

CONFERENCE PROGRAM

ACMLC 2024

2024 6th Asia Conference on Machine Learning and Computing

workshops

ACKIM

2024 2nd Asia Conference on
Knowledge and Innovation Management

AAIP

2024 2nd Asia Conference on
Advances in Image Processing



Bangkok, Thailand

July 26-28, 2024



Conference Abstract

2024 6th Asia Conference on Machine Learning and Computing ACMLC 2024

with workshops

2024 2nd Asia Conference on Knowledge and Innovation Management (ACKIM 2024)

2024 2nd Asia Conference on Advances in Image Processing (AAIP 2024)

Bangkok, Thailand | July 26-28, 2024

SUPPORTED BY





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Welcome Message

On behalf of the Conference Committee, we are delighted to welcome you to the 2024 6th Asia Conference on Machine Learning and Computing (ACMLC 2024) and its workshops 2nd Asia Conference on Knowledge and Innovation Management (ACKIM 2024) and 2nd Asia Conference on Advances in Image Processing (AAIP 2024) taking place from July 26-28, 2024, in the vibrant city of Bangkok, Thailand.

Conference invites contributions from all branches of Machine Learning and Computing. Topics of interest include, but are not limited to: Recommender Systems, Deep learning, Supervised Learning, Reinforcement Learning, Neural Networks and applications, Computational Theories of Learning, Intelligent Search, Statistical Learning, Real-time Decisions, Big Data Visualization, Image Classification, Robot Navigation, Data Mining, Computer Modeling, Parallel Computing, Quantum Computing, High Performance Computing, Distributed and parallel systems, Cognitive Computing, Cloud Computing, Distributed Computing, Grid Computing, Embedded Computing, Scalable Computing, Human-centred Computing, Mobile computing.

This year, conference received an impressive number of submissions from researchers, practitioners, and professionals from industry, academia, and government. All papers underwent a rigorous peer-review process by our conference committee members and international experts, with acceptance based on the quality and relevance of the submissions, ensuring a program of the highest caliber.

Conference is designed to promote the exchange of knowledge and experiences among experts from industry and academia, as well as university students. This will be achieved through keynote speeches, presentation sessions, and informal conversations among colleagues from around the world. We hope this conference will provide a memorable and valuable experience for all participants, fostering the discovery of new research domains, the dissemination of practical knowledge, and the cultivation of personal connections.

We are honored to have three distinguished keynote speakers this year:

- Professor Witold Pedrycz, University of Alberta, Canada, IEEE Life Fellow.
- Professor Rajkumar Buyya, University of Melbourne, Australia, IEEE Fellow.
- Professor Huiyu Zhou, University of Leicester, United Kingdom.

We would like to extend our heartfelt thanks to the committee members and staff, who have worked tirelessly to bring the initial vision for this conference to life. Their expertise, enthusiasm, and dedication have been instrumental in preparing the final program. We are also profoundly grateful to all authors, reviewers, and attendees for their contributions and participation in ACMLC 2024. Their commitment and expertise have been crucial in creating this high-quality program and ensuring the success of the conference. Finally, we wish all presenters and participants a productive and enjoyable conference experience.

Respectfully yours,

En-Bing Lin
Conference Chair



Conference Venue

Centara Watergate Pavilion Hotel Bangkok

Reservation Email: cwb@chr.co.th

General Email: cwb@chr.co.th

General Telephone: +66 (0)-2-625-1234

567 Rachaprarop Rd., Makkasan, Ratchathewi, Bangkok 10400, Thailand

<https://www.centarahotelsresorts.com/centara/cwb>



Best 47 min 46 min 52 min 9 hr

Suvarnabhumi International Airport (BKK)

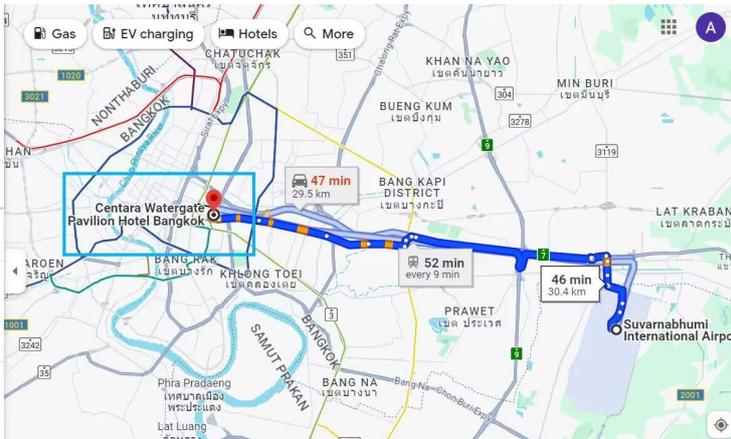
Centara Watergate Pavilion Hotel Bangkok

Add destination

Details

via Route 7 **47 min**
Fastest route now due to traffic conditions
29.5 km

1:55 PM—2:47 PM **52 min**
Phaya Thai - Suvarnabhumi



Best 47 min 46 min 52 min 9 hr

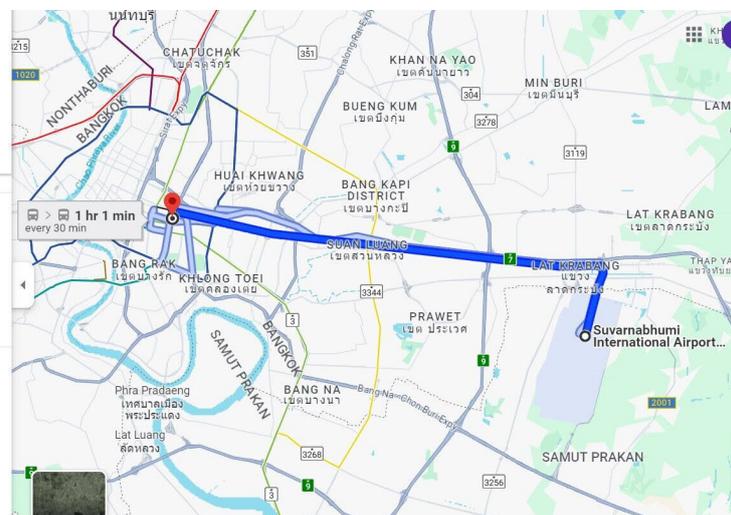
Suvarnabhumi International Airport (BKK)

Centara Watergate Pavilion Hotel Bangkok

1:56 PM—2:48 PM **52 min**
Phaya Thai - Suvarnabhumi
2:14 PM from Suvarnabhumi
THB 15.00 17 min every 9 min

Details

2:00 PM—2:53 PM **53 min**
Limobus Co. Ltd.
4-23E EV (140 EV) - Samae Dam - Vi...
3-16E AC (139 AC) - Victory Monum...
3-8 EV (38 EV) - Victory Monument -...
62 AC - Sathu Pradit - Victory Monu...
62 REG - Sathu Pradit - Victory Monu...





Useful Information

Important Notes

- Please take care of your belongings during the conference. The conference organizer does not assume any possibility for the loss of personal belongings of the participants.
- Please wear delegate badge during the conference. There will be NO access for people without a badge. Never discard your badge at will.
- Accommodation is not provided. Early reservation is suggested to be made for delegates.
- Please show the badge and meal coupons during lunch and dinner.
- Don't stay too late in the city and don't be alone in the remote area. Be aware of the strangers who offer you service, signature of charity, etc., at scenic spots. More Tourist Information and Security tips are available online.
- Delegates are advised to carry sufficient cash with them when travelling around. Only Thai baht are accepted in Thailand. You can withdraw Thai baht with credit cards issued by a foreign financial institution at international ATMs of Thailand Bank. VISA is the most widely accepted card.
- Time Zone: Thailand Time (**GMT+7**).

Important Phone Numbers

First Aid Call: 16699

Alarm Call: 191

Fire Alarm Call: 199

Average Temperature in July Bangkok

High Temp: 32 °C

Low Temp: 26 °C

Mean Temp: 29 °C



Useful Information

Zoom Information

Date	Time	Arrangement	Zoom Link (Password: 072628)
July 26	10:00-11:00	Test for Online Keynote Speakers, Invited Speakers, Session Chairs, Committee Members	ZOOM A https://us02web.zoom.us/j/89803680782
	11:00-13:00	Test for Online Session A & Online Session B	
	15:00-17:00	Test for Online Session C & Online Session D	
July 27	8:30-18:40	Opening Ceremony & Keynote Speeches & Invited speeches	ZOOM A https://us02web.zoom.us/j/89803680782
		Invited Speeches & Onsite Session A & Onsite Session B	
July 28	8:30-10:20	Online Session A	ZOOM A https://us02web.zoom.us/j/89803680782
	9:00-10:50	Online Session B	ZOOM B https://us02web.zoom.us/j/84854267418
	13:30-15:45	Online Session C	ZOOM A https://us02web.zoom.us/j/89803680782
	14:00-15:50	Online Session D	ZOOM B https://us02web.zoom.us/j/84854267418

Note:

Conference rooms will be open 30 mins before scheduled time.

Pls join the online room 15-30 mins before your session start and be prepared.

ZOOM Download Link: <https://zoom.us/download>

Conference Kits:

[Slide Template](#)

[Virtual Background](#)



Tips:

- It's suggested to use headset with microphone or earphone with microphone.
- Please unmute audio and start video while your presentation.
- It's suggested to use headset with microphone or earphone with microphone.
- Duration of each Presentation: about 12 Minutes of Presentation and 3 Minutes of Q&A.
- E-certificate will be sent to presenters after conference by email.
- An excellent presentation will be selected from each session and announced on the website after conference. An excellent presentation certificate will be sent after conference by email.



Useful Information

Rename your screen name	Example
Authors: Paper ID-Name	AC1001-Mary Zhan
Delegate: Delegate -Name	Delegate - Mary Zhan
Keynote Speaker: Keynote-Name	KN- Mary Zhan
Invited Speaker: Invited-Name	IS- Mary Zhan
Committee Member: Position-Name	Committee- Mary Zhan

Materials Prepared by the Presenters

PowerPoint or PDF files.

Duration of Each Presentation

- ✧ Keynote Speech: 45 Minutes of Presentation including Q&A.
- ✧ Invited Speech: 25 Minutes of Presentation including Q&A.
- ✧ Regular Oral Presentation: 15 Minutes of Presentation including Q&A.

Dress Code

- ✧ All participants are required to dress formally. Casual wear is unacceptable.
- ✧ National formal dress is acceptable.

Note

- ✧ 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 before it starts.
- ✧ An excellent presentation will be selected from each session which will be announced and awarded an excellent presentation certificate.



Daily Schedule

Day 1, July 26, 2024 (GMT+7)

Onsite Sign-in and Collect Conference Materials

10:00-17:00 Centara Watergate Pavilion Hotel Bangkok -- Lobby

Online Test

10:00-11:00 Online Test for Online Keynote Speakers, Invited Speaker, Session Chairs, Committee Members

Zoom link: <https://us02web.zoom.us/j/89803680782> (Password: 072628)

11:00-13:00 Online Test for Online Session A & B

Zoom link: <https://us02web.zoom.us/j/89803680782> (Password: 072628)

15:00 -17:00 Online Test for Online Session C & D

Zoom link: <https://us02web.zoom.us/j/89803680782> (Password: 072628)

Day 2, July 27, 2024 (GMT+7)

Onsite Meeting Room

Pavilion 2 Room on 9th Floor

Online Meeting Room

Zoom link: <https://us02web.zoom.us/j/89803680782> (Password: 072628)

Host: Assoc. Prof. Moirangthem Marjit Singh

North Eastern Regional Institute of Science & Technology (NERIST), India

Welcome Message

8:30-8:35

Conference Chair: Prof. En-Bing Lin, Wentworth Institute of Technology, Boston MA, USA

Keynote Speaker I

8:35-9:20

Prof. Rajkumar Buyya, University of Melbourne, Australia; IEEE Fellow
Speech Title: Neoteric Frontiers in Cloud, Edge, and Quantum Computing

Keynote Speaker II

9:20-10:05

Prof. Witold Pedrycz, University of Alberta, Canada; IEEE Life Fellow
Speech Title: New Horizons of Machine Learning: Pursuing a Unified Data - Knowledge Environment

10:05-10:25

Group Photo & Coffee Break

Keynote Speaker III

10:25-11:10

Prof. Huiyu Zhou, University of Leicester, United Kingdom

Speech Title: When Parkinson's Disease Meets Artificial Intelligence

**Invited Speaker I**

11:10-11:35

Assoc. Prof. Moirangthem Marjit Singh, North Eastern Regional Institute of Science & Technology (NERIST), India

Speech Title: Unsupervised Machine Learning Based Techniques for NIDs

Invited Speaker II

11:35-12:00

Asst. Prof. Manu Dube, Yeditepe University, Istanbul

Speech Title: A Data-Based Sustainability Approach

12:00-13:30

Lunch Time**Invited Speaker III**

13:30-13:55

Dr. Chiagoziem Chima Ukwuoma, Oxford Brookes University, Sino-British Collaborative Education, Chengdu University of Technology, China

Speech Title: Towards the Explainability of the Security Concerns of Machine Learning Models in Renewable Energy Production

Onsite Session A

13:55-16:10

Topic: Machine Learning Models and Computing

Session Chair: Assoc. Prof. Moirangthem Marjit Singh, North Eastern Regional Institute of Science & Technology (NERIST), India

AC1007, AC1009, AC1018, AC1026, AC1044-A, AC1055, AC1070, KM017, RT006-A

16:10-16:25

Coffee Break**Onsite Session B**

16:25-18:40

Topic: Data Driven Information Extraction and Management

Session Chair: Prof. Li-Ren Yang, Tamkang University, Taiwan

AC1004, AC1015, AC1059, AC1061, AC1065, AC1066, KM009-A, KM014-A, AP103



Day 3, July 28, 2024 (GMT+7)

Online Session A

Zoom link: <https://us02web.zoom.us/j/89803680782> (password:072628)

Topic: Machine Learning Methods, Models and Applications

8:30-10:20

Session Chair: Prof. Mark Mixer, Wentworth Institute of Technology, USA

Invited Speaker - Prof. Umesh C. Pati, National Institute of Technology, India

Invited Speaker - Assoc. Prof. Renjith V Ravi, M.E.A Engineering College, India

AC2005, AC1016, AC1048, AC1056

Online Session B

Zoom link: <https://us02web.zoom.us/j/84854267418> (password:072628)

