JUNE 20-22, 2025

WEBSITE: HTTPS://ICCEE.ORG/

ONSITE HOTEL

ICCEE 2025

Onsite:
Holiday Inn Singapore Atrium
Address: 317 Outram Road Singapore 169075

ONLINE ZOOM

Online:
Zoom No. : 878 1246 2011
Password: ICCEE
Link: https://us02web.zoom.us/j/87812462011

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AGENDA OVERVIEW

* All schedules will be scheduled in **Singapore time (UTC+8)**

Day 1- June 20, 2025 (Friday)

13:00-17:00	Onsite Sign-in & Registration	Riverside Boardroom, Level 1
10:00-15:00	Online Test	Zoom No. : 878 1246 2011 (Password: ICCEE)

Day 2- June 21, 2025 (Saturday)

09:00-12:15	Opening Remarks & Guest Speeches	Seletar Room 3, Level 3
10:30-11:00	Coffee Break & Group Photo & Posters Display	Seletar Room 3 & Foyer
14:00-15:45	Session A	Seletar Room 3, Level 3
15:45-16:10	Coffee Break & Posters Display	Foyer, Level 3
16:10-18:10	Session B	Seletar Room 3, Level 3
18:10-19:30	Dinner	Atrium Restaurant

Day 3- June 22, 2025 (Sunday)

10:00-12:00	Guest Speech & Session 1	Zoom No. : 878 1246 2011 (Password: ICCEE)
14:00-15:45	Session 2	Zoom No. : 878 1246 2011 (Password: ICCEE)
10:30-18:30	One-day Trip (paid and optional)	Onsite Only

WELCOME

Dear Esteemed Delegates,

On behalf of the Organizing Committee, it is our great pleasure to extend a warm welcome to you at The 18th International Conference on Computer and Electrical Engineering (ICCEE 2025). This prestigious event will take place from June 20-22, 2025, in the dynamic city of Singapore.

In today's rapidly evolving technological landscape, computer and electrical engineering play pivotal roles in shaping the future of industries, smart systems, and sustainable innovations. ICCEE 2025 is dedicated to fostering interdisciplinary collaboration and international exchange, bringing together leading researchers, engineers, and industry experts from around the world. By bridging cutting-edge research and practical applications, this conference aims to drive advancements that address global challenges and inspire transformative solutions.

We would like to express our deepest gratitude to all those who have contributed to making this conference a reality. A special thanks goes to our organizing committee, technical committee members, and reviewers for their dedication in ensuring a high-quality program with diverse and impactful research contributions. We are also honored to welcome our distinguished keynote and invited speakers, whose expertise and insights will provide invaluable perspectives on the latest trends and breakthroughs in computer and electrical engineering.

Over the course of three days, we have prepared an engaging and diverse program, including onsite technical sessions for in-depth discussions, interactive poster presentations, and virtual sessions to facilitate global participation. These platforms are designed to encourage meaningful exchanges, foster collaborations, and spark innovative ideas among participants.

We sincerely hope that ICCEE 2025 will be a rewarding experience for all attendees, offering opportunities to learn, network, and explore new frontiers in the field.

Welcome to Singapore, and welcome to ICCEE 2025!

Yours sincerely,
Conference Committee
ICCEE 2025

COMMITTEE

Conference Chairs

Zhixin Wang, Shanghai Jiao Tong University, China
Siew Hwa Chan, Nanyang Technological University, Singapore
Hong Shen, Sun Yat-sen University, China

Program Chairs

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Chengwen Luo, Shenzhen University, China
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Wanyok Atisattapong, Thammasat University, Thailand
Yew Kee WONG (Eric), Hong Kong Chu Hai College, Hong Kong, China
Yuan Yu, Beijing University of Chemical Technology, China
Zichao Li, University of Waterloo, Canada

