

2024 9th International Conference on Cloud Computing and Big Data Analytics (ICCCBDA)

Workshop: 2024 the 4th International Symposium on AI (ISAI)

☞☞☞ 25-27 April, 2024 | Chengdu, China

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► Welcome Message

We are very pleased to introduce the program of 2024 the 9th International Conference on Cloud Computing and Big Data Analytics and its workshop ISAI (2024 the 4th International Symposium on AI), which will be held in Chengdu, China, between 25-27 April 2024.

Cloud Computing and Big Data Analytics have transformed the way businesses, governments, and individuals manage data and compute resources. These technologies have brought about groundbreaking changes in scalability, data accessibility, and computational speed. They have also democratized data analytics, making it easier for organizations of all sizes to derive actionable insights from complex data sets.

In China, the growth trajectory of Cloud Computing and Big Data Analytics has been particularly remarkable, fueled by extensive investment in R&D, governmental support, and a burgeoning internet user base. China's 14th Five-Year Plan identifies these sectors as critical components for transitioning to a digital economy. Leading technology firms in China are pushing the boundaries of what's possible in Cloud Computing and Big Data, particularly in applications related to artificial intelligence, cybersecurity, and the Internet of Things (IoT).

This program provides the record of what was presented. They indicate the state of development at the time of writing of all aspects of this important topic and will be invaluable to all workers in the field for that reason.

ICCCBDA & ISAI 2024 includes keynote speeches from Prof. Qingfu Zhang, City University of Hong Kong, Hong Kong, China; Prof. Jixin Ma, University of Greenwich, UK; Prof. Fei Teng, Southwest Jiaotong University, China; Prof. Xianyong Li, Xihua University, China and Prof. Shigang Chen, University of Florida, America, invited speeches from Dr. Gou Haosong, Mobile Group Sichuan Co., Ltd., China, Dr. Zhang Shiling, State Grid Chongqing Electric Power Company, China and Prof. Hossam A. Gabbar, Ontario Tech University, Canada and 8 parallel technical sessions.

Finally, it is appropriate that we record our thanks to our fellow members of the conference organizing committee and of the conference technical committees for their work in securing a substantial input of papers and in encouraging participation from all around the world. We are also indebted to those who served as session chair. Without their support, the conference could not have been the success that it was. We also acknowledge the authors themselves, without whose expert input there would have been no conference.

We wish you an enriching, stimulating, and enjoyable week of discovery, and looking forward to meeting you again in next year!

ICCCBDA&ISAI 2024 Conference Committees



► Guideline

For Onsite Participants

Time Zone

- Chengdu standard time: UTC/GMT+8

Conference Venue

- Xihua University (西华大学) / 西华大学学术交流中心 1 楼报告厅 (校内)
No. 999, Jinzhou Road, Jinniu District, Chengdu, China
四川省成都市金牛区土桥金周路 999 号
导航上请搜索: 西华大学, 郫都区红光大道 9999 号
- 订房电话: +86-28-87722356 180 元/间 无早

Reservation Number: +86-28-87722356 / 180 RMB/Night (No breakfast)



For Presentation

- The duration of oral presentation slot is 15 minutes (including 2-3 minutes Q&A).
- Your punctual arrival and active involvement in each session will be highly appreciated.
- Get your presentation PPT or PDF files prepared and backed up.
- The regular oral presentation time arrangement is for reference only. In case any absence or some presentations are less than 15 minutes, please join your session earlier.
- A best presentation will be selected from each session which will be announced and awarded a best presentation certificate.

Attention

- For security purpose, all participants are required to wear name badge to all sessions and social function. Entrance into sessions is restricted to registered delegates only.
- For your personal and property safety, please take care of your belongings in public area. Conference does not assume any responsibility for loss of personal belongings of participants.

Emergency Numbers

Medical Emergency: 120

Police: 110

Fire: 119



► Guideline

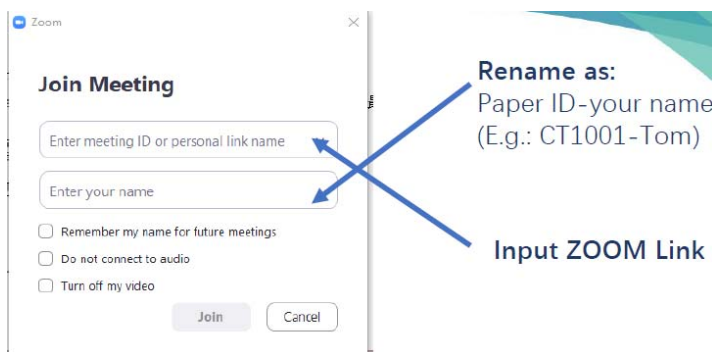
For Online Participants

Time Zone

- Chengdu standard time: UTC/GMT+8

Platform: ZOOM

- For general users, Zoom Download: <https://zoom.us/>
- For authors in China: Zoom Download: <https://zoom.com.cn/download>
- Please unmute audio and start video during your presentation.
- Use headset with microphone or earphone with microphone.



- Set up your Name.
 Authors: Paper ID-Name / A11001-Jimmy Smith
 Delegate: Delegate - Name / Delegate - Jimmy Smith
 Keynote Speaker: Keynote-Name / Keynote- Jimmy Smith
 Committee Member: Committee-Name / Committee- Jimmy Smith

Conference Recording

- The whole conference will be recorded. We appreciate your proper behavior and appearance.



► Conference Schedule Overview

April 25, 2024 / UTC/GMT+8

Onsite Activity		
Time	Schedule	Venue
13:30-17:00	Registration & Sign-in & Collecting Materials	西华大学-学术交流中心 1 楼 地址：郫都区红光大道 9999 号
Online Test		
ZOOM link: https://us02web.zoom.us/j/86052995049 Password: 042527		
11:00-12:00	Online Speakers & Online Session Chairs & Committee Members	
14:00-17:00	Online Paper Presentation Test A313, A22036, A22044, A33060, A2001, A33058, A22051, A33059, A33067 A33082-A, A33075, A43102, A43107, A33078, A33076, A22043, A22037 A33070, A22035, A22017, A22033 A11002, A105, A107, A22034, A22053 A43092, A33077, A43105, A43089, A43097, A22024, A22057, A11004, A11007 A33073, A43096, A33065, A22016, A11013, A312, A317 A22041, A33069, A22048, A33063, A43098, A33062, A22038, A423	



► Conference Schedule Overview

April 26, 2024 / UTC/GMT+8

Time	Arrangement - 学术交流中心 1 楼报告厅 Zoom link: https://us02web.zoom.us/j/86052995049 Password: 042527
8:00-9:00	Onsite Conference Sign-in
Opening Ceremony Host: Assoc. Prof. Jianhong Zhou, Xihua University, China	
9:00-9:05	Welcome Message Yingqiao Pu, Secretary-general, Sichuan Institute of Electronics, China
9:05-9:10	Opening Remarks Prof. Xianhua Niu, Director of Science and Technology Department, Xihua University, China (西华大学科技处处长)
9:10-9:20	Group Photo
Keynote Speech Session Host: Prof. Shengke Zeng, Xihua University, China	
9:20-9:55	Keynote Speaker I – Onsite Talk Prof. Qingfu Zhang, City University of Hong Kong, Hong Kong, China -- Speech Title: Modelling and Solution Set Constraints in MOEA/D
9:55-10:30	Keynote Speaker II - Onsite Talk Prof. Jixin Ma, University of Greenwich, UK -- Speech Title: The Dividing Instant Puzzle - DIP
10:30-10:45	Coffee Break
10:45-11:20	Keynote Speaker III – Onsite Talk Prof. Fei Teng, Southwest Jiaotong University, China -- Speech Title: Automated International Classification of Diseases Coding: Development, Challenges, and Applications
11:20-11:55	Keynote Speaker IV – Onsite Talk Prof. Xianyong Li, Xihua University, China -- Speech Title: Sentiment Analysis Methods with External Knowledge
12:00-13:30	Lunch & Break
13:30-15:35	Session 1 - Image Analysis and Processing Methods Session Chair: Assoc. Prof. Yue Wu, Xihua University, China Invited Speaker: Dr. Gou Haosong, Mobile Group Sichuan Co., Ltd., China A003, A321, A22047, A11012, A101, A210, A22022
15:35-15:50	Coffee Break
15:50-18:05	Session 2 - Data Model, Security and Privacy Session Chair: Dr. Nijing Yang, Xihua University, China Session Chair: Assoc. Prof. Chee Kiat Seow, University of Glasgow, UK A33081, A43109, A43103, A43110, A22040, A33064, A22050, A102, A22031
18:10-19:30	Dinner



► Conference Schedule Overview

April 27, 2024 / UTC/GMT+8

Online Sessions / Password: 042527	
9:00-9:35	Keynote Speaker V - Online Talk Zoom link: https://us02web.zoom.us/j/86052995049 Prof. Shigang Chen, University of Florida, America -- Speech Title: Internet Data Streaming and Sketches
9:40-12:00	Online Session A- Predictive Models and Optimization Algorithms Zoom link: https://us02web.zoom.us/j/86052995049 Session Chair: Dr. Ye XIA, Université Grenoble Alpes, United States Invited Speaker: Dr. Zhang Shiling, State Grid Chongqing Electric Power Company, China A313, A22036, A22044, A33060, A2001, A33058, A22051, A33059, A33067
9:40-11:40	Online Session B- Advanced Information Design and System Analysis Zoom link: https://us02web.zoom.us/j/81671414032 Session Chair: Dr. Guanlin He, Xihua University, China A33082-A, A33075, A43102, A43107, A33078, A33076, A22043, A22037

Online Sessions / Password: 042527	
13:30-15:45	Online Session C- Image Analysis and Computer Vision Zoom link: https://us02web.zoom.us/j/86052995049 Session Chair: Assoc. Prof. Peishun Liu, Ocean University of China, China A33070, A22035, A22017, A22033 A11002, A105, A107, A22034, A22053
13:30-15:45	Online Session D- Modern Data Science and Information Engineering Zoom link: https://us02web.zoom.us/j/81671414032 Session Chair: Assoc. Prof. Ling Xiong, Xihua University, China A43092, A33077, A43105, A43089, A43097, A22024, A22057, A11004, A11007
15:45-16:00	Break
16:00-18:05	Online Session E- New Generation Artificial Intelligence Technology and Applications Zoom link: https://us02web.zoom.us/j/86052995049 Session Chair: Dr. Peiyao Liu, Xihua University, China Invited Speaker: Prof. Hossam A. Gabbar, Ontario Tech University, Canada A33073, A43096, A33065, A22016, A11013, A312, A317
16:00-18:00	Online Session F - System Model and Data Calculation Zoom link: https://us02web.zoom.us/j/81671414032 Session Chair: Prof. William Wei Song, Dalarna University, Sweden A22041, A33069, A22048, A33063, A43098, A33062, A22038, A423



► Keynote Speakers

April 26, 2024 / Friday / UTC/GMT+8

9:20-9:55 | 学术交流中心 1 楼报告厅 - Onsite Talk

Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527



Prof. Qingfu Zhang, The Yangtze River Scholar, IEEE Fellow

City University of Hong Kong, Hong Kong, China

Bio: Qingfu Zhang is a Chair Professor of Computational Intelligence at the Department of Computer Science, City University of Hong Kong. His main research interests include evolutionary computation, optimization, neural networks, data analysis, and their applications. MOEA/D developed by his team has been one of the most widely used multiobjective optimization methodologies.

Professor Zhang is an Associate Editor of the IEEE Transactions on Evolutionary Computation and the IEEE Transactions on Cybernetics. He is a Web of Science highly cited researcher in Computer Science for seven times from 2016. He is an IEEE fellow.

Speech Title: Modelling and Solution Set Constraints in MOEA/D

Abstract: Most multi-objective evolutionary algorithms are to generate a finite set of solutions to approximate the Pareto optimal solution set (PS) in the decision space and the Pareto front (PF) in the objective space. In other words, these algorithms provide a zero-order approximation to the PS and PF. In this talk, I will first introduce basic ideas behind MOEA/D algorithms and explain how to use MOEA/D to learn a math model to approximate the PS and PF. In some engineering design areas, it is desirable or required that different optimal solutions should share some common patterns. Deb's pioneering innovization methodology aim at addressing this requirement. I will explain our recently proposed concept of "solution set constraints" and show some of our preliminary work on using modelling in MOEA/D to handle these constraints. Our work can be regarded as a new attempt to do "innovization", and it also provides a new way for defining optimality in multiobjective optimization. It can provide more useful information for supporting interactive multiobjective optimization.