Topic: Models, Algorithms and Computational Methods in Computer Science and Information Systems

9:00-10:50

Session Chair: Assoc. Prof. Bambang Leo Handoko, Bina Nusantara University of Indonesia, Indonesia

Invited Speaker - Assoc. Prof. Bambang Leo Handoko, Bina Nusantara University of Indonesia, Indonesia

Invited Speaker - Prof. Loc Nguyen, Sunflower Soft Company, Vietnam

AC1003, AC1036, AC1054, AC1069

11:00-13:30

Lunch & Break

Online Session C

Zoom link: <https://us02web.zoom.us/j/89803680782> (password:072628)

Topic: Modern Information Theory and Information Technology

13:30-15:45

Session Chair: Asst. Prof. Yanglong Lu, Hong Kong University of Science and Technology, China

Invited Speaker - Asst. Prof. Yanglong Lu, Hong Kong University of Science and Technology, China

Invited Speaker - Dr. Sergii Khlamov, Kharkiv National University of Radio Electronics, Ukraine

Invited Speaker - Assoc. Prof. Mohammed M. Bait-Suwailam, Sultan Qaboos University, Oman

AC1058, AC1067, AC1072, KM001

Online Session D

Zoom link: <https://us02web.zoom.us/j/84854267418> (password:072628)

Topic: AI Based Intelligent Algorithms and Image Processing

14:00-15:50

Session Chair: - Prof. Cyrus F Nourani, Akdmkrd-DAI-TU Berlin, Germany

Invited Speaker - Prof. Cyrus F Nourani, Akdmkrd-DAI-TU Berlin, Germany

Invited Speaker - Assoc. Prof. Pavel Loskot, ZJU-UIUC Institute, China

AC1050, AC1071, AC2004, KM018-A



Keynote Speakers



Prof. Rajkumar Buyya

University of Melbourne, Australia

IEEE Fellow

Foreign Fellow of Academia Europaea

Redmond Barry Distinguished Professor

Time: 8:35-9:20, July 27-- GMT+7 (Onsite Talk)

Meeting Room: Pavilion 2 Room on 9th Floor

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr. Rajkumar Buyya is a Redmond Barry Distinguished Professor and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia. He is also serving as the founding CEO of Manjrasoft, a spin-off company of the University, commercializing its innovations in Cloud Computing. He has authored over 850 publications and seven textbooks including "Mastering Cloud Computing" published by McGraw Hill, China Machine Press, and Morgan Kaufmann for Indian, Chinese and international markets respectively. Dr. Buyya is one of the highly cited authors in computer science and software engineering worldwide (h-index=168 g-index=365, and 149,200+ citations). He has been recognised as a "Web of Science Highly Cited Researcher" for seven times since 2016, "Best of the World" twice for research fields (in Computing Systems in 2019 and Software Systems in 2021/2022/2023) as well as "Lifetime Achiever" and "Superstar of Research" in "Engineering and Computer Science" discipline twice (2019 and 2021) by the Australian Research Review.

Software technologies for Grid, Cloud, and Fog computing developed under Dr. Buyya's leadership have gained rapid acceptance and are in use at several academic institutions and commercial enterprises in 50+ countries around the world. Manjrasoft's Aneka Cloud technology developed under his leadership has received "Frost New Product Innovation Award". He served as founding Editor-in-Chief of the IEEE Transactions on Cloud Computing. He is currently serving as Editor-in-Chief of Software: Practice and Experience, a long-standing journal in the field established 54+ years ago. He has presented over 750 invited talks (keynotes, tutorials, and seminars) on his vision on IT Futures, Advanced Computing technologies, and Spiritual Science at international conferences and institutions in Asia, Australia, Europe, North America, and South America. He has recently been recognized as a Fellow of the Academy of Europe. For further information on Dr. Buyya, please visit his cyberhome: www.buyya.com.

Speech Title: Neoteric Frontiers in Cloud, Edge, and Quantum Computing

Abstract: The twenty-first-century digital infrastructure and applications are driven by Cloud computing and Internet of Things (IoT) paradigms. The Cloud computing paradigm has been transforming computing into the 5th utility wherein "computing utilities" are commoditized and delivered to consumers like traditional utilities such as water, electricity, gas, and telephony. It offers infrastructure, platform, and software as services, which are made available to consumers as subscription-oriented services on a pay-as-you-go basis over the Internet. Its use is growing exponentially with the continued development of new classes of applications such as AI-powered models (e.g., ChatGPT) and the mining of crypto currencies such as Bitcoins. To make Clouds pervasive, Cloud application platforms need to offer (1) APIs and tools for



rapid creation of scalable and elastic applications and (2) a runtime system for deployment of applications on geographically distributed Data Centre infrastructures (with Quantum computing nodes) in a seamless manner.

The Internet of Things (IoT) paradigm enables seamless integration of cyber-and-physical worlds and opening opportunities for creating new classes of realtime applications such as smart cities, smart robotics, and smart healthcare. The emerging Fog/Edge computing models support latency sensitive/real-time IoT applications with a seamless integration of network-wide resources all the way from edge to the Cloud.

This keynote presentation will cover (a) 21st century vision of computing and identifies various emerging IT paradigms that make it easy to realize the vision of computing utilities; (b) innovative architecture for creating elastic Clouds integrating edge resources and managed Clouds, (c) Aneka 6G, a 6th generation Cloud Application Platform, for rapid development of Big Data/AI applications and their deployment on private/public Clouds driven by user requirements, (d) a novel FogBus software framework with Blockchain-based data-integrity management for end-to-end IoT-Fog/Edge-Cloud integration for execution of realtime IoT applications, (e) experimental results on deploying Big Data/IoT applications in engineering, health care (e.g., COVID-19), deep learning/Artificial intelligence (AI), satellite image processing, and natural language processing (mining COVID-19 literature for new insights) on elastic Clouds, (f) QFaaS: A Serverless Function-as-a-Service Framework for Quantum Computing, and (g) new directions for emerging research in Cloud, Edge, and Quantum computing.



Keynote Speakers



Prof. Witold Pedrycz

University of Alberta, Canada

IEEE Life Fellow

Time: 9:20-10:05, July 27-- GMT+7 (Online Talk)

Meeting Room: Pavilion 2 Room on 9th Floor

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Witold Pedrycz (IEEE Life Fellow) is Professor in the Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada. He is also with the Systems Research Institute of the Polish Academy of Sciences, Warsaw, Poland. Dr. Pedrycz is a foreign member of the Polish Academy of Sciences and a Fellow of the Royal Society of Canada. He is a recipient of several awards including Norbert Wiener award from the IEEE Systems, Man, and Cybernetics Society, IEEE Canada Computer Engineering Medal, a Cajastur Prize for Soft Computing from the European Centre for Soft Computing, a Killam Prize, a Fuzzy Pioneer Award from the IEEE Computational Intelligence Society, and 2019 Meritorious Service Award from the IEEE Systems Man and Cybernetics Society.

His main research directions involve Computational Intelligence, Granular Computing, and Machine Learning, among others.

Professor Pedrycz serves as an Editor-in-Chief of Information Sciences, Editor-in-Chief of WIREs Data Mining and Knowledge Discovery (Wiley), and Co-editor-in-Chief of Int. J. of Granular Computing (Springer) and J. of Data Information and Management (Springer).

Speech Title: New Horizons of Machine Learning: Pursuing a Unified Data - Knowledge Environment

Abstract: Over the recent years, we have been witnessing truly remarkable progress in Machine Learning (ML) with highly visible accomplishments encountered, in particular, in natural language processing and computer vision impacting numerous areas of human endeavours. Driven inherently by the technologically advanced learning and architectural developments, ML constructs are highly impactful coming with far reaching consequences; just to mention autonomous vehicles, control, health care imaging, decision-making in critical areas, among others. Data are central and of paramount relevance to the design methodology and algorithms of ML. While they are behind successes of ML, there are also far-reaching challenges that require urgent attention especially with the growing importance of requirements of interpretability, transparency, credibility, stability, and explainability. As a new direction, data-knowledge ML concerns a prudent and orchestrated involvement of data and domain knowledge used holistically to realize learning mechanisms and support the formation of the models.

The objective of this talk is to identify the challenges and develop a unique and comprehensive setting of data-knowledge environment in the realization of the development of ML models. We review some existing directions including concepts arising under the name of physics informed ML.

We investigate the representative topologies of ML models identifying data and knowledge functional modules and interactions among them. We also elaborate on the central role of information granularity in this area.



Keynote Speakers



Prof. Huiyu Zhou

University of Leicester, United Kingdom

Time: 10:25-11:10, July 27-- GMT+7 (Online Talk)

Meeting Room: Pavilion 2 Room on 9th Floor

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr. Huiyu Zhou received a Bachelor of Engineering degree in Radio Technology from Huazhong University of Science and Technology of China, and a Master of Science degree in Biomedical Engineering from University of Dundee of United Kingdom, respectively. He was awarded a Doctor of Philosophy degree in Computer Vision from Heriot-Watt University, Edinburgh, United Kingdom. Dr. Zhou currently is a full Professor at School of Computing and Mathematical Sciences, University of Leicester, United Kingdom. He has published over 500 peer-reviewed papers in the field. His research work has been or is being supported by UK EPSRC, ESRC, AHRC, MRC, EU, Innovate UK, Royal Society, British Heart Foundation, Leverhulme Trust, Puffin Trust, Alzheimer's Research UK, Invest NI and industry. Homepage: <https://le.ac.uk/people/huiyu-zhou..>

Speech Title: When Parkinson's Disease Meets Artificial Intelligence

Abstract: Parkinson's disease (PD) is a severe condition that affects the brain. PD causes huge problems in humans such as shaking and stiffness that become worse over time. Early diagnosis and prognosis of PD results in effective and personalised treatment, reduced care costs and better quality of life. In this talk, first of all, Zhou introduces fundamental knowledge about PD and the technologies used for PD identification. This talk is divided into two streams, animal mice- and human-based PD identification. Afterwards, Zhou reports how his research group deal with immersive challenges such as single and multiple mice detection and tracking, single and multiple mice behaviour recognition, and social behaviour analysis using new video analytics technologies developed within the team. Zhou presents the machine learning techniques used to distinguish between normal and PD mice through social behaviour analysis. Zhou also shows the artificial intelligence methods developed within his team for biomarker analysis. Finally, conclusions are given to summarise the talk.



Invited Speakers



Assoc. Prof. Moirangthem Marjit Singh

North Eastern Regional Institute of Science & Technology (NERIST), India

Time: 11:10-11:35, July 27-- GMT+7 (Onsite Talk)

Meeting Room: Pavilion 2 Room on 9th Floor

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr. Moirangthem Marjit Singh is currently an Associate Professor in Computer Science & Engineering Department at North Eastern Regional Institute of Science & Technology (NERIST), Arunachal Pradesh, India. He received B.Tech. and M.Tech. in Computer Science & Engineering degrees from NERIST and was awarded Gold Medal for securing top position in M.Tech. He received his PhD (Engineering) degree in computer Science and Engineering from University of Kalyani, West Bengal, India. He was the Head of the Department of Computer Science and Engineering, NERIST during 2018 to 2022. He was also the founder Honorary Joint Secretary of the Institution of Engineers, Arunachal Pradesh State Centre, India during 2019-2021. Dr. Marjit is a Fellow of IETE New Delhi, India and Fellow of the Institutions of Engineers (India) and the senior member IEEE, USA. Dr. Marjit was honoured with “Academic Excellence Award” by Taylor’s University, Malaysia in recognition of his outstanding academic performance on 13 September 2023 at Taylor’s University in association International Conference on Evolutionary Artificial Intelligence (ICEAI 2023). He was awarded the IE(I) Young Engineers Award 2014–2015 from the Computer Engineering Division, Institution of Engineers, India. He received the Best Paper Awards at international conferences namely the ICEAI 2023 (held at Taylors’ University, Malaysia) and the ICACCT 2016, (held at APIIT, India) published by springer.

Dr. Marjit secured First Position in X and Second Position in XII Examinations conducted by CBSE, New Delhi, India, amongst the candidates sent up from Jawahar Navodaya Vidyalayas (JNVs) of North Eastern region states of India, in 1995 and 1997, respectively. He was awarded the Gold Medal for getting top position in the M.Tech.(CSE) at NERIST in 2010 He has more than 20 years of teaching and research experience. He has published several research papers in journals and conferences of repute. He has organized/associated with several technical conferences held in India and abroad. His research interests include mobile adhoc networks, wireless sensor networks, network security, AI, machine learning, and deep learning.

Speech Title: Unsupervised Machine Learning Based Techniques for NIDs

Abstract: This invited talk is targeted to explore various unsupervised Machine Learning (uML) based techniques that are developed for Network Intrusion Detection systems (NIDs). The supervised Machine Learning (sML) techniques are used to detect known attacks. To detect unknown and zero-day attacks, the uML techniques are used. The talk will investigate on some of the recent uML based techniques developed for NIDs indicating issues and challenges. The talk will delve into elucidating the research landscape where uML based techniques are applied for NIDs. At the end of the talk, appropriate problem and solution domains will also be discussed briefly.



Invited Speakers



Asst. Prof. Manu Dube

Yeditepe University, Istanbul

Time: 11:35-12:00, July 27-- GMT+7 (Onsite Talk)

Meeting Room: Pavilion 2 Room on 9th Floor

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Manu Dube is an Assistant Professor in the Faculty of Computer and Information Sciences at Yeditepe University, Istanbul. He has a background in Mechanical Engineering and his research interests include mathematical and numerical modeling of complex material behavior especially with regard to reliability of electronics systems, issues related to computer modeling of complex systems, and facilitating solutions that are robust to the inherent variability in human factors. He has been a Consultant/Subcontractor for material modeling related to borehole stability for an oil multinational, and Technical Consultant to the Board of a Turkish group for company projects and reorganization.

Speech Title: A Data-Based Sustainability Approach

Abstract: Sustainability is not an optional destination. The only question is whether we can determine a path that allows us to transition to sustainable development in an orderly manner while maintaining economic growth or whether we will wait for nature to impose it on us. Literature suggests we are falling behind on almost every metric, and there is a need to tackle the problem in a systematic and effective manner rather than haphazard steps that often prove counterproductive and economically unsustainable. We suggest that there is an urgent need to obtain actual data on the environmental impact of various economic activities and present a methodology that can help optimize investments on a cost-benefit basis.