ONSITE VENUE

Venue Holiday Inn Singapore Atrium, an IHG Hotel

Address 317 Outram Road Singapore 169075

Sign-in

Spot Riverside Boardroom, Level 1

Time 1:00 pm-5:00 pm | June 20, 2025

Transportation

From Singapore Changi International Airport	30 minutes by taxi, Approx. 23 km 1 hour by subway and bus: CG (Tanah Merah Tanah) to Merah MRT Station—transfer to EW (Tuas Link) to Outram Park MRT Station—transfer to bus TE (Woodlands North) to Havelock—5 minutes by foot
From Seletar Airport	22 minutes by car, Approx. 19 km

Weather (For reference only)

June 20	June 21	June 22
Sunny or Rainy	Sunny or Rainy	Cloudy
27-31℃	27-29℃	27-30℃

Notice

Accommodation is not included in the registration. Please note that the conference hotel or conference secretary will not contact any participant for reservation, please be careful when anyone asks you to provide your credit card information to book rooms for you. If you have any questions, please contact us via the conference email address or phone or WeChat on the contact page.

ONSITE GUIDELINES

Opening Ceremony and Guest Speeches on June 21, 2025

This session requires everyone to participate. Please enter the meeting room at least 15 minutes early and keep your mobile phones silent. We hope that you can gain new thoughts from the experts' talks and look forward to active discussions.

Oral Presentation

- Regular oral presentation: **15 minutes (including Q&A)**.
- Get your presentation **PPT or PDF files** prepared. Presentations MUST be uploaded at the session room at least 15 minutes before the session starts.
- Laptop (with MS-Office & Adobe Reader), projector & screen, laser pointer will be provided in all oral session rooms.

Poster Presentation

Print poster in A1 size, and content must be on 1 page. Please set the poster as vertical format, and bring it to paste onsite.

- The content must include: the title of the article author, the logo of the unit in the upper left corner, the conference name + the ID of the article in the upper right corner, the key framework knowledge of the article, contact information and other necessary basic information, the rest of the information according to the importance of arrangement and design.
- Other main content design, template format is not fixed, no template restrictions.
- Prepare a **3-5 minutes presentation** of the framework for on-site communication.

Other Important Notes

- Please enter the meeting room at least 15 minutes before your session. Your punctual arrival and active involvement will be highly appreciated.
- Please wear your name tag for all the conference activities. Lending it to others is not allowed. If you have any companying person, please do inform our staff in advance.
- Please keep all your belongings (laptop and camera etc.) at any time. The conference organizer does not assume any responsibility for the loss of personal belongings.
- Please show name tag and meal coupons when dining.

ONLINE GUIDELINES

Before the Conference

◆ **Time Zone Singapore Time (UTC+8)**

◆ **Platform: Zoom Workplace**

* You can download Zoom Platform from the link below:

- https://zoom.us/download
- https://zoom.com.cn/download (Chinese authors' option)
- **Zoom Information:**
  Zoom No. : 878 1246 2011
  Password: ICCEE
  Link: https://us02web.zoom.us/j/87812462011

◆ **Equipment and Environment Needed**

*A computer with internet connection and camera *Headphones *A quiet place
*Proper lighting and background

◆ **Test Your Presentation**

Date: June 20, 2025

Prior to the formal meeting, presenters shall join the test room to ensure everything is on the right track. Every presenter or listener enter the ZOOM, please rename as **Paper ID + Your Name.**

*For example: Presenter: E-000+ David | Listener: L001+David

During the Conference

◆ **Voice Control Rules**

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

◆ **Oral Presentation**

*Timing: a maximum of 15 minutes in total, including 2-3 minutes for Q&A.
*Please join the meeting room 10 minutes in advance.
***It is mandatory for all presenters to make live oral presentations. For technical problems such as network instability, please contact conference secretary in advance.**

◆ Conference Recording and Screenshot

*We will not record the whole conference, but will screenshot for each presenter as conference participation proof. If you need a record of your presentation, please tell the staff in advance.