► Keynote Speakers

April 26, 2024 / Friday / UTC/GMT+8

9:55-10:30 | 学术交流中心 1 楼报告厅 - Onsite Talk

Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527



Prof. Jixin Ma
University of Greenwich, UK

Bio: Dr Jixin Ma is a Full Professor of Computer Science in the School of Computing and Mathematical Sciences at University of Greenwich, U.K. He has been the Director of the Centre for Computer and Computational Science, and the Director of the School's PhD/MPhil Programme. Professor Ma is also a Visiting Professor of Beijing Normal University, Hainan University, Auhui University, Zhengzhou Light Industrial University and Macau City University. Professor Ma obtained his BSc and MSc of Mathematics in 1982 and 1988, respectively, and PhD of Computer Sciences in 1994. His main research areas include Artificial Intelligence, Data Science and Information Systems, with special interests in Temporal Logic, Information Security, Machine Learning, Case-Based Reasoning and Pattern Recognition. Professor has been a member British Computer Society, American Association of Artificial Intelligence, ICIS/IEEE, World Scientific and Engineering Society, and Special Group of Artificial Intelligence of BCS. He has also been the Editor of several international journals and international conference proceedings, Conference/Program Chair, and Invited Keynote Speakers of many international conferences. Professor Ma has published more than 150 research papers in international journals and conferences.

Speech Title: The Dividing Instant Puzzle - DIP

Abstract: The so-called Dividing Instant problem (DIP) is an ancient historical puzzle encountered when attempting to represent what happens at the boundary instant which divides two successive states. The specification of such a problem requires a thorough exploration of the primitives of the temporal ontology and the corresponding time structure, as well as the conditions that the resulting temporal models must satisfy. The problem is closely related to the question of how to characterise the relationship between time periods with positive duration and time instants with no duration. It involves the characterisation of the "closed" and "open" nature of time intervals, i.e., whether time intervals include their ending-points or not. In the domain of Artificial Intelligence, the DIP may be treated as an issue of how to represent different assumptions (or hypotheses) about the DIP in a consistent way. This talk examines various temporal models including those based solely on points, those based solely on intervals, and those based on both points and intervals, and points out the corresponding DIP with regard to each of these temporal models. A classification of assumptions about the DIP is introduced with a solution to the corresponding DIP.



► Keynote Speakers

April 26, 2024 / Friday / UTC/GMT+8

10:45-11:20 | 学术交流中心 1 楼报告厅 - Onsite Talk

Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527



Prof. Fei Teng
Southwest Jiaotong University, China

Bio: Teng Fei received her B.S. and M.S. degrees from the Southwest Jiaotong University, China, in 2006 and 2008, respectively. She received her Ph.D. at Ecole Centrale Paris in France in 2011. She serves as a professor of the School of Computer and Artificial Intelligence at Southwest Jiaotong University, China. Her research interests include medical data mining. She has published three monograph and over 100 research papers. Dr. Teng is the reviewer of the IEEE Journal of Biomedical and Health Informatics, Information Sciences, and IEEE Transactions on Computers. She is a director of the China Computer Federation (CCF), executive committee member of CCF Big Data and Service Computing Committee, deputy director of Pharmacy Inheritance and Development Committee of Sichuan Medical Communication Society, and executive director of Sichuan Higher Education Computer Basic Education Research Association. She has served as the chairman and member of the procedural committee for more than 10 academic conferences, including GreenCom, PAKDD, Bigdata, etc.

Speech Title: Automated International Classification of Diseases Coding: Development, Challenges, and Applications

Abstract: International classification of diseases coding (ICD coding) serves as a core task in clinical data management and plays a significant role in monitoring health issues, reporting diseases, collecting morbidity statistics, and assisting in medical reimbursement decision-making. This report will outline the importance of ICD coding and its role in modern medical information systems, with a focus on how data-based and knowledge-based methods utilize the complex characteristics within medical records to enhance the accuracy, stability, and interpretability of ICD coding. Additionally, the application and future directions of few-shot learning and zero-shot learning in disease coding and clinical text parsing will also be discussed.



► Keynote Speakers

April 26, 2024 / Friday / UTC/GMT+8

11:20-11:55 | 学术交流中心 1 楼报告厅 - Onsite Talk

Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527



Prof. Xianyong Li
Xihua University, China

Bio: Xianyong Li is a professor and master's supervisor at the School of Computer and Software Engineering of Xihua University in China. He received his doctoral degree from Chongqing University in China in 2014. He is the Sichuan Province High-level Overseas Talent, and Xihua University Young Scholars Reserve Talent. He is the members of the Network Space Search Committee of the Chinese Information Processing Society of China, the Affective Computing Committee, the China Computer Federation, and the Chinese Association for Artificial Intelligence. He is also the vice Chairman of the Natural Language Processing Professional Committee of the Sichuan Computer Federation. His research focuses on various problems of natural language processing, artificial intelligence, social network analysis, Evolution and guidance of network public opinion, sentiment analysis, etc. From September 2016 to September 2017, he worked as a visiting scholar at the State University of New York at Binghamton. He has presided over 9 projects, such as the National Natural Science Foundation Youth Fund, the Chunhui Program Project of the Ministry of Education, the Sichuan Science and Technology Program, and the Natural Science Foundation of Sichuan Education Department. He has published more than 40 academic papers in international main academic journals and conferences, and has authorized 2 national invention patents. He won two first prizes for Scientific and Technological Progress awarded by the China Federation of Logistics & Purchasing and the China Building Materials Circulation Association in 2023.

Speech Title: Sentiment analysis methods with external knowledge

Abstract: External knowledge aims to complement the explicit sentiment clues of sentences, improving the sentiment analysis methods' performance. Implicit sentiment word definitions and emojis always carry a lot of sentiment information. In this talk, we will introduce some sentiment analysis models with external knowledge including implicit sentiment word definitions and emojis. We will find that the sentiment analysis methods that are injected the external knowledge obtain better performance than other baselines. Extensive experiments show that the proposed sentiment analysis methods integrated the implicit sentiment word definitions, the emoji information and the relationships between texts and emojis are effective for sentiment analysis.



► Keynote Speakers

April 27, 2024 / Saturday / UTC/GMT+8

9:00-9:35 | Online Talk

Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527



Prof. Shigang Chen, IEEE Fellow University of Florida, America

Bio: Dr. Shigang Chen is a professor with Department of Computer and Information Science and Engineering at University of Florida. He received his B.S. degree in computer science from University of Science and Technology of China in 1993. He received M.S. and Ph.D. degrees in computer science from University of Illinois at Urbana-Champaign in 1996 and 1999, respectively. After graduation, he had worked with Cisco Systems for three years before joining University of Florida in 2002. His research interests include data streaming, Internet of things, cybersecurity, RFID technologies, intelligent cyber-transportation systems, etc. He published over 200 peer-reviewed journal/conference papers. He received the NSF CAREER Award and several best paper awards. He holds 13 US patents, and many of them were used in software products. He served as an associate editor for IEEE Transactions on Mobile Computing, IEEE/ACM Transactions on Networking and a number of other journals. He served in various chair positions or as committee members for numerous conferences. He held the University of Florida Research Foundation Professorship and the University of Florida Term Professorship. He is a Fellow of IEEE and an ACM Distinguished Scientist.

Speech Title: Internet Data Streaming and Sketches

Abstract: There is hardly any other data set whose size can rival the big data that flows on the Internet. This talk covers some of the fundamental concepts, data structures, and algorithms for extracting information from packet streams on the Internet in real time, with applications in network security, traffic engineering, e-commerce, and big data analytics. It provides an introduction to big Internet data, practical needs of making big data small, different statistics of interest, flow models, how to summarize big network data, challenges in performing summarization, etc. It also includes some recent sketching methods that reduce streaming network data to summaries that are orders-of-magnitude smaller than what the traditional sketches can do. The new methods hold the promise of allowing routers to perform measurement on ever growing traffic at unprecedented line speeds, allowing enterprise systems to keep their network records for much longer time, and allowing users with ordinary computing resources to work on big data.



► Invited Speaker

April 26, 2024 / Friday / UTC/GMT+8

13:30-13:50 | 学术交流中心 1 楼 - Onsite Talk



Dr. Gou Haosong
Mobile Group Sichuan Co., Ltd., China

Bio: Dr. Gou Haosong is a professor and chief information technology expert of China Mobile Group Sichuan Co., Ltd., as well as a senior researcher of the postdoctoral Programme.

Dr. Gou has been focusing on network intelligentization. He hosted and participated in more than 10 major and key research and development projects which funded by the National and provincial Science Foundation, and China Mobile Group. He has been granted more than 20 national, provincial and other awards, obtained more than 30 patents, and published more than 30 papers in SCI, EI, and Chinese core journals.

Speech Title: Practice on Autonomous Network in China Mobile

Abstract: Autonomous network has been proposed as promising method to deal with the challenges of network maintenance, Marketing development and cost efficiency, and it heats up industrial cooperation continues to expand. As a major participant and contributor, China Mobile has been done practice a lot on autonomous network, and aims to build automated and intelligent OAM capabilities in the whole network lifecycle, providing customers with new network and ICT services of "zero wait, zero fault and zero contact", building digital intelligent OAM capabilities of "self-configuration, self-healing and self-optimization" for front-line operation and maintenance. This presentation shows the motivation and strategy of autonomous network development, and also tells you what has China Mobile done practiced in research and application on autonomous network.



► Invited Speaker

April 27, 2024 / Saturday / UTC/GMT+8

9:40-10:00 - Online Talk

Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527



Dr. Zhang Shiling

State Grid Chongqing Electric Power Company, China

Bio: As the first author, Zhang Shiling has published more than 90 SCI/EI search papers in the domestic and foreign journals and international academic conferences, 19 Chinese Core Journals of Peking University, won 9 provincial and ministerial awards such as the first prize of Chongqing scientific and technological progress and the special first prize of China Water Conservancy and power quality management Association, authorized 1 international invention patent, 20 national invention patents and utility models, 18 software copyrights, and more than 20 reports of international and domestic conferences, As the project leader, he presided over 2 provincial and ministerial projects at the basic frontier and 3 science and technology projects at the headquarters of State Grid Corporation of China.

Speech Title: Using Deep Learning Networks to Process Corona and Heating Characteristics of Large Fittings in UHVDC Valve Halls and Structural Optimization

Abstract: Considering the dual effects of the load current and voltage on the metal fittings, it is necessary to comprehensively analyze their corona and heating characteristics, and optimize the design and analysis of structure. The pressure equalization device is divided into three typical types of hardware: shielding ball, shielding ring, and the shielding cover, and the flexible connecting components are formed between the tubular busbars through flexible wires. Corona tests are conducted independently on the positive and the negative electrodes of the diameters, and corresponding test phenomena and data were recorded. During the experiment, no corona discharge was observed on balls with diameters of the 900mm and 1000mm under positive polarity, while corona discharge was observed on balls with the different diameters under negative polarity. Then, using deep learning networks to process corona and heating characteristics of large fittings in UHVDC valve halls and structural optimization. It is proposed that the corona field strength value of valve fittings is: for valve tower shielding plates, OCT, and the lightning arrester equalizing rings with an equivalent diameter of less than 200mm, it is considered that their corona field strength is not less than $2500V \cdot mm^{-1}$. For the equal pressure shielding balls and casing shielding covers with equivalent diameter of 200mm or more, it is considered that corona field strength is not less than $1500V \cdot mm^{-1}$.



► Invited Speaker

April 27, 2024 / Saturday / UTC/GMT+8

16:00-16:20 - Online Talk

Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527



Prof. Hossam A. Gabbar, **Director of Smart Energy Systems Lab, Ontario Tech University,** **Canada**

Bio: Dr. Gabbar is a full Professor in the Department of Energy and Nuclear Engineering, Faculty of Engineering and Applied Science, at Ontario Tech University (UOIT), where he has established the Energy Safety and Control Lab (ESCL), Smart Energy Systems Lab, and Advanced Plasma Engineering Lab (APEL). He is the recipient of the Senior Research Excellence Award for 2016, UOIT. He is recognized among the top 2% of worldwide scientists with high citation in the area of energy. He is a Distinguished Lecturer of IEEE NPSS. He is leading national and international research in the areas of smart energy grids, energy safety and control systems, and waste to energy using advanced plasma technologies. Dr. Gabbar obtained his B.Sc. degree in 1988 with first class of honor from the Faculty of Engineering, Alexandria University (Egypt). In 2001, he obtained his Ph.D. degree from Okayama University (Japan). From 2001 till 2004, he joined Tokyo Institute of Technology (Japan), as a research associate. From 2004 till 2008, he joined Okayama University (Japan) as an Associate Professor, in the Division of Industrial Innovation Sciences. From 2007 till 2008, he was a Visiting Professor at the University of Toronto. He also worked as process control, safety, and automation specialist in energy and oil & gas industries. Dr. Gabbar has more than 230 publications, including patents, books / chapters, journal and conference papers.

Speech Title: Transactive Mobility with Collaborative Simulation for Smart Energy Infrastructures

Abstract: Mobility is supported by transportation infrastructures based on energy networks to meet mobility demands. Transportation electrification enables mobility with more penetration of electric vehicles (EVs) and hydrogen-based fuel cell vehicles (HVs), besides internal combustion vehicles. The charging infrastructures should support mobility based on hybrid transportation technologies. The complex and expensive transition to transportation electrification infrastructures can be alleviated by implementing transactive mobility, which will provide cost management of different layers within the mobility services infrastructures. This talk presents an integrated framework and advanced approaches for transactive mobility in view of hybrid charging infrastructures. The interface between transactive energy and charging infrastructures will be modeled and formulated by the transactive mobility model.