Invited Speakers



Dr. Chiagoziem Chima Ukwuoma
Oxford Brooks University, Sino-British Collaborative Education, Chengdu University of Technology, China
Time: 13:30-13:55, July 27-- GMT+7 (Online Talk)

Meeting Room: Pavilion 2 Room on 9th Floor

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr. Chima received a Bachelor of Engineering degree in Mechanical Engineering (Automotive Technology) from the Federal University of Technology Owerri (FUTO) Nigeria and a Master of Science degree in Software Engineering from the University of Electronics Science and Technology of China respectively. He was awarded a Doctor of Philosophy degree in Software Engineering from the University of Electronics Science and Technology of China. Dr. Chima currently is a Senior Lecturer/Senior Researcher at Oxford Brooks University, Sino-British Collaborative Education, Chengdu University of Technology, China. He has published over 70 peer-reviewed papers in the field as well as served as an academic judge for the United States Academic Decathlon & Pentathlon (USAD & USAP) China, National Economics Challenge (NEC) 2019 till date. He is a recipient of the University of Electronic Science and Technology of China Full Scholarship for Masters Research Program, the Chinese Government Scholarship for Doctoral Research Program, and the Centre for West African Studies of UESTC Doctoral Research fund.

Speech Title: Towards the Explainability of the Security Concerns of Machine Learning Models in Renewable Energy Production

Abstract: The integration of machine learning (ML) models in renewable energy production systems presents significant opportunities for optimization and efficiency. However, the adoption of these models also introduces complex security concerns that demand comprehensive understanding and mitigation strategies. Using some examples from his work on security concerns of machine learning models, Dr. Chima will illustrate the pivotal aspect of explainability in elucidating the potential vulnerabilities, threats, and challenges associated with ML models deployed in renewable energy production. Moreover, Dr. Chima will explore explainable AI (XAI) techniques as a means to enhance transparency and interpretability, thereby fostering trust and reliability in the decision-making processes of these models.



Invited Speakers



Prof. Umesh C. Pati

National Institute of Technology, India

Time: 8:30-8:55, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr. Umesh C. Pati is a Full Professor at the Department of Electronics and Communication Engineering, National Institute of Technology (NIT), Rourkela. He has obtained his B.Tech. Degree in Electrical Engineering from National Institute of Technology (NIT), Rourkela, Odisha. He received both M. Tech. and Ph.D. degrees in Electrical Engineering with specialization in Instrumentation and Image Processing, respectively, from the Indian Institute of Technology (IIT), Kharagpur.

His current areas of interest are Internet of Things (IoT), Industrial Automation, Instrumentation Systems, Artificial Intelligence, Image/Video Processing, Computer Vision, and Medical Imaging. He has authored/edited two books and published more than 100 articles in the peer-reviewed international journals as well as conference proceedings. Dr. Pati has filed 2 Indian patents. He has served as a reviewer in a wide range of reputed international journals and conferences. He also has guest-edited special issues of Cognitive Neuro dynamics and the International Journal of Signal and Imaging System Engineering. He has delivered many Keynote/Invited talks in India as well as abroad. Besides other sponsored projects, he is currently associated with a high-value IMPRINT project, "Intelligent Surveillance Data Retriever (ISDR) for Smart City Applications," which is an initiative of the Ministry of Education (formerly the Ministry of Human Resource Development) and Ministry of Housing and Urban Affairs, Govt. of India.

He has visited countries like the USA, Australia, Italy, Austria, Singapore, Mauritius, etc., in connection with research collaboration and paper presentation. He was also an academic visitor to the Department of Electrical and Computer Engineering, San Diego State University, USA, and the Institute for Automation, University of Leoben, Austria. He is a Senior member of IEEE, Fellow of The Institution of Engineers (India), Fellow of The Institution of Electronics and Telecommunication Engineers (IETE), and life member of various professional bodies like MIR Labs (USA), The Indian Society for Technical Education, Instrument Society of India, Computer Society of India, and Odisha Bigyan Academy. His biography has been included in the 32nd edition of MARQUIS Who's Who in the World 2015.

Speech Title: Video-based Loitering Detection System (LDS) using Deep Learning (DL)

Techniques

Abstract: Intelligent video surveillance systems (IVSS) are widely used in security applications to detect potential crimes and suspicious activities in the early stage for smart city applications. Usually, suspicious activity such as loitering often leads to crime activities such as vandalism, terrorist attacks, bank robbery, pickpocketing, stealing and drug-dealing activity. Loitering can be defined as the act of staying in a sensitive place or public place for a protracted duration or for a period of time longer than a given time threshold. Detection of the loitering in real-time from the enormous amount of video surveillance data by the human operator is an inefficient, erroneous, and tedious job. The timely detection and intimation of the loitering of an individual in a particular geographical area can help in preventing various crime activities. Hence, a deep-learning-based Loitering Detection System (LDS) with re-identification (ReID) capability over a multicamera network is proposed. The proposed LDS mainly comprises of object detection and tracking,



loitering detection, feature extraction, camera switching, and re-identification of the loiterer. The person is detected using YOLO and tracked using Simple Online Real-time Tracking with a deep association matrix (Deep SORT). From the trajectory analysis, once the time and displacement thresholds are satisfied, the person is treated as a loiterer. When the loiterer moves from one camera to another, then the algorithm is switched to the appropriate camera feed as per the proposed camera switching algorithm to minimize the computational cost. Subsequently, the loiterer is reidentified in the switched camera feed by comparing the features of the loiterer extracted by the Mobile Nets with those of the other detected persons based on the triplet loss criteria. The proposed system provides an enhanced accuracy of 96 % on an average fps of 33 (without ReID) and 81.5 % at an average fps of 30 (with ReID).



Invited Speakers



Assoc. Prof. Renjith V Ravi

M.E.A Engineering College, India

Time: 8:55-9:20, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr Renjith V Ravi is presently employed as Associate Professor and Head of the Department of Electronics and Communication Engineering and Coordinator of the Post Graduate Programmes at MEA Engineering College, Kerala, India. He possesses B.Tech. degree in Electronics and Communication Engineering in, M.E. degree in Embedded System Technology and Ph.D. in Electronics and Communication Engineering. He is a member of the panel of academic auditors of APJ Abdul Kalam Technological University, Kerala and had conducted external academic auditing in various affiliated institutions under the same University. He had published several research articles in SCIE and Scopus indexed journals, Edited books and international conferences inside and outside the country. He is an academy graduate and academy mentor in Web of Science and a certified peer reviewer from Elsevier Academy. He has been serving as a reviewer for various SCIE and Scopus indexed journals from IEEE, ACM, Springer, Elsevier, Taylor & Francis, IET, Inderscience, World Scientific, IOS Press De-Gruyter and IGI Global. He has been published five edited books and currently editing one edited book from renowned international publishers. He got granted one patent, one industrial design and two copyrights. He had been awarded several outstanding achievement and outstanding service awards, and several best paper awards from international Conferences. He is a Fellow of IETE and member of IE, ISTE, CRSI, IACSIT, IAENG, SDIWC and senior member of SCIEI and SAISE and a chartered engineer certified by the Institution of Engineers (India). He has been served as the Program Committee member, Session Chair as well as reviewer of several National and International conferences conducted in India and abroad. His research areas include Image Cryptography, Image Processing, Machine Learning, Internet of Things Etc. He is currently focusing his research in the area of secure image communication using image cryptography.

ORCID: <https://orcid.org/0000-0001-9047-3220>

SCOPUS: <https://www.scopus.com/authid/detail.uri?authorId=57200193505>

Publons : <https://publons.com/researcher/3344582/renjith-v-ravi>.

Speech Title: The Role of Explainable Artificial Intelligence (XAI) in Cybersecurity: Building Trust and Transparency in Visible Data Protection

Abstract: Machine learning (ML) models, especially deep learning systems, have made significant progress in various areas of image security. However, due to the complex nature of these models, there are often difficulties in understanding their decisions, leading to a lack of trust and transparency. This talk discusses the importance of XAI in the context of image security and explores ways to build trustworthy and transparent ML-based security systems. Briefly, this lecture examines the principles, techniques, and applications of XAI in image security. Emphasis will be placed on XAI's ability to increase interpretability, improve human-AI collaboration, and build trust in security settings.



Invited Speakers



Assoc. Prof. Bambang Leo Handoko

Bina Nusantara University of Indonesia, Indonesia

Time: 9:00-9:25, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/84854267418>

(password:072628)

Biography: Bambang Leo Handoko, academics and practitioners in the field of accounting, specialty in Auditing. Experience as auditor in public accounting firm, internal auditor for corporation and auditor for securing vital objects of National Police Headquarters. He is an expert in financial audit, cryptocurrencies, financial technology, stock market and e-business. He has had many international publications in reputable journals and proceeding with high index from many citation and acknowledgement from international researchers. He had won a lot of research grant from institution and government. Currently work as Subject Content Coordinator Auditing in Accounting Department, School of Accounting, Bina Nusantara University of Indonesia. He also technical committee in many reputable journal and conference. He is also reviewer for many of Elsevier Journal and professional member of world class reputable research organization, Association of Computer Machinery (ACM).

Speech Title: Enhancing Fraud Prevention: Exploring the Interplay of Internal Control System, Organizational Culture, Internal Audit Roles and Online Whistleblowing Mechanisms

Abstract: The purpose of this study is to determine whether internal control systems, organizational cultures, internal audit roles, and online whistleblowing systems significantly affect fraud prevention. The study uses quantitative methodology. Data was collected through an online questionnaire employing a Likert Scale. Structural Equation Modeling (SEM) with Partial Least Squares (PLS) was used as the analytical technique, using SmartPLS 4.0 software. The study included 95 employees in the position of sales supervisor at a retail company. The results indicate that internal control systems, organizational culture, internal audit roles, and online whistleblowing platforms all significantly contribute to fraud prevention.



Invited Speakers



Prof. Loc Nguyen

Sunflower Soft Company, Vietnam

Time: 9:25-9:50, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/84854267418>

(password:072628)

Biography: Loc Nguyen is an independent scholar from 2017. He holds Master degree in Computer Science from University of Science, Vietnam in 2005. He holds PhD degree in Computer Science and Education at Ho Chi Minh University of Science in 2009. His PhD dissertation was honored by World Engineering Education Forum (WEEF) and awarded by Standard Scientific Research and Essays as excellent PhD dissertation in 2014. He holds Postdoctoral degree in Computer Science from 2013, certified by Institute for Systems and Technologies of Information, Control and Communication (INSTICC) by 2015. Now he is interested in poetry, computer science, statistics, mathematics, education, and medicine. He serves as reviewer, editor, speaker, and lecturer in a wide range of international journals and conferences from 2014. He is volunteer of Statistics Without Borders from 2015. He was granted as Mathematician by London Mathematical Society for Postdoctoral research in Mathematics from 2016. He is awarded as Professor by Scientific Advances and Science Publishing Group from 2016. He was awarded Doctorate of Statistical Medicine by Ho Chi Minh City Society for Reproductive Medicine (HOSREM) from 2016. He was awarded and glorified as contributive scientist by International Cross-cultural Exchange and Professional Development-Thailand (ICEPD-Thailand) from 2021 and by Eudoxia Research University USA (ERU) and Eudoxia Research Centre India (ERC) from 2022. He has published 92 papers and preprints in journals, books, conference proceedings, and preprint services. He is author of 5 scientific books. He is author and creator of 9 scientific and technological products.

Speech Title: Adversarial Variational Autoencoders to Extend and Improve Generative Model

Abstract: Generative artificial intelligence (GenAI) has been developing with many incredible achievements like ChatGPT and Bard. Deep generative model (DGM) is a branch of GenAI, which is preeminent in generating raster data such as image and sound due to strong points of deep neural network (DNN) in inference and recognition. The built-in inference mechanism of DNN, which simulates and aims to synaptic plasticity of human neuron network, fosters generation ability of DGM which produces surprised results with support of statistical flexibility. Two popular approaches in DGM are Variational Autoencoders (VAE) and Generative Adversarial Network (GAN). Both VAE and GAN have their own strong points although they share and imply underline theory of statistics as well as incredible complex via hidden layers of DNN when DNN becomes effective encoding/decoding functions without concrete specifications. In this research, I try to unify VAE and GAN into a consistent and consolidated model called Adversarial Variational Autoencoders (AVA) in which VAE and GAN complement each other, for instance, VAE is good at generator by encoding data via excellent ideology of Kullback-Leibler divergence and GAN is a significantly important method to assess reliability of data which is realistic or fake. In other words, AVA aims to improve accuracy of generative models, besides AVA extends function of simple generative models. In methodology this research focuses on combination of applied mathematical concepts and skillful



techniques of computer in order to implement and solve complicated problems as simply as possible.

Invited Speakers



Asst. Prof. Yanglong Lu

Hong Kong University of Science and Technology, China

Time 13:30-13:55, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr. Lu holds a Ph.D. and B.S. degrees from the Department of Mechanical Engineering at the Georgia Institute of Technology. In 2022, he joined the Hong Kong University of Science and Technology as an assistant professor, following his work as a postdoctoral research fellow at the University of Michigan. Dr. Lu was a finalist in the 2023 NSF Manufacturing Blue Sky Competition and received the ASME Computers and Information in Engineering Division (CIE) Best Ph.D. Dissertation Award in 2021. Dr. Lu's research focuses on several areas, including process modeling and monitoring in additive manufacturing, design optimization, and human health monitoring and diagnosis. In the field of additive manufacturing, one of the major challenges is the variability of build qualities. Dr. Lu and his group have developed innovative sensing techniques that integrate physical models and machine learning methods to enhance efficiency and accuracy in process monitoring. Additionally, Dr. Lu explores the application of physics-informed machine learning in human health monitoring, a domain with limited available data. Emerging direction shows promise in improving monitoring and diagnosis methods for human health.