DETAILED AGENDA

* All schedules will be scheduled in **Singapore Time (UTC+8)**

Day 1 June 20, 2025 (Friday)

Onsite Sign-in and Conference Materials Collection	
Time	13:00-17:00
Location	Riverside Boardroom, Level 1
Steps	1. Give your Paper ID to the staff. 2. Sign your name in the attendance list and check meal information. 3. Check your conference kit, which includes conference bag, name tag, meal voucher, conference program, the receipt of the payment, the USB.
Online Test Zoom No. : 878 1246 2011 Password: ICCEE Link: https://us02web.zoom.us/j/87812462011	
Speaker (10:00-10:30)	Hong Shen, Zichao Li
Session Chair and Presenters (14:00-15:00)	Session 1: E-004, E-029, E-039, E-1007, E-128, E-091
	Session 2: E-085, E-002, E-043, E-042, E-088, E-052, E-153, E-110

Day 2 June 21, 2025 (Saturday)

Opening Remarks & Guest Speeches Onsite Venue: Seletar Room 3, Level 3 Online Zoom: 878 1246 2011 (Password: ICCEE)		
09:00-09:10	Opening Remarks	Conference Chair Zhixin Wang, Shanghai Jiao Tong University, China
09:10-09:50	Keynote Speaker 1 Local Time 11:10-11:50	Hong Shen Central Queensland University, Australia China National Endowed Expert, Sun Yat-sen University, China Title: Privacy-Preserving Multiparty Collaborations against Malicious Attacks
09:50-10:30	Keynote Speaker 2	Zhixin Wang Shanghai Jiao Tong University, China Title: Intelligent Building Energy System with PV&ESS and Application Based on DC Microgrid Technology
10:30-11:00	Coffee Break & Group Photo & Posters Display Posters Display (Foyer, Level 3): E-049, E-059, E-063	
11:00-11:25	Invited Speaker 1	Li Fang Nanyang Technological University, Singapore Title: Exploring the impact of large language models on the future of teaching and learning
11:25-11:50	Invited Speaker 2	Yang Yun Nanyang Technological University, Singapore Title: Thermal Management of Battery Modules through Power Electronics
11:50-12:15	Invited Speaker 3	Wang Lin Nanyang Technological University, Singapore
12:15-14:00	Lunch @ Sentosa Room, Level 3	

Onsite Session A-B & Posters Display		
14:00-15:45	Seletar Room 3, Level 3	Session A: Modern power electronic systems and control technologies E-044, E-093, E-098, E-040, E-065, E-100, E-156
15:45-16:10	Coffee Break & Posters Display Posters Display (Foyer, Level 3): E-103-A, E-104-A, E-105-A	
16:10-18:10	Seletar Room 3, Level 3	Session B: Intelligent image analysis and processing E-006, E-013, E-045-A, E-077, E-046, E-071, E-145, E-133-A
18:10-19:30	Dinner @ Atrium Restaurant	

Day 3 June 22, 2025 (Sunday)

Guest Speech & Online Session 1-3		
10:00-10:30	Zoom No. : 878 1246 2011 Password: ICCEE	Zichao Li University of Waterloo, Canada (speaker's local time at 22:00-22:30 on June 21) Title: Cross-Chain Fraud Detection: Advancing Machine Learning and Metaheuristics for Multi-Blockchain Transactions
10:30-12:00		Session 1: Digital image recognition, detection and analysis methods E-004, E-029, E-039, E-1007, E-128, E-091
14:00-15:45	Zoom No. : 878 1246 2011 Password: ICCEE	Session 2: Advanced information theory and application technology E-085, E-002, E-043, E-042, E-088, E-052, E-153
One-day Trip (paid and optional) 10:30-18:30 More details, please see the last one page of this program. (Onsite Only)		

SPEAKER

Hong Shen

Central Queensland University, Australia
China National Endowed Expert, Sun Yat-sen University, China

Speech time: 09:10-09:50 on June 21
(speaker's local at 11:10-11:50 on June 21 | UTC+10)
Meeting room: 878 1246 2011 (Password: ICCEE)

zoom

Biography

Hong Shen is currently Professor of Information and Communications Technology in Central Queensland University, Australia. He is also "China National Endowed Expert" in Sun Yat-sen University and Invited Professor in Macao Polytechnic University, China. He was Professor (Chair of Computer Science) and Leader of Faculty Research Group "Networks, Parallel and Distributed Systems" in University of Adelaide, Australia, where he worked 15 years, and Professor and Head of the Computer Networks Laboratory in Japan Advanced Institute of Science and Technology (JAIST) for 5 years. With main research interests in parallel and distributed computing, network optimization, privacy-preserving computing, social computing and machine leaning, he published more than 500 research papers including over 100 papers in major international journals such as variety of IEEE and ACM Transactions.

