

CONFERENCE PROGRAM

ICSIM 2023

2023 The 6th International Conference on
Software Engineering and Information Management

ICBDSC

2023 the 6th International Conference on
Big Data and Smart Computing

Massey University, Palmerston North, New Zealand

Jan. 31-Feb. 2

2023

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ICSIM 2023

Workshop: ICBDSC 2023

Hybrid

Massey University, Palmerston North, New Zealand

January 31-February 2, 2023



Onsite Venue

Massey PN Campus:
Tennent Drive, Massey University,
Palmerston North 4472

Conference Room:
Riddet Complex C, RCC 2.143,
Presentation Lab.

Online Link

Room A: Zoom ID: 815 2493 0618
Zoom Link: <https://us02web.zoom.us/j/81524930618>

Room B: Zoom ID: 828 7868 7524
Zoom Link: <https://us02web.zoom.us/j/82878687524>

Room C: Zoom ID: 858 3690 8819 (Passcode: 518749)
<https://massey.zoom.us/j/85836908819?pwd=VmVEeDdHMHVlSDUyRUR4b1ZlOTZ2UT09>

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AGENDA OVERVIEW

* All schedules will be scheduled in **New Zealand Daylight Time (NZDT) (UTC+13)**

Day 1: January 31, 2023 | Tuesday

New Zealand Daylight Time	Event
15:00-22:10	Committee & Speakers' Test Session
15:00-19:30	Online Sessions Test
14:00-16:00	Onsite Sign-up

Day 2: February 1, 2023 | Wednesday

New Zealand Daylight Time	Event
9:30-12:05	Opening Remarks & Guest Speeches
13:30-18:30	Onsite Session A & B
16:15-18:30	Online Session 1

Day 3: February 2, 2023 | Thursday

New Zealand Daylight Time	Event
15:00-17:15	Guest Speech & Session 2 & 3
18:30-21:15	Guest Speech & Session 4 & 5

WELCOME

Dear distinguished delegates,

On behalf of the conference Committee, we warmly welcome you to 2023 The 6th International Conference on Software Engineering and Information Management (ICSIM 2023) and its workshop: 2023 the 6th International Conference on Big Data and Smart Computing (ICBDSC 2023), which will be held in Massey University, Palmerston North, New Zealand on January 31-February 2, 2023. The conference will be held both online and onsite based on all the participants' willingness.

ICSIM initiated in Casablanca, Morocco in 2018, and then held in Bali, Indonesia in 2019, Sydney, Australia in 2020, Yokohama, Japan virtually in 2021-2022 due to the impact of covid19. The conference is addressed to academics, researchers and professionals with a particular interest related to the conference topic. It brings together academics, researchers and professionals in the field of Software Engineering and Information Management making the conference a perfect platform to share experience, foster collaborations across industry and academia, and evaluate emerging technologies across the globe.

We would like to express our sincere gratitude to everyone who has contributed to this conference as its success could have only been achieved through a team effort. Special thanks go to our Advisory Chair, Conference Chairs, Program Chairs, Student Program Chair, Publicity Chairs, Publicity Chairs, Regional Chairs and all the technical committee members for their excellent work in securing a substantial input of papers from all around the world.

Additionally special welcome is given to our keynote speakers and invited speakers who are pleased to contribute to our conference and share their new research ideas with us. They are: Prof. Hans Guesgen; Prof. Huiyu Zhou; Prof. Fuhua (Oscar) Lin; Prof. Dr. Imas Sukaesih Sitanggang; Assoc. Prof. Paul Pang. We do hope that their speeches will provide the reader a broad overview of the latest research result in this field and that it will be a valuable reference source for your further research. We hope that you will find it useful, exciting and inspiring.

Through three days' conference, we will have 2 onsite sessions and 5 online sessions. We believe that by this excellent conference communication, you can get more opportunities for further communication with researchers and practitioners with the common interest in this field. Wish all of you will have an unforgettable experience in the conference.

Yours sincerely,
Conference Committee

COMMITTEE

Advisory Chair

Gourab Sen Gupta, Massey University, New Zealand

Conference Chairs

Yonghui Li, The University of Sydney, Australia

Xiang Gui, Massey University, New Zealand

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Suhuai Luo, University of Newcastle Australia, Australia

Hiroaki Nishi, Keio University, Japan

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Jianxiong Wan, Inner Mongolia University of Technology, China

FuhuaLin, Athabasca University Alberta, Canada

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Paniti Netinant, Rangsit University, Thailand

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Rusli bin HajiAbdullah, Universiti Putra Malaysia, Malaysia

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Omar Hujran, United Arab Emirates University, United Arab Emirates

Zhongkui Wang, Ritsumeikan University, Japan

Chin Teck Min, Sunway University, Malaysia

VENUE

Massey University, Palmerston North, New Zealand

Address: Tennent Drive, Massey University, Palmerston North 4472

Conference Room: Riddet Complex C, RCC 2.143, Presentation Lab.