Speech Title: Image Compression and Denoising Using Physics-Constrained Dictionary Learning

Abstract: Image compression and denoising are crucial tasks in image processing, each presenting unique challenges and employing different techniques. In recent years, compressed sensing (CS) has emerged as a method to improve data acquisition efficiency by leveraging the sparse representation of signals. CS has found extensive applications in image compression and denoising. Dictionary learning has also been developed to enhance the compression ratio in CS by training the basis matrix with specific signal types. However, existing approaches do not optimize the measurement matrix, which determines the pixel locations to be stored, limiting the customization potential for maximizing image compression ratios. To address this limitation, this study introduces a novel approach that combines image compression and denoising using physics-constrained dictionary learning (PCDL). PCDL is a recently developed method that aims to enhance compression ratios and reconstruction accuracy by simultaneously optimizing both the measurement matrix and the basis matrix. The measurement matrix, optimized using a constrained FrameSense algorithm, plays a crucial role in indicating the pixel locations to be stored within the images. On the other hand, the basis matrix is trained using the K-SVD algorithm. By inversely estimating a sparse coefficient vector through PCDL, the original image can be reconstructed while incorporating denoising effects through a linear combination of the basis matrix and the coefficient vector. The effectiveness of PCDL in image compression and denoising tasks is demonstrated in this work. Moreover, the compression ratio is further improved by incorporating constraints that facilitate the selection of the most important regions while eliminating redundant information. The PCDL framework has been successfully applied to medical images and optical images



within the context of manufacturing process monitoring.

Invited Speakers



Dr. Sergii Khlamov

Kharkiv National University of Radio Electronics, Ukraine

Time: 13:55-14:20, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Dr. Sergii Khlamov holds a Ph.D, MSc and BSc degrees with honors at the Kharkiv National University of Radio Electronics, Ukraine, where continues working. The Ph.D dissertation title was "Computational data processing methods for detecting objects with near-zero apparent motion" of the specialty 01.05.02 "Mathematical modeling and computational methods". Dr. Khlamov's research focuses on several areas, including computational methods, mathematical modeling (statistical and in situ), image recognition, image filtering, image processing, machine/computer vision, observational astronomy, computer science, big data and data science, data mining, knowledge discovery in databases, machine learning, internet of things, artificial intelligence, etc. Since 2014 Dr. Sergii Khlamov is a senior researcher of the Collection Light Technology (CoLiTec) project and the developer of the Lemur software for detecting the moving space objects (asteroids/satellites) in a series of astronomical frames. Also, Dr. Khlamov has more than 12 years of experience in Test Automation and Quality Assurance in the different top IT-companies. Now he is a Team Lead Test Automation of the SoftServe Incorporation. Dr. Sergii Khlamov has more than 160 national and international publications, including 5 monographs, 22 patents. Currently he is a scientific supervisor of the Ukrainian project of fundamental scientific research "Development of computational methods for detecting objects with near-zero and locally constant motion by optical-electronic devices" #0124U000259 in 2024-2026 years.

Speech Title: Astronomical Image Processing by the Lemur Software

Abstract: The astronomical images are made by cameras with the charge-coupled device (CCD). They can be received from the different sources, like servers, clusters, predefined series, archives or "live" (online) data streams. The astronomical images processing is focused on but not limited to the following tasks: data mining, knowledge discovery, big astronomical data processing, filtering, background alignment, brightness equalization, segmentation, classification, image recognition, object's image detection, object's astrometry and photometry, moving object detection, parameters determination of the object's image and apparent motion, reference objects selection and others. The modern Lemur software of the Collection Light Technology (CoLiTec) project (<https://colitec.space>) was developed using the described above technologies and approaches. The Lemur software is designed to perform a sequence of the following main steps: pre-processing (astronomical information collection -> worst data rejection -> useful data extraction -> data mining -> classification -> background alignment -> brightness equalization), image processing (segmentation -> typical form analysis -> recognition patterns applying -> detection of the object's image -> astrometry -> photometry -> objects identification -> tracks detection), knowledge discovery (Solar System objects or artificial satellites to be discovered, tracks parameters for the investigation, light curves of the variable stars, scientific reports in the international formats). The paper describes the modern features for the astronomical image processing implemented in the Lemur software. It has assisted in making over 1700 discoveries of asteroids, including 5 NEOs, 21 Trojan asteroids of Jupiter, 1 Centaur. In



total it has been used in about 800 000 observations, during which five comets were discovered.

Invited Speakers



Assoc. Prof. Mohammed M. Bait-Suwailam

Sultan Qaboos University, Oman

Time: 14:20-14:45, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Mohammed M. Bait-Suwailam (Senior Member, IEEE) received the B.Eng. degree in Electrical and Computer Engineering from Sultan Qaboos University, Muscat, Oman, in 2001, the MSc. degree in electrical and computer engineering from Dalhousie University, Halifax, NS, Canada, in 2004, and the Ph.D. degree in Electrical and Computer Engineering from the University of Waterloo, in 2011. From 2018 to 2019, he spent his sabbatical research leave at the School of Electronic Engineering and Computer Science, Queen Mary University of London, London, U.K. He is currently an Associate Professor with the Department of Electrical and Computer Engineering, Sultan Qaboos University. He is also working as the Director of Communication and Information Research Center, Sultan Qaboos University. He has authored/co-authored more than 60 refereed journals and conference papers. His research interests include antenna theory and design, metamaterials, EMI/EMC, electromagnetic energy harvesting and flexible sensors for healthcare applications, deployment of artificial intelligence and remote sensing for food inspection and renewable energy solutions. Dr. M. Bait-Suwailam was the recipient of several scholarships and awards, including the Best Paper Award from The Research Council of Oman in 2017 and the Best Teacher Award from Sultan Qaboos University in 2015. He is also serving as an Associate Editor for IEEE Access and the Journal of Engineering Research.

Speech Title: Impact of Open Datasets on Objects Detection and Tracking

Abstract: Open datasets play a major role in advancing artificial intelligence and machine learning algorithms, especially in the detection and tracking of small objects and features, in fields including but not limited to healthcare, autonomous vehicular systems, consumer electronics among others. Although datasets from real-world experiments can significantly help in the prediction and tracking of objects, such datasets have certain limitations, due to the nature of experimental setups along with high cost of experimental preparation and data labeling and segmentation. Thus, the use of synthetic datasets applied to various real-world problems can be advantageous to fit many realistic problems. In this talk, the impact of datasets generation, size and scalability will be discussed and addressed to some problems of interest. Some suggested measures to alleviate the encountered challenges under various environmental conditions will be addressed.



Invited Speakers



Prof. Cyrus F Nourani

Akdmkrd-DAI-TU Berlin, Germany

Time: 14:00-14:25, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/84854267418>

(password:072628)

Biography: Cyrus F. Nourani, PhD, has a national and international reputation in computer science, artificial intelligence, mathematics, virtual haptic computation, enterprise modeling, decision theory, data sciences, predictive analytics economic games, information technology, and management science. In recent years he has been engaged as a research professor at Simon Frasier University in Burnaby, British Columbia, Canada, and at the Technical University of Berlin, Germany, and has been working on research projects in Germany, Sweden, and France. He has many years of experience in the design and implementation of computing systems. Dr. Nourani's academic experience includes faculty positions at the University of Michigan-Ann Arbor, the University of Pennsylvania, the University of Southern California, UCLA, MIT, and the University of California, Santa Barbara. He was a visiting professor at Edith Cowan University, Perth, Australia, and a lecturer of Management Science and IT at the University of Auckland, New Zealand. Dr. Nourani has taught AI to the Los Angeles aerospace industry and has worked in many R&D and commercial ventures. He has written and coauthored several books. He has over 400 publications in computing science, mathematics, and management science, and he has written several books and has edited several volumes on additional topics, such as pure mathematics; AI, EC, and IT management science; decision trees; and predictive economics game modeling. In 1987, he founded Ventures for computing R&D and was a consultant for such clients such as System Development Corporation (SDC), the US Air Force Space Division, and GE Aerospace. Dr. Nourani has designed and developed AI robot planning and reasoning systems at Northrop Research and Technology Center, Palos Verdes, California. He also has comparable AI, software, and computing foundations and R&D experience at GTE Research Labs. Dr. Nourani commenced his university degrees at MIT, where he became interested in algebraic semantics. That was pursued with a world-renowned category theorist at the University of California and Oxford University. Dr. Nourani's dissertation on computing models and categories proved to have pure mathematics foundations developments that were published from his postdoctoral times in US and Europe publications.

Speech Title: Generative Visual AI Processes with a Visual Commonsense Deductive Processor

Abstract: A visual multiagent diagrammatic reasoning system with abstract models, predictive visual analytics based on a visual virtual tree-based functional deductive system called Morph Gentzen which was developed by the author since 1997. Context abstractions with categorical linguistics, agent languages, and Meta Contextual Reasoning are newer areas encompassed since the Morph Gentzen computing logic by this author since 1997. Reflecting on what was accomplished over the years, this brief is a glimpse on the techniques that bring forth computable AI world knowledge representable with generic model diagrams, characterized with a minimal family of generalized Skolem functions. The functions may correspond to objects defining shapes and depicting pictures. The process is instantiated on tableau sequents with logical deductive completeness on the sequent models that are proved to have



compactness properties.

Invited Speakers



Assoc. Prof. Pavel Loskot

ZJU-UIUC Institute, China

Time: 14:25-14:50, July 28-- GMT+7 (Online Talk)

Zoom link: <https://us02web.zoom.us/j/89803680782>

(password:072628)

Biography: Pavel Loskot joined the ZJU-UIUC Institute, Haining, China, in January 2021 as Associate Professor after 14 years being the Senior Lecturer at Swansea University in the UK. He obtained his PhD degree in Wireless Communications from the University of Alberta in Canada, and the MSc and BSc degrees in Radioelectronics and Biomedical Electronics, respectively, from the Czech Technical University of Prague in the Czech Republic. In the past 25 years, he was involved in numerous collaborative research and development projects, and also held a number of consultancy contracts with industry. Pavel Loskot is a Senior Member of the IEEE, a Fellow of the Higher Education Academy in the UK, and the Recognized Research Supervisor of the UK Council for Graduate Education. His current research interests focus on mathematical and probabilistic modeling, statistical signal processing and classical machine learning for multi-sensor data in biomedicine, computational molecular biology, and wireless communications.

Speech Title: Quantifying Uncertainty via Conformal Predictions

Abstract: In many scenarios, it is useful to understand how good the estimated or predicted values are, especially when the observations are very noisy. One option is to evaluate the parameter likelihood or even posterior distribution. This may, however, be problematic when more sophisticated machine learning methods such as deep neural networks are used. On the other hand, conformal prediction is a simple and model-agnostic method for obtaining credible or confidence bounds very likely containing the true values. The uncertainty bounds can be also used for other machine learning tasks such as measuring the model uncertainty or deciding how likely it is that the sample comes from a training distribution. In this talk, we will introduce conformal predictions, outline how they are related to quantile regression, then discuss their key statistical properties, and finally explain how conformal predictions can be used in machine learning.



Onsite Session A

- ✚ Topic: Machine Learning Models and Computing
- ✚ Time: 13:55-16:10, Thailand Time, GMT+7, July 27,2024
- ✚ Location: Pavilion 2 Room on 9th Floor
- ✚ Session Chair: Assoc. Prof. Moirangthem Marjit Singh, North Eastern Regional Institute of Science & Technology (NERIST), India
- ✚ AC1007, AC1009, AC1018, AC1026, AC1044-A, AC1055, AC1070, KM017, RT006-A

AC1007 13:55-14:10

Title: Forecasting of photovoltaic power using deep learning

Author(s): Akarapon Lertwiputh, Chakrit Watcharopas, Pakaket Wattuya

Presenter: Akarapon Lertwiputh, Kasetsart University, Thailand

Abstract: The forecasting of photovoltaic (PV) power presents a solution to mitigate the impact of fluctuations in PV power, thereby enhancing grid stability and reducing the overall impact on power generation planning. Consequently, this facilitates the integration of more PV generation into the grid, contributing to an increase in electricity generation from renewable energy sources. This study employs deep learning algorithms as the primary technique to forecast PV power, with a forecast horizon extending up to 10 days ahead. The findings suggest that the Multilayer Perceptron is the preferred technique for constructing a forecast model using numerical weather prediction data, while a model incorporating Convolutional Neural Networks and Long Short-Term Memory is well-suited for implementing with sequences of historical data. Additionally, we assess the performance of the models by evaluating the Root Mean Square Error for PV power forecasting validation.

AC1009 14:10-14:25

Title: Search Space Reconstructing for Neural Architecture Search

Author(s): Yuzhuo Gao, Hao Li, Chao Wu

Presenter: Chao Wu, Zhejiang University, China

Abstract: Neural architecture search (NAS) has shown its great potential in finding outstanding network architecture. For NAS, a predefined search space is required to specify the searching principle for the search strategy. Search space defines the structural paradigm that searching methods can explore, directly predetermining the best network architecture search method can find. It is a vital but challenging problem to construct a great search space. Generally, a good search space is expected to exclude human bias and be large enough to cover a wider variety of model architectures. Existing NAS works manually design their search space according to prior knowledge and the scale of search space heavily suffers from the limitation of computational cost for it can grow exponentially when a new operation is added to search space. To maintain the advantage of a large search space while meeting the limitations of computational cost, we propose search space reconstruction (SSR), a simple but effective approach to construct search space based on dataset and task. Experiments demonstrate that a reconstructed search space can dramatically reduce time consumption during the searching phase and enhance the performance of search results. Specifically, we apply a new search space constructed by SSR to DARTS, without any other modification, achieving a 0.68% error rate promotion immediately on CIFAR-10.

**AC1018**

14:25-14:40

Title: Personal Authentication by both Palm and Back of the Hand Images using CNN

Author(s): Kai Ebato, Kouya Tochikubo, Mitsuhiko Meguro

Presenter: Kouya Tochikubo, Nihon university, Japan

Abstract: In recent years, there has been an increasing demand for personal authentication using biological information such as fingerprints, faces, palmprints and iris. In general, conventional biometric authentication involves first extracting geometric features from a scanned image. Then, authentication is performed by matching the features at the time of enrollment with those at the time of authentication. For example, in the case of fingerprint authentication, features (maneuvers) such as ridges and edge points of a fingerprint are extracted. For palmprint authentication, it is common to estimate a palmprint region of excellent quality. On the other hand, this paper proposes a personal authentication method by both palm and back of the hand that directly matches images without extracting geometric features. In our method, images of the palm and back of the hand are taken with a smartphone, and the images are divided into training images for machine learning and images for evaluation. The training images are machine learned using a convolutional neural network (CNN), which is widely used in image recognition. Then, the authentication accuracy is evaluated using the evaluation images. In this paper, authentication accuracy is evaluated not only on RGB color images, but also on grayscale images and edge-extracted images. The results show that the proposed method can achieve high authentication accuracy even with small image sizes by using both the palm and back of the hand, rather than only one of the palm or back of the hand.

