow Considering Invalid Time-consuming and Reliability Authors: Yaotong Wu , Ming Gao , Ye Wang , Liantan Duan Presenter: Yaotong Wu Presenter’s Organization: Dongbei University of Finance and Economics, China</p> <p>Abstract: Cloud computing workflow scheduling problem in now hundreds of thousands, millions of sensors are distributed in the edge cloud, information is summarized to the proximal small data center, and then converged to the</p>

	<p>edge-cloud hybrid scene of data storage on several public cloud, with broad development prospects and application market. The systematic and quantitative reliability research of workflow scheduling problems based on cloud computing is one of the key factors to ensure the efficient and high-quality completion of workflow scheduling tasks. Therefore, this paper follows from three dimensions: cloud provider, task and service type, and data transmission, Combined with energy consumption factors including resource balance, GPU / CPU energy consumption model, energy consumption model with load change with voltage, By quantireliability parameters, simulated workflow scheduling and reasonably setting time window, a hybrid big data reliability optimization model are proposed for the optimization of workflow scheduling.</p>
<p>15:45-16:00 CB-1011</p>	<p>Title: Big Data Analysis in Human Resources Management:Performance Prediction Based on Employee Network Author: Jia Yuan Presenter: Jia Yuan Presenter’s Organization: Chengdu Institute of Public Administration, China</p> <p>Abstract: Big data is comprehensively changing the concept and methodology of scientific research. In particular, some semi quantitative and even qualitative disciplines, including sociology, psychology and management, will be transformed into quantitative chemistry based on massive data analysis. Taking a specific example, this paper shows the immeasurable prospect of big data analysis in human resource management. Through the non intervention data left on the internal employee socialization platform, this paper constructs a two-tier employee network: social network and interactive network, analyzes the structural characteristics of the employee network, and realizes the employee performance analysis and promotion and resignation prediction based on the employee network. This paper is the starting point for the analysis and application of a large class of human resources big data with theoretical and practical significance.</p>
<p>16:00-16:15 CB-153</p>	<p>Title: A*-FastIsomap: An Improved Performance of Classical Isomap based on A* Search Algorithm Authors: Tanzeel U Rehman, Jing Li, Zhou Zhiqiang, Naji Alhusaini Presenter: Tanzeel U Rehman Presenter’s Organization: University of Science and Technology of China, China</p> <p>Abstract: Nonlinear Dimensionality Reduction (NLDR) is a well-known approach of manifold learning to transform the data from high to low dimensional space. After studying various techniques proposed for the NLDR, we find that performance improvement is still required. Therefore, we adopt classical Isomap, which faces Shortest Path Distance (SPD) and high computational time cost problems. These problems are occurring due to the Dijkstra algorithm. This paper presents the A*-FastIsomap method for SPD issues, which is based on the A* Search Algorithm with the Double Buckets algorithm. We executed a comparison of the A*-FastIsomap with classical Isomap to verify its better efficiency and results for high dimensional datasets with much higher accuracy. The outcome of our current study</p>

	<p>demonstrates that as compared to classical Isomap, our proposed A*-FastIsomap is faster and more accurate. Furthermore, our proposed method can reduce the computation time for high and large dimensional datasets.</p>
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Parallel Session 6 - Intelligent Transportation and System Management

分会报告 6 -智能交通与系统管理

Session Chair: Dr. Zicheng Wang, China Railway Eryuan Engineering Group Co.Ltd, China

May 29, 2022 | 14:00-16:15

ZOOM D: 876 6131 8640

<https://us02web.zoom.us/j/87661318640>

<p>14:00-14:15 CB-058</p>	<p>Title: Fire Linkage Scheme Design and Modeling Verification of Urban Rail Transit Authors: Zicheng Wang, Jiacheng Liu, Lifu Yi, Guangqian Wang Presenter: Zicheng Wang Presenter's Organization: China Railway Eryuan Engineering Group Co.Ltd, China</p> <p>Abstract: The fully automatic operation (FAO) is the main developing direction of urban rail transit in the future. Compared with traditional control modes, it has very high requirements for emergency handling capacity and efficiency under special operation scenarios. Based on the special operation of train fire, this thesis designs a fully automatic linkage scheme, which is different from the previous dispatcher as the linkage bridge between the Integrated Supervisory Control System (ISCS) and Automatic Supervision System. It determines the fire identification process of Fire Alarm System, the data forwarding and emergency control process of Train Control Management System, the fire process of the Operation Control Center and the communication verification process between various systems. Meanwhile, the whole process from file identification to fire emergency response if formally modeled and analyzed by using UPPAAL tool, which based on timed automata theory. As the same time, the security attributes and functions attributes of the linkage scheme are formally verified. Finally, through numerical results, our interactive scheme can meet the interactive requirement of ISCS and other systems safely and effectively.</p>
<p>14:15-14:30 CB-050</p>	<p>Title: Intelligent Driving Safety Prediction Model Based on Algorithm Dynamic Fusion Authors: Wenxin Xu, Ying Chen, Jizhuang Zhao and Feng Wang Presenter: Wenxin Xu Presenter's Organization: China Telecom Research Institute, China</p> <p>Abstract: With the development of vehicle and road infrastructure coordination field in current society, driving safety has become a significant topic. The paper proposed an optimized driving safety prediction model DF-SKC based on dynamic fusion. After constructing three independent learners including SVM, KNN and CART, set a range of non-sensitive area widths, neighborhood values and subtrees. Aiming to achieve the least loss value, obtain dynamic calculated weights and integrated predicted results. At last, the performance of DF-SKC model has been evaluated by accuracy, precision, recall and F1-score. Compared with three independent models, the DF-SKC model has shown a better improvement in F1-score of 0.816, which presents a great significance for traffic accident control prospect.</p>
<p>14:30-14:45 CB-018</p>	<p>Title: Research on adaptive adjustment method of intelligent traffic light based on real-time traffic flow detection Authors: Li Huang, Hongjing Huang, Jie Xiao and Xiaorui Lv</p>

	<p>Presenter: Li Huang Presenter's Organization: Wuhan Railway Vocational College of Technology, China</p> <p>Abstract: In this paper, YOLOX algorithm is used to detect the traffic flow at traffic intersections by using UA-DETRAC dataset. The motor vehicle detection mode and vehicle classification detection mode are used to analyze the experimental results, and according to the experimental results, the adaptive scheduling strategy of intelligent traffic lights at traffic intersections is put forward. In the motor vehicle detection mode, our model obtains a map of 0.844 on the test set. In the vehicle classification detection mode, our model obtains an average map of 0.607 on the test set, in which the map of cars and buses reaches 0.799 and 0.863 respectively, which shows that our model has good detection and positioning performance for these two categories of motor vehicles. We propose two different traffic flow calculation strategies according to whether it is in the morning and evening peak hours: in the morning and evening peak hours, we use the vehicle classification detection model for classification detection and calculate the weighted traffic flow, and in the off-peak period, we use the vehicle detection model to count the actual traffic flow.</p>
<p>14:45-15:00 CB-070</p>	<p>Title: Optimization Of Patient Guidance Path Based On Improved Genetic Algorithm Authors: Renjie Du, Yu Wang, Xinli Zhang Presenter: Yu Wang Presenter's Organization: Sichuan University, China</p> <p>Abstract: For the first visit patients, the complexity of diagnosis and treatment spatial environment reduces the accessibility of to the diagnosis room, which causing congestion in hospital. Relying on spatial information to provide patients with a guidance path to the diagnosis room is of practical significance to alleviate the path congestion and reduce the treatment time. Based on spatial grid information, this paper presents an optimization method of guidance path to help find the optimal path. On the basis of generating the initial path with random selection model of path, this method takes the impact of hospital congestion into the optimization objective function, and carries out modeling and optimization combined with the improved genetic algorithm, which is mainly improved in the aspect of crossover that solves the crossover failure due to different path lengths . In the outpatient application of a large hospital, the optimal path is obtained, which proves the effectiveness of the new model.</p>
<p>15:00-15:15 CB-089</p>	<p>Title: Design of Intelligent Flight Platform for High-rise Fire Fighting and Rescue Authors: Minghui Zhao, Xinyu Liu, Qi Wang Presenter: Minghui Zhao Presenter's Organization: Tongji University, China</p> <p>Abstract: Aiming at the problems of many casualties, large property losses and difficult rescue in more and more urban high-rise buildings, an intelligent fire rescue flight platform based on Beidou Positioning is designed. The platform is divided into flight system, fire fighting and disaster relief system, rescue medical system,</p>

	<p>communication system, intelligent auxiliary system, etc. it integrates the functions of fire fighting, search and rescue medical treatment, autonomous identification, positioning and navigation, perception and obstacle avoidance, and is divided into manned control and unmanned control modes. It has the advantages of flexibility, fast response speed, excellent operation performance, all-terrain adaptation It has the advantages of a wide detection range and complete functions, and has a good application prospect in fire fighting, disaster relief and rescue.</p>
<p>15:15-15:30 CB-106</p>	<p>Title: Estimation of Vessel Link-level Sailing Time Distribution under a Connected Network Authors: Zhuo Chen, Jianlong Su, Yang Zhan Presenter: Zhuo Chen Presenter’s Organization: Wuhan University of Technology, China</p> <p>Abstract: To better improve the management of maritime traffic, transportation, and port operation scheduling, it is essential to estimate the vessel sailing time distribution. Some studies focus on generating a statistical profile of sailing time, but these methods have limitations, travel times are calculated only from vessels that completed the entire study segment journey. In this paper, we propose an estimation method of vessel link-level sailing time distribution based on Kernel Density Estimation (KDE). First, we propose a novel connected maritime network construction algorithm. The connected maritime network was constructed based on massive AIS data, and the vessel link-level sailing time in the network was extracted. To obtain the law of sailing time distribution, we use the KDE method to fit and estimate the vessel link-level sailing time. Finally, experimental results of different methods on real data demonstrate that the proposed method can effectively estimate the vessel sailing time distribution.</p>
<p>15:30-15:45 CB-145</p>	<p>Title: Research on the Shared supply mode of urban public transportation under the Internet of things—— a case study based on Hello travel platform Authors: Yapeng Li, Congmin Shao Presenter: Yapeng Li Presenter’s Organization: Hebei University of Technology, China</p> <p>Abstract: As the most important basic facilities in the operation of urban economic and citizens' life and travel, urban public transportation’s sufficient ,balanced and high-quality supply is the requirement of the transformation of major social contradictions in the new era. Supporting by Big data and cloud computing ,the rapid development of the Internet of things promotes the innovations in the production mode, management mode and property right in the supply of public transportation, which transforms the traditional thinking ways of single supply by administration and market, and has given rise to sharing economic model representing by sharing bike and gradually extended to other areas of the urban public transportation. As a successful public transportation equipment operator, we can summarize the existing public transportation sharing supply mode through the study of Hello Travel’s development history and operation mode, which can provide a new development direction and mode reference for the transformation of urban</p>

	public transportation supply mode.
<p>15:45-16:00 CB-1017</p>	<p>Title: Demand Analysis of Taxi Passenger-carrying Hot Spot Areas Based on XGBoost Algorithm Author: Tingting Xu Presenter: Tingting Xu Presenter’s Organization: Shandong University of Science and Technology, China</p> <p>Abstract: In order to study the demand prediction of taxi passenger-carrying hot spot areas, firstly, the density-based DBSCAN clustering algorithm is used to identify the hot spot areas and delineate the boundaries of the hot spot areas. And combined with the demand characteristics of taxi, the demand prediction of hot spot areas is carried out by using XGBoost algorithm without Fourier eigenvalues and XGBoost algorithm with Fourier eigenvalues. By comparing the mean absolute percentage error (MAPE), the prediction accuracy of the latter is significantly improved.</p>
<p>16:00-16:15 CB-1022</p>	<p>Title: Adaptive Cuckoo Search Algorithm Based On Dynamic Scaling Factor And Historical Experience Authors: Fu He, Haiwen Yuan, Changjun Luo and Qing Song, Junchi Chen and Yongyi Ma Presenter: Fu He Presenter’s Organization: Computational Aerodynamics Institute, Aerodynamics Research and Development Center, China</p> <p>Abstract: Adaptive Cuckoo Search Algorithm Based On Dynamic Scaling Factor And Historical Experience</p>

