

**2022 The 5th International Conference on
Computational Intelligence and Intelligent Systems
(CIIS 2022)**

With Workshop of

**2022 3rd International Conference on Artificial Intelligence
Technology
(CAIT 2022)**

**November 04-06, 2022
Quzhou, Zhejiang, China**

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CONFERENCE VENUE



衢州学院是一所以工为主、多科协调发展的全日制应用型普通本科院校。学校前身为创办于 1985 年的浙江工学院浙西分校（浙江工业大学浙西分校），2010 年经教育部批准升格更名为衢州学院。2013 年获批为国家级大学生创新创业训练计划高校，2015 年获批为浙江省应用型建设试点示范学校，2018 年顺利通过教育部本科教学工作合格评估，2021 年被列为教育部新一轮本科教育教学审核评估试点院校。学校获省大众创业万众创新示范基地、省重才爱才先进单位、省文明单位、省普通高校毕业生就业工作优秀学校、省高校平安校园、节约型公共机构示范单位、全国群众体育先进单位等荣誉。根据 2022 年软科中国大学排名，学校在全国本科高校中位列第 384 名。根据 2022 年 GDI 中国大学排名（主榜），学校在全国本科高校中位列第 334 名。

学校坐落于素有“南孔圣地”之称的国家历史文化名城衢州，校园占地 863 亩，设有化学与材料工程学院、机械工程学院、建筑工程学院、电气与信息工程学院、商学院、教师教育学院、外国语学院/国际教育学院、马克思主义学院、创业学院、体育工作部等 10 个学院（部），开设涉及工学、教育学、管理学、经济学、文学、理学、艺术学等 7 大学科门类的本科专业 29 个，现有全日制普通本专科学生 8300 余人。拥有国家级一流本科专业 1 个、国家级一流本科课程 2 门，省级一流本科专业 11 个、省级优势特色专业 6 个、省级一流课程 78 门，入选中职与应用型本科一体化培养试点专业 1 个。校舍总建筑面积 22.7 万平方米，教学科研仪器设备资产总值 2.42 亿元，馆藏纸质图书 105 万余册。设有附属学校教育集团 1 个。

近年来，学校立足“应用型、地方性、开放式”发展定位，致力于推进内涵发展、特色发展、高质量发展，打造高水平特色鲜明的应用型大学。

师资队伍不断壮大。现有教职员工 730 人，专任教师 566 人，其中正高级职称教师 64 人、副高级职称教师 173 人，具有博士学位教师 204 人。柔性引进院士团队 2 个、国家“引才计划”人才 1 人。拥有教育部“新世纪优秀人才支持计划”人才 1 人，享受国务院政府特殊津贴人员 1 人，省“引才计划”人才 2 人，省“151 人才工程”第二、三层次人选 22 人次，省高校领军人才培养计划人选 10 人，省“之江青年社科学者行动计划”人选 1 人，省“青年科学家培养计划”人选 2 人，省高校中青年学科带头人 11 人，省高校本科教学指导委员会委员 4 人，省高校优秀教师 1 人，省优秀科技工作者 1 人，省农业科技先进工作者 1 人，省“钱江人才计划”D 类项目择优资助人员 1 人，市拔尖人才 8 人（含青年 2 人），市级以上各类“人才工程（计划）”228 人次，市级重点创新团队 4 个，“双师双能”型教师 320 余人。

育人质量稳步提升。创新创业教育成果丰硕，学科竞赛累计获省级三等奖以上奖项 3800 余项，其中全国三等奖以上奖项 510 余项，学校在 2017-2021 年全国新建本科院校大学生竞赛排行榜中位列第 22 名，获省普通高校示范性创业学院、省级众创空间和省级创业孵化示范基地，累计孵化创业项目 81 项。毕业生就业率持续保持高位，近五年毕业生年均就业率达 95% 以上，考研上线率连续四年达 20% 以上。根据武书连 2021 年、2022 年中国高校本科教

学质量排行榜，学校人才培养实现了本科新生质量等级 E+到毕业生质量等级 C 的显著提升，进步程度均居全省高校第一名。教育国际化稳步推进，与美国、乌克兰、英国、德国、韩国、马来西亚、日本等多个国家和台湾地区高校建立了合作关系，探索国际化校企合作办学体制机制，与企业共同完成成班建制的南非留学生培养项目。“南孔文化”被评为浙江省高校校园文化品牌。累计获省级高等教育教学成果奖 8 项，获省级“五个一批”产教融合项目、省级教学改革项目、“互联网+教学”示范课堂以及产学研合作协同育人项目等 115 项。

科研创新逐步增强。拥有“十三五”省级一流学科 4 个，省级重点实验室 1 个、省级工程研究中心 2 个、林业和草原国家创新联盟 1 个、省级科技创新服务平台 4 个、省级产业创新服务综合体 3 个。获省科技进步奖、省自然科学奖和省哲学社会优秀成果奖等省部级以上奖项 9 项，决策咨询报告多次获省委、省政府、省政协主要领导批示。师均外来科研经费连续两年超过 7 万元。目前，与浙江工业大学、浙江师范大学、杭州电子科技大学、浙江工商大学、浙江科技学院、安徽建筑大学、沈阳化工大学、安徽工程大学等高校联合开展硕士研究生培养工作。

服务社会成效显著。强化“融入衢州、立足浙江、面向全国”的办学理念，连续举办服务发展大会，实施服务区域发展专项行动，着力建设现代产业学院、行业研究院等开放融合平台。开展“双走进、双服务、双促进”活动，与市委人才办、企业共建 106 家博士工作站/创新站（其中 7 家省级博士创新站）。推进与浙大衢州“两院”、东南数字经济发展研究院和绿色金融研究院的共建共享，借力电子科大长三角研究院（衢州）、西南政法大学等的赋能升级，牵头联合武夷学院、上饶师范学院、黄山学院成立浙闽赣皖四省边际应用型大学联盟和省际绿色制造产教融合联盟，助推衢州四省边际中心城市建设。

学校紧扣“抓改革、增动能、促升级”的主基调，聚焦“1455”战略任务，奋力打造城市发展的名片、省际高校的名牌、产教融合的名校，力争成为新建应用型本科高校建设的“重要窗口”，加快推进学校上层次上水平，以实际行动贯彻落实党的二十大精神。

WELCOME ADDRESS

Dear Attendees,

Welcome to attend 2022 The 5th International Conference on Computational Intelligence and Intelligent Systems (CIIS 2022) with workshop of 2022 3rd International Conference on Artificial Intelligence Technology (CAIT 2022), they are going to be held in Quzhou, Zhejiang, China during Nov. 04-06, 2022. The conference is sponsored by Quzhou University, Macau University of Science and Technology, co-sponsored by Beijing University of Posts and Telecommunications, Beijing Information Science and Technology University, Guangxi University, Institute of Big Data and Information Technology, Wenzhou University, organized by College of Electrical and Information Engineering, Quzhou University.

The conference aims at addressing advances in research on computational intelligence and intelligent systems, covering topics ranging from enabling technologies to emerging applications and industrial experiences. CIIS aims to encourage researchers and practitioners to exchange and share their experiences. Authors are solicited to contribute original, unpublished contributions in all aspects of computational intelligence.

There are four keynote speakers and one invite speaker invited to give the speeches. Their information is as follows:

Prof. Nirwan Ansari, New Jersey Institute of Technology, USA (IEEE Fellow, High Index 82)

Prof. Honghai Liu, HIT Shenzhen, China (IEEE & IET Fellow)

Prof. Yu-Wang Chen, the University of Manchester, United Kingdom

Prof. Meng Joo Er, Dalian Maritime University, China (IEEE Fellow)

Asst. Prof. Cong Wang, Northwestern Polytechnical University, China

There are around 40 oral presentation are included in the conference, one best presentation will be selected from each session, evaluated from: originality; applicability; technical Merit; qualities of PPT; English. The best one will be announced at the end of each Session.

We'd like to express our great appreciations to all the support from you, may you have an excellent time on the conference!

Conference Organizing Committees
November, 2022

CONFERENCE COMMITTEES

CONFERENCE CHAIRS

Zhuoran Wang, Quzhou University, China
Jianqing Li, Macau University of Science and Technology, China

CONFERENCE CO-CHAIRS

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Xiaoqin Zhang, Wenzhou University, China
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Huseyin Seker, Birmingham City University, UK

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Radek Marik, Czech Technical University, Czech Republic
Priya RL, University of Mumbai, India
Chawalit Benjangkprasert, King Mongkut's Institute of Technology Ladkrabang, Thailand
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Wenlong Ma, Quzhou College of Technology, China

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Pakawan Pugsee, Chulalongkorn University, Thailand
P. Aruna, Coimbatore Institute of Technology, India
Khanista Namee, King Mongkut's University of Technology North Bangkok, Thailand
Siphesihle Philezwini Sithungu, University of Johannesburg, South Africa
Sunarin Chanta, King Mongkut's University of Technology North Bangkok, Thailand
Shahzad Ashraf, Hohai University, China
Sherin M. Youssef, Arab Academy for Science and Technology, Egypt
Ishak B. Aris, Universiti Putra Malaysia, Malaysia
Saba Al-Wais, University of Technology, Iraq
Sukarnur Che Abdullah, University Teknologi Mara, Malaysia
Jiaoyun Yang, Hefei University of Technology, China
Evgeniy Bryndin, Research Center "NATURAL INFORMATICS," Russia
Su-Cheng Haw, Multimedia University, Malaysia
Santosh Wagaj, JSPM's Rajarshi Shahu college of Engineering, India
Elizabeth Marie Ehlers, University of Johannesburg, South Africa
Pavlo Maruschak, Ternopil Ivan Puluj National Technical University, Ukraine
Pravin Ghate, JSPM's Rajarshi Shahu College of Engineering, India
Di Cao, Zhejiang University of Technology, China
Youquan Wang, Nanjing University of Finance and Economics, China
Sixian Chan, Zhejiang University of Technology, China
Harini Sriraman, Vellore Institute of Technology, India

GUIDELINE FOR ATTENDANCE

►Time

The whole program is arranged by **Beijing Time (UTC+8)**, please double-check your Test Time and Presentation Time, and update with your Local Time on your own schedule, to make sure attend on time.