► Session 1

- **Image Analysis and Processing Methods**
- **Session Chair: Assoc. Prof. Yue Wu, Xihua University, China**
- 13:30-15:35 | April 26, 2024 | Venue: 学术交流中心 1 楼报告厅
- A003, A321, A22047, A11012, A101, A210, A22022

<p>Invited Speech 13:30-13:50</p>	<p>Speech Title: Practice on Autonomous Network in China Mobile Speaker: Dr. Gou Haosong, Mobile Group Sichuan Co., Ltd., China</p> <p>Abstract: Autonomous network has been proposed as promising method to deal with the challenges of network maintenance, Marketing development and cost efficiency, and it heats up industrial cooperation continues to expand. As a major participant and contributor, China Mobile has been done practice a lot on autonomous network, and aims to build automated and intelligent OAM capabilities in the whole network lifecycle, providing customers with new network and ICT services of "zero wait, zero fault and zero contact", building digital intelligent OAM capabilities of "self-configuration, self-healing and self-optimization" for front-line operation and maintenance. This presentation shows the motivation and strategy of autonomous network development, and also tells you what has China Mobile done practiced in research and application on autonomous network.</p>
<p>A003 13:50-14:05</p>	<p>Focal-UNet: Complex Image Semantic Segmentation Based on Focal Self-attention and UNet Authors: Haosong Gou, Lei Xiangd, Xiaonian Chen, Xin Tan, Lei Lv Presenter: Xiaonian Chen, XinRun Information technology Co. LLC</p> <p>Abstract: Semantic segmentation is an important task in the field of computer vision and is widely used in fields such as medical image analysis and autonomous driving. However, when the recognized subject and the background are very similar and easily confused, it is more difficult to segment the target. This paper proposes an image segmentation algorithm based on Focal self-attention and UNet -- Focal-UNet, which uses focal self-attention to capture local and global features and retain the most valuable information for edge recognition. At the same time, data enhancement methods are used to enhance the sensitivity of the model to surrounding local features during edge recognition. Experiments have proven that compared with traditional image segmentation algorithms, our algorithm achieves better segmentation results in scenes with complex backgrounds and high foreground similarities, and improves efficiency without losing more accuracy.</p>
<p>A321 14:05-14:20</p>	<p>A Study of Introducing Real-time Object Detection Algorithm into Screen Printing Thermal Transfer Printed Label Defect Detection Authors: Chen-Hao Lin, Chia-Pao Chang Presenter: Chia-Pao Chang, National Chin-Yi University of Technology</p> <p>Abstract: This research focuses on the necessity and feasibility of improving traditional optical inspection systems and using advanced object detection algorithms to detect industrial defects. Through actual inspection test results, it can successfully detect the content of PET film thermal transfer labels. Defect characteristics. The main architecture of this research includes the YOLO-V3 algorithm and the EfficientDet algorithm. Clear images obtained by planning and analyzing hardware equipment for defect accuracy</p>



	<p>and characteristics are used as functional verification. This research has achieved good research results, with the calculation accuracy reaching mAP 99% and meeting the speed requirement of real-time defect detection of 30fps (above). The introduction of the inspection system can increase the production capacity of the quality inspection department. In the past, each inspector produced an average of 3,600 labels. With the addition of the AI inspection system, the number can be increased to 5,000 labels. In addition to saving human resources, increasing production capacity can also share fatigue among inspection personnel.</p>
<p>A22047 14:20-14:35</p>	<p>Preliminary Results on Classifying the RTK Trajectories Using the BP Neural Network Authors: Chunhua Chen, Xiangqiang Zeng, Yanting Liu, Yubing Zhang, Lin Ouyang, Minsi Ao Presenter: Chunhua Chen, Hunan Institute of Geomatics Sciences, China</p> <p>Abstract: The classification of network RTK trajectories is significant to revealing the user behavior pattern and improving the services and managements. In this paper, a novel approach based on BP neural network is presented for classification on 5 types of behaviors as control point, line style, surface style, account sharing and invalid surveys. With the feature set consists 26 profiles, the BP neural network is trained and established. The preliminary results show that, the accuracy on training and testing data sets are respectively 84.3% and 81.2%. Especially for the account sharing and invalid activities, the accuracy reaches 94.7% and 93.8%, which indicates the well generalization ability. Moreover, the future work would be focus on improving the volume of data, optimizing trajectory shape feature indexes.</p>
<p>A11012 14:35-14:50</p>	<p>Research on Real time Tracking Technology of Radar Vehicle Trajectory Based on Inertial Compensation Algorithm Authors: Xiaohan Yang, Yonggang Huang, Yuliang Qi, Baoguo Feng Presenter: Xiaohan Yang, JIAOKE TRANSPORT CONSULTANTS LTD., China</p> <p>Abstract: Real time and continuous trajectory tracking of vehicles is becoming an important application of fine monitoring. In the face of short-term occlusion problems in radar detection, this paper proposes a radar vehicle trajectory real-time tracking algorithm based on inertial navigation, which is used to overcome the problem of short-term signal loss caused by occlusion in multi target monitoring by radar, making the precision monitoring radar have better fault tolerance, thus ensuring the stability and reliability of radar fine monitoring and real-time tracking of vehicle trajectories. At the same time, this article also introduces the application of this algorithm in practical engineering systems, in order to verify the feasibility and usefulness of this algorithm.</p>
<p>A101 14:50-15:05</p>	<p>Fire detection method based on improved DETR Authors: Ruize Ge, Xiaoyin Hu, Duo Xiao Presenter: Ruize Ge, College of Contral science and Engineering, Zhejiang University</p> <p>Abstract: Fire, as a type of disaster, poses a significant threat to both life and property safety. Therefore, timely and accurate detection of fire occurrences is of utmost importance. However, current fire detection methods that rely on traditional sensors suffer from limitations such as a high false alarm rate and extended response time. In this manuscript, we propose a novel fire detection method based on an enhanced version of DETR that leverages flame detection. Our approach entails several key modifications. Firstly, we replace the bounding box loss function of the original DETR with the alpha-CIoU loss function. This substitution enhances the accuracy and</p>



	<p>efficiency of our fire detection method. Secondly, we introduce relative position encoding to replace the sine-cosine position encoding in the transformer module. This adjustment aims to improve the model's ability to capture spatial relationships between flame instances, resulting in more precise detection outcomes. Furthermore, we incorporate multiscale features by modifying the backbone of DETR. This addition enables our algorithm to effectively handle variations in flame sizes and appearances, contributing to improved detection performance across different fire scenarios. Finally, we apply gradient clipping to the DETR optimizer to stabilize the training process and mitigate the potential issue of exploding gradients. To evaluate our proposed method, we train and test the model using a self-generated dataset specifically tailored for flame detection. Experimental results indicate that our improved DETR algorithm achieves an average accuracy of 92.27%, which represents a substantial 3.81% enhancement over the original DETR. Moreover, through ablation experiments, we demonstrate the effectiveness of each individual improvement in our approach.</p>
<p>A210 15:05-15:20</p>	<p>Research on the Application of Visualization Methods in the Training Process of Neural Networks Authors: Zhiyi Liu, Kai Zhang, Yejie Zheng, Likun Zheng Presenter: Kai Zhang, Eastmoney AI Research Institute, China</p> <p>Abstract: Large language models are being increasingly applied across various fields, with uses ranging from predictive analysis to strategic decision-making processes. Despite their impressive predictive accuracy, the interpretability of these neural network-based models presents a challenge, a topic of significant interest in both industry and academia. This paper investigates the use of visualization methods to enhance the interpretability of these large models. Firstly, we will review and summarize the existing research on the interpretability of neural networks. Then, we will conduct experimental analyses to understand the specific characteristics and needs when dealing with these models. Finally, based on the results of the experimental research, we will explore effective application strategies for large-scale neural network models across various fields. Our studies are anticipated to provide valuable insights for decision-makers, researchers, and practitioners interested in the application and understanding of large language models.</p>
<p>A22022 15:20-15:35</p>	<p>Research on Damage Effect Classification in Wargame Replay Data Based on Deep Neural Network Authors: Shi Yang, Yang Yong, Chen Longliang, Xu Lei Presenter: Shi Yang, Officers College of PAP, China</p> <p>Abstract: In recent years, wargame competitions have become more and more important. However, there is no targeted tools to analyze the massive wargame data, which can be analyzed to increase the probability of winning. In this paper we focus on the analysis of direct aiming attack data in the wargame replay data, which is very important in the wargame confrontation, but there are many factors affecting the damage effect, so the calculation rules are complicated. In this paper we propose a model of deep neural network can obtain a good training effect, which can accurately predict the damage effect in various complex battlefield situations.</p>



► Session 2

- **Data Model, Security and Privacy**
- **Session Chair: Dr. Nijing Yang, Xihua University, China**
- **Session Chair: Assoc. Prof. Chee Kiat Seow, University of Glasgow, UK**
- 15:50-18:05 | April 26, 2024 | Venue: 学术交流中心 1 楼报告厅
- A33081, A43109, A43103, A43110, A22040, A33064, A22050, A102, A22031

<p>A33081 15:50-16:05</p>	<p>Exploring Resource Prediction Models Based on Custom Kubernetes Auto-scaling Metrics Authors: Yi Xuan Chia, Chee Kiat Seow, Kan Chen, Qi Cao Presenter: Chee Kiat Seow, University of Glasgow, UK</p> <p>Abstract: The introduction of Kubernetes enabled automation of management, deployment, and monitoring of applications in productional environments, with Horizontal Pod Autoscalers that continuously monitors and scales applications according to real-time loads through CPU and memory. This paper aims to explore potential optimizations to Kubernetes Pod Autoscalers, using latency as a custom metric, and implementing various time-series forecasting models; ARIMA, Holt-Winters, LSTM, and Prophet. Results are evaluated and discussed, with most models able to forecast trends correctly. The Prophet model garnered the best results, with the pods scaled up before load, and scaled down only after. Moving forward, additional variables can be added into improved multi-variate models for further autoscaling optimization. All in all, the results produced signifies the applicability of using time-series resource forecasting models to optimize</p>
<p>A43109 16:05-16:20</p>	<p>Task Offloading in Edge Computing System with Deep Reinforcement Learning and Reward Shaping Authors: Huishi Zhao, Yitong Liu, Xingcheng Liu Presenter: Huishi Zhao, Sun Yat-sen University, China</p> <p>Abstract: The evolution of mobile internet has brought challenges to smart devices such as smartphones and VR headsets, only having limited computational power to handle intensive tasks. The advent of edge computing provides a solution, in which the smart devices are enabled to offload tasks to nearby servers, thus facilitating the necessary computations with reduced latency and energy consumption. This study focuses on the challenge of task offloading. In our proposed scheme, edge computing is considered as a Markov decision process (MDP). Hence, the deep Q-networks with reward shaping (DQN-RS) can be utilized to improve training effectiveness for sparse reward conditions. Experimental results show that this method DQN-RS significantly enhances DRL algorithm performance compared to a well hand-crafted greedy algorithm, demonstrating the efficacy of reinforcement learning in discovering optimal offloading strategies.</p>
<p>A43103 16:20-16:35</p>	<p>Empirical Study on Multi-factor Quantitative Stock Selection Model Based on Support Vector Machine Authors: only one author Presenter: Chengzhao Zhang, Chengdu Polytechnic, China</p> <p>Abstract: Machine learning has many applications in the financial field due to its superior data analysis ability and non-linear fitting ability. Multi-factor stock selection plays a</p>