AC1026

14:40-14:55

Title: A study of relationship between business performance and stock prices using machine learning techniques

Author(s): Vorapat Rukpanichsiri, Nuanwan Soonthornphisaj

Presenter: Vorapat Rukpanichsiri, Kasetsart University, Thailand

Abstract: This research investigates the relationship between fundamental factors and stock prices. The study uses 50 stocks listed on the SET100 index in 2022. The fundamental factors of interest are earnings per share (EPS), price-to-book ratio (P/B), net profit margin, dividend yield, return on assets (ROA), return on equity (ROE), and debt-to-equity ratio (D/E). The study uses quarterly data for 10 years, from 2012 to 2021. This results in 40 data points per stock. The relationship between fundamental factors and stock prices is investigated using machine learning methods, including Lasso, Regression Tree, Random Forest, AdaBoost, Xgboost, Gradient Boosting, and Neural Network. The relationship between fundamental factors and stock prices is evaluated using k-fold cross-validation. This method divides the data into training and testing sets. The performance of each model is measured using the R-squared value. The findings of the study suggest that some fundamental factors are significant predictors of stock prices. The strongest relationships are found in P/BV. The results also suggest that Neural Network methods can be used to identify the relationships between fundamental factors and stock prices.

AC1044-A

14:55-15:10

Title: A Short-Term Prediction Model of PM2.5 Concentration Based on Deep Learning and Mode Decomposition

Author(s): Jun Wei

Presenter: Jun Wei, Sun Yan-sen University, China

Abstract: The rapid development of urbanization and industrialization inevitably brings about environmental problems, and the air pollutants also pose a big threat to human health. It is urgent to predict the air quality correctly, especially the primary air pollutant PM2.5. The rise of artificial intelligence provides many new methods and ideas for the prediction of PM2.5. Based on Ensemble empirical mode decomposition (EEMD), Back Propagation (BP), Convolutional Neural Network (CNN) and Long Short-Term Memory (LSTM), a short-term concentration prediction model for PM2.5 in Beijing is established in this paper. To extract the time-frequency



characteristics of different frequency series, EEMD is used to decompose the original series, obtain several intrinsic mode functions (IMF), and then each IMF is trained by BP for its ability to process nonlinear big data. The final prediction value is the summation of the results of all IMF models. This study also constructs a hybrid model of CNN and LSTM, so as to explore the influence of regional PM2.5 values on the prediction of single station's PM2.5. CNN is used to extract spatial information of the time series of regional PM2.5, which is then transformed into a vector corresponding to time, used by LSTM prediction. The results show that both two mixed models can improve the prediction effect. Especially in the prediction of heavily polluted weather, the average absolute error of the output is reduced by more than 10 g/cm³. Compared with the single model or other mixed models, the prediction accuracy is significantly improved.

AC1055

15:10-15:25

Title: Machine Learning Regression Model Development and Data Visualization of Road Accidents in Urdaneta City, Pangasinan, Philippines

Author(s): Danilo Bedon Dorado, Joey Subridu Aviles

Presenter: Danilo B. Dorado, Angeles University Foundation, Philippines

Abstract: Road accidents contribute significantly to annual fatalities. Various agencies engaged in road safety management are consistently striving for quality improvement to predict and mitigate accidents through the aid of information technology. As machine learning emerged, its data analysis, visualization, and prediction capabilities have proven to help policymakers. The main objective of this study is to develop a machine-learning model for predicting road accidents in Urdaneta City, Philippines. The dataset used consists of three years (2021–2023) of road accident records from the Emergency Medical Services (EMS). Various preprocessing methods are employed, and a grid search technique is implemented to identify optimal features for the model. Random Forest, XGBoost, AdaBoost, Decision Tree, and LGBM algorithms are developed to predict and visualize road accident occurrences. Upon development, it was found that XGBoost performs well among other models, acquiring a total Rsquared of 0.9996 in training and 0.9898 during testing. To validate the findings of the study, the model's interpretability was assessed using a William Plot. The SHAP and LIME methodologies offer valuable insights into how various variables affect the model's forecast of the monthly number of road accidents. The Permutation Feature Importance approach provides insight into the specific impact of each feature on the model's predictions, emphasizing the significant influence of time on accident frequency, particularly during peak hours or late-night accidents. The Box Plot offers valuable insights, with the median (Q2) indicated by a line showing a value of around 10. Leveraging this model can significantly reduce the likelihood of accidents in real-time, resulting in a safer and more intelligent transportation ecosystem.

AC1070

15:25-15:40

Title: Deep Learning-Driven Sentiment Analysis: Unlocking Insights in Topic-Specific Twitter Conversations

Author(s): Amar Taggu, Chetana Dubey, Rosy Paul

Presenter: Amar Taggu, NERIST, India

Abstract: The current work introduces an advanced deep learning (DL) approach to perform sentiment analysis on Twitter, focusing on topic-specific contexts. Traditional sentiment analysis models often fall short in accurately interpreting the diverse and context-sensitive nature of social media language. The proposed approach utilizes cutting-edge neural network architectures, including convolutional neural networks (CNNs) and bidirectional long short-term memory networks (BiLSTMs), to effectively capture the complex linguistic patterns and sentiment nuances within tweets. By incorporating topic modeling techniques, the model's ability to discern sentiment in relation to specific subjects is enhanced. Extensive experiments using a variety of datasets demonstrate that this method significantly outperforms existing baseline models in terms of accuracy and robustness. Use of deep learning yields better accuracy in both topic detection (96% (DL) vs 86% [1] vs 82% (baseline)) and sentiment analysis (87%(DL) vs 82% [2] vs 76% (baseline)). The results suggest that this deep



learning-based approach not only improves sentiment classification but also offers valuable insights into public opinion on various topics.

KM017

15:40-15:55

Title: Enhanced Variable Precision Conceptual Approximations in Formal Context Settings

Author(s): Yu-Ru Syau, En-Bing Lin, Chang-Shiann Wu

Presenter: Yu-Ru Syau, National Formosa University, Taiwan

Abstract: This note comprehensively explores the application of refined variable precision rough conceptual approximations in formal contexts, with a particular focus on their implications in Formal Concept Analysis (FCA) and Rough Set Theory (RST). It delves into the representation of concept extents and object concepts within a formal context, elucidating the closure operator and its relationship with the closure system in FCA. Moreover, it provides insights into equivalence classes and their connections with rough conceptual approximations. Additionally, the discussion extends to binary relations in RST, introducing lower and upper approximations based on the afterset and establishing the binary relation-based generalized rough set model. Furthermore, it introduces variable precision concepts, delineating inclusion errors and their incorporation into Ziarko's VP-model to derive β -lower and β -upper approximations. The note further extends rough conceptual approximations using variable precision techniques, introducing the concept of inclusion errors and parameter variables to define variable precision rough conceptual approximations in formal contexts. The note also explores the properties and relationships of these approximations, showcasing their utility in handling finite formal contexts and demonstrating their equivalence to certain binary relations. Overall, it contributes to a deeper understanding of rough set theory, binary relations, and their applications in formal concept analysis, particularly focusing on variable precision techniques for conceptual approximations in finite formal contexts. An example is also presented to illustrate and validate the results.

RT006-A

15:55-16:10

Title: Investigating the Moderating Effects of Technological and Legal Factors and Frameworks on Knowledge Management Processes and Innovation Outcomes

Author(s): Abdulaziz Manea Almanea,

Presenter: Abdulaziz Manea Almanea, Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia

Abstract: In today's dynamic landscape, competitive advantage hinges on unlocking the power of knowledge management to drive innovation. Organizational knowledge often resides in silos or tacit forms, hindering its effective dissemination and application, thereby limiting its contribution to competitive advantage. Moreover, government and organization regulations and police might add another layer of complexity in managing knowledge when collaborating on innovative projects. This, as a result, might raise a critical serious concern that might influence the agility of the innovation of the organization. The purpose of this paper is to investigate the impact of regulations and policies on knowledge management and how various technologies might contribute to eliminating such challenges. This includes examining the literature and showcasing different examples from the Saudi industry to understand the legal and technical impact of fostering better knowledge management behaviors. From a tech perspective, the results showed the promise of AI technologies in advancing the use of an organization's knowledge, especially with the advanced development of various models that focus on unstructured data. From a legal perspective, the results highlighted the need for agile yet regulated frameworks that prioritize the frictionless exchange of knowledge, ensuring both compliance and optimal knowledge utilization.



Onsite Session B

- ✚ Topic: Data Driven Information Extraction and Management
- ✚ Time: 16:25-18:40, Thailand Time, GMT+7, July 27,2024
- ✚ Location: Pavilion 2 Room on 9th Floor
- ✚ Session Chair: Prof. Li-Ren Yang, Tamkang University, Taiwan
- ✚ AC1004, AC1015, AC1059, AC1061, AC1065, AC1066, KM009-A, KM014-A, AP103

AC1004 16:25-16:40

Title: DeltaAug: Cross-Modal Hard Feature Mining for Few-Shot Learning
 Author(s): Xuan Chen
 Presenter: Xuan Chen, Central University of Finance and Economics, China

Abstract: Few-shot learning, i.e., learning quickly from only a few examples, is of significant practical value within the realm of artificial intelligence. The challenges of this task are primarily associated with the issue of overfitting. Despite promising attempts, previous efforts still yield unsatisfactory results in indistinguishable categories. To address this, we propose DeltaAug, an innovative Cross-Modal hard feature mining strategy that leverages arithmetic operations of multi-modal features in pre-trained CLIP to significantly expand the dataset size. We first analyze the multi-modal characteristics of hard classes in pretrained CLIP, deducing an automatic discovery of hard categories prone to confusion. Following this, we develop a novel approach for uni- and cross-modality feature augmentation in the well-aligned visual-textual distribution of CLIP. The augmented features increase the amount of information available for supervised training and improve the distinctiveness of the extracted features, resulting in a superior performance with limited training data. Experimental results on eleven datasets demonstrate the robustness and outstanding classification performance of the proposed method in response to limited training data.

AC1015 16:40-16:55

Title: Investigating Market Strength Prediction with CNNs on Candlestick Chart Images
 Author(s): Nam Thanh Duon, Kien Trung Hoang, Khanh Quoc Duong, Dat Quoc Dinh, Hoan Duc Le, Tuan Huy Nguyen, Bach Xuan Duong, Ban Quy Tran, Anh Ngoc Bui
 Presenter: Duong Thanh Nam, FPT University, Hanoi

Abstract: Accurately predicting market strength remains a challenge, despite numerous existing models. This study explores whether candlestick chart images alone can provide sufficient information for such predictions. We explore this question using deep learning models on diverse financial data: stocks (AAPL), currencies (EUR_USD), and cryptocurrencies (Bitcoin), spanning 2017-2023. We develop two deep learning models: a CNN directly using chart images and a Decomposer architecture incorporating detected candlestick patterns. Our experiments, covering diverse financial assets, revealed that incorporating patterns did not significantly improve model performance compared to using raw images alone. The peak accuracy of approximately 0.7 highlights the limitations of purely image-based models for market prediction. These findings suggest the need for incorporating other data modalities, like financial news or sentiment analysis, to improve predictive power. This research not only informs effective trading strategies but also clarifies the limitations of relying solely on visual candlestick information.

AC1059 16:55-17:10

Title: Integrating Synthetic and Sparsely Labelled Real-World Data for Vineyard Point Cloud Semantic Segmentation
 Author(s): Harry Dobbs, Casey Peat, Oliver Batchelor, James Atlas, Richard Green
 Presenter: Harry Dobbs, University of Canterbury, New Zealand

Abstract: Accurate semantic segmentation of vineyard components is crucial for precision agriculture and robotic



pruning applications. However, the complexity of grapevine structures and the scarcity of labelled 3D point cloud data pose significant challenges. In this study, we investigate the effectiveness of different data strategies to address these challenges: using synthetic data, sparsely annotated real-world data, and a mixture of both. We employ a submanifold sparse convolutional neural network architecture and data augmentation techniques in our experiments. The proposed approaches are evaluated on real-world vineyard datasets, comparing the performance of the three training strategies. Results demonstrate that training on sparsely labelled real-world data alone achieves the best performance. Furthermore, the t-SNE visualization of feature spaces reveals a notable domain gap between synthetic and real-world data. This study highlights the importance of considering the domain gap when utilising synthetic data for vineyard semantic segmentation tasks and the potential benefits of focusing on sparsely annotated real-world data.

AC1061

17:10-17:25

Title: A Comparative Study of Transfer Learning Approaches for Strengthening Face Antispoofing Security

Author(s): Shushanta Pudasaini, Aman Shakya

Presenter: Aman Shakya, Tribhuvan University, Nepal

Abstract: Systems based on face recognition technology are vulnerable to spoofing attacks where fake faces can be used to bypass facial recognition systems. A comparative analysis of various CNN-architecture designs fused with a machine learning model is experimented within this study on a custom dataset. The pre-trained weights of these CNN architectures are used in forward propagation to serve as feature extractors, extracting useful features from a face image. The extracted features are then utilized to train a variety of machine-learning algorithms. VGG16, InceptionV3, Xception, ResNet50, and MobileNetV2 were the state-of-the-art pre-trained CNN architectures employed in this study for extracting facial features from face images. Additionally, various machine learning algorithms including Logistic Regression, KNN, Decision Tree, Support Vector Machines, Random Forest, Gradient Boosting, XGBoost, and LightGBM were trained on these extracted features to classify between real and spoof faces. Each combination was thoroughly investigated to determine how well each architecture and algorithm performed together for feature extraction and classification. Afterward, a comparative analysis was conducted using custom datasets to determine the best-performing combination. The most effective combination was then selected to develop a face-liveness detector. Among the designs investigated, the combination of VGG16 and Linear SVM appears to be the most promising, with an F1-score of 98.44% on test datasets. Furthermore, custom datasets were collected to enhance the research, taking into account the scarcity of Nepalese-origin facial datasets. A custom dataset was curated by collecting images and videos from 75 Nepalese-origin participants.