►Onsite Oral Presentations

Authors' oral presentations have been allocated 15 minutes of effective presentation time, including Q/A time between Session Chair and speakers.

Please be at the session room 15 minutes before session starts.

A video projector and a PC will be available in all conference rooms. Speakers suggested not use their own laptop computer.

Bring your presentation on a USB memory stick in MS-PowerPoint or Adobe PDF formats, and upload it in the Session Room computer no later than 10 minutes prior to your session start! You can also bring it earlier, during the coffee/lunch breaks before your presentation. Please upload your presentation in a right place in order to find it easily at the time of presentation.

Please wear formal clothes or national characteristics of clothing for participation.

PowerPoint Instructions. For MS-PowerPoint presentations, please use the following versions only: PP 97-2003 (*.ppt) or 2007, 2010 to guarantee that it will be opened successfully on the on-site PC

We recommend to the PPT/PPTX format instead of PPS. All videos or animations in the presentation must run automatically!

Pictures/Videos. We cannot provide support for embedded videos in your presentation; please test your presentation with the on-site PC several hours before your presentation.

In case your video is not inserted in MS-PowerPoint, it is possible to have it in other formats – MPEG 2,4, AVI (codecs: DivX, XviD, h264) or WMV. Suggested bitrate for all mpeg4 based codecs is about 1 Mbps with SD PAL resolution (1024x576pix with square pixels, AR: 16/9).

Fonts. Only fonts that are included in the basic installation of MS-Windows will be available (English version of Windows). Use of other fonts not included in Windows can cause wrong layout/style of your presentation.

Suggested fonts: Arial, Times New Roman.

If you insist on using different fonts, these must be embedded into your presentation by choosing the right option when saving your presentation:

Click on “File”, then “Save As”

Check the “Tools” menu and select “Embed True Type Fonts”

►Online Presentation

Tool

ZOOM (**zoom.com.cn or zoom.us**) will be used for the whole online event. On the button of the web page, you can choose download the app for free and then choose ‘JOIN A MEETING’, then input room’s ID.

As usual you could not create an account now, so you can join in our conference as a visitor, ZOOM may ask you to input your phone number and the passwords they sent to your number to verify.

How to Use Zoom

<https://support.zoom.us/hc/en-us/articles/206618765-Zoom-Video-Tutorials>

Presentation Tips

- 1, Please prepare a digital device with **Microphone** (mandatory) and Webcam (optional), a **computer or laptop** is recommended; And make sure you are connected to a stable and **high-quality Wi-Fi network**, or 4G/5G or Internet if available.
- 2, Presentation Time: **Total 15 Mins** for online oral presenter and including 5 Q&A time.
- 3, Read the detailed program, check the time and Zoom information of the session that you will do your presentation.
- 4, One best presentation will be chosen from each presentation session and announced at the end of the session. The conference secretary will email you the certificates after the conference.
- 5, An **English PPT** must be prepared and use English during the presentation
- 6, Each Presentation will be recorded, if you don't want it, please inform our staff ahead of time.
- 7, Please enter in your session's room 10 Mins earlier of the start of sessions.
- 8, For video presenters, you need to play the presentation video **yourselves**.
- 9, Please name your attendee name as '**Presentation ID + Your Full name**'. Such as '01-001+Lily Ren'

KEYNOTE SPEAKERS

Keynote Speaker 1



PROF. NIRWAN ANSARI

**New Jersey Institute of Technology, USA
(IEEE Fellow)**

13:40-14:25, November 04 (UTC+8)

Meeting ID: 882 6679 5745

衢州学院（报告厅）

Speech Title: Facilitating Next-Gen Networking through Big Data and Artificial Intelligence

Abstract:

From the very advent of mobile communications, modern networking has witnessed several generational leaps, each facilitated by equally significant paradigm shifts at both the hardware and software level at the networking infrastructure as well as the user equipment. The next two decades will perhaps usher in the most revolutionary transformation of all necessitated by the unprecedented integration of radio access technologies and non-terrestrial networks to support a vast range of highly diverse and sensitive applications and services, each a small cog with its unique set of complexities and open challenges. While several advances will play major roles in this highly anticipated leap, it can be rightfully argued that Big Data and Artificial Intelligence will be among the two key-enablers for the next-generation networks. Thus, in this talk, we trace our way through the history of Big Data, its resurgence to the current state, how it can be harnessed, and the open challenges that need to be addressed. To fully exploit such massive volumes of data which are already being generated at unparalleled rates, artificial intelligence-based solutions that are crucial for holistic network automation and optimization have been proposed at both the subscriber and network operator ends. To this end, we augment our talk with a discussion of a few of the promising AI implementations that can be considered for both the access end and core networks.

Biography:

Nirwan Ansari, Distinguished Professor of Electrical and Computer Engineering at the New Jersey Institute of Technology (NJIT), received his Ph.D. from Purdue University, MSEE from the University of Michigan, and BSEE (summa cum laude with a perfect GPA) from NJIT. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) as well as Fellow of National Academy of Inventors (NAI). He authored Green Mobile Networks: A Networking Perspective (Wiley-IEEE, 2017) with T. Han, and co-authored two other books. He has also (co-)authored more than 600 technical publications, over 340 published in widely cited journals/magazines. He has guest-edited a number of special issues covering various emerging topics in communications and networking. He is Editor-in-Chief of IEEE Wireless Communications and has also served on the editorial/advisory board of over ten journals. His current research focuses on green communications and networking, cloud computing, drone-assisted networking, and various aspects of broadband networks.

He was elected to serve in the IEEE Communications Society (ComSoc) Board of Governors as a member-at-large, has chaired some ComSoc technical and steering committees, is current Director of ComSoc Educational Services Board, has been serving in many committees such as the IEEE Fellow

Committee, and has been actively organizing numerous IEEE International Conferences / Symposia / Workshops. Some of his recognitions include several excellence in teaching awards, a few best paper awards, NCE Excellence in Research Award, several ComSoc TC technical recognition awards, NJ Inventors Hall of Fame Inventor of the Year Award, Thomas Alva Edison Patent Award, Purdue University Outstanding Electrical and Computer Engineering Award, NCE 100 Medal, NJIT Excellence in Research Prize and Medal, and designation as a COMSOC Distinguished Lecturer. He has also been granted more than 40 U.S. patents.

Keynote Speaker 2



PROF. HONGHAI LIU
HIT Shenzhen, China
(IEEE & IET Fellow)

14:25-15:10, November 04 (UTC+8)

Meeting ID: 882 6679 5745

衢州学院（报告厅）

Speech Title: Multi-modal Sensing and Understanding for Medical Devices and Systems

Abstract:

It requires innovative technologies and theoretical foundation of sensing and understanding to meet increasing complexity of modern medical human-centred systems. The state of the art in medical devices and systems is largely dominant by solutions that are ad-hoc and applications dependent. This talk attempts to summarize challenges of sensing and analytics from the perspective of two medical applications. Two projects will be presented to showcase stroke rehabilitation and stroke rehabilitation and interaction with autism children. The talk will be concluded with open issues and challenges.

Biography:

Honghai Liu received his Ph.D from King's College, University London, UK. He is a Professor at Harbin Institute of Technology, Shenzhen, China. He previously held research appointments at King's College London, University of Aberdeen, and project leader appointments in large-scale industrial control and system integration industry. He is interested in sensing and understanding for medical systems and applications with an emphasis on approaches that could make contribution to the intelligent connection of perception to action using contextual information. He has authored/co-authored more than 200 peer-reviewed journals and conference papers. He is an IET Fellow and IEEE Fellow.

Keynote Speaker 3



PROF. YU-WANG CHEN

**Decision and Cognitive Sciences Research Centre,
The University of Manchester, UK**

15:40-16:25, November 04 (UTC+8)

Meeting ID: 882 6679 5745

衢州学院（报告厅）

Speech Title: Data, Knowledge and Decision Analytics

Abstract:

Decision analytics allow individuals and organizations to transform data and aggregate knowledge to support informed decision making. However, real-world decision making problems are often characterized by multiple sources of data and different types of complex information. In this talk, I will briefly introduce my research on decision analytics in the context of data and uncertain knowledge, and illustrative examples will be used from the fields of both engineering and management.