Parallel Session 7 - Target Detection 分会报告 7 - 目标检测 Session Chair: Xuegang Wu, Chongqing University of Technology, China May 29, 2022 16:45-19:00 ZOOM A: 824 2128 3210 https://us02web.zoom.us/j/82421283210	
16:45-17:00 CB-001	<p>Title: Rotating Target Detection for Tarpaulin Rope Based on Improved YOLOv5 Authors: Donglin Li and Jie Zhang Presenter: Donglin Li Presenter's Organization: Southwest Jiaotong University, China</p> <p>Abstract: Waist rope is the main restraint on the tarpaulin when the train is running. Aiming at the problem of low accuracy for waist rope detection by the traditional horizontal frame detection approaches, this paper studies the principle of rotating target detection, proposes an effective detection method for the waist rope based on the improved yolov5 deep learning algorithm by computer vision technology and Gaussian window function, so as to realize the detection of tarpaulin rope with different angles. Experiments show that the proposed method has high detection accuracy for waist ropes and can accurately reflect the position information of tarpaulin waist ropes.</p>
17:00-17:15 CB-054	<p>Title: Research on Underground Personnel Behavior Detection Algorithm Based on Lightweight OpenPose Author: Yongqing Lv Presenter: Yongqing Lv Presenter's Organization: China Coal Technology & Engineering Group Shanghai Co., Ltd.,China</p> <p>Abstract: To effectively identify the unsafe behaviour of underground workers in coal mines, this paper designs an intelligent detection system of underground workers' behaviour based on a lightweight OpenPose algorithm. Firstly, the system obtains the coordinates of key points of human bones, detects the posture of falling, climbing and pushing by constructing different detection algorithms, and deploys the posture detection model to the industrial computer; Secondly, the industrial computer reads the video of the infrared camera and transmits the information of the detected unsafe behaviour to the alarm. The experimental results show that the detection speed can reach the actual application effect of single-channel 30fps or dual-channel 20fps.</p>
17:15-17:30 CB-138	<p>Title: A depression tendency detection model fusing weibo content and user behavior Authors: Tongkun Deng,Xin Shu,Jian Shu Presenter: Tongkun Deng Presenter's Organization: Nanchang Hangkong University, China</p> <p>Abstract: Numerous studies on depression have found that tweets from severely depressed users can be used to detect depression. This paper proposes a fusion of</p>

	<p>text, image, and user behavior model (TPBFM) for depressive tendency detection. To construct user text sequences and user image sequences, TPBFM uses build sequence (BS) and build picture (BP) algorithms to process text and images. TPBFM uses XLNet and ResNet18 networks to extract text and image features. In addition, this paper summarizes and extracts 11 behavioral characteristics from users' descriptions and posting behaviors, respectively from their Weibo content, social behaviors, and visual characteristics. Finally, the text image and behavior features are aggregated and fed into the recognition layer to achieve the effect of triple model fusion, and then identify the user's depression tendency. Experimental results show that the TPBFM model can identify depressive tendencies of social network users pretty well. It is superior to single-feature and double-feature detection in terms of precision, recall, and F1, and it has good performance compared with the best methods studied so far under the comparison of equivalent data sets.</p>
<p>17:30-17:45 CB-006</p>	<p>Title: Intelligent Helmet Detection System based on the Improved YOLOv5 Authors: Peng Zou and Jie Zhang Presenter: Peng Zou Presenter's Organization: Southwest Jiaotong University, China</p> <p>Abstract: In the train maintenance workshop, the standardized wearing of helmets by maintenance personnel can effectively avoid a larger part of safety accidents, so it is extremely significant to monitor the wearing of helmets by overhaul personnel in real time. In this paper, we propose an improved YOLOv5s helmet detection algorithm based on the deep learning method, and deploy it to the edge-end devices to realize a set of intelligent monitoring system for the helmet wearing of the maintenance personnel. In this paper, two improvement measures are proposed for the YOLOv5s algorithm. Firstly, for the problem of helmet misidentification and missed identification, the convolutional block attention module (CBAM) is incorporated in three different positions of the Backbone part of YOLOv5s to enhance the extraction capability of Backbone for important features and improve the recognition accuracy of the model for helmets; secondly, since workers' head areas are often obscured by each other in real scenes, replacing GloU Loss with CloU Loss in YOLOv5s can effectively improve the convergence speed of the network training and the regression localization accuracy of the network. The comparison experimental results fully prove the effectiveness of the proposed method.</p>
<p>17:45-18:00 CB-055</p>	<p>Title: Detection of Link Communities in Attributed Graphs via an Approximate Bayesian Generative Model Authors: Zehai Tang, Lun Hu and Xiangyu Pan Presenter: Zehai Tang Presenter's Organization: Wuhan University of Technology, China</p> <p>Abstract: Attributed graphs are complex networks with non-trivial topological structures and rich node contents. Recently, a variety of algorithms have been proposed to detect meaningful communities from a given attributed graph by combining these topology and content information. However, few of them is capable of detecting the communities of links, which are better to interpret the</p>

	<p>node behaviors in forming communities. Furthermore, since nodes are possible to grouped into more than one communities, community detection upon links is natural and parameter-free to incorporate overlap, thus revealing the intrinsic organization of attributed graphs in a more reasonable way. In this work, we propose a novel Bayesian probabilistic model to approximately simulate the generative process of an attributed graph given the prior knowledge regarding the distribution of community labels over links. An efficient variational algorithm, namely VBLCD, is developed to solve the inference problem of the proposed model, thus completing the task of detecting link communities. To evaluate the performance of VBLCD, we have applied it to address two practical applications including document classification and social community detection, and also compared VBLCD with several state-of-the-art algorithms. Experimental results demonstrate the promising performance of VBLCD in terms of both accuracy and scalability.</p>
<p>18:00-18:15 CB-141</p>	<p>Title: Research on Depression Tendency Detection Based on Image and Text Fusion Authors: Long Xu, Xin Shu, Jian Shu Presenter: Long Xu Presenter’s Organization: Nanchang Hangkong University, China</p> <p>Abstract: The fact that depression tendency detection is not equivalent to sentiment analysis makes it difficult to find a unified standard for depression tendency detection and to accurately mine depression emotions in image and text. A depression tendency detection model based on fusion of image and text is proposed, which is mainly composed of a textual depression tendency detection model and an image depression tendency detection model. These two models extract text emotion feature through a pre-trained BERT model and use pre-trained VGG19 to learn image emotion feature. Then use a BiGRU-based classifier to obtain the corresponding depression tendency polarity probability. Finally, a model fusion formula is designed in order to play the complementary role of text and image, according to the idea of late fusion. The model combines the text depression tendency detection model and the image depression tendency detection model to perform comprehensive depression tendency detection. The experimental results on the simplified WU3D dataset show that the proposed model has better performance in each index evaluation compared with the single-modal depression tendency detection model.</p>
<p>18:15-18:30 CB-043</p>	<p>Title: Robust Pantograph-Catenary Contact PointDetection from Infrared Images Based on the YOLOv5 and Corner Detection Authors: Wuchang Li, Jie Zhang, Peng Zou Presenter: Wuchang Li Presenter’s Organization: Southwest Jiaotong University, China</p> <p>Abstract: The pantograph and catenary (PAC) system is a major source of electricity for high-speed railways. Electric power is delivered to the pantograph from contact wire by direct contact. By detecting the contact point (CPT) between the pantograph and the catenary, the contact state can be evaluated. However, complicated</p>

	<p>backgrounds (such as cloud, light change, bent contact wire, and so on) make it difficult to properly and reliably detect contact points from infrared pictures. A robust approach with two steps is proposed in this research. First, the YOLOv5 object detection algorithm obtains the CPT and pantograph areas from complicated backgrounds. Second, the CPT is located at pixel level using corner detection based on the CPT bounding box. After that, the relative positions of the pantograph and the CPT can be determined. The proposed method's robustness and efficiency are proved by the experiment results.</p>
<p>18:30-18:45 CB-116</p>	<p>Title: Forgery Face Image Detection Based on Improved Capsule Network Authors: Yun Liu, Qianyu Qin, Wenchuan Yang, Aimin Wu, Wenzhuo Ma, Jiaqiang Zhang Presenter: Yun Liu Presenter's Organization: Southwest University, China</p> <p>Abstract: Face forgery technologies may have a significant adverse impact on individual privacy and national political security. In this paper, a simple but effective method for detecting forgery face image based on improved capsule network is proposed. More specifically, we first adopt the part of pre-trained VGG-19 to extract latent features for better classification. Then, the improved capsule network architecture makes use of exponential linear unit (ELU) instead of the traditional rectified linear unit (ReLU) to improve the learning speed and convergence properties. Moreover, the effective attention mechanisms are embedded into the improved capsule network for further improving the detecting accuracy performance. Experimental results on four famous face forgery datasets demonstrate that the proposed framework outperforms other state-of-the-art approaches.</p>
<p>18:45-19:00 CB-144</p>	<p>Title: Depressive Emotion Tendency Detection for users on Social Platform Based on Fusion of Graph and Text Authors: Jie Yan, Xin Shu, Jian Shu Presenter: Jie Yan Presenter's Organization: Nanchang Hangkong University, China</p> <p>Abstract: Depression is mainly manifested in negative emotions, physical fatigue, and often suicidal ideation. In recent years, more and more patients with depression have posted on social platform to express their emotions. Based on this, a method is proposed to detect depressive emotion tendency for users on social platform based on fusion of graphic and text features (FGTF-SP-DDET). In the method, the Weibo User Depression Detection Dataset (WU3D) was simplified and preprocessed to fit the model. The main body of the image feature learning module is the improved VGG-16 model, and the main body of the text feature learning module is BERT, BiLSTM combined with Attention. In order to make full use of the emotion feature of different modalities, the extracted features were fused by the method of early fusion. The comprehensive depressive emotion tendency detection was carried out by classifier. Experimental results show that FGTF-SP-DDET outperforms single-feature based detection methods in accuracy, precision, recall and F1.</p>