AC1065

17:25-17:40

Title: Multi-task Learning for Joint Entity and Relation Extraction on Open-domain

Author(s): Jiayue TIAN, Masaomi KIMURA

Presenter: Jiayue Tian, Shibaura Institute of Technology, Japan

Abstract: Joint entity and relation extraction is a critical task in natural language processing, aimed at extracting structured triples from texts. This process is essential for building knowledge bases that support applications like semantic search and content analysis. Named Entity Recognition (NER) is often utilized in relation extraction (RE) as a separate stage in traditional methods or as one of the training targets in modern deep learning methods. In this paper, we propose a multi-task learning approach for RE that integrates NER as one of the training targets while fine-tuning a pre-trained Transformer-based language model. Building on previous work, we utilized an intermediate product of the Transformer's attention mechanism, to represent specific NER tags in a sentence. The shared layers in the Transformer capture features for both RE and NER, resulting in more robust and generalized features that enhance our model's RE performance. We tested our approach on two popular open-domain RE datasets, the New York Times (NYT) and the WebNLG, using four NER types: location, organization,



person, and country. The results show that our model achieved state-of-the-art performance of F1 score on both datasets, outperforming several span-level RE baseline models. Further analysis showed that our model demonstrated superior performance in Single Entity Overlap, a challenging scenario in RE. These findings demonstrate the effectiveness of our multi-task learning approach in improving joint entity and relation extraction.

AC1066

17:40-17:55

Title: Enhancing Data Labeling Through Integration of SS-DBSCAN Clustering and Human-in-the-Loop

Author(s): Gloriana Joseph Monko, Masaomi Kimura,

Presenter: Gloriana Joseph Monko, Shibaura Institute of Technology, Japan

Abstract: This study introduces a novel method for integrating Stratified Sampling for Density-Based Spatial Clustering of Applications with Noise (SS-DBSCAN) clustering with the human-in-the-loop approach to semi-supervised data labeling. We enhance the feature representation of text data using attention mechanisms, leading to the formation of more contextually relevant clusters. The clusters are then processed using SS-DBSCAN, where a custom similarity function aligns them closely with expert-labeled examples, facilitating efficient label propagation. Subsequently, human experts re-evaluate the clustering outputs, refining the process by reassessing the feature similarities to the expert-labeled classes. This iterative process ensures high fidelity in label assignment and enhances the overall reliability of the semi-supervised learning approach. Applied to MIMIC III and Cancer Doc Classification datasets, our method not only aligns the data labels more closely with expert evaluations but also leverages human judgment to confirm the accuracy and reliability of the re-clustering process. Based on the BERT transformers model, the fine-tuned prediction model achieved 100% accuracy in predicting the correct label and evaluated the re-clustering technique's effectiveness, demonstrating 90.3% and 97.8% correctness in the re-clustered labels in MIMIC III and Cancer Doc Classification datasets, respectively.

KM009-A

17:55-18:10

Title: Moderating Role of Project Characteristics in the Relationship between Technological Innovation and Project and Market Performance

Author(s): Li-Ren Yang

Presenter: Li-Ren Yang, Tamkang University, Taiwan

Abstract: Organizations that do not innovate disappear irremediably. They must innovate constantly to stay competitive. Innovation organizations have a sustainable competitive advantage. However, few innovations have significant success. The majority of new ideas never even reach the market. Technological innovations have changed the way new project development (NPD) activities are performed. In addition, it is important for firms to innovate their products in an environmental friendly manner. The pressure of the environmentalism of investors and clients and environmental regulations has caused many firms to enhance green innovation to increase productivity in order to reduce waste generation from production process. Green innovations are the best way to improve the performance of environmental management to satisfy the requirement of environmental regulations. Thus, green technological innovation (GTI) plays an important role in supporting the strategic goals of a NPD project. Although innovation may increase the chances of success, this lack of clear evidence regarding the value of green technological innovation may be why the implementation of GTI on NPD projects appears limited. Thus, a study of the relationship between the implementation of GTI and NPD performance is necessary. The objective of the study was to evaluate the moderating role of project characteristics in the relationship between the implementation of GTI and NPD performance in terms of project and market performance. The findings indicate that the implementation of GTI in terms of green learning, green organization, and green planning contributes significantly to project and market performance. The results also show that team size, information availability, team relationship, and material availability have a moderating effect on the relationship between the implementation of GTI and NPD performance. The research results offer guides to adopting green technological



innovation in the high-tech industry. Project managers can use the research results to modify their current NPD planning and control.

KM014-A Title: Institutional ownership and corporate green innovation
Author(s): Wan Li, Lianghua Chen, Xue Peng
18:10-18:25 Presenter: Wan Li, Southeast University, China

Abstract: Green innovation is a new driver to balance sustainable economic development and environmental protection. As an increasingly important role in corporate governance, more shareholdings held by institutional investors represent louder voice in corporate decision-making. Therefore, the impact of institutional ownership on green innovation deserves serious attention. Based on the data from China, this paper investigates the effect of institutional ownership on corporate green innovation. The results show that higher institutional ownership impedes corporate green innovation. Moreover, in terms of the company's financing power and management structure, smaller financing constraints and Chairman-CEO separation can positively moderate this impact. Further researches find that this impeding effect is less pronounced in state-owned enterprises, but more prominent for the strategic green innovation. These findings contribute to drive corporate eco-friendly practices and provide inspiration for investor governance and company operations.

AP103 Title: Video Performance Metric Assessment of Coding Standards H.264/AVC and MPEG-4
18:25-18:40 Author(s): Andreja Samčović
Presenter: Andreja Samčović, University of Belgrade, Belgrade, Serbia

Abstract: This paper presents a comprehensive video quality assessment that focuses on the comparison of two predominant video coders, H.264/AVC and MPEG-4, particularly at very low resolutions pertinent to web-based applications and security cameras. Objective quality metrics such as Peak Signal-to-Noise Ratio (PSNR) and Structural Similarity Index Measure (SSIM) were employed to evaluate the performance of these coders. Through experimental analysis, it was observed that H.264/AVC offered superior performance over MPEG-4 in terms of both PSNR and SSIM values. This result underscores the efficiency of H.264/AVC in scenarios where high-quality video is essential, despite bandwidth or storage constraints.



Online Session A

- ✚ Topic: Machine Learning Methods, Models and Applications
- ✚ Time: 8:30-10:20, Thailand Time, GMT+7, July 28, 2024
- ✚ Zoom Link: <https://us02web.zoom.us/j/89803680782> (Password: 072628)
- ✚ Session Chair: Prof. Mark Mixer, Wentworth Institute of Technology, USA
- ✚ Invited Speaker- Prof. Umesh C. Pati, National Institute of Technology, India
- ✚ Invited Speaker - Assoc. Prof. Renjith V Ravi, M.E.A Engineering College, India
- ✚ AC2005, AC1016, AC1048, AC1056

Invited Speech 8:30-8:55
 Speech Title: Video-based Loitering Detection System (LDS) using Deep Learning (DL) Techniques
Invited Speaker-- Prof. Umesh C. Pati, National Institute of Technology, India

Abstract: Intelligent video surveillance systems (IVSS) are widely used in security applications to detect potential crimes and suspicious activities in the early stage for smart city applications. Usually, suspicious activity such as loitering often leads to crime activities such as vandalism, terrorist attacks, bank robbery, pickpocketing, stealing and drug-dealing activity. Loitering can be defined as the act of staying in a sensitive place or public place for a protracted duration or for a period of time longer than a given time threshold. Detection of the loitering in real-time from the enormous amount of video surveillance data by the human operator is an inefficient, erroneous, and tedious job. The timely detection and intimation of the loitering of an individual in a particular geographical area can help in preventing various crime activities. Hence, a deep-learning-based Loitering Detection System (LDS) with re-identification (ReID) capability over a multicamera network is proposed. The proposed LDS mainly comprises of object detection and tracking, loitering detection, feature extraction, camera switching, and re-identification of the loiterer. The person is detected using YOLO and tracked using Simple Online Real-time Tracking with a deep association matrix (Deep SORT). From the trajectory analysis, once the time and displacement thresholds are satisfied, the person is treated as a loiterer. When the loiterer moves from one camera to another, then the algorithm is switched to the appropriate camera feed as per the proposed camera switching algorithm to minimize the computational cost. Subsequently, the loiterer is reidentified in the switched camera feed by comparing the features of the loiterer extracted by the Mobile Nets with those of the other detected persons based on the triplet loss criteria. The proposed system provides an enhanced accuracy of 96 % on an average fps of 33 (without ReID) and 81.5 % at an average fps of 30 (with ReID).

Invited Speech 8:55-9:20
 Speech Title: The Role of Explainable Artificial Intelligence (XAI) in Cybersecurity: Building Trust and Transparency in Visible Data Protection
Invited Speaker- Assoc. Prof. Renjith V Ravi, M.E.A Engineering College, India

Abstract: Machine learning (ML) models, especially deep learning systems, have made significant progress in various areas of image security. However, due to the complex nature of these models, there are often difficulties in understanding their decisions, leading to a lack of trust and transparency. This talk discusses the importance of XAI in the context of image security and explores ways to build trustworthy and transparent ML-based security systems. Briefly, this lecture examines the principles, techniques, and applications of XAI in image security. Emphasis will be placed on XAI's ability to increase interpretability, improve human-AI collaboration, and build trust in security settings.

**AC2005**
9:20-9:35

Title: Two genetic algorithms for final exam scheduling
Author(s): Mark Mixer, Steven Morrow, Lev Sukherman,
Presenter: Mark Mixer, Wentworth Institute of Technology, USA

Abstract: The scheduling of final exams at a university is a problem which can be improved with artificial intelligence techniques. In this paper we explain and compare two algorithms used to solve the exam scheduling problem at Wentworth Institute of Technology. The first technique is an implementation of a pure genetic algorithm, while the second combines some graph theoretical algorithms with two variations of a genetic algorithm. We will compare the performance of these approaches to each other as well as compare them to historical results which were obtained using a heuristic approach.

AC1016
9:35-9:50

Title: Investigating the Factors Affecting Risky Levels of Alcohol Consumption among Students Using Machine Learning Approach
Author(s): Sara Fariha Shanchary, Md Naved Meraz, Ayman Ibne Hakim, Chowdhury Nafis Faiyaz, Muhammad Shafayat Oshman
Presenter: Ayman Ibne Hakim, North South University, Dhaka, Bangladesh

Abstract: Addressing the pressing issue of alcohol consumption among students is crucial for the well-being of young individuals and the community. Understanding and mitigating alcohol related challenges faced by young people is essential for their healthy development. This study utilizes machine learning models to analyze data from a Portuguese school, aiming to link students' alcohol consumption levels to personal and familial factors. The primary objective is to identify key factors associated with high alcohol consumption among students. After data preprocessing on their dataset, we employed various machine learning algorithms, including hyperparameter-optimized Decision Tree, Random Forest, Boosting, and Ensemble Learning. Our findings revealed that the decision tree algorithm performed well in predicting risky alcohol consumption for our target research question. Our selected feature subset showed strong positive correlation with the target variable, achieving an accuracy of 80.9 percent on the test set and 98.43 percent on the train set. Notably, this project breaks new ground by using explainable artificial intelligence to add reason to our prediction based on students' familial relationships, expanding upon previous research that also focused on demographic factors.

AC1048
9:50-10:05

Title: Anomaly and Pattern Detection Using Advanced Machine Learning Models All Authors
Author(s): Piyavachara Nacchanandana, Gio Picones, Basem Suleiman
Presenter: Basem Suleiman, University of New South Walse, Australia

Abstract: This research addresses a unique intersection in the field of machine learning: the convergence of anomaly detection and decentralized learning. Although each domain has been extensively studied in isolation, their combination remains relatively unexplored. This study pioneers in investigating the practicality and efficiency of decentralized anomaly detection. We achieve this by integrating the GANomaly architecture with Federated Learning, a novel approach that allows us to analyze the impact of various factors on system performance. The core of our investigation revolves around four aggregation methods: Federated Averaging, FedProx, Federated Personalization, and the newly introduced Federated Median. We meticulously evaluate the efficacy of these methods within a combined GANomaly and Federated Learning framework, focusing on their performance across different levels of local computation and varying proportions of straggler clients per round. This research not only fills a gap in the existing literature, but also offers new insights into the optimization of decentralized learning systems for effective anomaly detection.

**AC1056**
10:05-10:20

Title: Generalized Posterior Calibration via Sequential Monte Carlo Sampler

Author(s): Masahiro Tanaka

Presenter: Masahiro Tanaka, Fukuoka University, Japan

Abstract: As the amount and complexity of available data increases, the need for robust statistical learning becomes more pressing. To enhance resilience against model misspecification, the generalized posterior inference method adjusts the likelihood term by exponentiating it with a learning rate, thereby fine-tuning the dispersion of the posterior distribution. This study proposes a computationally efficient strategy for selecting an appropriate learning rate. The proposed approach builds upon the generalized posterior calibration (GPC) algorithm, which is designed to select a learning rate that ensures nominal frequentist coverage. This algorithm, which evaluates the coverage probability using bootstrap samples, has high computational costs because of the repeated posterior simulations needed for bootstrap samples. To address this limitation, the study proposes an algorithm that combines elements of the GPC algorithm with the sequential Monte Carlo (SMC) sampler. By leveraging the similarity between the learning rate in generalized posterior inference and the inverse temperature in SMC sampling, the proposed algorithm efficiently calibrates the posterior distribution with a reduced computational cost. For demonstration, the proposed algorithm was applied to several statistical learning models and shown to be significantly faster than the original GPC.