Biography:

Dr. Yu-Wang Chen is Professor in Decision Sciences and Business Analytics at Alliance Manchester Business School (AMBS), The University of Manchester, and Turing Fellow at Alan Turing Institute. Prior to joining AMBS, he worked briefly as a Postdoctoral Research Fellow at the Department of Computer Science, Hong Kong Baptist University. He received the PhD degree in Control and System Engineering from Shanghai Jiao Tong University. His research focuses primarily on decision sciences and data analytics, including their applications to risk analysis, supply chain management, healthcare decision support, consumer preference prediction, etc. He has published widely in leading journals, such as European Journal of Operational Research, Environment and Planning A: Economy and Space, Information Sciences, Computers & Operation Research and IEEE Transactions on Systems. He serves as Associate Editor of the Decision Analytics Journal (Elsevier) and Editorial Board Member of Complexity, Web Intelligence: An International Journal and International Journal of Productivity and Performance Management (Emerald). He has been awarded as PI/Joint PI/Co-I a number of research or industry projects by Innovate UK, ERDF, EPSRC, etc.

Keynote Speaker 4

16:25-17:10, November 04 (UTC+8)

Meeting ID: 882 6679 5745

衢州学院（报告厅）



PROF. MENG JOO ER

Dalian Maritime University, China

(IEEE Fellow)

Speech Title: Artificial Intelligence: Past, Present and Future

Abstract:

The quest for building human-like intelligence has gained enormous momentum in recent decades. Since the seminal works on Artificial Intelligence (AI), the desire of realizing the quest has become stronger. With the rapid developments in Science, Engineering and Technology, machines that mimic human intelligence have become a reality and sometimes indispensable parts in our daily life, such as Apple Siri and Google Voice. AI is concerned with the theory and practice of developing systems that exhibit the characteristics we associate with intelligence in human behavior: perception, natural language processing, reasoning, planning and problem solving, learning and adaptation. In this talk, recent developments of AI with applications in autonomous driving, marine vehicles, healthcare industry, domestic services, etc will be reviewed. Futuristic trends and research challenges will also be discussed.

Biography:

Meng Joo Er is currently Changjiang Scholar Distinguished Professor and Director of Institute on Artificial Intelligence and Marine Robotics, School of Marine Electrical Engineering, Dalian Maritime University (DMU), China. He was a Professor in the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore from 1992-2020. He served as the Founding Director of Renaissance Engineering Programme and an elected member of the NTU Advisory Board and from 2009 to 2012. He also served as a member of the NTU Senate Steering Committee from 2010 to 2012.

His research interests include Artificial Intelligence, Machine Learning, Fuzzy Neural Systems, Robotics and Automation, Object Detection, Intelligent Control and Marine Engineering. He has authored 6 books, 21 book chapters and more than 500 refereed journal and conference papers in his research areas of interest achieving a total citation count of more than 13,700 and a h-index of 57 based on Google Scholar. He is ranked first in Google citation count and h-index. Professor Er was bestowed the Web of Science Top 1 % Best Cited Paper and the Elsevier Top 20 Best Cited Paper Award in 2007 and 2008, respectively. In recognition of the significant and impactful contributions to Singapore's development by his research projects, Professor Er presented the Institution of Engineers, Singapore (IES) Prestigious Engineering Achievement Award twice (2011 and 2015). He is also the only dual winner in Singapore IES Prestigious Publication Award in Application (1996) and IES Prestigious Publication Award in Theory (2001). He was bestowed the title of Amity Researcher in 2018 for his outstanding and significant contributions in Robotics and Automation.

He received the Teacher of the Year Award for the School of EEE in 1999, School of EEE Year 2 Teaching Excellence Award in 2008, the Most Zealous Professor of the Year Award in 2009 and the Outstanding Mentor Award in 2014. He also received the Best Session Presentation Award at the World Congress on Computational Intelligence in 2006, Best Paper Award (First Prize) at the International Automatic Control

Conference 2016, Best Presentation Award at the IEEE-sponsored International Conference on Intelligent Control, Power and Instrumentation (ICICPI) 2016, Best Presentation Award at the IEEE-sponsored International Conference on Intelligent Autonomous System (ICoIAS) thrice (ICoIAS'2018, ICoIAS'2019 and ICoIAS'2021) and the Best Presentation Award at the 2021 6th International Conference on Automation, Control and Robotics Engineering (CARCE). On top of this, Professor Er has been invited to deliver more than 100 keynote speeches and invited talks overseas and has won more than 70 awards at international and local competitions.

Currently, Professor Er serves as the Editor-in-Chief of 2 international journals, namely Transactions on Machine Learning and Artificial Intelligence and the International Journal of Electrical and Electronic Engineering and Telecommunications. He also serves as an Associate Editor of IEEE Transactions on Systems, Man and Cybernetics-Systems, IEEE Transactions on Fuzzy Systems, Sensors, Asian Journal of Control, Sensors, ETRI Journal and International Journal of Modelling, Simulation and Scientific Computing. Professor Er has been active in professional bodies. Under his leadership, the IEEE Computational Intelligence Society (CIS) Singapore Chapter won the CIS Outstanding Chapter Award in 2012 creating history of making CIS Singapore Chapter becoming the first Asian CIS Chapter to win such prestigious award. In recognition of his outstanding contributions to professional bodies, he was bestowed the IEEE Outstanding Volunteer Award (Singapore Section) and the IES Silver Medal in 2011. He was also presented the Distinguished Service Award by the Institution of Engineering Technologists (IET), Singapore Branch Management in recognition of his services as Chairman of the IET Branch from 2002 to 2004.

He served as Chair of the Technical Track on Artificial Intelligence and Digitization, World Engineers Summit held from 10 to 12 October 2021 in Singapore. He was first elected as a member of the IES Council in 2004 and has served as Chair of the IES Electrical and Computer Engineering Technical Committee since then. Currently, he serves as General Chair of the 5th International Conference on Intelligent Autonomous Systems (ICoIAS'2022), a premium internationally conference which is technically sponsored by the IEEE Computational Intelligence Society and the IES.

He is listed in Who's Who in Engineering, Singapore, Edition 2013.

Invite Speaker 1

17:10-17:40, November 04 (UTC+8)

Meeting ID: 882 6679 5745

衢州学院（报告厅）



Asst. Prof. Cong Wang

Northwestern Polytechnical University, China

Speech Title: Fuzzy Clustering for G-image Segmentation

Abstract: Classic image segmentation involves an analysis or manipulation of image data defined in regular Euclidean domains. In recent years, with rapid advances in information and computer technology, image data defined in irregular domains including complex topologies have received much attention. Graphs positioned in high dimensional spaces offer a capacity to model such data and complex interactions among them. Let us assume for now that an image defined on a graph can be modelled as a real-valued function residing on vertices. It can be simply referred to a G-image. It can be represented through various interacting objects, such as colors, labels, and coordinates. In conclusion, G-images extend the universe of discourse of classical image processing. In other words, the scope of investigation on image processing is extended from Euclidean domains to graph ones. Due to the nonlinear nature of graphs, it is challenging to design efficient computing methods for manipulating and processing G-images. To do so, this speech discusses how to improve fuzzy clustering methods and then apply them to G-image segmentation.

Biography:

Cong Wang received the B.S. degree in automation and the M.S. degree in mathematics from Hohai University, Nanjing, China, in 2014 and 2017, respectively. He received the Ph.D. degree in mechatronic engineering from Xidian University, Xi'an, China in 2021.

He is now an assistant professor in School of Artificial Intelligence, OPTics and ElectroNics (iOPEN), Northwestern Polytechnical University, Xi'an, China. He was a Visiting Ph.D. Student at the Department of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada, and the Department of Electrical and Computer Engineering, National University of Singapore, Singapore. He was also a Research Assistant at the School of Computer Science and Engineering, Nanyang Technological University, Singapore. His current research interests include information computation, fuzzy theory, wavelet analysis, as well as image processing.

Dr. Wang has over 30+ papers (10+ in IEEE TRANSACTIONS) and host/participate in 10+ research projects (over 2.5 million RMB). He also has a book and a chapter to be published. He is funded by the China National Postdoctoral Program for Innovative Talents and the Excellent Chinese and Foreign Youth Exchange Program of the China Association for Science and Technology. He serves as a Frequent Reviewer of 40+ international journals, including a number of the IEEE TRANSACTIONS and many international conferences. He is a member of Institute of Electrical and Electronics Engineers (IEEE), Chinese Institute of Electronics (CIE), China Computer Federation (CCF) and China Society for Industrial and Applied Mathematics (CSIAM).