	<p>Compared with the single-feature method, the image-text feature fusion method can effectively detect the depressive emotion tendency of social platform users.</p>
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<p>Parallel Session 8 - Machine Learning 分会报告 8 -机器学习 Session Chair: Assoc.Prof. Haiqing Zhang, Chengdu University of Information Technology,China May 29, 2022 16:45-19:00 ZOOM B: 862 3655 9782 https://us02web.zoom.us/j/86236559782</p>	
<p>16:45-17:00 CB-056</p>	<p>Title: A tool platform for predicting the quality of production based on machine learning technology Authors: Xin Ding, Hanqing Zhou, Haixiong Lv Presenter: Xin Ding Presenter’s Organization: China Aero-Polytechnology Establishment, China</p> <p>Abstract: In order to meet the needs of China to improve quality of manufacturing by using information technology, we developed a user-friendly tool platform of quality prediction system that is and does not require a high level of knowledge related to machine learning. Users can pre-process and model the data generated in the general production process and then perform quality prediction. The tool platform includes six modules: data import, data pre-processing, data modeling, data prediction, root cause diagnosis and system management; it provides a variety of classification and regression algorithms such as multiple linear regression, SVR algorithm, KNN algorithm, decision tree algorithm, random forest algorithm, SVM algorithm, neural network algorithm, etc.</p>
<p>17:00-17:15 CB-087</p>	<p>Title: A Survey of Available Information Recovery of Binary Programs Based on Machine Learning Authors: Wenqiang Shao, Qichao Yang, Xixi Guo, Ruijie Cai Presenter: Wenqiang Shao Presenter’s Organization: State Key Laboratory of Mathematical Engineering and Advanced Computing, China</p> <p>Abstract: A binary program is an executable file obtained by compiling the source code. In order to reduce the size of software or prevent reverse engineering, software publishers usually only release executable files that have stripped a lot of source information. The rich source-level information is very helpful for software hardening and malware analysis. In recent years, the rapid development of artificial intelligence has promoted the research of binary program information recovery. This paper summarizes the relevant research on effective information recovery of binary programs since 2016. Firstly, the importance of recovering source-level information from binary programs is introduced. Next, the problems are divided into three categories, compiler traceability, signature information recovery and variable information recovery of source program. Finally, based on the latest technology in this field, the future development direction is analyzed.</p>
<p>17:15-17:30 CB-120</p>	<p>Title: A Feature Engineering Approach for Tree-based Machine Learning Sales Forecast, Optimized by a Genetic Algorithm Based Sales Feature Framework Author: Jiezhen Li Presenter: Jiezhen Li</p>

	<p>Presenter’s Organization: Hitachi (China), Ltd. Guangzhou Branch, China</p> <p>Abstract: In the new retail era, the sales pace and consumers' consuming habits are disrupted dramatically by e-commerce and mobile consuming market developments and become various, volatile, and complicated. In sales forecasting, tree-based machine learning algorithms are popular and impressive. Feature engineering, on the other hand, is the most significant impediment to blending business and technological knowledge. An innovative way to solving the feature engineering problem of employing tree-based algorithms in sales forecast is proposed in this work. And a genetic algorithm is presented to enlarge the feature base and to explore potential values from features. To ensure that features with important business characteristics are picked, a novel feature framework for sales forecast is offered. Also given is a genetic algorithm for expanding the feature base and exploring potential values from features. The performance of tree-based models from AutoGluon will next be evaluated using a public dataset, Kaggle Rossmann sales data. The results suggest that the proposed strategy can improve the accuracy and stability of decision tree algorithms in sales forecasting significantly.</p>
<p>17:30-17:45 CB-143</p>	<p>Title: Adoption of Blockchain-based Artificial Intelligence in Healthcare Authors: Mir Hassan, Jincai Chen, Chuanbo Zhu, Umer Zukaib Presenter: Chuanbo Zhu Presenter’s Organization: Huazhong University of Science and Technology, China</p> <p>Abstract: Data and technology have made it possible to find solutions to a wide variety of challenges in healthcare. Blockchain and Machine Learning gives the best solutions together in performing various tasks in the Smart Health care system. With these two new emerging technologies, that have materialized in the last decade. It has been demonstrated that machine learning may be useful in a variety of fields because of its ability to recognize patterns in data, perform analyses, and reach choices. To create appropriate choices, machine learning requires a sufficient amount of data. Data sharing and data reliability are critical components of machine learning in order to increase its accuracy. Blockchain Technology's decentralized database places a premium on data exchange. Consensus in Blockchain technology ensures the legitimacy and security of data. Converging these two technologies can result in highly accurate machine learning results combined with the security and stability of Blockchain Technology. In this paper, we will have opportunity to know about Machine learning integration along with Blockchain in the field of Healthcare. We proposed secure, transparent and intelligent methods in the Smart Health care Industry using Machine learning models and blockchain technology to enhance security level and train our models to improve diagnostic, prevention, treatment of the patient, patient rights, patient autonomy and equality in the health care system.</p>
<p>17:45-18:00 CB-007</p>	<p>Title: The Influence of EmbeddingSize and HiddenUnits Parameters Changes on the Sequence2Sequence Model Authors: He Zhengfang, Pan Mingbo, Wang Yikai, Xu Gang, Su Weibin and Shi Chunmei Presenter: He Zhengfang</p>

	<p>Presenter's Organization: Yunnan Technology and Business University, China</p> <p>Abstract: The parameters of the neural network are very important to the model, and the changes of the parameters have a greater impact on the accuracy of the neural network. This paper takes the Sequence2Sequence (Seq2Seq) model as an example, in which Encoder and Decoder both use basic RNN models to research the impact of parameter changes on neural network performance. The EmbeddingSize and HiddenUnits are two important parameters of the Seq2Seq model. This paper uses parameter combinations to build different models based on the two important parameters. And using self-made Sequential-Reverse data sets to experiment on these models. Then visualize the experimental results in three dimensions and analyze the influence of these two parameters on the Seq2Seq model. The results of this paper can provide researchers with some suggestions when they build neural networks.</p>
<p>18:00-18:15 CB-108</p>	<p>Title: Vision4All- A Deep Learning Fashion Assistance Solution For Blinds Authors: Laila Khalid, Wei Gong Presenter: Laila Khalid Presenter's Organization: University of Science & Technology of China,China</p> <p>Abstract: Fashion is an industry that never appears to slow down, and it would be incredible if the blind could participate in this growing trend. By 2050, nearly 120 million individuals are expected to be vision-impaired. In this paper, the proposed Vision4All model assists users in identifying colors, clothing categories, textures, fabric, style, graphic, and text-based content on clothes. We enhanced FashionNet, a deep model that learns clothing characteristics by predicting garment qualities and categories together. To improve prediction accuracy, the ResNet34 architecture replaced the obsolete VGG16 design. A Fine-Grained multilabel classification model was trained by tackling the noisy data problem for attribute prediction. For identifying the range of graphical content printed on clothes, we use Pythia's modular re-implementation of the bottom-up, top-down approach. Our solution allows users to navigate through speech eliminating the requirement for users to rely on their vision. Vision4All is the first complete solution to align with Fashion assistance for the visually impaired."</p>
<p>18:15-18:30 CB-1003</p>	<p>Title: Generate Lanscape Paintings From text to landscape painting generation and redrawing using deep learning model Author: Chen Yijia Presenter: Chen Yijia Presenter's Organization: Beijing Forestry University,China</p> <p>Abstract:In this paper the writer adopts the interdisciplinary research method of landscape art and artificial intelligence, and uses a deep learning model -- generative adversarial network to study the generation and redrawing of landscape paintings. Input different types of text information in the test process, so that the model through the interpretation of text to achieve the generation of landscape painting. At the same time, the name of the landscape painting as the input text, with its</p>

	<p>picture as the initial picture to achieve redrawing. The experimental results were further evaluated from the aspects of image quality and color expression. This model has the potential to be applied to the expression of reference maps, intention maps and the study of garden art and history."</p>
<p>18:30-18:45 CB-031</p>	<p>Title: Attention based Large Scale Multi-Agent Reinforcement Learning Authors: Xiaoqiang Wang, Liangjun Ke, Gewei Zhang and Dapeng Zhu Presenter: Xiaoqiang Wang Presenter's Organization: Xi'an Jiaotong University, China</p> <p>Abstract: Learning in large scale Multi-Agent Reinforcement Learning is fundamentally difficult due to the curse of dimensionality. In homogeneous multi-agent setting, mean field theory provides an effective way of scaling MARL to environments with many agents by abstracting other agents to a virtual mean agent, which assumes the impact of each player on the outcome is equal and infinitesimal. However, in some real scenarios, it is only several neighboring agents that affect the decision-making of an agent, need not all other agents. In addition, different neighboring agents may have different degrees of influence on the decision-making of an agent. In this paper, not restricted to homogeneous setting, we propose {Adaptive Mean Field Multi-Agent Reinforcement Learning} (AMF-MARL), which is based on the attention mechanism and can be used to deal with many agent scenarios in which there may be different influence relationships among agents. Specifically, we firstly derive the mean field approximation with adaptive weight. Then, we propose the Adaptive Mean Field Q-learning (AMF-Q) approach, and describe how to obtain the adaptive weight. Finally, we conduct experiment to study the learning effectiveness of proposed approach.</p>
<p>18:45-19:00 CB-005</p>	<p>Title:Textual Similarity Based on Double Siamese Text Convolutional Neural Networks and Using BERT for Pre-training Model Authors: He Zhengfang, Ivy Kim D. Machica and Bi Zhimin Presenter: Zhengfang He Presenter's Organization: University of Southeastern Philippines, Philippines</p> <p>Abstract:Textual similarity measurement has become even more important in natural language processing for information retrieval. The improvement in the accuracy of machine translation is a prime reason for developing a two-stage model of fine-tuning Bidirectional Encoder Representation from Transformers (BERT) and training using the Double Siamese Text Convolutional Neural Networks (DSTCNN). The first stage task is improved to use the output of each word of BERT as the input of the DSTCNN model. The DSTCNN model is proposed in the second stage task to determine the sequential and reverse relationship. The design motivation and detailed structure of the DSTCNN model are provided. Also, the STS-B dataset was used for the experiment. The Two-stages model achieved 88.1% Spearman's rank correlation coefficient, which increased by 1.6%, compared with the first-stage model. The experimental results show that using the two-stage model yields an improved performance compared to other algorithms.</p>

Parallel Session 9 - Software and Information Technology

分会报告 9 -软件与信息技术

Session Chair: Assoc. Prof. Hui Xia, Chongqing University of Technology, China

May 29, 2022 | 16:45-18:45

ZOOM C: 873 4342 3113

<https://us02web.zoom.us/j/87343423113>

<p>16:45-17:00 CB2-001</p>	<p>Title: A multi-way access portal website construction scheme Authors: Yan Bian, Dechao Ma, Qing Zou, Weirui Yue Presenter: Yan Bian Presenter’s Organization: NARI Technology Co. Ltd , China</p> <p>Abstract: In modern website construction, the website function system is becoming increasingly complex and huge, and front-end Web projects cannot be completed independently just by one development team. In addition, after some systems go online, there will continue to be subsystems that need to be accessed. Furthermore, systems that are running online often require version upgrades due to new functions being launched or function maintenance, and it is difficult to solve these problems in the actual use of a single web application. This paper proposes a multi-way access to the portal site. Introducing a concept similar to microservices into Web applications can make traditional monolithic Web applications get rid of the existing dilemmas. Web applications are split according to dimensions such as functions or technology stacks, and micro front-end technology or iframe technology is used to integrate functional modules to form an external unity. Users have no perception of the underlying split. The product is both in the development phase and in the operation and maintenance process. Decoupling can be maximized. This article introduces various access methods and the comparison of the advantages and disadvantages of each access method, which can be analyzed and evaluated according to specific conditions in the actual application process. The access methods proposed in the article have been successfully applied in some large-scale business systems and achieved good results.</p>
<p>17:00-17:15 CB-021</p>	<p>Title: Fault Diagnosis and Treatment of DS6-K5B Computer Interlocking System Authors: Kaixia Lu, Jie Xiao and Li Huang Presenter: Jie Xiao Presenter’s Organization: Wuhan Railway Vocational College of Technology, China</p> <p>Abstract: Computer interlocking system is a kind of important signal equipment to ensure safety in railway traffic. DS6-K5B Computer Interlocking System is one of the mainstream interlocking systems on railway lines[1]. When it breaks down, railway signalmen are required to find out the fault scientifically and efficiently and restore it to normal work in the shortest time. This paper puts forward a method of fault treatment of DS6-K5B Computer Interlocking System, and applies this method to the fault treatment of actual equipment. Through many interlocking experiments, it is verified that this method is efficient and fast. At the same time, this method can be extended to other types of computer interlocking systems, and the efficiency of fault handling can be significantly improved.</p>