Online Session B

- ✦ Topic: Models, Algorithms and Computational Methods in Computer Science and Information Systems
- ✦ Time: 9:00-10:50, Thailand Time, GMT+7, July 28, 2024
- ✦ Zoom Link: <https://us02web.zoom.us/j/84854267418> (Password: 072628)
- ✦ Session Chair: Assoc. Prof. Bambang Leo Handoko, Bina Nusantara University of Indonesia, Indonesia
- ✦ Invited Speaker - Assoc. Prof. Bambang Leo Handoko, Bina Nusantara University of Indonesia, Indonesia
- ✦ Invited Speaker - Prof. Loc Nguyen, Sunflower Soft Company, Vietnam
AC1003, AC1036, AC1054, AC1069

Invited Speech 9:00-9:25

Speech Title: Enhancing Fraud Prevention: Exploring the Interplay of Internal Control System, Organizational Culture, Internal Audit Roles and Online Whistleblowing Mechanisms

Invited Speaker-- Assoc. Prof. Bambang Leo Handoko, Bina Nusantara University of Indonesia, Indonesia

Abstract: The purpose of this study is to determine whether internal control systems, organizational cultures, internal audit roles, and online whistleblowing systems significantly affect fraud prevention. The study uses quantitative methodology. Data was collected through an online questionnaire employing a Likert Scale. Structural Equation Modeling (SEM) with Partial Least Squares (PLS) was used as the analytical technique, using Smart PLS 4.0 software. The study included 95 employees in the position of sales supervisor at a retail company. The results indicate that internal control systems, organizational culture, internal audit roles, and online whistleblowing platforms all significantly contribute to fraud prevention.

Invited Speech 9:25-9:50

Speech Title: Adversarial Variational Autoencoders to Extend and Improve Generative Model

Invited Speaker-- Prof. Loc Nguyen, Sunflower Soft Company, Vietnam

Abstract: Generative artificial intelligence (GenAI) has been developing with many incredible achievements like ChatGPT and Bard. Deep generative model (DGM) is a branch of GenAI, which is preeminent in generating raster data such as image and sound due to strong points of deep neural network (DNN) in inference and recognition. The built-in inference mechanism of DNN, which simulates and aims to synaptic plasticity of human neuron network, fosters generation ability of DGM which produces surprised results with support of statistical flexibility. Two popular approaches in DGM are Variational Autoencoders (VAE) and Generative Adversarial Network (GAN). Both VAE and GAN have their own strong points although they share and imply underline theory of statistics as well as incredible complex via hidden layers of DNN when DNN becomes effective encoding/decoding functions without concrete specifications. In this research, I try to unify VAE and GAN into a consistent and consolidated model called Adversarial Variational Autoencoders (AVA) in which VAE and GAN complement each other, for instance, VAE is good at generator by encoding data via excellent ideology of Kullback-Leibler divergence and GAN is a significantly important method to assess reliability of data which is realistic or fake. In other words, AVA aims to improve accuracy of generative models, besides AVA extends function of simple generative models. In methodology this research focuses on combination of applied mathematical concepts and skillful techniques of computer programming in order to implement and solve complicated problems as simply as possible.

**AC1003**

9:50-10:05

Title: Data-Driven Analysis for Identifying High Crash-Risk Locations in Silang Cavite, Laguna, Philippines

Author(s): Apollo Neil Reyes Duran, Arvin Ramos Manzano, Jasper M Garcia

Presenter: Jasper M Garcia, Laguna State Polytechnic University, Philippines

Abstract: Road infrastructure plays a vital role in the country's economic progress; road accidents are a major factor hindering local and national economic growth. The study aims to identify high-risk locations in Silang, Cavite, Philippines using prediction algorithms. These algorithms are Rule induction, Naïve Bayes, and Decision Tree methods. Using these classifiers, the following results are obtained; 89.84% accuracy and 0.786 kappa were acquired for the decision tree, whereas 88.98% accuracy and 0.770 kappa were obtained for Naïve Bayes, and 85.45% accuracy was achieved for Rule Induction with 0.681 kappa. In conclusion, alcohol and drug intake have a minimal contribution to the results. Reckless imprudence is the major factor in these road crashes that happened between 4:30 PM to 6:00 PM and 9:30 PM to 12:00MN during weekends (Friday to Sunday).

AC1036

10:05-10:20

Title: Tour Itinerary Planner: A Genetic Algorithm and Clustering Approach for Travel plan and Hotel Recommendation

Author(s): Chetan Raju P M, Siddharth M, Channabasav D, Ajith S, Uma D

Presenter: Siddharth M, PES University, India

Abstract: Tourism stands as both a critical industry and a widely embraced leisure pursuit worldwide. Among the foremost challenges faced by tourists lies in the adept planning and coordination of tour itineraries, entailing myriad considerations including Points-of-Interest (POIs), time constraints, budget constraints, and accommodation arrangements. Regrettably, this task often consumes a considerable amount of time, leading to the abandonment of numerous plans. Traditional methods necessitate meticulous examination of hotels, attractions, dining options, their ratings, reviews, and various attributes, rendering the creation of an itinerary within a specified budget a daunting endeavor. In response to this challenge, we propose a model that amalgamates Genetic Algorithm and Clustering methodologies to craft personalized itineraries. This approach takes into consideration factors such as transportation mode, seasonal variations, optimal lodging, and ensures maximal coverage of destinations within the designated budget. Furthermore, the model suggests the optimal timing for visiting each locale. This innovative solution aims to streamline the itinerary planning process and enrich the overall travel experience.

AC1054

10:20-10:35

Title: Telecommunications Product Revenue Time-Series Forecasting Using Target Variable Preprocessing Methods

Author(s): Philippe Anthony Bautista, Christian Paul Chan Shio, Patricia Angela Abu

Presenter: Philippe Anthony C. Bautista, Ateneo De Manila University, Philippines

Abstract: Accurate revenue forecasting is critical for decision-making support of telecommunications companies (telcos). This study explored the use of machine learning for time-series revenue forecasting of a telco product. While existing research explores machine learning for time-series forecasting primarily for stocks price prediction and different use cases in other industries, this study focused on telco revenue and the impact of target variable preprocessing on forecasting accuracy. Two datasets with different business rules for the same attribute were used, with two preprocessing techniques for converting monthly revenue data to daily applied to each dataset: even distribution and a weighted distribution based on daily subscriber count. Recurrent neural networks (RNNs), specifically long short-term memory (LSTM) and gated recurrent unit (GRU), were employed for revenue prediction. Various factors were used to produce additional model variations, specifically seed selection, dataset, preprocessing technique, and input window size. Mean Absolute Percentage Error (MAPE) was the key metric for comparison of model performance. The results showed that weighted preprocessing produced



the most accurate model with an MAPE of 3.08\% despite its reliance on a specific variable combination. This study concludes that target variable preprocessing impacts model outputs, with weighted distribution offering the highest accuracy for telco product revenue forecasting using RNNs.

AC1069
10:35-10:50

Title: Effectiveness of Transformers for S&P500 Index Forecasting

Author(s): Carlos Montenegro, Krishna Román, Rolando Armas

Presenter: Carlos Montenegro, Escuela Politécnica Nacional, Ecuador

Abstract: This article delves into the effectiveness of Transformer Models, a state-of-the-art deep learning architecture, for data mining regression models. It deploys six transformer-based regression models to forecast the values of the S&P500 index, a dataset known for its noise, non-linearity, complexity, dynamics, non-parametric characteristics, and chaos. We provide a comprehensive overview of the methodology, experimental results, and analysis of these tests. The study identifies the architecture with the most promising effectiveness metrics among the Transformer models, offering practical insights for future research and application in stock market analysis. Additionally, it conducts a comparative evaluation with the latest generation models based on Recurrent Neural Network (RNN).



Online Session C

- ✚ Topic: Modern Information Theory and Information Technology
- ✚ Time: 13:30-15:45, Thailand Time, GMT+7, July 28, 2024
- ✚ Zoom Link: <https://us02web.zoom.us/j/89803680782> (Password: 072628)
- ✚ Session Chair: Invited Speaker- Asst. Prof. Yanglong Lu, Hong Kong University of Science and Technology, China
 - Invited Speaker- Prof. Yanglong Lu, Hong Kong University of Science and Technology, China
 - Invited Speaker - Dr. Sergii Khlamov, Kharkiv National University of Radio Electronics, Ukraine
 - Invited Speaker - Assoc. Prof. Mohammed M. Bait-Suwailam, Sultan Qaboos University, Oman
 - AC1058, AC1067, AC1072, KM001

Invited Speech 13:30-13:55 Speech Title: Image Compression and Denoising Using Physics-Constrained Dictionary Learning
Invited Speaker- Asst. Prof. Yanglong Lu, Hong Kong University of Science and Technology, China

Abstract: Image compression and denoising are crucial tasks in image processing, each presenting unique challenges and employing different techniques. In recent years, compressed sensing (CS) has emerged as a method to improve data acquisition efficiency by leveraging the sparse representation of signals. CS has found extensive applications in image compression and denoising. Dictionary learning has also been developed to enhance the compression ratio in CS by training the basis matrix with specific signal types. However, existing approaches do not optimize the measurement matrix, which determines the pixel locations to be stored, limiting the customization potential for maximizing image compression ratios. To address this limitation, this study introduces a novel approach that combines image compression and denoising using physics-constrained dictionary learning (PCDL). PCDL is a recently developed method that aims to enhance compression ratios and reconstruction accuracy by simultaneously optimizing both the measurement matrix and the basis matrix. The measurement matrix, optimized using a constrained FrameSense algorithm, plays a crucial role in indicating the pixel locations to be stored within the images. On the other hand, the basis matrix is trained using the K-SVD algorithm. By inversely estimating a sparse coefficient vector through PCDL, the original image can be reconstructed while incorporating denoising effects through a linear combination of the basis matrix and the coefficient vector. The effectiveness of PCDL in image compression and denoising tasks is demonstrated in this work. Moreover, the compression ratio is further improved by incorporating constraints that facilitate the selection of the most important regions while eliminating redundant information. The PCDL framework has been successfully applied to medical images and optical images within the context of manufacturing process monitoring.

Invited Speech 13:55-14:20 Speech Title: Astronomical Image Processing by the Lemur Software
Invited Speaker-- Dr. Sergii Khlamov, Kharkiv National University of Radio Electronics, Ukraine

Abstract: The astronomical images are made by cameras with the charge-coupled device (CCD). They can be received from the different sources, like servers, clusters, predefined series, archives or "live" (online) data streams. The astronomical images processing is focused on but not limited to the following tasks: data mining, knowledge discovery, big astronomical data processing, filtering, background alignment, brightness equalization, segmentation, classification, image recognition, object's image detection, object's astrometry and photometry,



moving object detection, parameters determination of the object's image and apparent motion, reference objects selection and others. The modern Lemur software of the Collection Light Technology (CoLiTec) project (<https://colitec.space>) was developed using the described above technologies and approaches. The Lemur software is designed to perform a sequence of the following main steps: pre-processing (astronomical information collection -> worst data rejection -> useful data extraction -> data mining -> classification -> background alignment -> brightness equalization), image processing (segmentation -> typical form analysis -> recognition patterns applying -> detection of the object's image -> astrometry -> photometry -> objects identification -> tracks detection), knowledge discovery (Solar System objects or artificial satellites to be discovered, tracks parameters for the investigation, light curves of the variable stars, scientific reports in the international formats). The paper describes the modern features for the astronomical image processing implemented in the Lemur software. It has assisted in making over 1700 discoveries of asteroids, including 5 NEOs, 21 Trojan asteroids of Jupiter, 1 Centaur. In total it has been used in about 800 000 observations, during which five comets were discovered.

**Invited
Speech**
14:20-14:45

Speech Title: Impact of Open Datasets on Objects Detection and Tracking

Invited Speaker-- Assoc. Prof. Mohammed M. Bait-Suwailam, Sultan Qaboos University, Oman

Abstract: Open datasets play a major role in advancing artificial intelligence and machine learning algorithms, especially in the detection and tracking of small objects and features, in fields including but not limited to healthcare, autonomous vehicular systems, consumer electronics among others. Although datasets from real-world experiments can significantly help in the prediction and tracking of objects, such datasets have certain limitations, due to the nature of experimental setups along with high cost of experimental preparation and data labeling and segmentation. Thus, the use of synthetic datasets applied to various real-world problems can be advantageous to fit many realistic problems. In this talk, the impact of datasets generation, size and scalability will be discussed and addressed to some problems of interest. Some suggested measures to alleviate the encountered challenges under various environmental conditions will be addressed.

AC1058
14:45-15:00

Title: Edge-Guided Non-Activated Feature Residual Network for Infrared Image Super-Resolution

Author(s): Zezhou Li, Yang Yang, Yunxia Liu, Ngai-Fong Bonnie Law,
Presenter: Zezhou Li, Shandong University, China

Abstract: We considered the problem of super-resolution (SR) in infrared (IR) images. Directly applying visible SR methods yields unsatisfactory results due to unique degradation properties of blurred texture regions and low contrast. The existing IR SR network ignores weak edge information presented in IR images, as activation layers treat weak edges as nearly zero. To address this, we propose an edge-guided non-activated feature residual network. It contains a key component named non-activated feature residual block, which leverages the inactive features by incorporating them into the forward data flow. Besides, a novel prior edge-guided branch path is proposed to extract prior edge information to guide the extraction of weak texture features. Effective fusion strategies are designed to combine deep feature maps and prior edge information at different granularities. Experimental results have demonstrated that the proposed network achieves high restoration accuracy and superior perceptual quality.

AC1067
15:00-15:15

Title: Enhancing Indoor Localization Estimation Using RSS Similarity-Based k-Nearest Neighbors



Author(s): Benyamain Yacoob, Daniel Marku, Mina Maleki

Presenter: Benyamain Yacoob, University of Detroit Mercy, United States

Abstract: The rapid growth of indoor positioning is revolutionizing our understanding of entity locations within indoor spaces. The fingerprint-based indoor localization method using Wi-Fi access points (APs) stands out for its minimal hardware requirements, making it one of the promising techniques in this domain. The k-nearest neighbors (k-NN) algorithm, a common machine learning (ML) approach, provides location estimations by pinpointing the k neighbors with the most similar representation values. However, conventional distance functions utilized in k-NN, including Euclidean distance and cosine similarity, prove insufficient in accurately identifying nearest neighbors based on the meaningful interpretation of received signals from APs. Thus, in this research, we propose a new distance function based on received signal strength (RSS) similarity that can be employed in tandem with k-NN to find the optimal nearest neighbors for real-time localization on a more consistent basis when compared to other distance functions. The experimental results of the collected dataset demonstrated a 1 to 3% improvement in the coefficient of determination (R²) score and a reduction in distance error by 6.5 to 10 inches, as determined from the mean absolute error (MAE).