CONFERENCE AGENDA

November 04, 2022- Morning

Onsite Participants		Venue
10:00-12:00	Onsite registration (Collecting of conference materials)	衢州学院 (报告厅)
Online Test		Venue
10:00-11:00	Online Keynote, Invited Speaker and Session Chair	ZOOM ID: 88266795745
11:00-11:10	Break	
11:10-12:10	Online Oral Presenter of Session 1-5	

November 04, 2022-Afternoon

Time	Arrangements	Venue
	Host: Prof. Xiaolong Zhou, Quzhou University, China	
13:30-13:40	Opening Ceremony Opening Remarks: Prof. Zhaozhong Zhou, Quzhou University, China (Vice President) Welcome Address: Prof. Zhuoran Wang, Quzhou University, China (Dean of College of Electrical and Information Engineering) Program Address: Prof. Jianqing Li, Macau University of Science and Technology, China (Dean of School of Computer Science and Engineering)	
13:40-14:25	Keynote Speaker 1 Prof. Nirwan Ansari, New Jersey Institute of Technology, USA (IEEE Fellow) Speech Title: Facilitating Next-Gen Networking through Big Data and Artificial Intelligence	衢州学院 (报告厅) ZOOM ID: 88266795745
14:25-15:10	Keynote Speaker 2 Prof. Honghai Liu, HIT Shenzhen, China (IEEE & IET Fellow) Speech Title: Multi-modal Sensing and Understanding for Medical Devices and Systems	
15:10-15:40	Group Photo & Coffee Break	
	Host: Prof. Tok Wang Ling, National University of Singapore, Singapore	
15:40-16:25	Keynote Speaker 3 Prof. Yu-Wang Chen, Decision and Cognitive Sciences Research Centre, The University of Manchester, UK Speech Title: Data, Knowledge and Decision Analytics	

16:25-17:10	Keynote Speaker 4 Prof. Meng Joo Er , Dalian Maritime University, China (IEEE Fellow) Speech Title: Artificial Intelligence: Past, Present and Future	
17:10-17:40	Invite Speaker 1 Asst. Prof. Cong Wang , Northwestern Polytechnical University, China Speech Title: Fuzzy Clustering for G-image Segmentation	
18:30-19:30	Dinner Banquet	

冠发君悦大酒店
君临厅-五楼

November 05, 2022

Time	ROOM A (Online & Onsite)	ROOM B (Online)
	衢州学院（智慧教室阶 102） ZOOM ID: 88266795745	ZOOM ID: 879 2599 3800
10:00-11:45	Oral Session 1 Image Detection and Recognition	Oral Session 4 Intelligent Computing Model and Intelligent Algorithm
11:45-13:30	Lunch Break	
13:30-15:45	Oral Session 2 Intelligent Image Analysis and Algorithm	Oral Session 5 Intelligent Information System and Evaluation
15:45-16:00	Afternoon Break	
16:00-18:00	Oral Session 3 Data Privacy and Information Security	
18:00-19:00	Dinner	

November 06, 2022

Time	Arrangements
9:30-12:30	Academic Visit
12:30-17:00	Free Time

TECHNICAL ORAL SESSIONS

November 05		Oral Session 1 Image Detection and Recognition 衢州学院（智慧教室阶 102） ZOOM ID: 88266795745
10:00-11:45	Presentation ID	Session Chair: Sixian Chan, Zhejiang University of Technology, China
10:00-10:15	01-001 (Onsite)	<p>Research on Object Tracking Technology Based on Region Proposal Siamese Network</p> <p>Presenter: Yanjing Lei Zhejiang University of Technology, China</p> <p>Most of the existing trackers have high performance and good effect, but it is difficult to have fast speed and can not meet the real-time requirements. Therefore, the development of target tracking system with high accuracy and good robustness has become an urgent task for researchers. This paper proposes to add an Region Proposal Network(RPN) module based on the structure of the traditional Siamese Network (SiamFC), calculate the template and branch of the Siamese sub network in advance in the reasoning stage, and decompose the tracking task into task nodes that are detected first and then matched for real-time online tracking. The experimental results on VOT2015, VOT2018 and OTB2015 data sets show that compared with other trackers, the model based on SiamRPN proposed in this paper shows better performance. To achieve the dual goals of high accuracy and low robustness.</p>
10:15-10:30	01-002	<p>Fer-MLP: Fast Expression Recognition Network based on MLP</p> <p>Presenter: Wanghao Xia Zhejiang University, China</p> <p>Facial expression recognition (FER) is an important research topic of image classification in computer vision. However, due to the complexity and locality of facial expressions, there are still challenges in FER. The effective methods for FER were mainly based on traditional CNN networks, such as VGG and ResNet. Unfortunately, the CNN-based methods brought heavy computation. They led to low speed and the inability to recognize expressions in real-time and efficiency-critical conditions. In this paper, we propose Fast expression recognition MLP(Fer-MLP), which is a network only based on multi-layer perceptions(MLP). We design a tokenized MLP block, which can tokenize the features and model the representation well. The proposed tokenized MLP block can extract more compelling features to help classification with fewer parameters and computational complexity. Experiments on the FER2013</p>

		dataset show that the proposed Fer-MLP outperforms the CNN baselines. Compared to average, the Fer-MLP decreases the parameter amount by 10%, reduces the calculation amount by 69%, and accelerates inference by 96% without much loss of accuracy.
10:30-10:45	01-003 (Onsite)	<p>Traffic Incident Detection System Based on Video Analysis</p> <p>Presenter: Yanjing Lei Zhejiang University of Technology, China</p> <p>With the increasing urbanization and the popularity of traffic video surveillance, and the rapid development of object detection algorithms, object detection of traffic events through video analysis has become possible. This paper proposes the design and implementation of a traffic event detection system based on video analysis. Firstly, the video stream is processed, mainly for video access and display, and the compression of neural networks achieves the network acceleration. Secondly, the structured information of vehicles is obtained by nighttime vehicle detection and joint detection and tracking. Finally, the car's driving behavior is analyzed through video calibration and video analysis. The system has been used online in many places in China and has achieved remarkable results.</p>
10:45-11:00	01-004	<p>Conv2NeXt: Reconsidering ConvNeXt Network Design for Image Recognition</p> <p>Presenter: Jianwei Feng School of Computer Science and Cyber Engineering, Guangzhou University, China</p> <p>Currently, transformer in computer vision, whether in image recognition, image segmentation or target detection, are widely popular due to their excellent performance. Traditional convolutional neural networks (CNNs) are dwarfed by Transformers, but the disadvantage of Transformers is that they require huge resources for cultivation. In 2022, Liu et al. rethought CNNs and proposed a series of models that refer to the structure of Transformers (e.g., Swin Transformers). In contrast to Transformers, Liu's CNN models, dubbed ConvNeXt, use the standard convolutional neural network. The accuracy of ConvNeXt on the ImageNet dataset is surprisingly close to that of Swin Transformers, proving that CNNs still have superior performance. However, ConvNeXt does not perform as well on low-resolution datasets, such as CIFAR-10, CIFAR-100, and Tiny ImageNet, and there is still much room for improvement. To enhance the generalisation of ConvNeXt, we propose Conv2NeXt models, which consist of two patch embedding layers and a symmetric convolutional block of repeated applications. In addition, Conv2NeXt incorporates some attention modules to refine feature maps, making them more robust. In experiments, Conv2NeXt surpasses most well-known and widely used state-of-the-art performances (SOTAs) with an accuracy of 98.23% in CIFAR-10, 83.82% in CIFAR-100, and 71.94% in Tiny</p>

		ImageNet. Most importantly, these performances were trained by only one customer-based GPU, achieving almost SOTAs with a much lower number of parameters (Params). The open source code and checkpoint of this work are accessible at https://github.com/southerly7/Conv2NeXt .
11:00-11:15	01-005	<p>Monkeypox Skin Lesion Detection Using Deep Learning Models</p> <p>Presenter: Selen Gürbüz Firat University, Turkey</p> <p>In the last two years, monkeypox virus has started to appear as the biggest epidemic threat after the COVID19 epidemic. Cases have now been reported in more than forty countries outside of Africa. In cases where Confirmatory Polymerase Chain Reaction (PCR) testing is not possible, studies for detection by image analysis are extremely important. Within the scope of this study, Kaggle Monkeypox Image dataset, which is available as open source, was used. In order to increase the sample dataset, firstly, data replication methods were applied to the images. The results of 5 pre-trained deep learning models (DesNet121, ResNet50, Xception, EfficientNetB3, EfficientNetB7) for the detection of Monkeypox virus are presented comparatively. The success of the methods is demonstrated by accuracy, recall, precision, F1 score and confusion matrix. The detection accuracy rates of DesNet121, ResNet50, Xception, EfficientNetB3, EfficientNetB7 methods are 72%, 75%, 73%, 82% and 90%, respectively. The detection success rates obtained have shown that it is a supportive practice for physicians for rapid screening.</p>
11:15-11:30	01-006	<p>MaskGAN: A Facial Fusion Algorithm for Deepfake Image Detection</p> <p>Presenter: Zhen Yang Beijing University of Posts and Telecommunications, China</p> <p>The rapid development of deepfakes has caused serious harm to social cognition. However, the current deepfake detection algorithms generally have the problem of poor generalization, and the accuracy rate drops sharply on datasets with unknown deepfake methods. In this paper, we propose a facial fusion algorithm called MaskGAN to enable more generalized deepfake detection. The generator of MaskGAN uses U-Net and SSE to extract the features of face images, and realizes mask generation and face fusion, The discriminator of MaskGAN uses the convolution layer to discriminate the face-swapping images generated by MaskGAN. Then, the obtained face-swapping images are used as training sets and input into an improved DeeplabV3+ for training, so that the network can extract the fusion feature circle generated during the face-swapping process from the face-swapping images, so as to identify the authenticity of the face-swapping images. We achieve accurate face swapping with only fused features introduced, generating a face swapping dataset with fused labels. It solves the common problems of over-fitting and poor generalization of existing algorithms. Through a large number of experiments, it is proved that MaskGAN enabled</p>