<p>17:15-17:30 CB-028</p>	<p>Title: An Improved Raft Protocol Combined with Cauchy Reed-Solomon Codes Authors: Donglin Ren, Jun Tu and Wei Xie Presenter: Donglin Ren Presenter's Organization: Hubei University of Technology, China</p> <p>Abstract: Raft can provide highly reliable and available distributed services, it needs at least $2F+1$ nodes to tolerate any F nodes failures. In Raft, the methods of leader replicates complete log entry to all followers causes high communication cost and storage cost. This harm the performance of Raft. In this paper, leader initiates a different log replication request to different followers, then each follower uses Cauchy Reed-Solomon codes to generate the same number of log data blocks as followers and sends them to other followers, this reduces the communication cost of leader and storage costs of clusters. Experiments show that the communication cost of leader is reduced by 73.86%, storage cost of cluster is reduced by 41.99% and request processing delay is reduced by 40.39%.</p>
<p>17:30-17:45 CB-034</p>	<p>Title: DKBERT: An Efficient and Effective Ranking Model via Weight Sharing Decoupling and Kernel Matching Authors: Xiang Li, Daifeng Li Presenter: Xiang Li Presenter's Organization: Sun Yat-sen University, China</p> <p>Abstract: Recently, the use of BERT has remarkably improved the performance of Information Retrieval (IR) tasks. However, the BERT model needs to take each concatenation of queries and documents in the collection as input, and its computational cost makes it less practical to use in real-time ranking scenarios. Some methods try to reduce the time cost but may suffer from the partial matching problem due to the max-sum mechanism. This paper proposes a new model named DKBERT, it first uses two encoders sharing the same weights to decouple the query encoder and the document encoder and make the query and document in the same semantic space, and then uses multiple kernels to extract different matching signals from the term interaction matrix, rather than using only the best matching score. With the decoupling mechanism, the model could precompute and cache the document representation, and different ranking features could be computed in a parallel way, so the model could create a better balance between the ranking efficiency and the ranking effectiveness. Experimental results on two benchmark datasets show that our proposed model could improve the ranking performance significantly (with 3.1% promotion at $MRR@10$) with less time cost.</p>
<p>17:45-18:00 CB-017</p>	<p>Title: FLfinder: Detecting Unknown Network Anomaly in Federated Learning Authors: Manyadza Justice, Haizhou Du, Shiwei Wang, Wenbin Yang, Chen Cheng and Fei Tian Presenter: Manyadza Tinashe Justice Presenter's Organization: Shanghai University of Electric Power, China</p> <p>Abstract: The emergence of federated learning has enabled deep learning models to ensure that data security and privacy while training models efficiently. However, the</p>

	<p>transmission of network parameters in federated learning may be subject to unknown anomalies. In this paper, we attempted to to detect unknown anomalies in transmitted parameters in federated learning. We designed and implemented FL-finder, an unknown network anomaly detection framework in federated learning, which detects unknown network anomalies based on incremental learning. It transfers the unknown anomalies to the prior knowledge base using the network updater, and adopts an online mode that reports new anomalies in a real-time. Experimental results show that our model increased the average accuracy of unknown anomaly detection by 10.4% and the average F1-Score improved by 19%.</p>
<p>18:00-18:15 CB-020</p>	<p>Title: Design Of Campus Behavior Management Architecture Using IoT Technology Authors: Gang Xu, Ivy Kim D. Machica, Weibing Su and Zhengfang He Presenter: Xu Gang Presenter’s Organization: Yunnan Technology and Business University, China</p> <p>Abstract: Student management has always been one of the key tasks of colleges and universities. The use of intelligent management is an indispensable tool for college student management. Especially in the current epidemic situation, colleges and universities, as densely populated places, are the key areas of epidemic prevention and control. However, relying on the traditional manual method, they can not be completed efficiently, nor can they accurately grasp the latest trends in real time, and the investment time and management cost are high. At present, Internet of things technology has gradually entered all aspects of our life and work, changing our way of life. It is a very popular phenomenon to use Internet of things technology to realize campus student management. However, at present, campus Internet of things is mostly used in all-in-one card consumption, and only a few places use all-in-one card to manage students’ business. This paper will study the use of Internet of things technology to design a behavior management architecture of colleges and universities, use the technologies such as sensors, face recognition and Bluetooth positioning integrated in wearable devices to upgrade only simple business management, and realize the information collection of students’ health status and action track in the school, so as to realize the accurate monitoring of students’ behavior, Provide reference for campus students’ intelligent management.</p>
<p>18:15-18:30 CB-093</p>	<p>Title: Research on Autonomous 6TiSCH Network Resource Demand Calculation Based on Queuing Theory Authors: Yan Zhang,Jinglong Guo,Youxin Cai,Yushuang Wu Presenter: Jinglong Guo Presenter’s Organization: Chongqing University of Posts and Telecommunications, China</p> <p>Abstract: IETF established the working group of 6TiSCH (IPv6 over the TSCH Mode of IEEE 802.15.4e) standard, aiming to develop a set of industrial wireless protocol stack that integrates low power short-range wireless communication technology and IPv6 technology, which can solve the IP access problem of nodes in industrial field. And to achieve communication reliability and certainty under resource constraints. Resource scheduling has always been an important method to optimize network</p>

	<p>delay, energy consumption and reliability based on the deterministic TSCH network. Autonomous network resource scheduling can avoid additional information interaction and has better flexibility. This paper proposes an autonomous network resource demand calculation method based on queuing theory. The method can accurately calculate the mathematical expectation of packet queuing length and the average amount of occupied resources in nodes, considering the success rate of communication resource transmission and the limited cache space of nodes. By comparison with MSF, the mathematical model of autonomous resource demand calculation based on queuing theory solves two core problems: when to trigger scheduling and how to determine the number of scheduling resources. In addition, this model avoids frequent scheduling operations that simply compare the number of packets and the amount of communication resources. This paper provides a solution for resource quantity calculation of resource scheduling in 6TiSCH network.</p>
<p>18:30-18:45 CB-029</p>	<p>Title: Analysis of the Impact of Political Connection Using Community Detection Authors: Mingshan Zhu Presenter: Mingshan Zhu Presenter’s Organization: Fuyang Normal University, China</p> <p>Abstract: The spending in the U.S. 2020 election reached 14 billion dollars, a record high, as the enthusiasm of firms to make campaign contributions was unprecedented. How to understand the links between firms and politicians has become a focus of research. Previous studies tended to focus on individual firms and ignored influence of social networks between politicians and firms. In this paper, we extract a large scale donation dataset for the US elections from 1997 to 2020. Then, a community detection algorithm based on political donations are proposed. More specifically, firms and politicians are formulated as vertices in an undirected graph network, and firm donations form edges between the vertices. By optimizing the proposed donation-based modularity, the correlation between the election success rate and the firm’s stock price return can be used to improve the result of community division. During the evaluation, firm’s fundamentals, campaign contributions, election results and community characteristics are utilized simultaneously to predict the future returns of firms’ share prices. Experiments reveal that the proposed method significantly outperforms the baseline method.</p>

Parallel Session 10 - Image and Signal Analysis

分会报告 10 -图像与信号分析

Session Chair: Dr. Yan Liang, Shudao (Chongqing) Technology Co., Ltd., China

May 29, 2022 | 16:45-19:00

ZOOM D: 876 6131 8640

<https://us02web.zoom.us/j/87661318640>

<p>16:45-17:00 CB-026</p>	<p>Title: A High-accuracy Two-stage Model for Automatic Speech Recognition Authors: Xiong Li and Huabing Yan Presenter: Xiong Li Presenter's Organization: University of Electronic Science and Technology of China(UESTC), China</p> <p>Abstract: Compared with the traditional multi-stage speech recognition model, the speech recognition model based on deep neural network has promising performance in accuracy and speed and can realize end-to-end speech conversion to text. However, its practical difficulties in training determine its performance limit. The method proposed in this paper is that combines the advantages of both by dividing the recognition task into two stages for processing. Both stages are carried out by a deep neural network model. First, the speech sequence is converted into a phoneme sequence, then the phoneme sequence is converted into a character sequence. The recognition process can be controlled more finely to achieve higher recognition accuracy with different loss functions and datasets. On the widely used open-source AiShell-1 Mandarin speech dataset, the acoustic model based on convolution in the first stage achieves a phonemic error rate of 1.90%, and the language model based on Bi-LSTM and self-attention in the second stage achieves a character accuracy of 99.4%. Finally, the speech recognition character error rate (CER) of the complete model with only 15M parameters is as low as 4.15%, achieving state-of-the-art accuracy.</p>
<p>17:00-17:15 CB-121</p>	<p>Title: Analysis of Anti-Multipath Performance Based on Traditional Acquisition Algorithm of BOC Signal Authors: Yuanfa Ji, Sisi Song, Xiyan Sun, Kamarul Hawari Bin Ghazal, Songke Zhao, Presenter: Sisi Song Presenter's Organization: Guilin University of Electronic and Technology,China</p> <p>Abstract: At present, multipath interference is still an inevitable natural influencing factor for high-precision navigation and positioning. The signal transmitted by the satellite is reflected and refracted by the interference of the surrounding environment, which will cause certain error interference to the phase and pseudorange of the direct wave signal. In order to analyze the degree of interference caused by multipath errors in the signal acquisition process, and compare the anti-multipath performance advantages of the acquisition algorithm. In this paper, starting from the formation principle of multipath signals. Based on the analysis of the code loop phase detector technology of incoherent lead minus lag (EML), the MATLAB simulation analysis platform is built, and then The comparison and simulation experiment of multipath error of sine BOC modulation signal and cosine</p>

	<p>BOC modulation signal is carried out for two traditional acquisition algorithms which are ASPECT acquisition algorithm and SCPC acquisition algorithm. The simulation results show that the anti-multipath performance of the ASPECT acquisition algorithm is better than that of the SCPC algorithm.</p>
<p>17:15-17:30 CB-152</p>	<p>Title: EEG-based Assessment of Human Endurance: Association between Endurance and Brain-wave Activity Authors: Haipeng Zhang, Changshui Zhang, Yulu Wang, Keying Zhang, Ruidong Liu, Lei Fang, Fangfang Wu, Chunmei Cao Presenter: Haipeng Zhang Presenter's Organization: Tsinghua University, China</p> <p>Abstract: Endurance is a fundamental human potential that researchers have focused on widely. Studies on athletes have shown that human endurance is linked to brain signals. To improve modern assessment and intervention systems for human endurance, it is necessary to identify certain cortical brain-signal activity reflecting endurance potential. This study proposes a deep learning-based model that automatically extracts features from electroencephalograms (EEGs) to predict human endurance performance and identify the frequency ranges and brain regions reflecting key endurance characteristics in running athletes during task and resting states. The EEGs of 50 individuals (27 running athletes and 23 non-athletes) were acquired during resting and bicycle-riding states. The signals were preprocessed, transformed into spectrograms, and fed into a convolutional neural network (CNN) for feature extraction and inter-individual classification. The results showed that when applying this model to the data of three different states, one riding and two resting, the average accuracies were 82.0%, 82.0%, and 74.7% respectively, outperforming the baseline methods in all cases. Furthermore, the features were visualized by class activation mapping (CAM) to identify the frequencies and brain regions associated with key endurance characteristics. Accuracies were improved by selecting the featured regions, but were significantly compromised if masked, thereby confirming the reliability of the extracted features. It is indicated that high beta (20–30 Hz) and gamma (31–40 Hz) activities in the parietal and occipital regions were most related to endurance characteristics during tasks, while gamma activities in the premotor and primary motor cortex differed between athletes and non-athletes at rest. The results were further confirmed using Wilcoxon signed-rank tests.</p>
<p>17:30-17:45 CB-065</p>	<p>Title: EEG motor imagery classification based on multi- spatial convolutional neural network Authors: Li Xin, Peng Maoqing, Chen Siyu, Zheng Wenyin, Zhang Yunxia, Gao Dongrui, Wang Manqing Presenter: Li Xin Presenter's Organization: Chengdu University of Information Technology, China</p> <p>Abstract: EEG motor imagery classification has important implications for the development of brain-computer interfaces. Unfortunately, how to accurately and comprehensively utilize the feature information contained in EEG motor imagery</p>