	<p>crucial role in quantitative investment, demonstrating consistent performance across various market conditions. In order to effectively monitor the driving factors of China's stock market, this article identifies the influential factors that are effective in the A-share market. The paper uses SVM algorithm for multi-factor stock selection, with the CSI300 (China Securities Index 300) Component Stocks as the research object. The individual stock returns are predicted and the optimal investment portfolio is constructed by training the factor data of each component stock. The SVM stock selection model with a warehouse transfer frequency of 30 trading days exhibits an impressive annualized return of 15.70% based on empirical findings, which is better than the SVM model with a warehouse transfer frequency of 60 trading days and the SVM model with a warehouse transfer frequency of 90 trading days.</p>
<p>A43110 16:35-16:50</p>	<p>Privacy-Enhanced Data Sharing in Multi-Institutional Healthcare Authors: Jixiang Xiao, Shengke Zeng, Tiantian Zhou, Yawen Feng Presenter: Jixiang Xiao, Xihua University, China</p> <p>Abstract: In multi-institutional patient data sharing scenarios, maintaining fine-grained access control while safeguarding privacy and adapting to real-world environments is crucial. Traditional attribute-based encryption (ABE) schemes may inadvertently expose sensitive information through access policies and lack support for dynamic policy updates. To tackle these challenges, this paper proposes an ABE scheme with partially hidden access policies to bolster privacy protection for encrypted data stored on servers across healthcare institutions. Our scheme also facilitates access policy updates, ensuring accurate and efficient adaptation to evolving real-world needs. Through rigorous security analysis, we validate the efficacy of our approach in safeguarding patient data integrity, confidentiality, and adaptability to dynamic environments. Our scheme offers a robust solution for secure and efficient multi-institutional patient data sharing, supporting fine-grained access control, privacy preservation, and dynamic policy updates.</p>
<p>A22040 16:50-17:05</p>	<p>Density peak semi-tied covariance matrices for Gaussian mixture models Authors: Min Li, Guoyin Wang, Zeng Yu, Hongjun Wang, Jihong Wan, Tianrui Li Presenter: Min Li, Southwest Jiaotong University, China</p> <p>Abstract: People widely use Gaussian mixture models (GMM) in data mining and knowledge discovery. The flexibly tied GMM can solve the memory, computational load, and data shortage problems caused by increasing the number of Gaussian components. However, sharing a full-rank matrix for all Gaussian components in a flexibly tied GMM cannot express the data structure. For example, when facing complex data, Gaussian components that share several full-rank matrices have stronger fitting capabilities. Motivated by this problem, this paper proposes an adaptive semi-tied GMM (ASemi-tied GMM). (1) Adaptive grouping of Gaussian components based on defining a similarity measure for the covariance matrix of the Gaussian components and realizing the adaptive semi-tied covariance of GMM by sharing the semi-tied transformation of the covariance within the group. (2) For ASemi-tied GMM, the Grouped Fast Newton Minimum Residual (G-FNMR) algorithm is proposed to estimate the parameters of this model. This paper validates the proposed ASemi-tied GMM on synthetic and real datasets, and experimental results show that its performance in log-likelihood and clustering is better than algorithms such as flexibly tied GMM.</p>
<p>A33064 17:05-17:20</p>	<p>A data cleaning algorithm based on two-layer index for satellite big data Authors: Li Bing, Yang Xiaoyan, Shi Tao, Ma Fuli, Yang Guangjian, Yu Qinsi, Meng</p>



	<p>Lingtong Presenter: Li Bing, Chinese Academy of Sciences Beijing, China</p> <p>Abstract: With the increasing information capacity and high data transmission rate from satellite to ground, the volume of satellite data has grown rapidly. The high proportion of duplicate part in re-transmission data and inter-orbit data seriously reduce the data processing effectiveness. In this paper, A data cleaning algorithm to eliminate duplicate data based on two-layer index from the transmission frame and source packet is proposed to achieve this goal. Typical experiments show that the processing time of the algorithm is closely related to the total amount of data and the proportion of duplicate data. Compared with traditional algorithm, the algorithm has significant advantage in terms of processing timeliness.</p>
<p>A22050 17:20-17:35</p>	<p>Cloud Computing Adoption by Small and Medium Enterprises based on DOI and TOE Theory Authors: Shuyi Xie, Yuxin Zuo, Guohua Deng Presenter: Shuyi Xie, Jiangnan University, China</p> <p>Abstract: In order to identify the key factors influencing small and medium enterprises (SMEs) adoption of cloud computing, a cloud computing adoption model for SMEs was constructed based on the diffusion of innovation (DOI) theory and the technology-organization-environment (TOE) framework. A questionnaire-based survey was used to collect data from 136 firms (SMEs) in central China. The results showed that top management support, technology readies and regulatory support have a significant influence on the adoption of cloud computing and external pressure has an indirect effect on it, however relative advantages, complexity, perceived risk, firm size and sensitivity & criticality of business have no significant influence on it. The research help firms consider their evaluation and investment for cloud computing project and also offer service providers with a better understanding of what effects cloud computing adoption, with relevant insight on current designs and promotions.</p>
<p>A102 17:35-17:50</p>	<p>Energy management strategy for fuel cell hybrid emergency power system based on deep reinforcement learning Authors: Jingyi Xi, Xiaoyin Hu, Duo Xiao Presenter: Jingyi Xi, Zhejiang University, China</p> <p>Abstract: Addressing the challenges in energy consumption and lifespan of fuel cell hybrid emergency power system, this paper proposes an energy management strategy based on deep reinforcement learning. The strategy aims to holistically balance objectives such as hydrogen consumption of the fuel cell, its lifespan, the stability of the lithium battery's state of charge (SOC), and its degradation. Firstly, we present the system architecture of the fuel cell hybrid emergency power system and establish models for hydrogen consumption and degradation of the fuel cell, as well as the SOC variations and degradation of the lithium battery, upon which a multi-objective reward function is constructed. Subsequently, we adopt the distributional soft actor- critic (DSAC) deep reinforcement learning algorithm, combined with a maximum entropy-based objective function to balance the exploration-exploitation trade-off and incorporated with a distributed value function estimation to alleviate the overestimation of Q-values. Simulation results demonstrate that the proposed strategy can effectively reduce the overall value loss, extend the system's lifespan, and showcase robust adaptability.</p>



<p>A22031 17:50-18:05</p>	<p>Streamlining Data Exchange in Intelligent Mines: Cross-System Services Leveraging the Industrial Internet Platform Authors: Maoquan Wan, Hao Wang Presenter: Maoquan Wan, Mine Big Data Research Institute, Chinese Institute of Coal Science, China</p> <p>Abstract: In the dynamic landscape of mining production, the integration of intelligent systems has revolutionized operations across various domains. This paper addresses the challenges encountered during the construction of intelligent mines, emphasizing disparities in interconnection, data sharing, and protocol standardization. Leveraging the capabilities of Industrial Internet Platforms, we propose a cross-system unified data service tailored for the mining industry. The data model encompasses diverse operations, providing a structured framework for efficient cross-system data exchange. The platform architecture ensures standardized data handling, security, and the provision of interfaces. A low-code configuration tool facilitates plug-and-play functionality, thereby optimizing the efficiency of data interactions. Additionally, microservice containers enhance deployment flexibility. The implementation in an underground coal mine demonstrates significant improvements in data efficiency, security, and integration. The proposed approach offers a comprehensive solution to the challenges of non-standardized and error-prone data interaction within mining subsystems.</p>
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► Online Session A

- **Predictive Models and Optimization Algorithms**
- **Session Chair: Dr. Ye XIA, Université Grenoble Alpes, United States**
- 9:40-12:00 | April 27, 2024
- Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527
- A313, A22036, A22044, A33060, A2001, A33058, A22051, A33059, A33067

<p>Invited Speech 9:40-10:00</p>	<p>Speech Title: Using Deep Learning Networks to Process Corona and Heating Characteristics of Large Fittings in UHVDC Valve Halls and Structural Optimization Speaker: Dr. Zhang Shiling, State Grid Chongqing Electric Power Company, China</p> <p>Abstract: Considering the dual effects of the load current and voltage on the metal fittings, it is necessary to comprehensively analyze their corona and heating characteristics, and optimize the design and analysis of structure. The pressure equalization device is divided into three typical types of hardware: shielding ball, shielding ring, and the shielding cover, and the flexible connecting components are formed between the tubular busbars through flexible wires. Corona tests are conducted independently on the positive and the negative electrodes of the diameters, and corresponding test phenomena and data were recorded. During the experiment, no corona discharge was observed on balls with diameters of the 900mm and 1000mm under positive polarity, while corona discharge was observed on balls with the different diameters under negative polarity. Then, using deep learning networks to process corona and heating characteristics of large fittings in UHVDC valve halls and structural optimization. It is proposed that the corona field strength value of valve fittings is: for valve tower shielding plates, OCT, and the lightning arrester equalizing rings with an equivalent diameter of less than 200mm, it is considered that their corona field strength is not less than $2500V \cdot mm^{-1}$. For the equal pressure shielding balls and casing shielding covers with equivalent diameter of 200mm or more, it is considered that corona field strength is not less than $1500V \cdot mm^{-1}$.</p>
<p>A22036 10:00-10:15</p>	<p>Optimizing Cloud Application Scheduling: A Dual-Stage Heuristic Approach Authors: Ye Xia, Xavier Etchevers, Loïc Letondeur, Thierry Coupaye, Frédéric Desprez Presenter: Ye XIA, Université Grenoble Alpes, United States</p> <p>Abstract: Effective application scheduling in cloud environments is crucial for optimizing operational efficiency and resource utilization. This paper addresses the inherent complexities of this problem by introducing an innovative approach, focused on reducing operational costs, particularly in terms of energy consumption and application migration expenses. The methodology involves a two-stage decision-making process, supplemented by a suite of integrated and compatible heuristics, which together ensure improved efficiency and manageable runtime. Validated through comprehensive experiments against a public dataset and industry-standard contests, our approach demonstrates significant advancements in cloud scheduling, offering scalable and effective resource management solutions for cloud environments.</p>
<p>A22044 10:15-10:30</p>	<p>Comparison of different machine learning algorithms in the parameterization of near-surface turbulent fluxes Authors: Qiang Fan, Bo Gong, Qili Zhang, Hourong Zhang, Xianyin Mao, Haipeng Zhang, Jianrong Wu, Lusong Zhang Presenter: Hourong Zhang, Electric Power Research Institute of China Southern Power</p>



	<p>Grid Co. Ltd, China</p> <p>Abstract: The study of non-iterative schemes for near-surface turbulent flux parameterization is significant for model forecasting and climate prediction. In this paper, four machine learning algorithms (Random Forest, CatBoost, XGBoost and LightGBM) are used to design non-iterative schemes for near-surface turbulent flux parameterization. Through comparison, we find that the results obtained by XGBoost and LightGBM exhibit significant fluctuations, sensitivity to minor data changes, and poor stability, with lower accuracy compared to the BH&H scheme, making them unsuitable to design the parameterization model. While CatBoost shows less fluctuation, its results still possess minor irregularities compared to the Random Forest model. The results of Random Forest are smooth, stable, and highly accurate, making it the most suitable algorithm among the four algorithms for application in the parameterization of near-surface turbulent fluxes.</p>
<p>A33060 10:30-10:45</p>	<p>The bond language for interest rates prediction: a Transformer model approach Authors: Huiming Liu, Ying Liu Presenter: Huiming Liu, Industrial and Commercial Bank of China, China</p> <p>Abstract: Considering the development of bond market, effective analysis of the interest rate could help bond investment managers obtain higher profits and avoid potential loss. However, prior literature that using natural language process to discuss the interest rate is quite limited. Our study builds bond language and adopts a Transformer model to infer the tendency of 1/5/10 year Treasury bonds' interest rates. Our sample is interest rates data and economic data from 2016.1.20 to 2023.9.15. We find that the difference between predicting results and true tendency of interest rates is relatively similar. Moreover, the application of correcting mechanism shows that considering the impact of the release of economic data could improve the accuracy of our model. This study provides evidence that researchers could consider the weight of disparate indicators during the analysis on bond market.</p>
<p>A2001 10:45-11:00</p>	<p>A prediction method for the industry of an enterprise based on knowledge graph completion technology Authors: Dezhi Kong, Min Tan, Yang Cao, Dingding Li Presenter: Dezhi Kong, CETC Big Data Research Institute Co., Ltd. Guiyang city, China</p> <p>Abstract: This article proposes a method based on knowledge graph completion technology, aiming to achieve accurate prediction of the industry to which the enterprise belongs. This method first constructs an enterprise knowledge graph, and then completes the knowledge graph through path analysis and relationship description to capture the complex relationship between enterprises and industries. Through experimental verification, this method can effectively improve the accuracy of industry prediction for enterprises. Compared to traditional machine learning methods and statistical models, methods based on knowledge graph completion technology have higher prediction accuracy and wider application prospects.</p>
<p>A33058 11:00-11:15</p>	<p>A Random Forest Based Prediction Method for Moisture Content in Wood Materials Authors: Yan Xu, Qing Ye, Wei Song Presenter: Qing Ye, Jiangxi University of Finance and Economics, China</p> <p>Abstract: Missing values is a crucial problem in the area of big data analysis, which hinders data integrity. Various regression methods have been employed for estimating</p>