		<p>DeeplabV3+ detection model can perform well in the case of unknown tampering methods, which achieved 23.02% and 6.9% cross-domain AUC performance improvement.</p>
11:30-11:45	01-007	<p>Motorcycle Helmet Detection and Usage Classification in the Philippines using YOLOv5 Algorithm</p> <p>Presenter: John Paul Q. Tomas Mapua University, Philippines</p> <p>Motorcycles are becoming the primary option for mobility worldwide, and the number of motorcycle riders has been exponentially increasing over the years. In the Philippines, it is reported that the increase in registered motorcycles was greater than the increase in total registered vehicles. However, motorcycles are notorious as one of the most dangerous and fatal modes of transportation. Hence, it is heavily enforced that motorcycle riders wear the proper motorcycle helmets that meet the safety standards of motorcycle riding. The study introduced a YOLOv5 algorithm-based motorcycle rider detection and helmet usage classification model. The study utilized two pieces of footage captured by the researchers in Makati City. The footage underwent frame segmentation and preprocessing before being loaded into the model for training. The results of the model showed a desirable performance in the detection and classification capabilities of the trained model. The optimal hyperparameter values were also found using the babysitting method for model validation. It is recommended that future studies ensure consistency in data samples to eliminate bias in any class of the model. The study also recommends using smaller increments for tuning the hyperparameter values to further investigate the effects of increasing and decreasing hyperparameter values. It is also recommended to use separate models for the detection and classification tasks, as the study utilized a single model for both tasks.</p>

November 05		Oral Session 2 Intelligent Image Analysis and Algorithm 衢州学院（智慧教室阶 102） ZOOM ID: 88266795745
13:30-15:15	Presentation ID	Session Chair:
13:30-13:45	02-001 (Onsite)	<p>Research and Application of Real-time High-resolution Video Matting Algorithm</p> <p>Presenter: Beibei Duan Zhejiang University of Technology, China</p> <p>Nowadays, many application tools provide the video matting function. The accuracy of the results of video matting is of great importance in practical applications. Existing video matting methods view video as multiple consecutive frames. The matting for video is also a continuous single-frame matting, and the synthesized video will have obvious flickering problems. We introduce a human video matting method that can address this problem well. We use the temporal information existing in the video to perform video matting. Our method uses a recurrent structure to exploit the temporal information in videos, resulting in improvements in both temporal coherence and matting quality. We train the segmentation and matting on the network at the same time, and take the results of semantic segmentation as input. The method does not require any auxiliary inputs, such as trimap or pre-captured background images, and can be widely applied to existing human matting applications. A large number of experimental results show that our model is superior to MODNet in terms of evaluation metrics, where the lift value is 2.73 on MAD(Mean Absolute Difference), 1.83 on MSE(Mean Squared Error), 0.46 on Grad(Spatial Gradient), 0.3 on Conn(Connectivity), and 0.49 on dtSSD. We also designed a simple, real-time, visual, user-friendly and understandable video matting system, which is convenient for users to achieve video matting.</p>
13:45-14:00	02-002 (Onsite)	<p>A Spatial Feature-based Adaptive Technique To Match Models For Motor Imagery EEG Signals</p> <p>Presenter: Chuanlai Wang Zhejiang University of Science and Technology, China</p> <p>In recent years, deep learning has been widely used in the field of motor imagery brain-computer interfaces, facilitating great improvements in classification accuracy in this field. However, due to the specificity of EEG data, the same model has uneven learning effects on different subject features. The difference in learning effects means that training with only one model results in signals that are not correctly identified in some subjects, which is not conducive to the diffusion of motor imagery EEG signal classification</p>

		<p>techniques. During the study, we found that each subject data has a suitable model for it, and assigning a suitable model to the data for training can better ensure a better classification accuracy for each subject. In this paper, we propose a technique for automatic matching of motion imagery EEG signals with recognition models. This is a technique for extracting spatial features of motor imagery EEG signals based on graph convolution. Because the spatial features are highly stable and all time steps are included in the extraction of spatial features, the features extracted are macroscopic in nature. Based on the big data screening, we selected four excellent motor imagery EEG signal classification models and put the data of subjects who performed well on these models into the graph convolution model for supervised learning. The completed learning graph convolution model can be well trained to assign appropriate classical models of EEG signals to different subjects based on spatial features. After using this method, we achieved an average classification accuracy of 88% on the BCI Competition IV dataset 2a.</p>
14:00-14:15	02-003 (Onsite)	<p>An Improved KCF Algorithm and Its Application in Video Tracking</p> <p>Presenter: Li Wenhui Anhui Jianzhu University, China</p> <p>The massive use of video surveillance makes the processing of video information become increasingly important. tracking moving objects in video is an important part of video processing. Kernel Correlation Filter(KCF) algorithm is a widely used algorithm in the field of video processing, which has the characteristics of fast tracking speed and high efficiency. However, it is strict with the surrounding environment, and lighting changes, scale and shape changes, motion blur, etc. will affect the performance of the algorithm. In this paper, an improved KCF algorithm is proposed. The algorithm adds the reliability estimation and re detection mechanism to solve the problem of severe occlusion and rapid movement of the target. The scale pool method is introduced. Through simulation experiments and actual video testing, the improved KCF algorithm can track moving objects under poor external environment conditions and achieve satisfactory results.</p>
14:15-14:30	02-004	<p>Machine Learning and Deep Learning Approaches Towards Pressure Injuries Segmentation and Classification From Skin Lesion Images: A Review</p> <p>Presenter: Selen Gürbüz Firat University, Turkey</p> <p>Long or recurrent ulcerations in the skin and subcutaneous tissues caused by capillaries closing completely and stopping circulation or necrosis called "Pressure Sore (Pressure Injuries) / Decubitus Ulcer" that occur as a result of capillaries closing completely and stopping circulation or necrosis, particularly with bony protrusions in the body. According to another term, a pressure sore is a wound that is caused by pressure, friction, or tears. Localized tissue damage occurs in the skin and subcutaneous tissues as a result of various</p>

		<p>causes. Pressure ulcers, limited mobility, or chronic illness, as well as a threatening appearance in the elderly. Pressure sores are a serious health issue that reduces people's quality of life, lengthens hospital stays and raises the cost of patient care and treatment[1]. Owing to both clinical characteristics and the care and treatment attempts used in these units, patients who receive care in intensive care units have a greater risk of developing pressure sores than other patients. As a result, it is important in the ICU (Intensive Care Unit) to recognize patients who are at risk of developing pressure sores and to implement early measures to avoid these wounds. The purpose of this study is how to create a deep learning and machine learning-based system for the analysis and tracking of pressure injuries that can automatically classify pressure injury stages.</p>
14:30-14:45	02-005	<p>Single Node Acceleration of Generative Adversarial Networks using HPC for Image Analytics</p> <p>Presenter: Aswathy Ravikumar Vellore Institute of Technology, India</p> <p>Generative Adversarial Networks (GAN) are approaches that are utilized for data augmentation, which facilitates the development of more accurate detection models for unusual or unbalanced datasets. Computer-assisted diagnostic methods may be made more reliable by using synthetic pictures generated by GAN. Generative adversarial networks are challenging to train because too unpredictable training dynamics may occur throughout the learning process, such as model collapse and vanishing gradients. For accurate and faster results the GAN network need to trained in parallel and distributed manner. We enhance the speed and precision of the Deep Convolutional Generative Adversarial Networks (DCGAN) architecture by using its parallelism and executing it on High-Performance Computing platforms. The effective analysis of a DCGAN in Graphic Processing Unit and Tensor Processing Unit platforms in which each layer execution pattern is analyzed. The bottleneck is identified for the GAN structure for each execution platforms. The Central Processing Unit is capable of processing neural network models, but it requires a great deal of time to do it. Graphic Processing Unit in contrast, side, are a hundred times quicker than CPUs for Neural Networks, however, they are prohibitively expensive compared to CPUs. Using the systolic array structure, TPU performs well on neural networks with high batch sizes but in GAN the shift between CPU and TPU is huge so it does not perform well.</p>
14:45-15:00	02-006	<p>Jaccard Index in Ensemble Image Segmentation: An Approach</p> <p>Presenter: Daniel Ogwok University of Johannesburg, South Africa</p> <p>Many methods have been applied to image segmentation, including unsupervised, supervised, and even deep learning-based models. Semantic and</p>

		<p>instance segmentation are the two most widely researched forms of segmentation. It is of value to use multiple methods to segment an image. In this paper, we present an image segmentation ensemble methodology. Multiple image segmentation methods are applied to an image and merged to create one segmentation using the proposed method. The technique uses the Jaccard index algorithm, sometimes called the Jaccard similarity coefficient and commonly known as Intersection over Union (IoU). This resulted in better segmentation results than the respective individual segmentation methods. This experiment was applied to mathematical expression recognition (MER), with the expressions taken from blackboards with varying degrees of noise, and lighting conditions, from different classroom environments. A summary of empirical results from the segmentation of multiple images is presented in the paper.</p>
<p>15:00-15:15</p>	<p>02-007</p>	<p>Classification of Flood Disaster Risks With the Use of Gradient Boosting Algorithm</p> <p>Presenter: John Paul Tomas Mapua University, Philippines</p> <p>This study used base and ensemble approaches to classify the flood disaster risks in a local provincial capital in the Philippines using an intelligent methodology based on machine learning. It focused on Gradient Boosting Algorithm with Decision Trees as base classifiers/estimators. The researchers consulted with experts to determine the weights of causative factors to fluvial flooding, which were then classified into four (4) risk levels using the Quantile Method and the Exponential Regression for missing value imputation. The K-fold cross-validation was used to validate the proposed algorithms. The experiment shows that Gradient Boosting Algorithm is the most appropriate model for the disaster data with the score of 80.00%, more than 70% in all the classification criteria (accuracy, precision, recall f1-score), respectively.</p>