Massey University (Māori: Te Kunenga ki Pūrehuroa) is a university based in Palmerston North, New Zealand, with significant campuses in Albany and Wellington. Massey University has approximately 30,883 students, 13,796 of whom are extramural or distance-learning students, making it New Zealand's second largest university when not counting international students. Research is undertaken on all three campuses, and more than 3,000 international students from over 100 countries study at the university.

Massey University is the only university in New Zealand offering degrees in aviation, dispute resolution, veterinary medicine, and nanoscience. Massey's veterinary school is accredited by the American Veterinary Medical Association and is recognised in the United States, Australia, Canada, and Britain. Massey's agriculture programme is the highest-ranked in New Zealand, and 19th in Quacquarelli Symonds' (QS)



world university subject rankings. Massey's Bachelor of Aviation (Air Transport Pilot) is an internationally recognised and accredited qualification, is the first non-engineering degree to be recognised by the Royal Aeronautical Society (1998), and has ISO9001-2000 accreditation.

Weather

Palmerston North, New Zealand Temperatures during Jan. 31-Feb. 2, 2023

55-75°F or 13-24°C / Partly cloudy

How to get there?

From Palmerston North International Airport

Taxi: 9.9 kilometers from PN Airport to Massey University | 20 minutes

Bus: walk 1.4 kilometers from PN Airport to 992 Tremaine Ave → Bus 108 (10 stations) to Main St Terminal → Bus 150 (9 stations) to University Ave → Walk 220 meters to Massey University. | 1 hour

Notice

Accommodation is not included in the registration.

ONLINE GUIDELINES

Before the Conference

Time Zone

New Zealand Daylight Time (NZDT) (UTC+13)

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

Platform: ZOOM

* You can download Zoom Platform from the link below:

<https://zoom.us/download>

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

Equipment Needed

- A computer with internet connection and camera
- Headphones

Environment Needed

- A quiet place
- Stable internet connection
- Proper lighting and background

Test Your Presentation

Date: Tuesday, January 31, 2023

Prior to the formal meeting, presenters shall join the test room to ensure everything is on the right track. Please check your test time on this program. Every presenter or listener enter the ZOOM, please rename as SESSION NUMBER + PAPER ID + YOUR NAME.

*For example:

Presenter: S1+ IM-106+David

Listener: L001+David

During the Conference

Voice Control Rules

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

Oral Presentation

- Timing: a maximum of 15 minutes in total, including 2-3 minutes for Q&A. Please make sure your presentation is well timed.
- Please join the meeting room 10 minutes in advance.
- ICSIM encourages all presenters to make live oral presentations. For technical problems such as network instability, we suggest you email a record video/slide to conference secretary as backup before on **January 30, 2023**.

Conference Recording

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

DETAILED AGENDA

* All schedules will be scheduled in **New Zealand Daylight Time (NZDT) (UTC+13)**

Day 1

January 31, 2023 | Tuesday

Online Participants Test	
Committee & Speakers' Test Session	
Room C: Zoom ID: 858 3690 8819 (Passcode: 518749)	
https://massey.zoom.us/j/85836908819?pwd=VmVEeDdHMHViSDUyRUR4b1ZlOTZ2UT09	
New Zealand Daylight Time	Presenter's Local Time
15:00-15:10	19:00-19:10 on Jan. 30, 2023
15:10-15:20	13:10-13:20 on Jan. 31, 2023
15:20-15:30	9:20-9:30 on Jan. 31, 2023
22:00-22:10	9:00-9:10 on Jan. 31, 2023
Presenter	
Prof. Fuhua (Oscar) Lin	
Assoc. Prof. Paul Pang	
Prof. Dr. Imas Sukaesih Sitanggang	
Prof. Huiyu Zhou	
Online Sessions Test	
Room B: Zoom ID: 828 7868 7524 Zoom Link: https://us02web.zoom.us/j/82878687524	
New Zealand Daylight Time	Event
15:00-15:30	Session 2: IM-039; IM2-009; IM-021; IM-043; IM2-051; IM2-002; IM2-025
	Session 3: IM-090; IM2-022; IM-051; IM-003; IM-009; IM-1005; IM2-036
19:00-21:00	Session 1: IM-010; IM2-010; IM2-057; IM-060; IM2-024; IM2-008; IM2-060; IM2-043
	Session 4: IM-015; IM-070; IM-1002; IM-038; IM-011; IM-002; IM-073; IM-076; IM-086
	Session 5: IM-066; IM2-041; IM-036; IM-063; IM-087-A; IM-065; IM2-040; IM-049; IM-075
Onsite Sign-up	
New Zealand Daylight Time	Location
14:00-16:00	Riddet Complex C, RCC 2.143, Presentation Lab.