Prof. Shen served on editorial roles for 11 international journals, chaired numerous international conferences, and served on program committees for more than 80 international conferences. He delivered keynote speeches at many conferences, and received numerous honors and awards including Science and Technology Progress Award of Ministry of Education of China, Natural Sciences Award of Chinese Academy of Sciences, and best paper awards from international conferences.

Title

Privacy-Preserving Multiparty Collaborations against Malicious Attacks

Abstract

Recent years have witnessed an exponential growth of security incidents resulted by privacy breaches, along with the rapid development of various computing paradigms of multiparty collaboration systems such as federated learning, mobile-edge computing and IoT. The evolving variety of security threats with strengthened attacking power has made traditional privacy-preserving computing techniques incapable of combating emerging malicious attacks such as shilling, collusion and inference attacks. This makes it an urgent need to develop effective mechanisms for privacy-preserving data sharing, collaborative computing and data analysis among multiple parties connected by public networks.

In this talk, I will first illustrate the emerging cyberattacks and security threats in the popular

contemporary multiparty collaboration platforms, overview some popular privacy-preserving computing techniques and show their ability in protecting participant's data privacy against semi-honest and malicious adversaries. I will then show the main challenges for developing effective privacy-preserving computing techniques from a parametric view of balancing data utility for targeted application and privacy (security) against semi-honest and malicious attacks Next, focusing on data privacy protection against malicious attacks in multiparty collaborative computing systems, I will introduce two distributed implementations of differential privacy for centralized and decentralized multiparty collaborations respectively, highlight some design challenges, compare our proposed schemes with others for different system settings and show their performance comparison in data privacy and utility. Finally, I will show our recent work on deploying differential privacy to achieve privacy-preserving machine learning and multiagent consensus in the applications of network traffic classification, path/trajectory classification, data clustering and federated learning.

SPEAKER

Zhixin Wang

Shanghai Jiao Tong University, China

Speech time: 09:50-10:30 on June 21 (UTC+8)
Meeting room: Seletar Room 3, Level 3

Biography:

Dr. Zhixin Wang was born on May 30, 1964, Zunyi, Guizhou Province, China

Dr. Zhixin Wang received Bachelor Degree, Master Degree from Zhejiang University, China at Department of Scientific Instrumentation, and Ph.D from Zhejiang University, China at Department of Mechanical Engineering in 1985, 1988 and 1994 respectively.

Dr. Zhixin Wang is Professor and Ph. D Supervisor at Dept. Electrical Engineering, Shanghai Jiao Tong Univ. China, and also Vice President of Shanghai Energy Saving Engineering Technology Association, China. He was ever Deputy Director of Mechanical Electrical Control Institute, Associated Dean to School of Mechanical Engineering, Deputy Director of Scientific Research Division, and Deputy Chair of Dept. Electrical Engineering, Shanghai Jiao Tong University, China. He is reviewer for international Journals, such as Applied Energy, ENERGY, International Journal of Electrical Power & Energy Systems, Protection and Control of Modern Power Systems, Renewable & Sustainable Energy Reviews, Sustainable Energy Technologies and Assessments, IEEE Transactions on Power Electronics, Transactions on Industrial Electronics, etc. He ever was Conference Chair for Asia Power and Electrical Technology Conference, APET 2022, APET 2023, The International Conference on Power and Renewable Energy, ICPRE 2020, ICPRE 2023, ICPRE 2024 etc.