November 05		Oral Session 3 Data Privacy and Information Security 衢州学院（智慧教室阶 102） ZOOM ID: 88266795745
16:00-18:00	Presentation ID	Session Chair:
16:00-16:15	03-001	<p>Survey on Methodology of Intrusion Detection in Industrial Control System Based on Artificial Intelligence</p> <p>Presenter: Wang Pan Hunan Kylinsec Co., Ltd., China</p> <p>With the increasingly close connection between the industrial control system and the Internet, the industrial control system are facing more and more cyber threats. Intrusion detection technology is one of the important technologies to protect the security of industrial control systems. With the development of artificial intelligence, many researchers have applied artificial intelligence algorithms based on machine learning and deep learning in the industrial control intrusion detection systems. Compared with the traditional methods, the detection accuracy based on machine learning is higher, but the procedure of manual feature extraction limits its practical application. The detection method based on deep learning has a strong feature extraction ability, but its computational complexity is high. In many cases, the detection effect is not ideal in industrial control scenes with real-time requirements. Based on the analysis of the related research, this paper not only summarizes the current research status of intrusion detection in industrial control system based on artificial intelligence, but also deeply discusses the challenges faced in this field. It is pointed out that the intrusion detection algorithm for the industrial control system should be further improved according to the characteristics of the industrial control system, such as real-time requirement, limited computing resources, high data dimension, and high data noise.</p>
16:15-16:30	03-002	<p>BAN-MPR: Defending against Membership Inference Attacks with Born Again Networks and Membership Privacy Regularization</p> <p>Presenter: Yiqing Liu Zhejiang Normal University, China</p> <p>Membership inference attack (MIA) is one of the data security issues faced by machine learning, that is, an attacker infers whether a specific sample exists in the training set based on the output of the model. There are quite a few methods have been proposed to defend against MIAs such as differential privacy, distillation and adversarial regularization, etc. However, due to the addition of too conservative noise, differential privacy leads to a sharp drop in model utility, which cannot achieve the trade-off between utility and security.</p>

		<p>For defending against MIAs, distillation often needs external data. Adversarial regularization makes strong assumptions about the attack model, so such this defense is usually limited to specific attacks.</p> <p>To overcome these deficiencies, in this work, we adopt the architecture of BAN (Born Again Neural Networks) as our defending framework to preserve model utility, and design MPR (Membership Privacy Regularization) to resist various forms of MIAs. In short, we propose a new method to defend against MIAs in the black-box setting, named BAN-MPR (a membership inference attacks defense method with Born Again Network and Membership Privacy Regularization). First of all, we create multiple subsets through data augmentation and partition, then use the distillation method of BAN, combined with MPR to train a series of student models on their respective subsets, and finally the results of the current sample in all the student models are simply integrated as the final output of the prediction stage.</p> <p>Our experiments show BAN-MPR achieves a better trade-off between model utility and security. It can mitigate the risks of MIAs (near random guess), and can achieve this with a negligible drop in model's utility (less than 3.5\%).</p>
16:30-16:45	03-003	<p>Generating Synthetic Data for Credit Card Fraud Detection using GANs</p> <p>Presenter: Emilija Strelcenia Bournemouth University, England</p> <p>Deep learning-based classifiers for object classification and recognition have been utilized in various sectors. However according to research papers deep neural networks achieve better performance using balanced datasets than imbalanced ones. It's been observed that datasets are often imbalanced due to less fraud cases in production environments. Deep generative approaches, such as GANs have been applied as an efficient method to augment high-dimensional data.</p> <p>In this research study, the classifiers based on a Random Forest, Nearest Neighbour, Logistic Regression, MLP, Adaboost were trained utilizing our novel K-CGAN approach and compared using other oversampling approaches achieving higher F1 score performance metrics.</p> <p>Experiments demonstrate that the classifiers trained on the augmented set achieved far better performance than the same classifiers trained on the original data producing an effective fraud detection mechanism. Furthermore, this research demonstrates the problem with data imbalance and introduces a novel model that's able to generate high quality synthetic data.</p>
16:45-17:00	03-004	<p>Automated Tool for NoSQL to SQL Migration</p> <p>Presenter: Ajish Kalia, Haleh M Dastjerdi University of Windsor, Canada</p> <p>Choosing which database to use is one of the most important decisions an organization needs to make when working on a new microservice. When deciding on a modern database, one of the biggest decisions is to select the</p>

		<p>correct type of (relational or non-relational) database. Organizations make this decision based on the application scenario before the development starts. However, sometimes due to the changes in requirements, developers need to switch between database systems after the development starts. Switching between database systems can be a tedious and time-consuming task. In this study, we propose a tool that will automate the process of schema and data migration from MongoDB to MySQL database. The tool has been developed using Python programming language and gives users the ability to convert the database structures while maintaining the relationships between the data fashion accurately and consistently.</p>
17:00-17:15	03-005	<p>A Systemic Big Data Framework for the Charging Pile Business</p> <p>Presenter: Licheng Xu Universiti Malaya, Malaysia</p> <p>There are some problems in the electric vehicle (EV) charging pile industry, such as the unreasonable location of charging station construction, low utilization rate of charging piles, and imprecise marketing strategies, which may elicit a negative response from EV users, cause colossal waste of resources and hinder the development of EVs. Based on the relevant charging pile data to be analyzed, this paper combines big data-related technologies to propose a big data framework for analyzing the charging pile data to solve the common charging service problems from a systemic perspective. The purpose of the framework is to provide decision-making reference information for charging pile operators, charging pile application operators and charging service marketers to improve the charging pile business more effectively. The framework is demonstrated by functional structure and technical structure.</p>
17:15-17:30	03-006	<p>Swift Search - An Open-Source Search Engine</p> <p>Presenter: Fenil Kaneria University of Windsor, Canada</p> <p>Businesses nowadays collect a huge amount of information. To search classified data in an efficient and streamlined manner, every organization will require a Search Engine that can be integrated into their websites and search through their data. To increase the productivity of searching the content with a modern, flexible site search experience, we are proposing a Search Engine that can help the organization to search efficiently. In this paper, we propose Swift Search which is an open-source search engine, with no additional cost involved. The search time is tested on an open-source tool called Meilisearch, which gives a promising level of performance.</p>
17:30-17:45	03-007	<p>Point Cloud Scene Reconstruction Based on Multi-planar Fitting</p> <p>Presenter: Yanning Gao North China University of Technology, China</p>

		<p>In order to solve the problem that the conventional mechanical LiDAR sensor cannot obtain the surrounding environment information in an all-round way when collecting point cloud data due to the limitation of angular resolution. This paper uses a system for extracting feature points of intersecting planes in the environment to achieve 3D environment reconstruction. A combination of the RANSAC algorithm and 3A-LSM is used to detect the intersecting planes in the scanned point cloud environment and to fit the plane equations. The extracted intersection points are used as the feature points of the current frame, and the virtual angle points are aligned between frames, which solves the problem of no initial value of ICP alignment algorithm and the low efficiency of alignment in large-scale point clouds. The experimental results show that the system completes the global three-dimensional reconstruction well.</p>
<p>17:45-18:00</p>	<p>03-008</p>	<p>Information Extraction based on User Intent and Multi- Dimensional Analysis</p> <p>Presenter: Liu Lijuan Shanghai Branch Center of National Computer Network Emergency Coordination and Processing Center, Shanghai</p> <p>In recent years, text analysis is mostly inaccurate and incomplete. To solve the above problem, an information extraction method based on user intent and multi-dimensional analysis is proposed. This method analyzes user intent, constructs user intent subtree by ontology theory, mines and integrates multi-features that conform to reality, uses deep learning model to train, and outputs text information that meets the requirement. Experiment shows that compared with keyword method and user intent method, the information extraction method based on user intent and multi- dimensional analysis, the number of returned result of information extraction text on related topics is higher, indicating that the accuracy rate has been improved to a certain extent.</p>

November 05		Oral Session 4 Intelligent Computing Model and Intelligent Algorithm
		ZOOM ID: 879 2599 3800
10:00-11:45	Presentation ID	Session Chair:
10:00-10:15	04-001	<p>The Spatial Topological Shape of the Rough Surface is Simulated and Generated by a New Gaussian Filtering Algorithm</p> <p>Presenter: Jianan Zhang Vocational Flight College of Mianyang, China</p> <p>The physical properties of rough surfaces are important research objects in geometry and tribology. The reason why rough surfaces are widely used in many fields is that their spatial topologies are uneven geometric shapes. In order to simulate the spatial topology of the rough surface, based on Gaussian distribution, numerical filtering, topology analysis and mathematical derivation, a new simulation algorithm for accurately generating rough surfaces with different features is established with five parameters. Roughness parameters, autocorrelation parameters, anisotropy parameters can be precisely controlled by algorithms, and the parameters are independent of each other. After experimental verification, the simulation results generated by the algorithm are similar to the real shape, and the numerical statistical results tend to converge.</p>
10:15-10:30	04-002	<p>Genetic algorithm for Traveling Salesman Problem</p> <p>Presenter: Yisu Ge Wenzhou University, China</p> <p>Traveling Salesman Problem (TSP) is one of the most famous NP-hard problems which is hard to find an optimal solution. Many heuristic algorithms are applied to find a suboptimal solution in a limited time. In this paper, we employ a Genetic Algorithm (GA) to solve the TSP, and a further study is conducted by evaluating the performance of different crossover and mutation methods with a heuristic strategy. Four experiments with different parameters are designed, which apply instances from benchmark TSPLIB. Partial-mapped crossover and rotate mutation with offspring-parent competition strategy has shown efficient gets the best results.</p>
10:30-10:45	04-003	<p>Use Maxent Statistics to Learn Models to Analyze the Suitable Area of the Spodoptera Frugiperda in the Central and Eastern Yunnan Province</p> <p>Presenter: Zhang Hanrui Key Laboratory of Forestry and Ecological Big Data State Forestry Administration on Southwest Forestry University, China</p>