	<p>signals to further improve the classification performance is still a challenge. To solve this problem, this paper proposes an EEG motion imagery classification model based on multiple spatial convolution kernels. The model consists of spatial convolution and temporal convolution to simultaneously extract the feature expressions of EEG signals in different spaces. The experimental results show that the algorithm proposed in this paper achieves better classification accuracy than most existing algorithms in multiple data sets, which reflects the superiority of the algorithm. The work in this paper will advance the field of EEG motor imagery.</p>
<p>17:45-18:00 CB-063</p>	<p>Title: KLT algorithm for non-contact heart rate detection based on image Photoplethysmography Authors: Wang hongyu, Gao dongrui, Guo chen, Jing yuan, Wang manqing Presenter: Wang Hongyu Presenter’s Organization: Chengdu University of Information Technology, China</p> <p>Abstract: Heart rate is one of the four vital signs that has the most obvious response to changes in human health status. This paper applied a non-contact heart rate detection method based on image Photoplethysmography (IPPG). Firstly, RGB color images of channels were collected by ordinary general cameras, and the region of interest (ROI) was located by face recognition. Then KLT algorithm is used to calculate the target offset of the region of interest, and the ROI is modified. After that, RGB channel signals are converted to Lab color space to extract Blood Volume Pulse (BVP) signals. Finally, complex Morlet 4-2 (CMOR4-2) was used for time-frequency analysis after BVP signal filtering, and heart rate was calculated according to time-frequency analysis. Experimental results show that the accuracy of this method is 96.5% in a relatively resting environment. The system can be used in a wide range of scenarios and can detect heart rate in a general home environment. This method has the characteristics of non-trauma, no need to wear the relevant sensor, easy to use, and has a broad prospect of popularization in daily application</p>
<p>18:00-18:15 CB-117</p>	<p>Title: A Comparison Study of Pre-trained Language Models for Chinese Legal Document Classification Authors: Ruyu Qin, Min Huang, Yutong Luo Presenter: Ruyu Qin Presenter’s Organization: University of Chinese Academy of Sciences, China</p> <p>Abstract: Legal artificial intelligence (LegalAI), aiming to benefit the legal domain using artificial intelligence technologies, is the hot topic of the moment. As the basis for various LegalAI tasks such as judgment prediction and similar case matching, the classification of legal documents is an issue that has to be addressed. The majority of current approaches focus on the legal systems of native English-speaking countries. However, both Chinese language and legal system differ significantly from that of English. Given the success of pre-trained Language Models (PLMs) and outperformance compared with feature-engineering-based machine learning models as well as traditional deep neural network models such as CNNs and RNNs in NLP, their effectiveness in specific domains needs to be further investigated, especially in legal domain. Moreover, few studies have made comparisons of these</p>

	<p>PLMs for specific legal tasks. Therefore, in this paper we train several strong PLMs which differ in pre-training corpus on three datasets of Chinese legal documents. Experimental results show that the model pre-trained on the legal corpus demonstrates its high efficiency on all datasets.</p>
<p>18:15-18:30 CB-118</p>	<p>Title: Boost speech recognition without training Authors: Yifeng Niu, Gong He, Jide Qian, Ling Xiao, Xiaoping Li, Jiye Qian Presenter: Yifeng Niu Presenter’s Organization: State Grid Chongqing Electric Power Research Institute, China</p> <p>Abstract: Speech recognition has many application scenarios, such as Interactive Voice Response, and voice commands in games. Many of the voice in these scenarios are short and with high concurrency, so that the performance requirements for speech recognition are very demanding. To boost the performance of speech recognition, one way is to use as much data as possible to train the recognition model to obtain higher accuracy or optimize the structure of the model to make the model smaller and faster. However, doing this is very expensive, it requires us to have very large datasets and a lot of computing resources. To boost the performance of speech recognition without training the model, we have proposed some methods based on our experience, including speech extraction, speech padding, fuzzy pinyin matching, and phonetic similarity matching. Experimental results show that our proposed method indeed boosts the performance of speech recognition. We also discuss the deployment methods we used.</p>
<p>18:30-18:45 CB-061</p>	<p>Title: A Joint Network for Pose Classification and Evaluation Based on Attention Mechanism Authors: Lantian Zhang and Bowen Zheng Presenter: Lantian Zhang Presenter’s Organization: Jiangxi University of Finance and Economics, China</p> <p>Abstract: In recent years, many studies have focused on pose recognition, with few studies on pose evaluation and even fewer on pose classification. Thus, studies combining pose evaluation and pose classification are almost non-existent. In this paper, a channel attention-based Siamese network was proposed, and two functions of pose classification and pose evaluation were integrated into the same network, which means this proposed model simultaneously implements classifying input poses into the appropriate categories and evaluating the similarity of input poses. Briefly, the proposed model was structured as a basic Siamese network with three convolutional blocks, one of which contains a convolution layer, a pooling layer, a batch normalization layer, and an activation function. After three convolutional blocks, one of the branches of the Siamese network diverged into two fully connected layers to generate two feature vectors, one for classification and the other for evaluation. The other branch connects a fully connected layer to generate a feature vector for pose evaluation. Furthermore, the attention module has been shown to be effective according to our experiments on the Baduanjin dataset.</p>

	<p>Experimental results also indicate that the performance of both the pose classification task and the pose evaluation task is relatively great in our proposed model.</p>
<p>18:45-19:00 CB-130</p>	<p>Title: An intention-based comprehensive feature extraction network for behavior sequences Authors: Shanglin Yang, Daiwei Li, Haiqing Zhang, Lei Yang, Fei Xiao, Dan Tang, Lei He Presenter: Shanglin Yang Presenter’s Organization: Chengdu University of Information Technology, China</p> <p>Abstract: The prediction of students’ performance can be used to discover students who need to be helped in academic, which is an important step towards personalized education. Recently, many researches focus on feature combination and selection. However, existing studies process missing data by simply removing, which not full use data information. And, majority studies lack customized attention for different students. Thus, this paper proposed Nearest Neighbor based Time Imputation algorithm for Campus Behavior Time Series Data (CBTS-NNTI) to fill the missing information based on students' school behavior regularity. To customized attention for different students, we proposed a Behavioral Purpose Feature Extraction network (BPFE) for predicting student academic performance. BPFE extract the long-term and short-term behavioral purposes by using Transformer Encoder and Gate Recurrent Unit (GRU) to discover the student's behavior feature deeply. We perform experiments in real-world dataset. Compared with no process for missing data, CBTS-NNTI improve accuracy 13.1%, 2.82% recall and 1.73% precision in best cases on same condition. BPFE have best performance in poor academic performance students’ predictions. Accuracy, recall and precision of BPFE is 74.99%, 50.41% and 50.49%. Meanwhile, classifiers train is fastest with BPFE.</p>

Parallel Session 11 - Pattern Recognition

分会报告 11 -模式识别

Session Chair: Assoc.Prof. Ke Huang, San Diego State University, USA

May 30, 2022 | 10:00-12:15

ZOOM A: 824 2128 3210

<https://us02web.zoom.us/j/82421283210>

<p>10:00-10:15 CB-004</p>	<p>Title: Macht: An application based on a sentiment analysis model to the identification of messages in Spanish with gender violence content on Twitter Authors: Ivonne Soldevilla, Nahum Flores and Sebastian Tuesta Presenter: Ivonne Soldevilla Presenter's Organization: National University of San Marcos Lima, Peru</p> <p>Abstract: During confinement, the number of anonymous complaints of gender violence in social networks has increased, affecting society. This work presents an alternative to detect messages with offensive content to women who have gone through a process of violence automatically. The applied methodology considers the construction of a public dataset with 1042 tweets in Spanish tagged by 48 volunteers. The model considers the fine-tuning process to 3 pre-trained BERT models (SpanBERT, BETO, multilingualBERT), with which 252 experiments were carried out to find the model with the best performance, obtaining an Area Under the Curve of 0.9349 and precision of 0.9043. The research contributes with a new public data labeled in Spanish in 5 age ranges where anyone from anywhere in the world will access the application and test the performance of the model.</p>
<p>10:15-10:30 CB-075</p>	<p>Title: Interference line removal using a progressive model Authors: Kangquan Mo, Pingjian Zhang Presenter: Kangquan Mo Presenter's Organization: South China University of Technology, China</p> <p>Abstract: Interference lines in the text image greatly affects the recognition of the text, thus, removing interference lines can improve the text recognition accuracy of the text image and the robustness of the text recognition model. This paper proposes a progressive model for interference line removal based on a recurrent neural network. The model utilizes the cyclic structure of RNN to perform multiple stages of interference line removal, which are responsible for removing part of the interference lines. In each stage, dilated feature extraction module is adopted to gradually extract richer image features. The feature extraction module aggregates dilated convolutions with different dilation rates, which ensures the extraction of receptive field of various scales. To make full use of shallow feature and speed up network training, dense connectivity is added between feature extraction blocks. The experimental results show that the proposed model can effectively remove interference lines in text images, and achieves better performance compared to other models.</p>
<p>10:30-10:45 CB-077</p>	<p>Title: The Fine-Grained Recognition of Bird Images Based on Joint Semantic Components and ResNet Authors: Yucheng Li, Hua Zhou, Yili Zhao</p>

	<p>Presenter: Yucheng Li Presenter's Organization: Southwest Forestry University, Kunming China</p> <p>Abstract: Yunnan Province is famous with the largest recorded bird species in China, which is covering 848 species, totaling 1074 species and subspecies and belonging to 19 orders and 69 families. The bird resources in Yunnan Province have great ornamental value and economic value, and they are characterized by abundant species and diverse forms of birds. These variable and colorful features bring many challenges to their intelligent recognition and efficient management. At present, bird recognition and management mainly rely on manual methods and experience accumulation, which is inefficiency. Based on the latest artificial intelligence technology and the YUB-300-2019 bird dataset which we have developed, the fine-grained recognition model of bird images based on joint semantic components and ResNet is used. The experiment results showed our method has higher accuracy and can be generalized the wider bird identification. The method directly serves the society and acts on the original bird data, thus avoiding the difficulties and problems of feature extraction manually.</p>
<p>10:45-11:00 CB-095</p>	<p>Title: A novel deep learning framework for recognizing high-speed train numbers Authors: Yi Zhao, Yunan Jiang, Xiaobo Zhang, Zhehao Zhang, Panpan Ni, Zhimin Li Presenter: Zhehao Zhang Presenter's Organization: Southwest Jiaotong University, China</p> <p>Abstract: With an upsurge in high-speed railway construction and operation, the demand and necessity for recognizing high-speed train numbers are increasing now. Unlike car license plate numbers, there is no fixed position, color and font for the high-speed train numbers. And during the process of numbers collection, the images about train numbers being photted also are different in the form. However, it is often difficult to obtain high accuracy for high-speed train number recognition using traditional image processing methods. Therefore, this paper proposes a novel deep learning framework, which combines the advantages of three networks, i.e., VGGNet, Faster R-CNN and DenseNet to recognize the high-speed train numbers. The recognition process is divided into two stages: firstly, train numbers are positioned, and secondly train numbers are classified. Among them, the train numbers are positioned by using the updated VGG network for feature extraction, and then region proposals are generated through the Region Proposal Networks in Faster R-CNN. For the classification of high-speed train numbers, the improved DenseNet model is utilized to identify and classify the train numbers images that have been marked with the train numbers area. The experimental results show that the accuracy of this method reaches 98.36%, which is significantly better than other benchmark object detection methods.</p>
<p>11:00-11:15 CB-1020</p>	<p>Title: Study on the Relationship of Process-oriented Servitization Strategy, Hierarchical Network Structure and Innovation Performance Authors: Lan WANG, Mian LIU Presenter: Lan WANG Presenter's Organization: Beijing Language and Culture University, China</p>