Dr. Zhixin Wang's research interests are located in the areas of wind power, photovoltaic generation and control technology, distributed generations of smart grid and intelligent distribution system, motor control system and energy-saving system. He teaches courses at Shanghai Jiao Tong University, China to both Post Graduated Student and Undergraduate Program, i.e, Renewable Energy Generation System, Control Technique of Electrical Machines. In 2020, Control Technique of Electrical Machines y was rated as a high-quality textbook for electrical majors in colleges and universities of China Electric Power Education Association

Dr. Zhixin Wang has ever hosted more than six Projects, which were supported by China Government, including Sub-Project of Key-note National Natural Science Foundation of China in 2009, General Project of National Natural Science Foundation of China and Sub-Project of National 863 Program of China in 2014, etc. He also have hosted more than fifteen Projects, which were supported by Government of Shanghai City, such as Fund of Shanghai Science and Technology Development, Shanghai Municipal Science and Technology Commission Project, Shanghai Municipal Economic and Information Commission Industrial Foundation Plan Project, etc.

Dr. Zhixin Wang has published more 150 SCI/EI Index journal Papers since 2007, such as Renewable and Sustainable Energy Reviews (IF 16.799), PCMP (IF 11.0), IEEE Transactions on Vehicular Technology, IET Generation, Transmission & Distribution, Electrical Power Syst. Res., International Journal of Electrical Power & Energy Systems. etc. He also published ten books/text books, and was granted invention patents about fifty, including one PCT patent, and eight Technical standards, including four GB/T, one NB/T and three Group Standard.

Dr. Zhixin Wang received many awards for research projects, i.e, First Class Award of China Petroleum and Chemical Industry Automation Science and Technology Progress Award, 2015, 2016. Second Class Award of Shanghai Technological Invention Award, 2014, Second Class Award of Shanghai Technological Invention Award, 2013, Second Class Award of China Electric Power Technological Invention Award, 2019, Second Class Award of Jiangsu Science and Technology Progress Award, 2011.

Dr. Zhixin Wang received many honorary titles, i.e Young scientific and technological expert in China machinery industry, former Ministry of Machinery Industry, China, 1995, 21st century talents of the Ministry of Machinery Industry, former Ministry of Machinery Industry, China, 1995, and Expert in China's power industry, China Electric Power Education Association,2022, etc.

Title

Intelligent Building Energy System with PV&ESS and Application Based on DC Microgrid Technology

Abstract

Focusing on the application of Intelligent building energy system with PV&ESS of DC microgrid, aiming at the key technologies and related scientific problems, such as DC fault current suppression and operation control, DC microgrid operation control, DC microgrid energy control, and intelligent building energy system planning involved in DC microgrid, the system architecture and capacity allocation method of intelligent building low-voltage DC microgrid integrated renewable energy, energy storage and DC load, and the integration of photovoltaic charging and storage, and multi-energy complementary synergy are proposed. Demonstration research on the planning, design and application of low-voltage DC microgrid based on renewable energy intelligent buildings is realized.

The report introduces in detail the research results of related technologies, such as intelligent building DC microgrid fault current suppression and DC arc detection technology, DC microgrid operation control and optimal scheduling, DC microgrid energy control and equipment development, and finally, combined with specific cases to show the application of the above results, to achieve the planning, design and application demonstration of low-voltage DC microgrid based on renewable energy intelligent buildings.

SPEAKER

Li Fang

Nanyang Technological University, Singapore

Speech time: 11:00-11:25 on June 21 (UTC+8)
Meeting room: Seletar Room 3, Level 3

Biography

Dr. Li Fang joined Nanyang Technological University (NTU), Singapore, as a Lecturer in 2002 and is currently a Senior Lecturer at the College of Computing and Data Science, NTU. She holds a B.Eng. in Computer Science from Southeast University, China, as well as an M.Sc. and Ph.D. in Computer Science from NTU, Singapore.

Her research interests include deep learning, brain-computer interfaces (BCI) using EEG, healthcare, education, image processing, and image retrieval. Dr. Li Fang has authored over 30 peer-reviewed publications in these areas, and her research has received multiple awards, including the Best Paper Award at the 4th International Conference on Cloud Computing and Security (ICCCS 2018).

She serves as an Associate Editor for the journal Information Systems Frontiers (ISF). Additionally, she has served as Secretary and Treasurer of the IEEE Education Society, Singapore Chapter, and remains an active researcher. Beyond local collaborations within Singapore, both inside and outside NTU, she is also engaged in international collaborations with researchers from Japan and China.