		<p>This article employs the Maxent model to simulate the spread of <i>Spodoptera frugiperda</i> in the suitable region of eastern and central China. The location of the research area is the Yunnan Plateau. Wenshan Prefecture, Qujing City, Honghe Prefecture, Kunming City, and Yuxi City are the five cities. The range of latitude and longitude is $E101^{\circ}16' \sim 106^{\circ}12'$, $N22^{\circ}26' \sim 27^{\circ}03'$. <i>Spodoptera frugiperda</i> is a dangerous agricultural insect that has infested India, Myanmar, Thailand, and other Asian nations, causing severe damage to grain harvests in these areas. The monitoring data for <i>Spodoptera frugiperda</i> used in this paper span the period from March 2021 to March 2022, and the environment and climatic data are provided to Maxent for the output of mixed simulation results. The region and the plains are Highly Suitable Area. The classification method of Maxent models incorporates linear regression, genetic algorithms, artificial intelligence approaches, Support Vector Machines, etc., and gives a variety of techniques for evaluating classification results. Consequently, a quick evaluation of Suitable Area, a nocturnal moth in the area of internal grassland. To prevent further invasions of grain moths in grassland greedy moths, monitoring must be intensified within the area of its adaptive range in order to protect farmers' income and crop yield.</p>
10:45-11:00	04-004	<p>Transformer Based on Deconstruction and Dot Product for Time Series Forecasting of Air Quality</p> <p>Presenter: Jiawei He Fouzhou University, China</p> <p>Air quality prediction has been considered a key factor in air pollution warning and control management. Artificial intelligence-based methods have been widely used for air quality prediction. Forecasting problems generally deal with time series data and recent studies have shown that transformers perform well in managing such data. However, for air quality prediction, the performance of the self-attentive mechanism in the standard transformer is limited owing to the nonlinear and dynamic characteristics of the multivariate air quality time series data. In this study, we propose a self-attentive mechanism based on deconstruction and dot product (DDPformer) to replace the self-attentive mechanism in the standard transformer. To highlight the features of the partial head in the multi-headed attention mechanism, we introduced and extended the channel attention mechanism and used the power normalization (PN) method instead of the layer normalization (LN) method. In addition to conducting a large number of experiments on two multivariate serial air quality datasets, we also conducted multiple experiments on four datasets in other fields. The results showed that DDPformer performed better than most baseline models.</p>
11:00-11:15	04-005	<p>Adapt to Non-Stationary Environments via Multi-Teacher and Single-Student Process</p> <p>Presenter: Yue Wangyang Artificial Intelligence Research Center, China</p>

		<p>A key challenge in reinforcement learning (RL) is that a policy trained in simulation fails to solve the same task when applied to the real world that is non-stationary or noisy. A common practice is to account for the environmental information that may change in the real world and leverage RL algorithms to train a generalized policy. However, this policy is overly conservative since it does not make sufficient use of environmental information. In this paper, we present a three-stage method for training a policy that can adapt to non-stationary environments. The first stage is to train multiple teachers under various numerical ranges of environmental information. The second stage is to distill multiple teachers into one single student policy. Finally, we train an adaptation module that can infer environmental information from historical data using a recursive model. We experimentally show that our method outperforms commonly used policy generalization methods in a range of environments.</p>
11:15-11:30	04-006	<p>Predicting the Future Suitable Area of <i>Spodoptera frugiperda</i> in the Central and Eastern Parts of Yunnan Province, China, using the Maxent Statistics Learning Model</p> <p>Presenter: Zhang Hanrui Key Laboratory of Forestry and Ecological Big Data State Forestry Administration on Southwest Forestry University, China</p> <p>This experiment predicts the future Suitable Area within the five regions of Yunnan, China, using the Maxent statistical analysis model. China's Yunnan Province has the administrative areas of Kunming, Yuxi, Honghe Prefecture, Wenshan Prefecture, and Qujing City. These cities are situated in the central and eastern regions of China's Yunnan Province. <i>Spodoptera frugiperda</i> originated in the Americas' tropical and subtropical climates. It is a major agricultural pest of concern to the United Nations Food and Agriculture Organization. Predating and assessing the probable appropriate region of the worm can give relevant management departments with vital information for the formulation of early warning and control actions. Essence The trial outcome is that the Highly Suitable Area of <i>Spodoptera frugiperda</i> will be relocated to the south of the research area and will continue until at least 2040. From 2061 to 2080, it will be Waiting for Suitable Region, but in the Red River Basin, it will still be Highly Suitable Area, which will continue to impact local grain harvests and be a crucial area for future prevention and governance.</p>
11:30-11:45	04-007	<p>Understanding Intention to Use Netflix in Taiwan: Integrating Perceived Value into the Technology Acceptance Model</p> <p>Presenter: Yi-Wei Lin Kang Chiao International School, Xiugang Campus, Taiwan</p> <p>The over-the-top services, especially Netflix, are currently gaining popularity around the world. The purpose of this study is to investigate the intentions of people in Taiwan using Netflix. The target respondents were people age ranged</p>

		<p>from 16 to 25, the young generation also would soon become main consumer in market since they obtain entertainment online more often compared to the older generation. Among 340 questionnaire responds gathered, 278 were used since part of the responds were not from the target population or were invalid. The Technology Acceptance Model (TAM) is applied in the study to respondents' intentions using Netflix, while confirmatory factor analysis and structural equation model (SEM) are adopted for the purpose to clarify the interactions among the following four main factors that each are shown as a result creates positive impact on one another: perceived ease of use, perceived usefulness, perceived value, intention to use. The results of the study could be implicated on Netflix's marketing strategy, and the model may also apply to broader streaming services in organizing customer's preferences.</p>
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<u>November 05</u>		Oral Session 5 Intelligent Information System and Evaluation
		ZOOM ID: 879 2599 3800
13:30-15:45	Presentation ID	Session Chair:
13:30-13:45	05-001	<p>Sail Assist</p> <p>Presenter: John Malcolm Anderson University of Johannesburg, South Africa</p> <p>Sailing is not a new concept. The use of artificial intelligence (AI) within the field of sailing however is a relatively new concept. AI is being applied to a variety of different aspects within the field of sailing such as AI plotting unmanned vessels across the globe as well as in the optimization of racing vessels in a variety of prestigious regatta. This paper aims to explore the application of AI to the route creation and plotting aspect of AI in sailing, the objective being to create a system that efficiently assists sailors with their route creation within a complex environment. The approach used is through the creation of a model that uses an adapted A* (star) search algorithm where the weightings of the heuristic values used better represent the costs associated with the complex environment the algorithm operates in. The environment devised in this paper is a combination of geographical and meteorological data and coordinates to create a semi-dynamic environment in which the system operates. The resulting system successfully creates optimized routes within the semi-dynamic environment devised by the system.</p>
13:45-14:00	05-002	<p>A Proposed Approach to Crowd Selection in Crowdsourced Requirements Engineering for Mobile Apps</p> <p>Presenter: Ghadah Alamer King Saud University, Saudi Arabia</p> <p>Lately, we have witnessed an overwhelming growth of mobile apps and their usage. Fast and continuously changing desires of users, and rising competition within the technology industry, have put greater stress on mobile apps producers. Meeting users' expectations cannot be easily fulfilled and requires new approaches to engage crowd of interested users in requirements engineering (RE) activities. Recently, a great deal of emphasis has been shed on leveraging crowdsourcing model for supporting RE activities. Identifying the right crowd is the key to obtain innovative and quality features and requirements, where few studies have researched. In addition, social media platforms have since become a fertile source for crowd-generated content. Such content reveal information that can assist in performing crowd selection. Therefore, in this research-in-progress paper, we propose an approach which utilizes the available data on Twitter to find a subset of the crowd to</p>