	<p>Abstract: In the modular supply chain network, the dependent and master-subordinate relationship between module suppliers and core enterprises is transformed into a complementary relationship. The article explores the relationship between the process-oriented servitization strategy, hierarchical network structure and collaborative innovation performance. Using survey data from a sample of 296 firms from mainland China, we demonstrate that process-oriented servitization strategy enhances innovation performance through hierarchical network structure. We also find that service complexity negatively moderates the relationship of hierarchical network structure and innovation performance. Theoretical and managerial implications are discussed.</p>
<p>11:15-11:30 CB-104</p>	<p>Title: A Review of Research on Feature Extraction for Emotion Recognition based on EEG Signals Authors: Liu Hongxing ,Du Lifeng,Li Lihu,Hu Shenhuia Presenter: Liu Hongxing Presenter’s Organization: Chengdu Jincheng College ,China</p> <p>Abstract: Emotion is a general term for a series of subjective cognitive experiences . When the human brain reacts to the relationship between external things and the subject's needs, it produces our experience and feelings of external things. Emotional information plays an important role in life today. The application of emotional information has spread to all aspects of life, such as medical, educational, psychological, business and military fields. This paper summarizes all the feature extraction methods currently used in the research field of EEG-based emotion recognition, and introduces the definition and calculation methods of various feature extraction from the time domain, frequency domain, time-frequency domain, and space domain, respectively. After summarizing and summarizing, a method suitable for EEG-based emotion recognition feature extraction is obtained. At the same time, it is pointed out that the combination of hybrid feature extraction and deep learning will become the mainstream trend. It is hoped that subsequent researchers can gain a preliminary understanding of feature extraction methods suitable for emotion recognition by studying this article when they engage in EEG-based emotion research, and provide new ideas for subsequent research.</p>
<p>11:30-11:45 CB-113</p>	<p>Title: Multistage degradation prediction based on degradation pattern recognition and long short-term memory Authors: Gao Rui, Han Wei, Zhang Li Presenter: Gao Rui Presenter’s Organization: Nanjing University of Information Engineering, China</p> <p>Abstract: The degradation of equipment is characterized by randomness and complexity. For some equipment, there are many degradation stages, and the degradation law of each stage is quite different. Aiming at the problem of multi-stage degradation prediction, this paper proposes a method combined with degradation pattern recognition and life prediction method. Based on the degradation stage identification, life prediction for each stage is carried out</p>

	<p>separately, and an oxygen concentrator is taken as an example to verify the method. The results show that the prediction accuracy of oxygen concentrator life by this method is much higher than that by direct prediction without subsection.</p>
<p>11:45-12:00 CB-1025</p>	<p>Title: Fungi recognition based on coordinated attention and EfficientNetV2 Authors: Chuxian Li, Wenjing Zhao, Lingchun Meng, Zhaohui Chen, Yongtao Zhao, Zhong Cao Presenter: Chuxian Li Presenter’s Organization: Guangzhou University, China</p> <p>Abstract: Fungi are diverse species, which are widely distributed and have high ecological, economic, and research values. Traditional classification relies on manual work, which is inefficient and not conducive to the research, promotion and application of fungi. Fungal identification is a fine-grained visual classification (FGVC) problem, which is challenging due to the wide variety of fungi and their different morphologies. In this paper, we propose a deep learning-based fungal recognition method that improves the convolutional neural network EffentnetV2. We add the coordinate attention module to EffentnetV2 for aggregating feature map spatial location information. Our model achieves an accuracy of 78.41% on the publicly available DF20-mini dataset, outperforming other mainstream neural networks and ViT architectures. We analyzed the improved model using the Grad-CAM visualization tool and demonstrated its effectiveness.</p>
<p>12:00-12:15 CB-133</p>	<p>Title: Generating Consistent Multimodal Dialogue Responses with Emoji Context Model Authors: Xiangwu Zuo, Xiao Yu, Mengnan Du, Qingquan Song Presenter: Xiangwu Zuo Presenter’s Organization: Texas A&M University, USA</p> <p>Abstract: Emoji plays a critical role in human-to-human conversations. It is straightforward to understand emotional feelings of others via the emojis in a dialogue response. However, incorporating emoji into a chatbot is a challenging task given the heterogeneity of the data sources. Motivated by previous work using emojis for sentiment analysis, we pave a novel way of creating a chatbot that can generate consistent multimodal responses. In this paper, we propose to develop an Emoji Context Model to generate emoji in dialogues. Also, considering dialogue historical information, responses generated by our proposed model achieve better performance in terms of coherency comparing with the state-of-the-art. The experimental results demonstrate our proposed model improves conversation consistency and provides effective multimodal responses with emojis.</p>

Parallel Session 12 - Computer Vision and Image Processing

分会报告 12 -计算机视觉与图像处理

Session Chair: Assoc. Prof. Hengjun Zhao, Chongqing College of Arts and Sciences, China

May 30, 2022 | 10:00-12:15

ZOOM B: 862 3655 9782

<https://us02web.zoom.us/j/86236559782>

<p>10:00-10:15 CB-131</p>	<p>Title: MFE-Net: Multi-Type Feature Enhancement Net for Retinal Blood Vessel Segmentation Authors: Haitao Yan, Jiexin Xie, Xiaotian Yue, Jiaxin Wang, Shijie Guo Presenter: Haitao Yan Presenter’s Organization: Fudan University,China</p> <p>Abstract: To improve the accuracy of retinal blood vessel segmentation, this paper presents a supervised segmentation method Multi-type Feature Enhancement (MFE). In MFE, a high-low level feature fusion module (FFM) is constructed to realize the fusion of spatial information and semantic information, which provides more comprehensive features for segmentation. Spatial Information Enhancement Module (SIEM) is introduced to promote the learning ability of spatial features, which is available for blood vessel image with continuous morphology. In addition, an operation of image preprocessing and augmentation is conducted to ensure MFE could train and implement on small datasets. Experiments on public dataset show that the proposed FFM can effectively improve the segmentation accuracy as well as solving the problem of inadequate training on small datasets.</p>
<p>10:15-10:30 CB2-005</p>	<p>Title: Analyzing Strengths and Weaknesses of Modern Game Engines Authors: Tauheed Khan Mohd, Fernando Bravo-Garcia, Landen Love, Mansi Gujadhur and Jason Nyadu Presenter: Tauheed Khan Mohd Presenter’s Organization: Augustana College, Rock Island, USA</p> <p>Abstract: The growing relevance of gaming engines in the gaming industry is making it harder and harder for a prospective developer to choose a game engine. In this technical paper we will analyze the following game engines: Cocos2D-X, CryEngine, GDevelop, Godot, Panda3D, Unity, and the Unreal Engine. In every section we will elaborate on advantages and disadvantages of each engine. Some users claim that older gaming engines like CryEngine are irreplaceable and that their engine structure should be an example for other engines. The new modern wave of game engines including Unity and Unreal Engine end up reigning supreme with compatibility with every gaming platform and the ability to create both 2D and 3D games. Along with that having a strong community and developer support results in a very content user-base.</p>
<p>10:30-10:45 CB-1002</p>	<p>Title: Complex Network-Based Image Classification Method Authors: Zhuang Ma,Guangdong Huang Presenter: Zhuang Ma Presenter’s Organization: China University of Geosciences, China</p>

	<p>Abstract: Complex networks are topologically invariant. Using complex network in image recognition and classification can greatly reduce the influence of image rotation, translation and scaling on recognition accuracy. Complex networks are modeled by mathematical graph theory and consist of numerous interconnected nodes. The topology of a complex network consists of "connections" and "disconnections" between nodes. The existence of connected edges between vertices depends on the weight of the connected edges. Based on this, we process the traditional image recognition data set and construct the complex network model of the image. Then the neural network is used to train and classify the processed images. The results show that the accuracy of image classification based on complex network is higher than that of traditional methods.</p>
<p>10:45-11:00 CB-1016</p>	<p>Title: Competition Threaten Risk Degree Assessment Strategy in Lane-changing Driving Scenarios based on Non-cooperative Game Theory for Autonomous Systems Authors: Mian Dai, Guoyu Zhang, Shuai Zhao, Xianglei Zhu Presenter: Guoyu Zhang Presenter’s Organization: CATARC ADC,China</p> <p>Abstract: A system for lane-changing driving scenario analysis and the CTRD (Competition Threaten Risk Degree) assessment based on Non-cooperative Game Theory is proposed. By computing with the real-time collected direct and indirect information, shallow and deep strategy analysis is implemented with uncertainty consideration, and the CTRD of each sampling of competing actions is calculated. In the ongoing potentially critical scenario with high occurrence rate, it could support the decision of whether autonomous driving strategy system is competitive or compromised, and the enhancement of the driving safety to avoid clash accident by rational compromise, or could keep the traffic efficiency with appropriate competition operations after beneficial consideration and risky consequences affordability calculation. The experiment with more than 3000 groups real-road cut-in data shows the relevance of each interactively tentative and feedback action in continuous non-cooperative competition rounds. The SVM method is employed to compare the result of driver's vehicle operation after facing the threaten challenge between CTRL-based strategy prediction and real reactions, the coincidence rate is 94%.</p>
<p>11:00-11:15 CB2-006</p>	<p>Title: Comparative Analysis on Various CSS and JavaScript Frameworks Authors: Tauheed Khan Mohd, Jordan Thompson, Amedeo Carmine and Grant Reuter Presenter: Tauheed Khan Mohd Presenter’s Organization: Augustana College, Rock Island, USA</p> <p>Abstract: Web development is a huge part of the current world, affecting all parts of the world and human interaction. Learning about frameworks used in web development allows for increased development efficiency and increased website performance and functionality, based on knowing what technologies to apply when and where. This paper will examine various web framework technologies, specifically in the realm of CSS and JavaScript, and various frameworks that make use of them</p>