Title

Exploring the impact of large language models on the future of teaching and learning

Abstract

The rapid advancement of large language models (LLMs) such as ChatGPT, Claude, and Gemini marks a transformative moment in the evolution of education. This keynote explores the multifaceted impact of LLMs on teaching and learning, examining both the opportunities and challenges they present for educators, students, and institutions. We will discuss how LLMs are reshaping instructional design, enabling personalized learning, supporting multilingual access, and fostering critical thinking through intelligent dialogue. At the same time, we will address concerns related to academic integrity, dependency, equity, and the evolving role of educators. Drawing from real-world applications, empirical studies, and policy developments, this talk offers a strategic perspective on integrating LLMs effectively and ethically into educational ecosystems—preparing us for a future where human-AI collaboration becomes an integral part of learning.

SPEAKER

Yang Yun

Nanyang Technological University, Singapore

Speech time: 11:25-11:50 on June 21 (UTC+8)
Meeting room: Seletar Room 3, Level 3

Biography

Yun Yang is currently an Assistant Professor at Nanyang Technological University. He has been recognized as one of the top 2% most-cited scientists by Stanford University for the past two consecutive years. He is also the recipient of the 2023 Second Prize Paper Award from the IEEE Journal of Emerging and Selected Topics in Power Electronics, as well as the 2022 and 2024 Outstanding Reviewer Awards from IEEE Transactions on Power Electronics. To date, he has published over 100 technical paper, including more than 50 in top-tier journals, and authored a monograph.

Title

Thermal Management of Battery Modules through Power Electronics

Abstract

Thermal runaway in lithium-ion batteries (LIBs) remains one of the most critical safety challenges in electric vehicles (EVs). In this talk, I will present recent advancements in power electronics and control strategies that we have developed to address this issue. Our research offers innovative solutions to mitigate thermal runaway risks while also enhancing the thermal uniformity across battery cells within a module. These technologies not only improve system safety but also contribute to extending the operational lifespan of battery packs.

SPEAKER

Wang Lin

Nanyang Technological University, Singapore

Speech time: 11:50-12:15 on June 21 (UTC+8)
Meeting room: Seletar Room 3, Level 3

Biography

Dr. Addison, Lin Wang is currently a Tenure-track Assistant Professor at the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. He is leading the Bio-inspired AI and Robotics (BioRAI) Research Group (Lab) at NTU, closely tied with the Centre for Advanced Robotics Technology Innovation (CARTIN) and Internet of Things (IoT) Center at School of EEE. He had been a faculty member with the Artificial Intelligence Thrust and the Department of Computer Science and Engineering of HKUST's Guangzhou and Clear Water Bay campuses from 2021.12-2024.10. He was a visiting researcher at the Dept. of Electrical and Electronic Engineering, Imperial College London (ICL), UK from 2020-2021. He earned the Ph.D. Degree in AI and robotics (with highest Ph.D. research award) in 2021 and M.S. degree in CAD/CAM and VR/AR for engineering design and manufacturing in 2017 from Korea Advanced Institute of Science and Technology (KAIST), Korea. Dr. Wang has extensive cross-disciplinary research experience with substantial publications and patents that cover artificial intelligence, computer science, industrial and mechanical automation. His research interests include bio-inspired sensing and perception, event-based vision, novel sensor-based learning; sensor fusion, neuromorphic multi-modal AI, spatial intelligence, embodied robotic systems, machine learning, human-AI interaction, etc. He received several awards and honors, including the Best Paper Award from IEEE VR conference, CVPR Oral/Highlight Paper, Tencent Excellent Patent Project Award, KAIST Highest Ph.D Research Award, etc. He has been serving as the session chair and program committee member for top-tier conferences and journals, such as CVPR/ICCV/ECCV, ICRA/IROS, IEEE TPAMI, IEEE RAL, IEEE T-ITS, IEEE VR, IEEE TNNLS. He has also been serving as the Technical Committee Member for the IEEE Robotics and Automation Society (RAS) on Robot Vision. He also serves as the Associate Editor (to be appointed) for the IEEE Transactions on Artificial Intelligence (IEEE TAI).