	<p>missing values, but they exhibit significant prediction errors. To ensure the integrity of data collected from a wood sensor monitoring system and address the issue of data loss and anomaly, we propose a missing value estimation method based on the random forest regression model. This study focuses on the environmental data, including temperature, relative humidity, and absolute humidity surrounding the wood subjects. We simulate a number of methods on the data for comparison purpose. The experiment results in terms of prediction performance indicate that the random forest regression model algorithm we developed for estimating moisture content's missing values yields favourable outcomes with consistently low estimation errors.</p>
<p>A22051 11:15-11:30</p>	<p>Gated Spatial-Temporal Graph Attention Network for Traffic Flow Authors: Xinhua Dong, Zhanyi Zhu, Zhigang Xu, Hongmu Han, Wanbo Zhao, Yupeng Lei Presenter: Zhanyi Zhu, Hubei University of Technology, China</p> <p>Abstract: Predictable traffic flow states can promote more rational traffic signal design and allocation of transportation resources. To address the issue of low accuracy in existing traffic flow prediction models, a traffic flow prediction model based on Gated Spatial-Temporal Graph Attention Network (GSTGAN) is proposed in this paper. GSTGAN integrates temporal convolutional networks, graph attention networks, and temporal self-attention encoding, using a sandwich structure to deeply extract long and short-term time features and generate dynamic spatial-temporal graphs. First, gated dilated causal convolutions are used to capture short-term dynamic features of the time series. Then, GAT calculates the correlation of relevant regions adaptively to dynamically capture the spatial features of the traffic network graph. Finally, temporal self-attention units are applied to capture long-term time features. To verify the effectiveness of GSTGAN, we conducted experiments on two large-scale real-world datasets, METR-LA and PEMS-BAY. The experimental results demonstrate that GSTGAN is highly competitive compared to existing techniques. In all predictive tasks at any time step, GSTGAN outperforms all baselines on all metrics in all datasets, with improvements of at least 1%. In particular, in the 30 minutes ahead predict, GSTGAN outperforms state-of-the-art methods by up to 11% improvement in MAPE measure.</p>
<p>A33059 11:30-11:45</p>	<p>CAROKRS: Cost-aware Resource Optimization Kubernetes Resource Scheduler Authors: Tianzhe Li, Lupeng Qiu, Fuhao Chen, Hao Chen and Naqin Zhou Presenter: Tianzhe Li, Guangzhou University, China</p> <p>Abstract: Kubernetes (K8s), as a widely used container orchestration tool in cloud computing platforms, provides powerful support for the automated deployment, scaling, and management of applications. However, effective resource scheduling has always been a challenging issue for Kubernetes. Existing K8s schedulers often have limitations in their scheduling approaches, typically optimizing for a specific target, and they lack targeted awareness of cluster and deployment resources for optimization goals, resulting in less noticeable optimization effects. This paper aims to propose a Cost-aware Resource Optimization Kubernetes Resource Scheduler (CAROKRS) to enhance the utilization of computing resources, avoid resource overruns, and reduce deployment costs. Through the study of the adaptability patterns between pod resource demands and node resource situations, we introduce a resource-adaptation-based scheduling algorithm. Further optimization of the scheduling strategy is performed using a simulated annealing algorithm, resulting in a final scheduling strategy with low deployment costs, low overrun rates, and high resource utilization. Experimental results</p>



	<p>show that the Cost-aware Resource Optimization Kubernetes Resource Scheduler, compared to the native K8s scheduler, achieves an average reduction of 89.78% in deployment costs, an average increase of 60.59% in load balancing, and an average decrease of 36.05% in resource overruns.</p>
<p>A33067 11:45-12:00</p>	<p>TBOOS: Optimizing Edge Computing Offloading Strategy Based on TOPSIS Authors: Hanhan Wang, Ruilin Liu, Yukai Ma, Shibo Wang Presenter: Yubin Li, Qufu normal university, China</p> <p>Abstract: With the rapid growth of mobile devices, edge computing has gained prominence in academia. A primary challenge is minimizing task completion time and energy consumption with limited computing resources. This paper proposes TOPSIS-Based Optimal Offloading Strategy (TBOOS), a novel task offloading strategy based on TOPSIS. Tasks are assessed for server performance, including latency, matching degree, and waiting tasks. TOPSIS computes a final score, guiding task scheduling. Experimental results demonstrate TBOOS's superiority over traditional algorithms, with average completion times reduced by 62.9% compared to First Come First Serve (FCFS) and 52.9% compared to Shortest Job First (SJF). TBOOS also outperforms intelligent algorithms like Particle swarm optimization (PSO), reducing completion time by 9%.</p>



► Online Session B

- **Advanced Information Design and System Analysis**
- **Session Chair: Dr. Guanlin He, Xihua University, China**
- 9:40-11:40 | April 27, 2024
- Zoom link: <https://us02web.zoom.us/j/81671414032> Password: 042527
- A33082-A, A33075, A43102, A43107, A33078, A33076, A22043, A22037

<p>A33082-A 9:40-9:55</p>	<p>Scalable Storage and Querying of RDF graphs with DynamoDB Authors: Andre Kashliev Presenter: Andre Kashliev, Eastern Michigan University, United States</p> <p>Abstract: Resource Description Framework (RDF) data model allows describing real world entities and relationships between them using subject-predicate-object statements, called triples. Organizations, large and small, use RDF to create machine-interpretable, machine-traversable knowledge graphs describing their domain data, from genes and proteins to product catalogs and sales events. The knowledge is then extracted from these semantic graphs using a query language called SPARQL. To define the structure of knowledge in their domains, organizations create domain-specific Web Ontology Language (OWL) ontologies, and generate RDF datasets that conform to these ontologies. To make use of RDF datasets, efficient storage and querying solutions are required. Much of the existing research projects have been focused on using traditional relational databases for storage and querying of RDF. However, this approach provides insufficient scalability for increasingly large RDF graphs. This creates a pressing need for a more scalable solution, not limited by the constraints of the relational model. To address this need, we propose a scalable, cloud-based approach to RDF data management, which uses DynamoDB to store and query RDF data. In this work we 1) propose schema mapping approach that enables storage of RDF data with or without an associated OWL ontology, 2) design a scalable DynamoDB table schema for RDF data management, 3) conduct a case study with RDF data from the retail domain to test our approach, and 4) present a scalable cloud architecture for RDF data management, which enables schema mapping, data mapping, and query mapping between the RDF data model and Dynamo's key-value model.</p>
<p>A33075 9:55-10:10</p>	<p>CodeQuest Mobile App: A Comprehensive Analysis of System Performance and User Evaluation for Enhanced Learning Experiences Authors: William P. Rey, Kieth Wilhelm Jan D. Rey Presenter: William P. Rey, Mapua University, Philippines</p> <p>Abstract: This study conducts a comprehensive analysis of the CodeQuest Mobile App, focusing on system performance and user satisfaction to enhance learning experiences in coding. The research objectives involve assessing system performance and evaluating user satisfaction, as well as addressing pertinent questions about the app's efficiency and user perceptions. The literature review explores key features of mobile learning apps, performance metrics, and user evaluation in educational contexts. Methodologically, a mixed-methods approach is employed, combining quantitative performance metrics analysis and qualitative user evaluations through surveys, interviews, and focus groups. Participants include students and educators, ensuring diverse perspectives. Results indicate efficient system performance and highly acceptable user satisfaction, positioning CodeQuest as a successful mobile learning</p>



	<p>solution for coding proficiency. The study offers insights for continuous improvement and future developments in educational app design.</p>
<p>A43102 10:10-10:25</p>	<p>Performance evaluation of quantum computing processors based on quantum assembly language Authors: Meng Zhang, Jing Wang, Junsen Lai Presenter: Meng ZHANG, China Academy of Information Communications Technology (CAICT), China</p> <p>Abstract: Quantum computing is one of the important directions for achieving leapfrog development in computing power in the future. The academic community has proposed multidimensional and multi-level performance evaluation indicators for quantum computing processors, but currently there is a lack of standardized universal evaluation tools. Based on industry research analysis and evaluation practice of quantum computing processors, a performance evaluation method for quantum computing processors based on quantum assembly language is proposed. A corresponding evaluation tool kit is developed and evaluation practice is carried out. Finally, performance analysis and future development suggestions are provided based on the evaluation results.</p>
<p>A43107 10:25-10:40</p>	<p>GFS: Gradient-Based Fairness-Aware Client Selection for Federated Learning Authors: Zijian Wang, Danyang Xiao, Diying Yang, Weigang Wu Presenter: Zijian Wang, Sun Yat-sen University, China</p> <p>Abstract: Statistical heterogeneity is one of the main causes of unfairness in federated learning (FL), which will make clients reluctant to participate in federated training. Recently, many client selection strategies have been proposed to handle client-wise data heterogeneity. However, most of these strategies neglect the cost of sampling data and the computing overhead of clients. In this paper, we study how to ensure fairness in scenarios that consider these costs. Firstly, we quantify the benefits for each client based on their cost. Then we define fairness by the Gini coefficient of the total benefits of clients. By our definition of fairness, we propose a gradient-based client selection strategy (GFS). GFS uses the gradients of clients to estimate the impact of selected clients on each client's benefit and fairness. GFS selects the subset of clients that maximizes a mixed function of average social welfare and the Gini coefficient to participate in federated training. Our experimental results show that compared to the baselines, GFS can improve the benefits of clients and ensure fairness better on FMNIST and CIFAR-10. Our code is available at: https://github.com/SelectionStrategy/GFS_Strategy.</p>
<p>A33078 10:40-10:55</p>	<p>CSPUMS: Pioneering Integrated Monitoring in Multi-Service Provider Ecosystems Authors: Jiali Liu, Yuqin Qin Presenter: Jiali Liu, Beijing University of Posts and Telecommunications, China</p> <p>Abstract: In the era of information interconnection, the evolution of enterprise digitalization necessitates the adoption of architectures that can support dynamic and complex business operations. Microservices architecture, characterized by its flexibility, scalability, and efficiency, has emerged as a pivotal solution for modern enterprises, enabling the decomposition of monolithic applications into independently deployable services. However, with the expansion of enterprises and the intricate nature of business operations, microservices architecture encounters challenges in service governance, monitoring, management, and integration in multi-vendor environments.</p>



	<p>Addressing these challenges, this paper introduces a Cross-Service Provider Unified Monitoring System (CSPUMS) tailored for microservice business platforms operating within multi-service provider ecosystems. CSPUMS, a novel three-layer system architecture, encompasses a data acquisition layer, a monitoring layer, and a data presentation layer, designed to ensure the reliability, performance, and security of service platforms across diverse cloud environments. Through the deployment of Docker container technology for data aggregation and the implementation of a multi-dimensional threshold alarm template, CSPUMS enhances operational monitoring, fault management, and service continuity in complex multi-service settings. This paper significantly enhances microservice platforms by providing integrated monitoring solutions for multi-cloud and multi-service environments, ensuring operational efficiency and agility for digitally transforming enterprises.</p>
<p>A33076 10:55-11:10</p>	<p>Research on Wide-Area-Cloud-Platform Operations Framework for Edge-Cloud System Authors: Yuqin Qin, Jiali Liu Presenter: Yuqin Qin, Beijing University of Posts and Telecommunications, China</p> <p>Abstract: With the rapid increase of data, the scale of cloud is gradually expanding, forming a wide-area cloud platform consisting of multiple data centers distributed across different locations. For industry professionals, maintaining the normal operation of such a large platform relies on reasonable system architecture and operational methods. This article provides an indepth analysis of the operational requirements for wide-area cloud platforms, investigates relevant anomaly detection methods, and proposes suitable anomaly detection methods for high-frequency local operational status data in data center operations systems and global operational status data in central operations systems respectively. In addition, based on edge-cloud architecture, an operational framework tailored to wide-area cloud platforms is proposed to provide reference means for improving the efficiency of operations personnel. The feasibility of the framework has been verified through actual project testing.</p>
<p>A22043 11:10-11:25</p>	<p>Research On Intelligent Extraction of Key Information from Drilling Geological Design Documents Authors: FuLei Wan, QiFu Xiao, Bo Zou Presenter: QiFu Xiao, CNPC Chuanqing Drilling Engineering Company, China</p> <p>Abstract: The rapid development of information technology has led to industrial changes and the transformation and upgrading of traditional industries. The oil and gas industry, as a traditional industrial industry, is facing the new situation and trend of accelerating the energy revolution and energy transformation. Under this situation, it vigorously develops the information construction of the oil industry, breaks through the information barriers among various majors in the oil industry, and realizes the information exchange among different majors. It is of great significance to improve the core competitiveness of petroleum enterprises and realize the development strategy of reducing cost and increasing efficiency. In order to realize the information interconnection between the major of oil drilling and the major of geology, this paper adopts the international POSC business analysis model, carries out the demand analysis of the key information extraction business of geological documents, and establishes the business model of key information extraction of geological documents. Through the construction of petroleum engineering information integration platform, the establishment of geological document key information dictionary and the construction of geological document key information extraction template library, the key information extraction method based on natural</p>



	<p>language processing is optimized. On the basis of the above research, the geological document information extraction module is developed to realize the information fusion between the drilling major and the geological major. After testing 100 geological documents, the key information extraction software developed in this paper shows that the extraction accuracy of key information is 98%, and the average extraction time of a single text is 10s. The extraction efficiency and accuracy are higher than expected, and fully meet the needs of drilling design. This paper provides ideas for the information construction of other majors in the traditional oil industry, breaks the information island between different majors, realizes the inter-professional information exchange, and greatly improves the work efficiency and benefit of the traditional oil industry.</p>
<p>A22037 11:25-11:40</p>	<p>High Dynamic Collaborative Team Query via Multi-fuzzy-constrained Graph Pattern Matching Authors: Tao Hu, Zan Zhang, Chenyang Bu and Lei Li Presenter: Tao Hu, Hefei University of Technology, China</p> <p>Abstract: Graph pattern matching is a technique widely used in various fields such as protein structure analysis, social group querying, and expert localization. This technique involves finding matching subgraphs in large social networks that align with the patterns specified in the pattern graph. In this paper, we focus on a specific sub-problem in social group querying, known as the cooperative team query, which arises from practical applications, where the nodes in the pattern graph and the data graph represent team member entities, while the edges represent their social relationships. We note that the requirements of many teams in the real world are dynamic, necessitating iterative computation for graph pattern matching using traditional methods. To address this challenge in highly dynamic systems, we propose a graph pattern matching method based on core pattern graph matching cache. This approach involves extracting the core pattern graph, and comprising core team members based on the characteristics of cooperative teams. The core graph-based matching cache enables the second half of the algorithm to operate on an order-of-magnitude smaller graph, significantly improving efficiency. Additionally, the multi-threaded approach fully leverages hardware resources, synchronizing multiple matching result of the core pattern graph to reduce matching time. Experimental results on three real social network datasets demonstrate that our proposed algorithm, Core Pattern Graph Matching Cache-based Multi-threaded Exploration (CCMTE), significantly outperforms existing methods in terms of efficiency.</p>