	<p>such as AJAX, Node JS, Bootstrap, and AngularJS, among others. This paper will provide analysis and explanation of these technologies’ designs, useful features, and potential shortcomings, and recommend which technology to use depending on various situations and web development environments.</p>
<p>11:15-11:30 CB-1024</p>	<p>Title: Improved Model of Common Radix and Rhizome Chinese Herbal Medicine Classification Based VGG16 Authors: Kunhui Wang, Yongtao Zhao, Yongzhe Wang, Xinyi Shang, Wenjing Zhao, Zhong Cao Presenter: Kunhui Wang Presenter’s Organization: Guangzhou University, China</p> <p>Abstract: Chinese Herbal Medicine (CHM) is a medicinal treasure of the Chinese nation, research on the identification and classification of CHM can help promote the heritage and development of CHM. In this paper, we propose a fast identification and classification method for common radix and rhizome CHM based on improved VGG16. Firstly, we add Convolutional Block Attention Module (CBAM) to VGG16 to improve the representation power of the model. Secondly, we reduce the number of parameters of VGG16 by global average pooling and improve the generalization ability of the model. The accuracy of the improved network model reaches 93.21%, which is higher than the popular models such as ResNet50, MobileNetV2, DenseNet121, and VGG16.</p>
<p>11:30-11:45 CB-150</p>	<p>Title: SiamL-MLP: Siamese-like network for object tracking based on MLP-Mixer Authors: Shipeng Sun, Shiyong Lan, Weikang Huang, Piaoyang Li Presenter: Shipeng Sun Presenter’s Organization: Sichuan University, China</p> <p>Abstract: Visual object tracking has always been a research hotspot in the field of computer vision. Recently, some excellent techniques in video object detection can be used to improve the performance of visual object trackers. Therefore, we propose a new Siamese-like network tracker by leveraging the superior representation ability of the recent visual object detection algorithm MLP-Mixer. Specifically, the MLP-Mixer based backbone network is used for feature extraction, which can enhance the feature representation. Furthermore, to connect the target template and the search region, we adopt cross-attention instead of conventional correlation operation to avoid getting stuck in local optimization when predicting target location. Finally, in order to demonstrate the effectiveness of the proposed method, we conduct extensive experiments on four tracking benchmarks, including OTB2015, VOT2016, VOT2018 and GOT-10k datasets. Experimental results show that our proposed SiamL-MLP achieves competitive performance on the OTB2015, VOT2016, VOT2018 and GOT-10k datasets. Our tracker runs at approximately 40 FPS on GPU. Code will be available at https://github.com/SilvesterSun/SiamL-MLP.</p>
<p>11:45-12:00 CB-016</p>	<p>Title: An image contour extraction model based on depth information and phase information Authors: Jie Xiao, Xiaorui Lv, Yan Zhang Presenter: Jie Xiao</p>

	<p>Presenter’s Organization: Wuhan Railway Vocational College of Technology, China</p> <p>Abstract: Edge extraction in images is very important for the understanding of image semantics. The Fourier components at various step, line, roof and other edge feature points in an image have the largest homophily, and the underlying features of the image are extracted using the phase congruency information of the image, which is consistent with the human visual mechanism. Meanwhile, different targets are at different depths in the image. Integrating the edge features at different depths is easier to obtain meaningful target contours. In this paper, we propose a contour extraction model based on depth information and phase information, and the accuracy and superiority of the algorithm in this paper are proved by natural image experiments</p>
<p>12:00-12:15 CB-1023</p>	<p>Title: Multi-CAM: A class activation mapping method based on multi-scale feature fusion</p> <p>Authors: Yuan Zeng, Jing Peng, Xi Wu, Jing Hu</p> <p>Presenter: Yuan Zeng</p> <p>Presenter’s Organization: Chengdu University of Information Technology, China</p> <p>Abstract: This paper addresses the problem that existing class activation mapping methods are limited to visualization at a single scale, resulting in inaccurate feature focus, and proposes Multi-CAM, a class activation mapping method based on multi-scale feature fusion. The method extracts image features from multiple scales and refines key feature regions to optimize image detail and generate desirable visualizations. Experiments show that the method is more effective than traditional class activation mapping methods for both single image and multiple image localization, providing a positive experience for interpretable work on neural network feature maps.</p>

Parallel Session 13 - Knowledge Engineering

分会报告 13 -知识工程

Session Chair: Assoc. Prof. Zhiyun Chen, East China Normal University, China

May 30, 2022 | 14:00-16:00

ZOOM C: 873 4342 3113

<https://us02web.zoom.us/j/87343423113>

<p>14:00-14:15 CB-035</p>	<p>Title: Research on the Application of Data Mining in Teaching System Authors: Yi Zhang, Chi Yang, Xianze Yang, Chujun Wang and Xiaoting Weng Presenter: Yi Zhang Presenter's Organization: Chengdu Neusoft University, China</p> <p>Abstract: Using data mining technology, based on relevant scientific theories, optimize the school teaching system. Taking full advantage of the huge data stored in the teaching system of colleges and universities for many years, through decision analysis and decision tree pruning method to carefully analyze the data, discover the messages and useful knowledge to promote the teaching quality from a great many data in teaching system, and be used in teaching practice. This paper establishes data mining system to monitor and control teaching quality. Among them, data mining algorithms such as association rules and decision trees are applied. From the perspective of data analysis, the main body, process and other factors affecting teaching quality and their mutual relations are studied, and a rule discovery method suitable for teaching evaluation is proposed.</p>
<p>14:15-14:30 CB-047</p>	<p>Title: The Theory and Empirical Study on the Two-dimensional Driving Choice of College Students' Major Choice Authors: Xing-guang CHEN, Xue-ting WANG Presenter: Xue-ting WANG Presenter's Organization: Jiangnan University, China</p> <p>Abstract: How do college students make their major choice and according to what value criterion can be discussed from two aspects: the driving source of choice and the value orientation. This paper proposes a two-dimensional drive-choice analysis framework of College Students' major selection, and then takes two consecutive grades of students major of "big data management and application" of Jiangnan University as a case to conduct an empirical survey. The results show that personal decision-making plays a more significant role in college students' major selection. In addition, college students' major selection shows an obvious utilitarian orientation. The analysis framework of this paper has a certain universality, and the research conclusion also has a certain reference value, which can provide theoretical guidance for the research of college students' major selection, as well as provide a reference for the administrative department of colleges to formulate enrollment relevant policies.</p>
<p>14:30-14:45 CB-066</p>	<p>Title: Constructing Dynamic Knowledge Graph Based on Ontology Modeling and Neo4j Graph Database Authors: Yaxi Chen, Xuefeng Xing Presenter: Yaxi Chen</p>

	<p>Presenter's Organization: Southwest Minzu University, China</p> <p>Abstract: At present, there are several issues with large-scale domain dynamic knowledge graphs including incomplete acquisition of original data, low accuracy with knowledge extraction and knowledge fusion, as well as ununiform semantic relations between entities. This paper constructs dynamic knowledge graph based on ontology modeling and Neo4j graph database. The ontology data model built based on the "seven-step method" effectively avoids the filling of instances without concept classes in the original data, while removing concepts with low user attention or learning value, which ensures integrity of original data acquisition, efficiency and accuracy of knowledge extraction and fusion, as well as rationality of logical relations between classes. Based on the ontology constraints and the mapping between the ontology model and Neo4j graph database, large-scale domain dynamic knowledge graph is achieved. We apply this scheme in the field of agricultural informatization and receive satisfying experimental results. In future work, we plan to explore multi-modal dynamic knowledge graph.</p>
<p>14:45-15:00 CB-071</p>	<p>Title: Research on compression of teacher guidance network use global differential computing neural architecture search Authors: Haozhe Shen, Wenjun Li, Yilin Li, Keqiang Yue, Ruixue Li, Yuhang Li Presenter: Haozhe Shen Presenter's Organization: Hangzhou Dianzi University, China</p> <p>Abstract: Large scale deep neural network has achieved unprecedented performances in many fields, such as computer vision, com-puter auditory, medical monitor and the others. However, it faces severe challenge for application scenarios with limited hardware resources and high real-time requirements. In our recent work, a globally differentiable deep neural architecture search method is adopted. At the same time, the knowledge of the teacher network is introduced into the network search, and the st-udent network that is more sensitive to the tea-cher network is automatically searched. The student network is used to replace the teacher network for the original task in series resource-constrained devices. Compared with teacher network, student network has tiny size and remarkable per-formance close to the teacher network with knowledge distilla-tion, so that the neural architecture search method is skillfully turned into a model compression method. We have verified the proposal in cifar10, cifar100 and engineering datasets. Exper-iments show that this method can greatly reduce the scale of the task network and maintain excellent performance similar to the original network. Additional experimental results on Jetson TX2 and raspberry show that the reasoning time of compressed network decreases significantly.</p>
<p>15:00-15:15 CB-111</p>	<p>Title: A General and Systematic Method for Constructing and Applying Chinese Medical Knowledge Graph Authors: Duan Junhua,Chen Ziyuan,Zhu Yi-an,Lu wei Presenter: Duan Junhua Presenter's Organization: Northwestern Polytechnical University, China</p>

	<p>Abstract: In this paper, we propose a general systematic medical knowledge graph construction technique, which combines the methods of domain knowledge graph building and general knowledge graph building. Using ICD-11 as the disease knowledge system, the bottom-up method is used to collect medical data, then the multi-source heterogeneous data are fused to build a medical knowledge graph. Because knowledge graphs that are constructed from the bottom to the top may be incomplete, the knowledge reasoning method is used to complete the knowledge graph. Given the high requirement of knowledge accuracy in the medical field, only the reasoning results considered correct by experts can be added to the knowledge graph for knowledge completion. Finally, we create an application website for the medical knowledge graph, which realizes the functions of medical knowledge Q & A and information recommendations. The approaches for medical knowledge graph construction, knowledge completion, and the Q & A system devised in this paper can be used as a general framework that can be applied to other knowledge graph construction systems.</p>
<p>15:15-15:30 CB-115</p>	<p>Title: Global Relation Auxiliary Graph Attention Network for Knowledge Graph Completion Authors: Ruotian Hou, Wenjun Zhu, Cui Zhu Presenter: Ruotian Hou Presenter's Organization: Beijing University of Technology, China</p> <p>Abstract: Knowledge Graph Completion (KGC) has been an active research topic in recent years, which is the task of predicting missing links based on known triples of knowledge graphs. Some recent work has shown that graph neural networks (GNNs) using graph structure can perform well on KGC. These models learn information from entities and relations within the subject's neighborhood and update the representation through a message passing mechanism. However, existing GNN models rarely include the modeling of relational information, and they tend to represent and learn nodes through complex networks, ignoring the underlying semantic information between relations. In this work, we propose a global relationship-assisted graph attention network. It not only models entities but also builds directed graph structures and updates the representation of relations between different relations. Specifically, the strongly correlated neighboring relations are identified for aggregation by an attention function based on the information and spatial domains. We also use a learnable nonlinear function to activate the attention values, allowing the model to adaptively aggregate information. Experiments show that GRA-GAT has a very advanced performance on link prediction tasks.</p>
<p>15:30-15:45 CB-1005</p>	<p>Title: An Optimized Graph Embedding based Knowledge Graph Cleaning Algorithm Author: He Min Presenter: He Min Presenter's Organization: Ya'an Polytechnic College, China</p> <p>Abstract: Data quality of knowledge graph is a one of the most important guarantees for many knowledge-based applications. We investigate the knowledge</p>

	<p>graph cleaning problem. We propose a knowledge graph error detection framework and design an optimized embedding based clean algorithm. The framework maps the knowledge graph into an numerical space and keeps the relationship between different nodes. With this framework, both miss data error and errous relationship can be cleaned. Extensive experimental study over different data sets validate the effectiveness of the method.</p>
<p>15:45-16:00 CB-1014</p>	<p>Title: Optimization of Subgraph Matching over Knowledge Graph based on Subgraph Indexing Authors: Lei Lv, Jiayu Liu, Qi Li, Jiazhou Li Presenter: Lei Lv Presenter’s Organization: Information & Communication Company, State Grid Sichuan Electric Power Company Chengdu, China</p> <p>Abstract: Given a query graph, subgraph matching is the process of finding all the isomorphic graphs over a large data graph. Subgraph is one of the fundamental steps of many graph-based applications including recommendation system, in-formation retrieval, social network analysis, etc. In this paper, we investigate the problem of subgraph matching over power grid knowledge graph. Since knowledge graph is a modelled as a directed, labelled, and multiple edges graph, it brings new challenges for the subgraph matching on knowledge graph. One challenge is that subgraph matching candidate calculation complexity increases with edges increase. Another challenge is that the search space of isomorphic subgraphs for a given region is huge, which needs more system resources to prune the unpromising graph candidates. To address these challenges, we propose subgraph index to accelerate the matching processing of subgraph que-ry. We use domain-specific information to construct index of power grid knowledge and maintain a small portion of search candidates in the search space. Experimental studies on real knowledge graph and synthetic graphs demonstrate that the proposed techniques are efficient compared with counterparts.</p>