SPEAKER

Zichao Li

University of Waterloo, Canada

Speech time: 10:00-10:30 on June 22 (UTC+8)
(speaker's local time at 22:00-22:30 on June 21)
Meeting room: 878 1246 2011 (Password: ICCEE)

Biography

Dr. Li is a researcher from the University of Waterloo, where he applies his expertise in management science (PhD) to advance machine learning optimization algorithms. His work bridges traditional optimization techniques (e.g., from transportation models) with deep learning-based knowledge graph structures, with key applications in financial market fraud detection and sentiment analysis. His broad research interests span pattern recognition in medical engineering, big data & deep learning, graph neural networks (GCN, GNN), optimization algorithms for large-scale data, reinforcement/adversarial learning, self-supervised/unsupervised methods, Bayesian optimization, sequential modeling (RNN/LSTM), knowledge-graph embedding, explainable AI, and distributed statistical modeling. In addition, Dr. Li serves as Chief Scientist at a fintech firm, where he drives innovation at the intersection of AI and finance.

Title

Cross-Chain Fraud Detection: Advancing Machine Learning and Metaheuristics for Multi-Blockchain Transactions

Abstract

The rapid proliferation of decentralized finance (DeFi) across interconnected blockchain networks has introduced sophisticated fraud vectors that transcend individual chains, from cross-chain bridge exploits to transaction laundering on high-throughput platforms like Solana. This work presents ChainSentry, a novel hybrid framework that synergizes evolutionary metaheuristics with deep learning to detect and interpret fraudulent transactions across Ethereum, Binance Smart Chain, and Solana. At its core, ChainSentry introduces TransAudit, a modular feature engineering pipeline that harmonizes 91 transaction attributes—including gas metrics temporal patterns, and cross-chain flow indicators—into a unified representation space while preserving chain-specific nuances. The framework's detection engine, EvoGraph, combines an DarwinSentry with a Graph Attention Network (GAT) in a two-phase architecture. The DarwinSentry component performs interpretable feature optimization through a penalty-weighted fitness function, while the GAT analyzes dynamic transaction graphs to uncover complex wallet-level relationships. Evaluated on *FraudNet-3.0*—the first comprehensive multi-chain dataset comprising 1.2 million labeled transactions across three ecosystems—EvoGraph achieves a 0.95 F1-score on Ethereum and maintains 0.92 F1-score on Binance Chain, demonstrating consistent superiority over benchmarks. Notably, it

reduces false positives by 22% compared to transformer-based models while providing sub-second inference latency critical for real-world deployment. A key innovation lies in EvoGraph's dual capability: it not only detects known attack patterns with 94% precision but also identifies zero-day threats through anomaly amplification in the GAT's attention layers. Regulatory compliance is ensured via integrated SHAPtorch, an explanation module that quantifies feature contributions and generates auditable reports aligned with FATF guidelines. The framework exhibits remarkable cross-chain adaptability, with models trained on Ethereum data successfully flagging 78% of Solana-based frauds without retraining—a breakthrough for interoperability-focused security solutions. This research advances the frontier of blockchain fraud detection by unifying metaheuristics and graph AI, offering both theoretical insights and practical tools.

ONE-DAY TRIP

10:30 Meet at the Hotel

Merlion Park

British Colonial Scenic Byway
(e.g. Jubilee Street Police Station)

Lau Pa Sat

Peranakan House

Dragon Mountain Temple

Ferris Wheel

The Gardens by the Bay

Time
10:30-18:30 on March 9

Registeration link:
https://confsys.iconf.org/register/iccee2025
(choose Academic Visit).

This event is paid and optional. The registration fee does not include the cost of One-day Trip. Please pay extra if you want to participate.

Notes
1. At least five people. Fewer than five people will be cancelled and refunded.
2. Meals and tickets should be on your own.
3. Please protect yourself and your property while travelling.

Route
The specific itinerary is subject to the actual visit