AC1072

15:15-15:30

Title: An Infrastructure Cost Optimised Algorithm for Partitioning of Microservices

Author(s): Kalyani Pendyala, Rajkumar Buyya

Presenter: Kalyani Pendyala, University of Melbourne, Australia

Abstract: The evolution and advances made in the field of Cloud engineering influence the constant changes in software application development cycle and practices. Software architecture has evolved along with other domains and capabilities of software engineering. As migrating applications into the cloud is universally adopted by the software industry, microservices have proven to be the most suitable and widely accepted architecture pattern for applications deployed on distributed cloud. Their efficacy is enabled by both technical benefits like reliability, fault isolation, scalability and productivity benefits like ease of asset maintenance and clear ownership boundaries which in turn lead to fewer interdependencies and shorter development cycles thereby resulting in faster time to market. Though microservices have been established as an architecture pattern over the last decade, many organizations fail to optimize the architecture design to maximize efficiency. In some cases, the complexity of migrating an existing application into the microservices architecture becomes overwhelmingly complex and expensive. Additionally, automation and tool support for this problem are still at an early stage as there isn't a single well-acknowledged pattern or tool which could support the decomposition. This paper discusses a few impactful previous research and survey efforts to identify the lack of infrastructure cost optimization as a parameter in any of the approaches present. This paper proposes an Infrastructure-optimised predictive algorithm for partitioning monolithic software into microservices. It also summarizes the scope for future research opportunities within the area of microservices architecture and distributed cloud networks.

KM001

15:30-15:45

Title: Environmental technology innovation across Indian states: A comparison of Bayesian and frequentist analyses of patents and natural disasters

Author(s): Lingchen Chen

Presenter: Lingchen Chen, Zhejiang Agriculture University, China

Abstract: Do new environmental technologies emerge when people experience many natural disasters? This paper examines whether people who have experienced many natural disasters in the past also tend to create relatively many new technologies that benefit the environment. These people may want to conserve the natural environment in order to reduce the risk of future natural disasters. Thus, I test the hypothesis that those states in India that have been particularly exposed to natural disasters tend to create more patented inventions in environmental technology. Due to the special geographical location of India, it is easy to be affected by natural disasters, and with the development of science and technology, the destruction of nature is getting greater and



greater. What is more, the number of natural disasters happening in various Indian states is also increasing. My assumption is that the development of environmental science and technology is a useful way to reduce the number of natural disasters and reduce the damage to nature. I apply regression analyses, where the outcome variable is the number of environmental technology patents filed in a state, and the explanatory variable is the number of natural disasters that happened in the respective state, indicating people's exposure to environmental problems. The results of my statistical analysis show that there is a statistically significant positive coefficient of the number of natural disasters, based on a simple negative binomial regression. However, when controlling for the GDP and population of Indian states, the coefficient becomes negative. Another novelty of this paper is that frequentist and Bayesian models are combined to obtain more comprehensive results. In conclusion, the analysis shows that there may only be a weak relationship between exposure to natural disasters and the creation of environmental technology patents. In particular, the extent to which an Indian state produces environmental technology patents depends on its overall economic performance, as indicated by GDP. Direct exposure to natural disasters in one's state does not have a strong effect on the creation of green technology patents. Nonetheless, there may be a small effect that is worth investigating by future studies that employ more detailed Bayesian methods.



Online Session D

- ✚ Topic: AI based intelligent algorithms and image processing
- ✚ 14:00-15:50, Thailand Time, GMT+7, July 28, 2024
- ✚ Zoom Link: <https://us02web.zoom.us/j/84854267418> (Password: 072628)
- ✚ Session Chair: Prof. Cyrus F Nourani, Akdmkrd-DAI-TU Berlin, Germany
- ✚ Invited Speaker - Prof. Cyrus F Nourani, Akdmkrd-DAI-TU Berlin, Germany
- ✚ Invited Speaker - Assoc. Prof. Pavel Loskot, ZJU-UIUC Institute, China
- ✚ AC1050, AC1071, AC2004, KM018-A

Invited Speech

14:00-14:25

Speech Title: Generative Visual AI Processes with a Visual Commonsense Deductive Processor

Invited Speaker-- Prof. Cyrus F Nourani, Akdmkrd-DAI-TU Berlin, Germany

Abstract: A visual multiagent diagrammatic reasoning system with abstract models, predictive visual analytics based on a visual virtual tree-based functional deductive system called Morph Gentzen which was developed by the author since 1997. Context abstractions with categorical linguistics, agent languages, and Meta Contextual Reasoning are newer areas encompassed since the Morph Gentzen computing logic by this author since 1997. Reflecting on what was accomplished over the years, this brief is a glimpse on the techniques that bring forth computable AI world knowledge representable with generic model diagrams, characterized with a minimal family of generalized Skolem functions. The functions may correspond to objects defining shapes and depicting pictures. The process is instantiated on tableau sequents with logical deductive completeness on the sequent models that are proved to have compactness properties.

Invited Speech

14:25-14:50

Speech Title: Quantifying Uncertainty via Conformal Predictions

Invited Speaker-- Assoc. Prof. Pavel Loskot, ZJU-UIUC Institute, China

Abstract: In many scenarios, it is useful to understand how good the estimated or predicted values are, especially when the observations are very noisy. One option is to evaluate the parameter likelihood or even posterior distribution. This may, however, be problematic when more sophisticated machine learning methods such as deep neural networks are used. On the other hand, conformal prediction is a simple and model-agnostic method for obtaining credible or confidence bounds very likely containing the true values. The uncertainty bounds can be also used for other machine learning tasks such as measuring the model uncertainty or deciding how likely it is that the sample comes from a training distribution. In this talk, we will introduce conformal predictions, outline how they are related to quantile regression, then discuss their key statistical properties, and finally explain how conformal predictions can be used in machine learning.

AC1050

14:50-15:05

Title: Analysis Use of Remote Audit, Cloud Computing, Artificial Intelligence and Auditor Work Experience on Audit Procedure Implementation

Author(s): Bambang Leo Handoko, Ameliya Rosita, Razi Hazim

Presenter: Razi Hazim, Bina Nusantara University, Indonesia

Abstract: Auditing is a crucial process in business and finance, primarily aimed at ensuring the reliability, integrity, and compliance of an entity with established standards. A systematic audit process can enhance the detection of potential fraud or rule violations. As technological transformation advances, the procedures used in auditing will continue to evolve. Information technology offers new opportunities for auditors to improve efficiency and effectiveness. This study examines several aspects, including the use of remote auditing, cloud



computing, and artificial intelligence, as well as an evaluation of auditors' work experience, in relation to the efficiency and effectiveness of audit procedures. The research is quantitative, involving the distribution of questionnaires to external auditors at Public Accounting Firms. The collected data will be analyzed using SPSS software, version 29. The results indicate that cloud computing, artificial intelligence, and auditors' work experience significantly enhance the efficiency and effectiveness of audit procedures. However, remote auditing does not show a significant effect.

AC1071
15:05-15:20

Title: Transformer-based AI for Sentiment Analysis in Marketing
Author(s): Pythagoras Petratos, Mina Giannoula
Presenter: Mina Giannoula, University of Cyprus, Cyprus

Abstract: Previous research has found that sentiment analysis is the main focus of Artificial Intelligence (AI). Nevertheless, a limited number of studies exist on advanced AI applications. First of all, this study contributes to this limited literature. It is argued that Transformer Architecture has initiated a new phase in AI and sentiment analysis. We contribute to this argument by providing evidence that transformer-based AI provides better performance and capabilities. We do so by systematically reviewing and analysing the applications of Transformer-based models for sentiment analysis. The focus of this paper lies in the broader marketing field. In addition, marketing is one of the most essential fields in business. The choice of marketing in examining Transformer-based sentiment analysis constitutes a novelty. Using the PRISMA methodology we reviewed 481 papers. Only eight papers fulfill the criteria. It is a somewhat surprising finding that so few papers have applications of Transformer-based AI for sentiment analysis in marketing. Most papers follow older AI methods (i.e., Recurrent Neural Networks, Convolutional Neural Networks, etc.). This leaves a gap in this area, and we examine novel trends and directions for future research.

AC2004
15:20-15:35

Title: Advancing Population Dynamics Analysis: Leveraging AI-Enhanced Mathematical Techniques
Author(s): Mutaz Mohammad, En-Bing Lin
Presenter: Mutaz Mohammad, Zayed Univeristy AUH, UAE

Abstract: —In this study, we blend advanced mathematical methods with AI to investigate structured population dynamics. Focusing on the 3rd generation AI techniques, especially numerical simulation, we aim to gain deep insights into population models and their behaviors. By transforming partial differential equations into ordinary differential equations, we conduct practical explorations with illustrative examples to showcase our discoveries. We particularly emphasize exploring the model's link with size-structured population models, enhancing our understanding of population dynamics. Our methodology seamlessly integrates the tight frame representation method with collocation, enabling resolution of complex partial differential equations and facilitating more precise simulations through AI-driven analysis of numerical solutions.

KM018-A
15:35-15:50

Title: Adopting Artificial Intelligence and Machine Learning Technologies for Content Moderation, Film Censorship and Rating
Author(s): Gururaj Devarhubli
Presenter: Gururaj Devarhubli, Nirma University, India

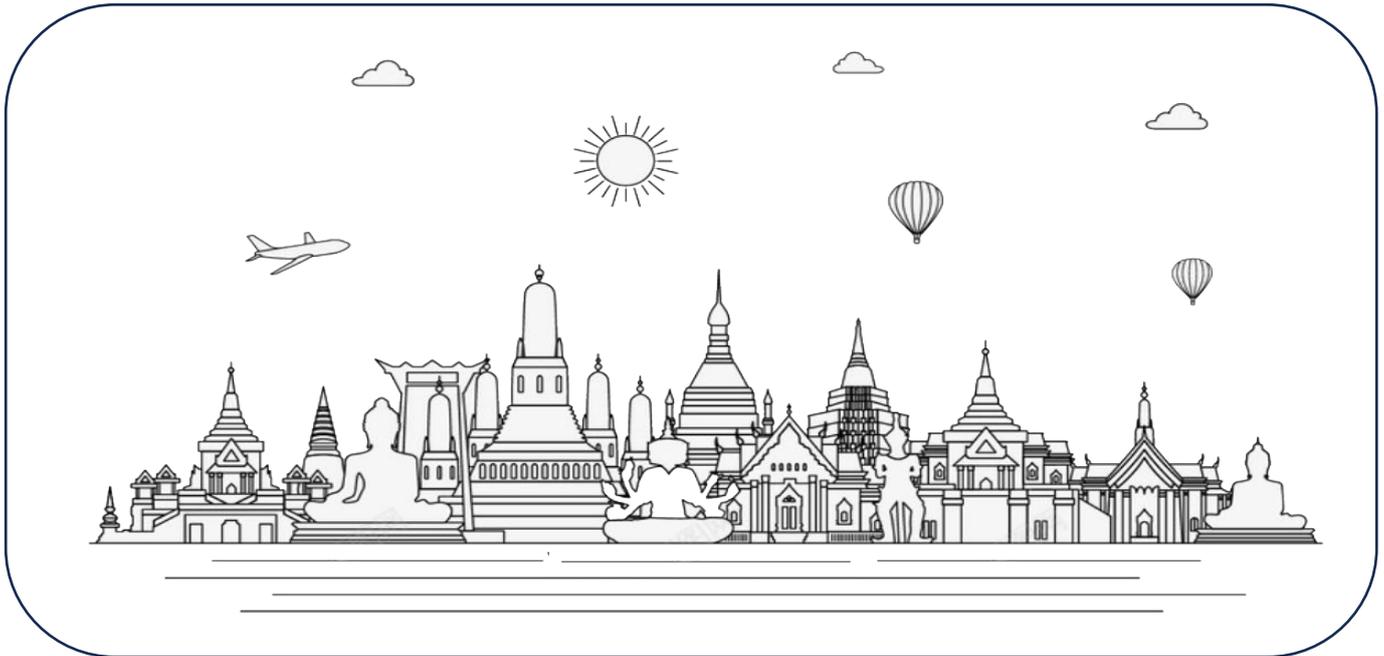
Abstract: In recent years, Automated Film Censorship and Rating (AFCR) has emerged as a prominent field within the field of Machine Learning (ML). Manually censoring and rating films, TV shows, animations, and other audiovisual contents has become an increasingly laborious task due to the widespread expansion of film production and streaming services. As a result, new approaches to AFCR system design based on ML have been appearing. The first, impromptu attempts to build the AFCR system, however, necessitate a "complete" conceptual model of the system, including all possible classes and the criteria for selecting them. Primarily, this article seeks to identify the content's contextual and general classes, as well as its AFCR system criteria. In



addition, the ML models, benefits, and drawbacks of the most recent state-of-the-art AFCR systems have been thoroughly examined. An essential step in determining video age groups is giving a video a content-based rating. The two most popular rating systems established by expert committees are the movie content rating system and the TV show rating system. The problem is that there is an ever-increasing volume of video content available online, making it nearly impossible for a committee to manually assess and evaluate scene/film content. Consequently, automating the review process with computer vision-based video content analysis algorithms is a desirable approach. With a comparative analysis of the existing ML models, we have shown the efficacy of sequential and multimodal analysis in the development of an effective AFCR system. This paper summarizes related works for content moderation, video classification, multi-modal learning, and movie content rating.



Bangkok, Thailand



WAT PHRA KAEW

Located inside the grounds of the Grand Palace, Thailand's most valued temple features the magnificent Emerald Buddha that dates back to the 14th century. Wat Phra Kaew is famous throughout Thailand as the original home of the translucent green Buddha which graces the Emerald Buddha Temple in Bangkok's Grand Palace.

JIM THOMPSON HOUSE

This former home of an American named Jim Thompson, who started the Thai silk industry after World War II, houses a magnificent collection of Asian art and many unique displays.

CHATUCHAK WEEKEND MARKET

Chatuchak Weekend Market is home to a whopping 15,000 stalls spanning 26 sections and is the world's largest weekend market. At this colossal market, scout for local delicacies, clothing, second-hand merchandise, home decor, handicrafts, antiques, and even plants. You can also enjoy a soothing Thai massage after shopping. Navigating the market can be slightly overwhelming, so snap a picture of the schematic map that shows you what you can find in each section. For a smoother experience, join a private tour to be whisked directly to the best stores to make the most of your Thai Baht. The market can be easily reached by the Skytrain.