► Online Session C

- **Image Analysis and Computer Vision**
- **Session Chair: Assoc. Prof. Peishun Liu, Ocean University of China, China**
- 13:30-15:45 | April 27, 2024
- Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527
- A33070, A22035, A22017, A22033 A11002, A105, A107, A22034, A22053

<p>A33070 13:30-13:45</p>	<p>Target Detection Algorithm for Unmanned Vehicles in Complex Environments Authors: Zhang Pengfei , Liu Jian Presenter: Zhang Pengfei, Naval University of Engineering, China</p> <p>Abstract: In the realm of unmanned vehicles, challenges persist regarding their limited perception and real-time obstacle detection capabilities. This paper introduces the YOLOv5-SA object recognition algorithm, built upon YOLOv5, which addresses these issues. Leveraging Laplace transformation and SSR image enhancement on the training dataset, coupled with the integration of the SiAM attention mechanism at the network's output layer, and the replacement of the SPPF module with the AIFI module, the proposed model significantly enhances detection speed and accuracy. Experimental results demonstrate lower target omission rates and faster detection in various complex environments.</p>
<p>A22035 13:45-14:00</p>	<p>Image Upsampling Detection Based on Autocorrelation Matrix Authors: Feifan Wu, Xiaolong Li, Jingtian Wang, Yao Zhao Presenter: Feifan Wu, Beijing Jiaotong University, China</p> <p>Abstract: Upsampling detection is a key issue of digital image forensics. Among the widely used methods, the one based on spectrum analysis suffers from the aliasing problem, necessitating a prior constraint on the estimation range of interpolation factors. To address this limitation, this paper introduces a novel second-order metric and proposes an analysis approach based on the autocorrelation matrix. The study reveals that the Fourier spectrum of the autocorrelation matrix of upsampled images contains detectable features at specific positions, which can effectively eliminate aliasing effects. Building upon this, a blind and efficient method for detecting up-sampling traces is proposed. Extensive experiments demonstrate that the proposed detector outperforms state-of-the-art methods.</p>
<p>A22017 14:00-14:15</p>	<p>Cross-Modality Transformer with Mixed Data Augmentation Learning for Visible-Infrared Person Re-identification Authors: Shilong An, Jilin Chen, Jianyu Xu, Kai Kang, Ruichun Tang Presenter: Shilong An, Ocean University of China, China</p> <p>Abstract: Visible-Infrared Person Re-Identification (VI-ReID) involves matching images of individuals with the same identity captured in visible daytime and infrared nighttime modalities. One of the main challenges is the modality gap between visible light (VIS) and infrared (IR) images. In practice, training samples are often limited, and the substantial modality gap makes it difficult for existing methods to effectively exploit various cross-modality cues. In response to this limitation, we propose a novel mixed data augmentation algorithm called MixGridMask, aiming to augment the diversity of training data and bolster the model's robustness. And we propose a new deep learning framework called MixGridMask Modality-shared Transformer (MGMT). We use a</p>



	<p>Transformer-based feature extraction network to better extract modality-invariant features and use the Context Broadcasting module to improve model accuracy. Furthermore, to address the problem of large intraclass differences and small inter-class differences, we propose a Modality-shared Center Distinguish Loss algorithm (MCDL) to achieve a stronger “tightening” effect between cross-modality image features. Extensive experimental results affirm the efficacy of the proposed method, outperforming the most recent research accomplishments on two benchmark VI-ReID datasets.</p>
<p>A22033 14:15-14:30</p>	<p>YOLO-SCFormer: A Feature Fusion Model for Small Target Foreign Object Detection in Transmission Lines Authors: Ji Huang, Yongsheng Dai, Tianrui Li, Shengdong Du Presenter: Ji Huang, South West Jiaotong University, China</p> <p>Abstract: The presence of foreign objects on transmission lines significantly impacts the safe operation of the power grid. These foreign objects on transmission lines pose challenges such as small target size, low resolution, and varying dimensions. To address this, this paper introduces a small object detection algorithm tailored for foreign objects on transmission lines. Our contributions encompass a small object detection strategy, introducing a specialized layer to enhance the detection of small targets. Additionally, we propose the SCFormer attention mechanism, which integrates both channel and spatial features to augment modeling capabilities. Furthermore, we integrate deeply separable convolution into the backbone network of the YOLOv8 model, resulting in notable improvements in efficiency and speed. Experimental results demonstrate that the proposed approach accurately detects foreign objects on transmission lines, achieving a $mAP^{0.5}$ accuracy of 99.5%. Compared to traditional object detection algorithms, our method strikes a balance between speed and accuracy, establishing itself as a state-of-the-art algorithm.</p>
<p>A11002 14:30-14:45</p>	<p>A Method of Photoelectric Capture of UAV under Rough Guidance Authors: Biaobiao Ma, Peng Li, Jian Cheng, Pengju Gao Presenter: Biaobiao Ma, CETC38, China</p> <p>Abstract: The popular application of low-speed, slow and small unmanned aerial vehicle (UAV) not only profoundly changed the form of modern warfare, but also brought serious challenges to the security protection of civil infrastructure. The weapon system based on high-precision radar guidance, target photoelectric locking and laser burning is not only difficult to achieve large coverage of defense in war, but also difficult to be widely used in the civilian market because of its complex operation, huge size and high cost. Radio spectrum detector, finds UAV by detecting the image transmission and control signals between the UAV and the remote controller, has been widely used in recent years as its low false alarm rate, simple deployment and low price. However, its azimuth measurement accuracy is not only much lower than that of traditional equipment such as radar, but also unable to output target pitch angle and distance information, which makes it hard to achieve accurate positioning and then accurately guide the soft and hard strike equipment to attack the UAV. This paper presents a method of using image recognition technology to search, capture and track UAV in the relevant airspace based on the improved YOLOv7 model under the guidance of rough orientation of UAV radio spectrum detector. After the system realizes the tracking and locking of UAV image, the pan tilt zoom (PTZ) of photoelectric device then can accurately guide the strike weapon to attack.</p>



<p>A105 14:45-15:00</p>	<p>DilateTracker: Feature Fusion Dilated Transformer for Multi-object Tracking Authors: Fan Wu, Yi Feng Zhang Presenter: Fan Wu, Southeast University, China</p> <p>Abstract: In recent years, tracking-by-detection (TBD) has emerged as the predominant approach for Multi-object Tracking (MOT). The majority of MOT techniques are either CNN-based or Transformer-based. While CNN is swift, it lacks the ability to model long-range dependencies, whereas the transformer exhibits the opposite characteristics. Several studies have aimed at reducing the computational complexity of the Transformer by modifying the global attention mechanism. For instance, DilateFormer reduces computation costs by employing dilated convolution, yet it lacks interaction between stages. Inspired by this, we have enhanced it by introducing the IDAUP mechanism to facilitate feature interaction between stages. Subsequently, we integrated the lightweight improved DilateFormer into FairMOT as a feature enhancement module, thus enhancing its performance without significantly increasing computational costs. This approach, termed DilateTracker, offers an effective fusion of CNN and Transformer. DilateTracker demonstrates impressive performance on MOT datasets when compared to other advanced methods and is capable of achieving real-time tracking.</p>
<p>A107 15:00-15:15</p>	<p>Multiple Object Tracking Based on Feature Fusion of Channel-wise Transformer Authors: Yuanhao Li, Yifeng Zhang Presenter: Yuanhao Li, Southeast University, China</p> <p>Abstract: Multiple Object Tracking (MOT) plays a vital role in real applications. While the advancements in detection have significantly improved the performance of two-step MOT trackers, a persistent challenge remains in reconciling the conflict between detection and association. In response to this challenge, we propose a novel one-shot tracker by inserting Cross Channel Transformer (CCT) modules into FairMOT. The incorporation of such a Channel-wise Transformer allows for the exploration of relationships among different objects, facilitating the fusion of features and the generation of distinct identity embeddings. Furthermore, deformable convolution is employed in upsampling to reconstruct the multi-scale embeddings. Through comprehensive experiments on multiple datasets, the tracker termed CCTTracker demonstrates superior performance compared to most existing trackers, achieving both high accuracy and inference speed.</p>
<p>A22034 15:15-15:30</p>	<p>A Brief Review of Anti-Face Recognition Authors: Tiankuo Shi, Xiaolong Li, Jingtian Wang, Yao Zhao Presenter: Tiankuo Shi, Beijing Jiaotong University, China</p> <p>Abstract: The face recognition system has achieved significant success. However, the excessive power of these systems poses a significant threat to the security and privacy of individuals. It has been revealed that deep learning models are susceptible to adversarial examples. Consequently, researchers have explored the utilization of adversarial examples to safeguard images from unauthorized face recognition systems. This paper aims to provide a comprehensive review of recent approaches that employ adversarial examples to safeguard the face privacy. Specifically, the fundamental concepts associated with adversarial attacks in the context of face recognition are introduced. Subsequently, the generation of adversarial face images, utilizing adversarial example techniques for privacy preservation in both digital and physical</p>



	domains, is scrutinized. Finally, the challenges for further exploration are presented.
<p>A22053 15:30-15:45</p>	<p>Temporal Localization of Deepfake Audio Based on Self-supervised Pre-training Models and Transformer Classifier Authors: Zihan Yan, Hongxia Wang, Mingshan Du, Rui Zhang Presenter: Zihan Yan, Sichuan University, China</p> <p>Abstract: With the development of deep learning technology, the ability of deepfake audio is getting stronger and stronger, and localized audio tampering may bring huge semantic changes, posing a great threat to social security. Unlike the true-false binary classification for tampered audio detection, locating the regional location of tampered audio is more challenging. In order to improve the accuracy of localization, the framework proposed in this paper integrates an audio feature extractor based on a self-supervised pre-training model and a transformer-based back-end classifier. First, a large-scale self-supervised pre-training model is used to train the speech representations, such as BYOL-A or WavLM, and then the learned speech representations are fed into the transformer back-end classifier for the temporal localization and regression tasks, which classify each frame and estimate the audio tampering boundaries in order to detect audio tampering segments. Experiments demonstrate that our framework shows good performance for partial forgery detection and localization in challenging environments.</p>



► Online Session D

- **Modern Data Science and Information Engineering**
- **Session Chair: Assoc. Prof. Ling Xiong, Xihua University, China**
- 13:30-15:45 | April 27, 2024
- Zoom link: <https://us02web.zoom.us/j/81671414032> Password: 042527
- A43092, A33077, A43105, A43089, A43097, A22024, A22057, A11004, A11007

<p>A43092 13:30:13:45</p>	<p>A cluster-aided ensemble classification method for data stream with mixed concept drift Authors: Ping Liu, Kui Ge, Yonghe Zhang, Bangxin Xu Presenter: Ping Liu, China Energy Engineering Group Anhui Electric Power Design Institute Co., Ltd. China</p> <p>Abstract: Concept drift, i.e. the change of data distribution in data stream, is one of the main factors to reduce the accuracy of data stream classification. Among the methods to deal with concept drift, concept drift adaptation methods have been shown to be very competitive. However, in existing ones, the solution of solving mixed concept drift which means multiple concept drifts occur at the same time is seldom taken into account. To this end, in this paper, we suggest a multi-level cluster framework to reserve data and utilize the value of the historical data for respectively updating mixed drift, where two cluster-based updating strategies are proposed for updating the internal and external weights of instances and selecting the instances suitable for mixed concept drift. The two weights of instances are used to measure the contribution of instances to the quality and diversity of instance space. In multi-level cluster framework, the change of space caused by concept drift is decomposed into the change of cluster, and the range of cluster is used to simulate the range of drift. Accordingly, the cluster-aided ensemble classification is developed to adapt to data stream with mixed concept drift. Experimental results on synthetic and real-world datasets show that our algorithm outperforms existing concept drift adaptation methods.</p>
<p>A33077 13:45-14:00</p>	<p>A Provenance-Aware Approach to Big Data Workflow Management in Heterogeneous Cloud Environments Authors: Andre Kashliev and Kaitlyn Tracy Presenter: Andre Kashliev, Eastern Michigan University, United States</p> <p>Abstract: Big data workflows have emerged as a powerful paradigm that enables researchers and practitioners to run complex multi-step computational processes in the cloud to gain insight into their large datasets. To create a workflow, a user logs on to a specialized software, called Big Data Workflow Management System, or simply BDW system, to select and connect together various components, or tasks, into a workflow. The workflow is then mapped onto a set of distributed compute resources, such as Virtual Machines (VMs), and storage resources, such as S3 buckets and EBS volumes. It is then executed, with different branches and tasks of the workflow running in parallel on different nodes. During execution, the BDW system captures provenance, which is the history of data derivation that describes data processing steps that yielded each output result. Workflow management, including workflow composition and schedule refinement, is a challenging problem. This problem is further exacerbated by the growing number and heterogeneity of workflow tasks and cloud resources, as well as by the growing size and complexity of workflow structures. Few efforts were made to leverage provenance for facilitating workflow composition and schedule refinement. To</p>