		crowdsource RE tasks for mobile apps.
14:00-14:15	05-003	<p>Crisis Impact on Use of Technology. Evidence from Omnichannel Restaurant Sales during Covid-19 Pandemic</p> <p>Presenter: Roman Podkorytov City University of Hong Kong, Hong Kong</p> <p>This paper shines the light on how the critical outbreak of Covid-19 pandemic affected restaurant consumer's purchase behaviour. With a focus on omnichannel food ordering technology the context captures the rapid development of online sales channels for restaurants in Hong Kong. Particularly focusing on integrated ordering technologies with digital payment capabilities, such as: mobile applications, website, QR code self-service ordering applications.</p> <p>We conduct a longitudinal field experiment between June 2020 and January 2022 in cooperation with one of the vendors for omnichannel point of sale systems (OPOSS) in Hong Kong. The result captures a panel dataset with the total number of 23 restaurants that have been opened in a continuous order throughout the pandemic. The fixed effect regression model employs an additional dataset on Covid-19 daily cases obtained from census Hong Kong SAR Government data. We apply a moderating effect based on the type of sales channel used in the restaurants. The results show that during the pandemic, some restaurants implemented omnichannel technology to sustain restaurant sales. We observe that consumers start to use omnichannel restaurant ordering technologies during the pandemic outbreak. More importantly, we find supporting evidence that after the outbreak, the omnichannel technology use behaviour among consumers remains continuous.</p>
14:15-14:30	05-004	<p>A Gene Expression Programming-Inspired Evolution Symbiont Agent for Real-Time Strategy Generation</p> <p>Presenter: Siphesihle Philezwini Sithungu University of Johannesburg, South Africa</p> <p>AdaptiveSGA is a method for achieving Adaptive Game Artificial Intelligence-Based Dynamic Difficulty Balancing through the Symbiotic Game Agent Model. Previous work has shown that AdaptiveSGA can achieve Dynamic Difficulty Balancing in simulated soccer by effectively changing a team's strategy based on the opponent's performance. AdaptiveSGA pre-existing strategies and switches between them during runtime to increase the game's replayability by adapting the challenge it poses to the human player. Although this method works, its limitation is that if the human player surpasses the most intelligent strategy of the computer opponent, there is no way for the model to generate a new strategy during runtime that can potentially overcome the human player. AdaptiveSGA can only maintain engagement with the human player if the human player has not overcome the best strategy for the pool of pre-existing strategies. Current work addresses this</p>

		<p>limitation by introducing an Evolution Symbiont Agent whose purpose is to generate new strategies in real-time (during gameplay) through evolutionary mechanisms using Gene Expression Programming. Experimental results show that the presence of the evolution symbiont agent can use Gene Expression Programming to generate strategies capable of outperforming an opposing strategy.</p>
14:30-14:45	05-005	<p>LDA-Based Cosmetic Satisfaction Factors Mining</p> <p>Presenter: Chen Wang Xiamen University of Technology, China</p> <p>With the rapid development of Internet technology, the convenience of the information age makes it possible for consumers to buy satisfactory products without leaving home. Compared with offline purchase, online purchases of cosmetic products is more convenient and has more kinds of products for users to choose from, and the price and shopping cost of the products are also lower, but the quality, branding, and after-sales service of online products are often criticized by people, and these problems seriously affect user satisfaction. In this paper, we use a text mining method to crawl online reviews of lipsticks as a data source using python language to explore the factors affecting consumer satisfaction, taking a typical experience-based product, lipstick, as an example. Then the LDA topic model is used to cluster the processed text, and the factors affecting consumer satisfaction are summarized and summarized according to the results of text mining, to obtain the composition of factors affecting consumer satisfaction. The research shows that this study not only improves the reliability of determining key factors, but also provides management implications for cosmetic e-commerce enterprises in four aspects: product traits, usage experience, brand value, and purchase intention, respectively. The study shows that this study not only improves the reliability of determining key factors, but also provides management implications for the improvement of cosmetic e-commerce enterprises in four aspects: product traits, usage experience, brand value, and purchase intention.</p>
14:45-15:00	05-006	<p>Research on the Competency Framework of Management Accounting Profession in the age of "Great Wisdom Moving Cloud" of China based on Knowledge Graph</p> <p>Presenter: Kaodui Li Jiangsu University, China</p> <p>As China's economy steps into the new normal and its growth changes from extensive growth based on scale and speed to intensive growth based on quality and efficiency, enterprises are in urgent need of management accounting profession to help them improve their capital structure and realize transformation and upgrading. However, most of the enterprises in China still focus on the traditional accounting model and lack a reasonable and perfect competency framework of management accounting profession. This thesis,</p>

		<p>based on the data of the general database of online publications of Chinese academic journals and by means of information visualization software (Gephi) and keywords co-occurrence network analysis, makes a visual analysis of the documents on the competency framework of management accounting profession from the perspective of time distribution, high frequency keywords, authors and source journals. It explores the knowledge graph of research hot spots on the competency framework of management accounting profession and analyses its overall development trend.</p>
15:00-15:15	05-007	<p>Analysis of Source Code Authorship Attribution Problem</p> <p>Presenter: Alina Bogdanova Innopolis University, Russia</p> <p>Source Code Authorship Attribution (SCAA) has become very important for the functioning of our societies. For example, it is central in copyright and plagiarism issues, for detecting authors of malware, and even in recruitment and selection processes. The goal of this review is to analyze existing approaches to SCAA, compare them, and identify the most common feature types and architectures of neural networks underlying them. We identified the most common taxonomy of the feature types in SCAA. These are: a. lexical, b. layout, and c. structural. We also found that the combination of the lexical (most language agnostic) and structural (most language dependent) features usually provides the most accurate results.</p>
15:15-15:30	05-008	<p>Canvas Mobile Application for English Language Learning through Corrective Feedback</p> <p>Presenter: Adriana Guanuche Universidad Politécnica Salesiana, Ecuador</p> <p>Nowadays, Information and Communications Technology (ICT) is contributing to the education field and consequently in English learning as a foreign language. To reinforce this advantage, it is important to add the chance that technological devices allow for corrective feedback comments, in which learners can identify mistakes and correct them on their own. This study considered four types of exercises in the Canvas platform and considered three types of corrective feedback to students have the chance to confirm their correct answers or to correct their mistakes by themselves through the Canvas application. Using this mobile application on cellphones allows students to find support in grammar exercises, innovating the traditional way of learning. The goal of this article is to give corrective, non-corrective, and metalinguistic feedback so students can be engaged and participate actively in their learning. Furthermore, another objective is to compare the Canvas application and its feedback types with paper-based exercises with explicit feedback. The results show that Canvas obtained a 4.6% of improving in grammar learning and that the type of question students prefer is ordering statements with 84.80%.</p>

<p>15:30-15:45</p>	<p>05-009</p>	<p>Gain Property and Data Analysis for Diagnosing Failures in a High-Efficiency Induction Motor</p> <p>Presenter: Bryan Marcelo Asimbaya Universidad Politécnica Salesiana, Ecuador</p> <p>Induction motors are the most commonly used in the industrial market, corresponding to 90% in areas such as manufacturing, pharmaceutical, machines and tools; this is due to its robustness compared to other types of machines. Due to the main role they play in large scale production, they should not stop due to failures. From this perspective, it is intended to diagnose any type of malfunction that occurs in these traction machines, before a production stop takes place. These situations give rise to the proposition of a variety of time-domain and frequency-domain methods to make a successful diagnosis of the failures. This paper proposes the Gain Property method, which relates the currents and voltages (C/V) supplied to a high-efficiency induction motor; the results obtained by such method are stated in two ways: using statistical tools (gray correlation, average deviation and quadratic deviation) and a Bayesian probabilistic tool, in order to analyze the behavior of the results and obtain a favorable diagnosis. In a testbench the motor was subject to four types of incipient failures, and after processing the data of the gains in the three supply lines it was concluded that, depending on the techniques used as statistical tool, the effectiveness of the diagnosis changes, approximating its results in 35%; on the other hand, the Bayesian probabilistic method exhibited a significant improvement for failure diagnosis.</p>
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About Quzhou (关于衢州)

衢州市地处浙江省西部，是闽浙赣皖四省边际中心城市。下辖六个县（市、区），区域面积 8841 平方公里，总人口 254 万。

区位优势优势。衢州交通便捷，陆、水、空交通网四通八达。高铁到杭州 1 小时、到上海仅需 2 小时；衢州机场有通往北京、深圳、厦门等地的航线；钱塘江上游衢江 4 级航道开工建设，可通行 500 吨级船舶至杭州。

资源优势。衢州水资源丰富，是目前浙江省唯一饮用水源达到国家一级地表水的城市。衢州自然资源丰富，已探明储量的矿产有 50 多种。

产业优势。衢州是国内唯一同时具备氟和硅两个高端产业发展基础的产业基地，被科技部授予国家火炬计划氟硅新材料产业基地。衢州是国家级空气动力机械产业基地，是中国高档特种纸产业基地，是国家级绿色休闲食品和健康饮品产业基地。

Located in western Zhejiang province, Quzhou is a center city on the borders of four provinces, namely, Zhejiang, Fujian, Jiangxi and Anhui. It is consisted of 6 counties (county-level cities, districts), and covers an area of 8,841 km². The total population is 2.54 million.

Location and transportation Advantages with efficient transportation system of water, land and air. High-speed railway takes local people 1 hour to Hangzhou and 2 hours to Shanghai; airlines to Beijing, Shenzhen and Xiamen are available at Quzhou airport; Qujiang level-4 passage on the upstream Qiantang River leads to Hangzhou, and it has a capacity of 500 tons.

Resource Advantages. Quzhou is rich in water resources, and it is the only city in Zhejiang province whose quality of drinking water meets the standard of national surface water level grade. Quzhou is also rich in natural resources with proven reserves of more than 50 kinds of minerals.

Industry Advantages. Quzhou is the only industry base in domestic which has the development foundation of the two high-end industries of fluorine and silicon, and it was awarded by the National Ministry of Science and Technology as the new material industry base of fluorine and silicon in the national torch plan. Quzhou is also the national pneumatic machinery industry base, high-grade specialty paper industry base of China, national green leisure food and health drink industry base.