Day 2

February 1, 2023 | Wednesday

Opening Remarks & Guest Speeches

Chaired by: Dr. Xiang Gui, Massey University, New Zealand

Onsite Venue: Riddet Complex C, RCC 2.143, Presentation Lab.

Room C: Zoom ID: 858 3690 8819 (Passcode: 518749)

<https://massey.zoom.us/j/85836908819?pwd=VmVEeDdHMHViSDUyRUR4b1ZlOTZ2UT09>

New Zealand Daylight Time	Presenter
09:30-09:40	Opening Remarks Prof. Yonghui Li, The University of Sydney, Australia
09:40-10:15	Speech I Prof. Hans Guesgen, Massey University, New Zealand <i>Title: Exploiting Spatio-Temporal Context for Activity Recognition in Smart Homes</i>
10:15-10:45	Speech II Prof Donald Bailey, Massey University, New Zealand <i>Title: Transforming Software Algorithms for FPGA-based Acceleration</i>
10:45-11:05	Coffee Break
11:05-11:35	Speech III Prof. Huiyu Zhou, University of Leicester, UK <i>Title: Modelling uncertainty in image analysis</i>
11:35-12:05	Speech IV Prof. Fuhua (Oscar) Lin, Athabasca University Alberta, Canada <i>Title: Hybrid Human Artificial Intelligent Educational Systems</i>
12:05-13:30	Lunch Time

Onsite Session A&B

Onsite Venue: Riddet Complex C, RCC 2.143, Presentation Lab.

Room C: Zoom ID: 858 3690 8819 (Passcode: 518749)

<https://massey.zoom.us/j/85836908819?pwd=VmVEeDdHMHViSDUyRUR4b1ZlOTZ2UT09>

New Zealand Daylight Time	Event
13:30-15:45	Session A: Artificial Intelligence and Software Development IM2-031; IM2-028-A; IM2-001-A; IM2-015-A; IM-033; IM-007; IM-1001; IM2-035; IM-067-A
16:15-18:30	Session B: Information management and multimedia technology IM-027; IM2-007-A; IM2-018-A; IM-006; IM-012; IM-035; IM2-006-A; IM2-046; IM2-013-A

18:30-20:00	Dinner Time
Online Session 1	
Room A: Zoom ID: 815 2493 0618 Zoom Link: https://us02web.zoom.us/j/81524930618	
16:15-18:30	Session 1: Machine learning model and algorithm
	IM-010; IM2-010; IM2-057; IM-060; IM2-024; IM2-008; IM2-060; IM2-043

Day 3

February 2, 2023 | Thursday

Guests Speeches & Online Session 2-5		
Room A: Zoom ID: 815 2493 0618 Zoom Link: https://us02web.zoom.us/j/81524930618		
Room B: Zoom ID: 828 7868 7524 Zoom Link: https://us02web.zoom.us/j/82878687524		
New Zealand Daylight Time	Venue	Presenter / Event
15:00-15:30	Room A	Speech V Prof. Dr. Imas Sukaesih Sitanggang, Bogor Agricultural University, Indonesia <i>Title: Machine Learning in Agriculture Case study: Garlic Field Classification</i>
15:30-17:15		Session 2: Data storage and management IM-039; IM2-009; IM-021; IM-043; IM2-051; IM2-002; IM2-025
15:00-16:45	Room B	Session 3: Information system model and multimedia technology IM-090; IM2-022; IM-051; IM-003; IM-009; IM-1005; IM2-036
18:30-19:00		Speech VI Assoc. Prof. Paul Pang, Federation University Australia, Australia <i>Title: GrainSupp: Tracing Grain Quality over End to end Supply Chain in Australia</i>
19:00-21:15	Room A	Session 4: Software testing and application system IM-015; IM-070; IM-1002; IM-038; IM-011; IM-002; IM-073; IM-076; IM-086
18:30-20:45		Session 5: Information Education and Service Management IM-066; IM2-041; IM-036; IM-063; IM-087-A; IM-065; IM2-040; IM-049; IM-075

SPEAKERS



Prof. Hans Guesgen

Massey University, New Zealand

Speech Time: 09:40-10:15 on February 1, 2023

Venue: Riddet Complex C, RCC 2.143, Presentation Lab.