	<p>address these issues, we 1) produce a comprehensive conceptual model for big data workflow provenance that captures the complexity and heterogeneity of cloud-based workflow execution, 2) propose a scalable Cassandra database schema for provenance-aware workflow composition and schedule refinement, 3) outline a four-step provenance-based schedule refinement process for balancing workflow execution time and cost, and 4) present a scalable and highly available microservices-based reference architecture for big data workflow management in the cloud. Our proposed loosely coupled architecture ensures superior scalability, as well as operational and technological independence of each module within the BDW system.</p>
<p>A43105 14:00-14:15</p>	<p>The Impact of Shareholder-Firm Geographic Distance on Perquisite Consumption Based on Geospatial Big Data Analysis Authors: Yuying Chen, Jing Deng, Tao Luo, Wenxin Che, Ruining Guo Presenter: Yuying Chen, Sichuan University, China</p> <p>Abstract: In recent years, executives' perquisite consumption has become a hot topic. Perquisite consumption is a manifestation of agency costs between executives and shareholders, which not only damages the company's economic value, but also has a significant impact on the company's corporate image and cultural atmosphere. Given its hidden characteristics, how to effectively supervise perquisite consumption has also attracted widespread attention from scholars. This paper starts from the perspective of the geographical distance between shareholders and the company, combined with the external governance environment, to explore the impact of shareholder supervision on executives' perquisite consumption. The study found that there is a positive correlation between shareholder-firm geographic distance and perquisite consumption, indicating that shareholders do have a supervisory role in executives' perquisite consumption, and the farther the distance, the worse the supervisory effect. The results of the sub-sample study suggest that when the shareholder-firm geographic distance increases and the supervisory effect is weakened, institutional ownership can supplement the absent supervision of large shareholders, thus reducing the level of perquisite consumption.</p>
<p>A43089 14:15-14:30</p>	<p>Current Hotspots of Smart Transportation Research under the Background of Big Data: Visual Analysis Based on CiteSpace Authors: Xiaona Bao, Shuoshuo Jin Presenter: Shuoshuo Jin, Dalian Polytechnic University, China</p> <p>Abstract: In the context of the rapid development of cloud computing and big data, many daily activities are associated with big data. Therefore, for smart transportation as the main subject of inquiry, we used Citespace knowledge mapping software to visualize and analyze 500 pieces of literature published in Web of Science over the past ten years. Through the research of the country, the publishing institution, the core authors, and the keyword clustering analysis method, the research hotspots of smart transportation were analyzed. This study shows that the existing hotspots of smart transportation research can be mainly summarized into five categories: smart transportation, parallel smart transportation, demand-responsive transit system, comprehensive review, and electric vehicles algorithm. In future research, we can enrich the research literature on smart transportation from the aspects of smart transportation technology support and smart transportation use scenarios.</p>
<p>A43097 14:30-14:45</p>	<p>Exploration of Data Reuse Patterns Based on Scientific Data Lifecycle in Big Data Environment Authors: Shangyue Yang, Qi Xia, Biran Zhu</p>



	<p>Presenter: Shangyue Yang, Wuhan University of Technology, China</p> <p>Abstract: In the realm of big data, the volume of research data in universities is expanding rapidly. However, the lack of data collaboration results in data isolation, hindering the realization of their potential value. This study aims to enhance data interoperability and promote data reuse by developing a comprehensive metadata scheme, which facilitates standardized descriptions of scientific data metadata throughout the entire process, from data generation to citation. Additionally, by delineating the data governance process encompassing data collection, processing and handling, archival and management, as well as data utilization and sharing, a data management cloud platform is established based on data reuse patterns. This platform incorporates features for data retrieval, storage and management, and data monitoring, ensuring the seamless continuity of research management efforts.</p>
<p>A22024 14:45-15:00</p>	<p>Industrial Building Sustainability Evaluation System Based on Big Data Authors: Tiantian Mu, Yang Xu, Quaojuan Shan, Guangyu Zhu Presenter: TianTian Mu, University Sains Malaysia, Malaysia</p> <p>Abstract: With the development and progress of the times, sustainable development has become a focus in the world. As a high consumption industry of global resources and energy, industrial construction industry needs to carry out sustainable development design and transformation. In order to implement the sustainable development strategy to industrial buildings (IB) and realize the sustainable development of IB, it is necessary to evaluate the sustainability of IB. This paper mainly studies the design of the sustainable evaluation system of IB based on big data. This paper points out the function of design and Realization of the sustainable evaluation of IB, points out that the evaluation system of IB sustainable development needs to follow certain selection principles, and puts forward the construction ideas of the index system of the sustainable development of IB. This paper analyzes the structure of the evaluation system for the sustainable development of IB, evaluates the whole from four indexes, namely economy, society, resources and environment, and calculates the weight of the evaluation system. In this paper, through data mining technology, select an IB sample, and collect its annual construction data, using the questionnaire survey method, the IB sample data will be sorted out together with the questionnaire sent to ten experts to fill in, and then collect the questionnaire, calculate the results of the experts' questionnaire, get the evaluation results of IB sustainable development. The experimental results show that the accuracy of using index weight calculation to calculate the sustainability of IB is higher than that of traditional evaluation calculation, and the development trend of the results between the two is highly consistent, showing an upward trend. From the index weight calculation method, the sustainable development index has gradually increased in recent years, from 1.018 in 2015 to 2.3923 in 2020.</p>
<p>A22057 15:00-15:15</p>	<p>HHM: A Hybrid Model for predicting Medicare violation data Authors: Zhigang Xu, Yupeng Lei, Xinhua Dong, Hongmu Han, Chuang Li, Zhanyi Zhu Presenter: Yupeng Lei, Hubei University of Technology, China</p> <p>Abstract: With the imbalance between medical supply and demand, coupled with the shortage of medicare funds, some hospitals engage in fraudulent practices by overcharging for unreasonable expenses. It is essential to identify such irregularities and provide feedback to the medicare authority for better supervision. In order to address this issue, this paper proposes a hybrid integrated model called the Hidden Hybrid</p>



	<p>Model (HHM). The model combines a BP neural network with a decision tree, utilizing the hidden layer to generate fused features that serve as inputs to the decision tree, resulting in a collaborative model. Subsequently, this collaborative model acts as a strong classifier and is integrated with individual BP neural networks and decision trees through voting to form the final integrated model. Experimental results on a real dataset from a municipal-level hospital showed that the model achieved an accuracy of 99.5% in predicting five-class violation outcomes with a data volume of 100,000. The model demonstrates strong robustness and performs well in predicting violation results.</p>
<p>A11004 15:15-15:30</p>	<p>Multi-channel high-speed signal acquisition system based on EV10AQ190A and V7 Authors: Dihong Xie, Jin Wu, Bo Zhao, Wenting Pang Presenter: Dihong Xie, Xi'an University of Posts and Telecommunications, China</p> <p>Abstract: High-speed data acquisition systems are widely used in modern communication systems such as aerospace, radar, and military. This paper studies and designs a multi-channel high-speed signal acquisition system with domestic high-performance chips as the core. This paper studies the use of the domestic high-speed ADC-EV10AQ190A to replace the EV10AQ190A high-performance Analog-to-Digital Converter (ADC) chip with a sampling rate of 5 GHz produced and designed by E2V Company, and the high-speed 7-series FPGA chip JFM7VX690T produced and designed by Fudan Microelectronics to replace the high-speed 7-series Field Programmable Gate Array (FPGA) chip XC7VX690T of Xilinx Company's signal acquisition system hardware design scheme. An FPGA algorithm for ADC high-speed acquisition is designed on the Vivado platform. Completely implemented the design of a configurable multi-channel high-speed signal acquisition system for domestic alternatives, which can achieve a maximum dual-channel data acquisition rate of 4.8GHz, and can maximize the performance of the high-speed signal acquisition system.</p>
<p>A11007 15:30-15:45</p>	<p>Knowledge Graph Analysis of Social Media in the Context of Big Data Authors: Xiaona Bao, Shuoshuo Jin Presenter: Shuoshuo Jin, Dalian Polytechnic University, China</p> <p>Abstract: In order to analyze the historical changes of social media research in the big data environment at home and abroad, this paper uses Citespace knowledge mapping software to visualize and analyze the hotspots of social media research by using the Citespace knowledge mapping software to analyze 500 documents published in Web of Science over the past ten years through the method of cluster analysis of the research countries, publishing institutions, core authors, and keywords. This study shows that the existing hotspots of social media research can be mainly categorized into six groups, namely problematic media use, privacy, social media use, work-related social media, Twitter, and social capital. We can enrich the research literature on social media from the aspects of social media use crowd characteristics, social media use scenes.</p>



► Online Session E

► New Generation Artificial Intelligence Technology and Applications

► Session Chair:

► 16:00-18:05 | April 27, 2024

► Zoom link: <https://us02web.zoom.us/j/86052995049> Password: 042527

► A33073, A43096, A33065, A22016, A11013, A312, A317

<p>Invited Speech 16:00-16:20</p>	<p>Speech Title: Transactive Mobility with Collaborative Simulation for Smart Energy Infrastructures Speaker: Prof. Hossam A. Gabbar, Ontario Tech University, Canada</p> <p>Abstract: Mobility is supported by transportation infrastructures based on energy networks to meet mobility demands. Transportation electrification enables mobility with more penetration of electric vehicles (EVs) and hydrogen-based fuel cell vehicles (HVs), besides internal combustion vehicles. The charging infrastructures should support mobility based on hybrid transportation technologies. The complex and expensive transition to transportation electrification infrastructures can be alleviated by implementing transactive mobility, which will provide cost management of different layers within the mobility services infrastructures. This talk presents an integrated framework and advanced approaches for transactive mobility in view of hybrid charging infrastructures. The interface between transactive energy and charging infrastructures will be modeled and formulated by the transactive mobility model.</p>
<p>A33073 16:20-16:35</p>	<p>A Review of Knowledge Graph Recommendation Systems Based on VOSviewer Authors: Deqing Zhang, Mideth Abisado Presenter: Deqing Zhang, National University, Philippine</p> <p>Abstract: In the era of artificial intelligence, how recommendation algorithms can accurately and effectively solve the problem of matching individuals' interests and needs in the data ocean, so that they can quickly obtain the required information, has been a hot research topic in recent years. With the help of VOSviewer, this paper makes a visual analysis of the relevant core literature in the past five years, and summarizes the four main research directions currently: (1)Improving the performance of recommendation systems through graph embedding technology.(2)Explored knowledge graph perception propagation methods from the perspective of attention mechanism to improve recommendation quality.(3)The widespread application of technologies such as deep learning in knowledge graph recommendation systems has improved recommendation performance.(4)Innovate multi task frameworks to enhance recommendation effectiveness. Finally, summarize its application classification, corresponding technological development, and academic achievements, and propose future technological development directions for recommendation systems.</p>
<p>A43096 16:35-16:50</p>	<p>Integrating IoT, AI, and Cloud Technologies for Sustainable Oilfield Operations Authors: Abhay Dutt Paroha Presenter: Abhay Dutt Paroha, SLB, Houston, TX, USA</p> <p>Abstract: In the field of petroleum extraction, remote oilfield monitoring stands as a critical operation, necessitating robust and innovative technological solutions to address its complex challenges. This paper introduces a robust approach that combines the Internet of Things and Artificial Intelligence with cloud computing to revolutionize the</p>