Parallel Session 14 - Artificial Intelligence Technology and Application

分会报告 14 - 人工智能技术及应用

Session Chair: Prof. Mohd Saberi Mohamad, United Arab Emirates University, United Arab Emirates

May 30, 2022 | 14:00-16:30

ZOOM D: 876 6131 8640

<https://us02web.zoom.us/j/87661318640>

<p>14:00-14:15 CB-041</p>	<p>Title: Research on cooperative task assignment scheme of heterogeneous UAVs Authors: Shaokun Yan, Jihua Xu, Linan Song and Feng Pan Presenter: Shaokun Yan Presenter's Organization: Jiangsu Automation Research Institute, China</p> <p>Abstract: Aiming at the problem of cooperative task assignment of heterogeneous UAVs, a given group of UAVs with different reconnaissance payload capabilities is studied to perform reconnaissance, strike and evaluation tasks for multiple tasks in the mission scenario. Based on the CBBA algorithm, a new bidding function is designed, the consensus algorithm is improved, the completion time window and the time required for each task are set, and an improved CBBA algorithm is proposed. The simulation results show that the improved CBBA algorithm can solve the problem of UAV task assignment with time window in static environment.</p>
<p>14:15-14:30 CB-048</p>	<p>Title: Analysis of Key Technologies of Underground Inspection Robot and Design of Its Manipulator Authors: Cungen Xi, Bing Liu, Minghui Zhao Presenter: Cungen Xi Presenter's Organization: China Coal Technology & Engineering Group Shanghai Co., Ltd.,China</p> <p>Abstract: According to the special underground environment and the research and application status of inspection robot, the key technologies of underground inspection robot such as mobile platform, autonomous navigation and positioning, intelligent control, autonomous charging, background management and online fault diagnosis are discussed. This paper focuses on the design of a special mechanical arm for inspection robot. Combined with the requirements of underground belt conveyor in coal mine, the working space, torque and tension of the mechanical arm, the pressure of gripper and its mechanism realization are calculated, which can add innovative key technology to mine intelligence, and has engineering application value and economic significance.</p>
<p>14:30-14:45 CB-107</p>	<p>Title: D-leader Control Algorithm for Multi-Robot Formation Transformation Authors: Honggao Deng, Xinjia Xu, Yuanfa Ji, Yang Bai, Xiyun Sun Presenter: Xinjia Xu Presenter's Organization: Guilin University of Electronic Technology, China</p> <p>Abstract: The Leader-Follower algorithm stands out among many multi-robot formation control algorithms due to its simple operation and easy implementation. However, the Leader-Follower algorithm has a strong dependence on the pilot robot and poor information feedback. To solve this problem, the multi-variable D-leader</p>

	<p>algorithm based on multi-robot formation transformation is proposed in this paper. Based on the Leader-Follower algorithm, the idea of dynamic pilot is introduced to make the multi-robot formation flexibly, and realize the dynamic adjustment of the pilot robot while changing the multi-robot formation. At the same time, the Runge-Kutta algorithm and the transformation method of particle model and difference model are combined to realize the flexible adjustment of path and position during formation transformation. The cross-mode experimental simulation shows that compared with the Leader-Follower algorithm, the formation adjustment rate of multi-robot is increased by an average of 66.7% and the dynamic navigation rate of pilot robot is increased by an average of 53.35% under the D-Leader algorithm. The D-Leader algorithm not only realizes the formation adjustment of multi-robot but also effectively improves the performance of multi-robot formation.</p>
<p>14:45-15:00 CB-142</p>	<p>Title: Testing and Measurement on Willingness to Use Augmented Reality, Virtual Reality, and AI-Enabled Checkouts Authors: Sunisa Junsawang, Singha Chaveesuk, Wornchanok Chaiyasoonthorn Presenter: Sunisa Junsawang Presenter's Organization: King Mongkut's Institute of Technology Ladkrabang, Thailand</p> <p>Abstract: Augmented Reality, Virtual Reality, and AI-Enabled Checkouts in several industries, including education, retail, etc. These technologies have shown an essential and highly important ability to provide customers with new innovative user experiences and interactions between humans and technology. This paper focuses on developing a tool including nine latent and 23 observed variables for an exam a conceptual framework of Willingness to Use Augmented Reality, Virtual Reality, and AI-Enabled Checkouts with Unified Theory of Acceptance and Use of Technology², Expectation-Confirmation Model, Service Quality, and Personal Innovativeness. These findings will provide observed variables as a tool for exam insight into what affects customer willingness to use.</p>
<p>15:00-15:15 CB-149</p>	<p>Title: A Simple Framework for XAI Comparisons with a Case Study Authors: Guo Feng Anders Yeo, Irene Hudson, David Akman, Jeffrey Chan Presenter: Guo Feng Anders Yeo Presenter's Organization: RMIT University, Australia</p> <p>Abstract: The number of publications related to Explainable Artificial Intelligence (XAI) has increased rapidly this last decade. However, the subjective nature of explainability has led to a lack of consensus regarding commonly used definitions for explainability and with differing problem statements falling under the XAI label resulting in a lack of comparisons. This paper proposes in broad terms a simple comparison framework for XAI methods based on the output and what we call the practical attributes. The aim of the framework is to ensure that everything that can be held constant for the purpose of comparison, is held constant and to ignore many of the subjective elements present in the area of XAI. An example utilizing such a comparison along the lines of the proposed framework is performed on local, post-hoc, model-agnostic XAI algorithms which are designed to measure the feature</p>

	<p>importance/ contribution for a queried instance. These algorithms are assessed on two criteria using synthetic datasets across a range of classifiers. The first is based on selecting features which contribute to the underlying data structure and the second is how accurately the algorithms select the features used in a decision tree path. The results from the first comparison showed that when the classifier was able to pick up the underlying pattern in the model, the LIME algorithm was the most accurate at selecting the underlying ground truth features. The second test returned mixed results with some instances in which the XAI algorithms were able to accurately return the features used to produce predictions, however this result was not consistent.</p>
<p>15:15-15:30 CB-1012</p>	<p>Title: Thoughts on Whether Unmanned Driving can be Safe on the Road Authors: Yukun Yang Presenter: Yukun Yang Presenter’s Organization: Beijing No.20 High School, China</p> <p>Abstract: With the arrival of the era of intelligent transportation, unmanned driving technology has set off a research boom worldwide, and scientists and engineers have made a lot of achievements in related technical fields. The question of whether unmanned driving can be safely on the road has aroused widespread concern and discussion all over the world. It is a complex system engineering to study whether unmanned driving can be safely on the road, which is actually a prerequisite for studying the coordinated development of "human-vehicle-road". Not only a smart car, but also a smart road. This research focuses on sorting out the current status and problems of unmanned driving technology. Aiming at L0~L5 level unmanned driving, it tries to systematically reveal the current status and problems of unmanned driving from the perspectives of technology, products, infrastructure, laws and regulations, etc. Draw corresponding conclusions and put forward a vision. The research of the subject can provide some ideas and solutions for systematically solving the problems of infrastructure facilities, which has theoretical and practical significance.</p>
<p>15:30-15:45 CB-011</p>	<p>Title: Artificial Intelligence: A Promising Prospect for Better Management of Diabetic Patients Authors: Md Altab Hossin, Md Safiqul Islam, Sani Abubakar Hassan, Chiagoziem Chima Ukwuoma, Most. Miftahul Jannat Nuri and Md. Tofael Alam Siddiquee Presenter: Md Altab Hossin Presenter’s Organization: University of Electronic Science and Technology of China, China</p> <p>Abstract: Diabetic as an incurable chronic disease is increasing rapidly over time, and its impacts on other diseases are also striking. Indeed, science and technology have drastically developed, and it is also in the healthcare section. Getting diabetes education to help self-management is essential to help patients enhance their metabolic control and quality of life. Using artificial intelligence (AI) technologies, we can make significant progress in transforming available genetic data and clinical information into valuable knowledge. In disease education, given its potential</p>

	<p>benefits in encouraging individualization and full-course education intervention, AI would be extremely advantageous based on the unique situations of different individuals. The use of AI in different facets of diabetes education was explored based on collected data</p>
<p>15:45-16:00 CB-122</p>	<p>Title: A social recommendation method based on double-layer weak relation network Authors: Yan Wang, Shouzhi Sun, Aiping Tan Presenter: Shouzhi Sun Presenter's Organization: Liaoning University, China</p> <p>Abstract: In recent years, social recommendation become a popular research direction. Most social recommendation algorithms use solid relations for the recommendation, which causes a severe problem of accumulation of homogenized information in the recommendation list. Therefore, the paper proposes a social recommendation method based on a double-layer weak relation network. It can transmit heterogeneous information through a double-layer weak relation network. Firstly, the social recommendation method on weak relations reconstructs the knowledge graph and obtains the double-layer weak relations network. The first layered network uses SSLPA to establish a social trust network structure, the total weight of the network is quantified by the trust gate mechanism, and the migration confrontation technology determines the instance weight; The second layer is a weak relation social attribute network established by using the attribute information of nodes, and the social attribute network is constructed according to the bipartite graph technology. Secondly, the random walk model switches the double-layer weak relation network. After the random walk model reaches a stable distribution, the node heterogeneity recommendation list is obtained. Finally, building an experimental platform, and the experimental results show that the algorithm proposed in the paper has better heterogeneity propagation ability to ensure high accuracy.</p>
<p>16:00-16:15 CB-090</p>	<p>Title: Explicit and implicit feature interaction based on attention networks for Click-Through Rate prediction Authors: Shiqi Li, Zhendong Cui Presenter: Shiqi Li Presenter's Organization: Yantai University, China</p> <p>Abstract: Click-through rate (CTR) prediction, which aims to estimate the probability of a user to click on a given item, plays a critical role in both recommender systems and online advertising. Recently, a number of deep neural network-based approaches have been developed in an implicit and bit-wise interaction, which the order of interaction is inconclusive. In this work, a novel model called eXtreme Deep Attention Interaction Network (xAtInt) is proposed to capture meaningful combination features explicitly. On the one hand, xAtInt learn meaningful feature interaction via attention mechanism; on the other hand, it is capable of finding arbitrary degree interaction at a vector-wise. Furthermore, to improve performance, we integrate DNN with xAtInt learning explicit and implicit feature interactions.</p>

	<p>Extensive experiments are conducted on real-world dataset. The results show that our model present good performance compared existing state-of-the-art approaches.</p>
<p>16:15-16:30 CB-033</p>	<p>Title: On the Processing of Interrogative Sentence and Sentence Tense in Chinese-English Machine Translation Authors: Chi Yang, Yi Zhang, Linhui Wu and Xianze Yang Presenter: Chi Yang Presenter's Organization: Chengdu Neusoft University, China</p> <p>Abstract: This paper mainly discusses machine translation, the automatic translation of sentences in two different languages. It is mainly the product of artificial intelligence combined with computer software and hardware technology, linguistics, mathematics and other disciplines. At present, the computer software and hardware platform supports big data storage and high-speed operation, whose conditions are very good, but the quality of the translation made by machine translation is still unsatisfactory, especially the accuracy of some sentences. The research target of this paper is the machine translation of Chinese to English. Although there are many related technologies, this paper mainly discusses the processing of interrogative sentences and sentence tenses. This paper focuses on two tasks: (1) the translation processing of interrogative sentences in Chinese sentence translation and English sentence translation, putting forward the method of sentence pattern transformation; (2) the tense processing in Chinese sentence translation and English sentence translation.</p>

Closing Ceremony

闭幕式

Session Chair:

May 30, 2022 | 17:00-17:30

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