	<p>monitoring of remote oilfields. The proposed framework leverages the IoT's capability for extensive, real-time data acquisition from various on-site sensors and instruments. This data is then transmitted to cloud-based systems, where advanced AI algorithms undertake the task of processing, analyzing, and interpreting this data. The integration of AI enables predictive maintenance by identifying potential system failures and maintenance needs before they occur and enhances operational efficiency and safety measures through its data-driven insights. Additionally, this approach addresses the typical geographical and logistical constraints associated with remote oilfields, offering a scalable, flexible, and cost-effective solution. The paper further discusses the implementation challenges, data security concerns, and potential environmental impact of deploying such a system. By utilizing the combined power of IoT, AI, and cloud technologies, this proposed model aims to set a new standard in remote oilfield monitoring, contributing significantly to the digital transformation of the oil and gas industry.</p>
<p>A33065 16:50-17:05</p>	<p>Authenticity Classification of WeChat Group Chat Messages Based on LDA and NLP Authors: Nihan Nie, Hengyi Guo and Wei Song Presenter: Nihan Nie, Jiangxi University of Finance and Economics, China</p> <p>Abstract: This study conducts an in-depth verification and analysis of the authenticity of information in WeChat group chats by integrating Latent Dirichlet Allocation (LDA) topic modeling with advanced Natural Language Processing (NLP) techniques such as XLNet and BERT. Leveraging LDA, the thematic structure of group chat content is revealed, and through the integration of NLP technologies like XLNet and BERT, a comprehensive analysis of the information is achieved. Experimental results demonstrate that our developed model performs exceptionally well in identifying the authenticity of information, confirming the effectiveness of this method in the domain of social media information verification. This research not only deepens our understanding of the authenticity of information in WeChat group chats but also provides a more effective tool for social media platforms to detect and prevent the spread of false information. It opens up a new perspective on social media information authentication research and points out future research directions.</p>
<p>A22016 17:05-17:20</p>	<p>Enhanced Interactive Understanding for Human-Object Interaction Detection Authors: Jilin Chen, Shilong An, Zhipeng Zhao, Huafeng Xue, Ruichun Tang Presenter: Jilin Chen, Ocean University of China, China</p> <p>Abstract: Identifying and classifying the interaction between people and objects in images plays an important auxiliary role in the task of visual understanding. However, it is still a challenging task due to the diversity of human movements and object types. In this paper, a single-stage three-branch HOI detection model is proposed, which divides and fuses the difference in the relationship between the subtasks of the model, uses the three-branch to deal with the difference of subtasks, and enhances the interaction understanding by constructing the association module between the subtasks. In addition, by introducing a powerful visual language model, we designed a visual language knowledge transfer strategy, and used its visual language prior knowledge to assist HOI detection, which enhanced the understanding ability of the model. Finally, the proposed model was evaluated on two published standard datasets, HICO-Det and V-COCO. The experimental results show that the proposed network has better performance than other state-of-the-art methods.</p>



<p>A11013 17:20-17:35</p>	<p>Visual Analysis of Xi Jinping's Network Security Ideology Research Based on Mapping Knowledge Domain Authors: Yuanyuan Fan , Jianguo Li Presenter: Yuanyuan Fan, Huazhong University of Science and Technology, China</p> <p>Abstract: In recent years, Xi Jinping's research on cybersecurity has increasingly become the focus of attention for many interdisciplinary researchers and journals. This study used Citespace software and employed visualization and clustering analysis techniques to conduct a quantitative analysis of relevant literature on Xi Jinping's Network Security Ideology, and summarizes the current development status, research progress, and future trends of Xi Jinping's Network Security Ideology research. Firstly, 1940 articles on Xi Jinping's Network Security Ideology included in CNKI were screened, and then visualized using CiteSpace and the Mapping Knowledge Domain (MKD) method. The analysis software visualizes the number of publications, research authors, research organizations, and keywords, thereby stimulating Xi Jinping's inherent insight into the study of Network Security Ideology.</p>
<p>A312 17:35-17:50</p>	<p>Students' Motivation and Perceptions in an AI Chatbot-based Climate Change Classroom Authors: Hui-Wen Huang, Tsung-Shu Chang Presenter: Hui-Wen Huang, Shaoguan University, China</p> <p>Abstract: This study investigated students' motivation levels and their perceptions of AI chatbot-enhanced instruction for improving knowledge of climate change. A total of 59 sophomores majoring in teacher education volunteered for this four-week study. We utilized the survey of the ARCS motivation model and conducted focus-group interviews to gather both quantitative and qualitative data. The findings revealed that students exhibited positive motivation in their interactions with AI chatbots, specifically in terms of attention, relevance, confidence, and satisfaction when learning the climate change unit. Future research endeavors could further explore students' psychological transformations throughout the learning process and their learning performance within AI-empowered contexts.</p>
<p>A317 17:50-18:05</p>	<p>Solving Math Word Problems by Dual Feature Fusion Graph Neural Network Authors: Jiayi Lin, Hongbin Xia, Yuan Liu Presenter: Jiayi Lin, Jiangnan University, China</p> <p>Abstract: In recent years, graph neural networks have been widely used in solving math word problems. However, previous researches are still not deep enough to mine numerical values in text. Therefore, we propose a dual feature fusion graph neural network model. In terms of graph construction, we propose two new numerical relationship graphs: one is to classify the numeric values in the text, and the other is to compare the numeric values in the text with the numeric values in the answer. The graph features are obtained by multi-head convolution and common graph convolution modules. BERT model is used to encode text at sentence level, and it is fused with graph features through attention mechanism to guide the model to pay attention to global information. Experiments on two well-known datasets show that both of our proposed algorithms have advantages over other state-of-the-art competitors.</p>



► Online Session F

- **System Model and Data Calculation**
- **Session Chair: Prof. William Wei Song, Dalarna University, Sweden**
- 16:00-18:00 | April 27, 2024
- Zoom link: <https://us02web.zoom.us/j/81671414032> Password: 042527
- A22041, A33069, A22048, A33063, A43098, A33062, A22038, A423

<p>A22041 16:00-16:15</p>	<p>Multi-feature Fusion Multi-modal Sentiment Analysis Model based on Cross-Attention Mechanism Authors: Zhengjun Pan, Lianfen Zhao, Yanxian Tan Presenter: Zhengjun Pan, Software Engineering Institute of Guangzhou, China</p> <p>Abstract: To address the problem of insufficient intra-modal feature extraction and inter-modal interaction information fusion in current multimodal sentiment analysis, a multi-feature fusion multimodal sentiment analysis model based on cross-attention mechanism is proposed. The model first uses subnetworks and self-attention mechanism to obtain important features of multiple modalities such as text, audio, and video. Then, it calculates the correlation between modalities through cross-modal cross-attention mechanism to achieve the interaction and fusion of multimodal information. After that, soft attention mechanism is used to assign attention weights to each modality feature. Finally, the modalities features are spliced to output the final sentiment classification result. The experimental results show that compared with the benchmark model on the public datasets CH-SIMS and CMU-MOSEI, this model has certain improvements in two-class accuracy, three-class accuracy, and F1 value.</p>
<p>A33069 16:15-16:30</p>	<p>A Light Pollution Risk Standard Model Based on Entropy Weight Method and K-means Clustering Algorithm Authors: Haolin Liu Presenter: Haolin Liu, China Agricultural University, China</p> <p>Abstract: In recent years, with the continuous development of science and technology in the world, all kinds of lighting facilities are also increasing, which also means that we are also facing the problem of light pollution more and more serious. Light pollution will change our view of the night sky, affect the environment, and affect our health and safety. For example, plant maturation may be delayed or accelerated, and wildlife migration patterns may also be affected. Too much artificial light may disrupt our circadian rhythm, lead to poor sleep quality, and may also lead to physical and mental health problems. Glare caused by electric lights may cause some motor vehicle accidents. Therefore, we established a light pollution risk standard model based on entropy weight method and K-means clustering algorithm, and analyzed the light pollution risk in different regions. The results show that the risk level of light pollution in New York state is the highest, and the risk level of light pollution in China's Sanjiangyuan Nature Reserve is the lowest.</p>
<p>A22048 16:30-16:45</p>	<p>A Study on Short-Term Visibility Prediction Model in Jiangsu Province Based on Random Forest Authors: Wei Niu, Bo Gong, Xianyin Mao, Hourong Zhang, Huan Wang, Jinqiang He, Qi Yang, Haipeng Zhang Presenter: Hourong Zhang, Electric Power Research Institute of China Southern Power Grid Co.Ltd, China</p>



	<p>Abstract: Low visibility weather significantly impacts human life and property safety, making accurate visibility prediction of vital social significance. This study utilizes meteorological station observational data and environmental monitoring station data from 2017 to 2018. The mrmr algorithm is employed to select meteorological and environmental factors influencing visibility. Three methods, namely Random Forest, XGBoost, and LightGBM, are utilized to predict short-term visibility in Jiangsu. Results indicate that humidity and PM2.5 concentration are the most significant factors affecting visibility, and these factors vary across different stations. Among the three methods, Random Forest yields the best performance in predicting visibility in Jiangsu. Therefore, we choose the Random Forest method and establish distinct visibility prediction models for different stations, reducing input model parameters and enhancing the accuracy of visibility forecasts</p>
<p>A33063 16:45-17:00</p>	<p>Using Autoregressive Polynomial Regression Models to Study Moisture Content Dynamics in Wood Authors: Yurong Zhu, Xiaohuan Wang, Ziqiong Zha, Wei Song Presenter: Yurong Zhu, Dalarna University, Sweden</p> <p>Abstract: This study explores the complex relationship between wood moisture content and environmental factors, temperature and relative humidity. Utilizing a novel Autoregressive Polynomial Regression Model (APRM), data from sensors placed in reconstituted bamboo and pine planks at various positions were analyzed. The APRM, adept at handling polynomial and interaction terms, revealed a nuanced, non-linear relationship between moisture content and environmental conditions. The research findings underscore significant material-specific differences in response to environmental changes. This study not only contributes to the understanding of wood-environment interactions but also demonstrates the efficacy of APRM in environmental science, providing a foundational approach for future research in this field.</p>
<p>A43098 17:00-17:15</p>	<p>Large Language Model for Dynamic Strategy Interchange in Financial Markets Authors: Xingyu Zhong, Zongyi Zhao, Qingzhen Xu Presenter: Xingyu Zhong, South China Normal University, China</p> <p>Abstract: With the widespread application of large language model technologies, various industries have adopted this technology to optimize existing solutions, including the field of quantitative trading. Large language models, relying on their rich pre-trained knowledge, have achieved significant results in key tasks of quantitative trading such as news analysis, market sentiment judgment, and financial data forecasting. These quantitative strategies based on specific tasks can achieve considerable profits in the financial market. However, the instability of financial markets means it is difficult to maintain a market advantage by relying on a single strategy over the long term. In this paper, we draw on the principles of reinforcement learning to propose a dynamic strategy switching method based on large language models, to adapt to market changes. This method dynamically selects the most suitable strategy for execution based on the current financial market data status and predefined multiple quantitative strategies. Evaluation on two real datasets shows that our method outperforms single-strategy models in several aspects. Furthermore, the application of multi-strategy dynamic switching, combining large language models and reinforcement learning, not only demonstrates superiority but also reveals its great development potential.</p>



<p>A33062 17:15-17:30</p>	<p>A User Behavior Analysis Model Based on AARRR Model and RMF Model Authors: Haolin Liu Presenter: Haolin Liu, China Agricultural University, China</p> <p>Abstract: After more than ten years of rapid development, the e-commerce industry led by Taobao has attracted and obtained a large number of users. In the era of mobile Internet, the needs of users determine the future development direction of the e-commerce industry. In this context, it is of great significance for the future development of e-commerce to obtain and analyze user behavior, understand user needs, and guide product marketing and design. This paper selected the user behavior data of Taobao app from November 18, 2014 to December 18, 2014, and analyzed the user behavior data using AARRR model and RMF model. The analysis results show that the activity of Taobao users is high after 0:00 and 18:00 on the 12th day of the Double 12 shopping festival, and fell to the lowest point at 6:00; The loss of users mainly occurs in the process from clicking to adding to favorites, and the proportion of critical retention customers is the largest.</p>
<p>A22038 17:30-17:45</p>	<p>A Knowledge Enhanced Pre-Training Model for Chinese Weibo Sentiment Analysis Authors: LI YAO Presenter: LI YAO, Zhejiang Police College, China</p> <p>Abstract: Sentiment analysis aims to automatically identify and extract subjective information such as tendencies, stances, evaluations, and opinions from text. Current state-of-the-art Natural Language Processing (NLP) methods, primarily based on large-scale pre-trained language models (PLM), have significantly advanced the field of sentiment analysis. However, these methods often struggle due to the scarcity of annotated data. To address these challenges, we present a knowledge-enhanced pre-trained model for the Chinese social media platform. This model employs a phrase-based masking strategy and incorporates knowledge-related information by making adjustments to the structure of the intermediate encoder layer. We validated the model's performance through comparative experiments with other baseline methods, demonstrating the effectiveness of integrating sentiment resources into pre-trained language models.</p>
<p>A423 17:45-18:00</p>	<p>Multi-vessel area target search model based on MADDPG algorithm Authors: Fangyue Xiang Presenter: Fangyue Xiang, Chengdu Technological University, China</p> <p>Abstract: The use of unmanned ships in real sea areas can effectively improve search accuracy and reduce safety risks when assisting in complex target search work. This paper proposes a gym-based multi-vessel area target probing environment and a multi-vessel target cooperative search task model to address the multi-target search problem in uncertain environments. The paper mainly utilised the MADDPG deep reinforcement learning algorithm to solve the problem. A comparison with the DDPG algorithm revealed that MADDPG can learn a better exploratory strategy in this environment, resulting in a 45% improvement in success rate. The paper also provides effective evaluation in terms of task success rate, target search rate, and average search time, which demonstrates the effectiveness of the environment and method proposed.</p>