Zoom ID: 858 3690 8819

BIO: Hans Guesgen is a professor of computer science at Massey University, New Zealand. His research interests include smart environments, ambient intelligence (ubiquitous computing with artificial intelligence), knowledge representation, and spatio-temporal reasoning, with more than 100 refereed papers in these areas. He holds a doctorate in computer science of the University of Kaiserslautern, and a higher doctorate (Habilitation) in computer science of the University of Hamburg, Germany. Hans is a senior member of the Association for the Advancement of Artificial Intelligence (AAAI) and an honorary fellow of the Munich University of Applied Sciences. He has been a member of the programme committees of more than 70 international conferences and workshops, and has served as a referee for the Australian Research Council, the US National Science Foundation, the NZ Foundation for Research Science & Technology, and more than 70 international journals and conferences.

Exploiting Spatio-Temporal Context for Activity Recognition in Smart Homes

Activity recognition plays a key role in smart homes. For example, it can be used to support an elderly person in their activities of daily living to live longer an independent life. Often sensors are used as basis for activity recognition. Given a stream of sensor data, the goal is to determine the activities that triggered the sensor data. This process is not always accurate, since human behaviour is complex. However, it can be improved by exploiting spatial and temporal information.

The sensors that are used in smart homes are in most cases installed in fixed locations, which means that when a particular sensor is triggered, we know approximately where the activity takes place. We also know when the sensor is triggered, which might help to resolve ambiguities (eg having dinner vs having breakfast). In this presentation, we look at several methods that can be used to exploit spatio-temporal context for activity recognition in smart homes and discuss their advantages and disadvantages.

SPEAKERS



Prof Donald Bailey

Massey University, New Zealand

Speech Time: 10:15-10:45 on February 1, 2023

Venue: Riddet Complex C, RCC 2.143, Presentation Lab.

Zoom ID: 858 3690 8819

BIO: Donald G Bailey received the B.E. (Hons) degree in Electrical Engineering in 1982, and the PhD degree in Electrical and Electronic Engineering from the University of Canterbury, New Zealand in 1985. From 1985 to 1987, he applied image analysis to the wool and paper industries within New Zealand. From 1987 to 1989 he was a Visiting Research Engineer at University of California at Santa Barbara. Dr Bailey joined Massey University in Palmerston North, New Zealand as Director of the Image Analysis Unit at the end of 1989. He is currently a Professor in the School of Engineering and Advanced Technology, and leader of the Image and Signal Processing Research Group. His primary research interests include applications of image analysis, machine vision, and robot vision. One area of particular interest is the application of FPGAs to implementing image processing algorithms.

Transforming Software Algorithms for FPGA-based Acceleration

Many software algorithms have been written and optimised for a serial processor. Acceleration of such algorithms using FPGAs requires identifying both task parallelism (which enables pipelining) and data parallelism (which enables the problem to be partitioned over multiple processors). However, simply porting software algorithms to a hardware implementation usually gives disappointing performance. An efficient FPGA implementation requires transforming the algorithm to make better use of parallelism. Several transformations are illustrated using connected components analysis.

SPEAKERS



Prof. Huiyu Zhou

University of Leicester, UK

Speech Time: 11:05-11:35 on February 1, 2023

Venue: Riddet Complex C, RCC 2.143, Presentation Lab.

Zoom ID: 858 3690 8819

Presenter's Local Time: 22:05-22:35 on January 31, 2023

BIO: Prof. 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, supervised by Professors Patrick Green (Psychology) and Andrew Wallace (Computer Engineering).

Prof. Zhou heads the Applied Algorithms and AI (AAAI) Theme and leads the Biomedical Image Processing Lab at University of Leicester. He was Director of MSc Programme (2018-19) and Coordinator of MSc Distance Learning at Informatics (2018-2022), and is PGR Director and Deputy Director of Research Centre for Artificial Intelligence, Data Analytics and Modelling (AIDAM). Prior to this appointment, he worked as Reader (1/2018-3/2020) at University of Leicester, and Lecturer (9/2012-12/2017) at the School of Electronics, Electrical Engineering and Computer Science, Queen's University Belfast (QUB). He was a visiting scholar of QUB during 2018-2020.

Prof. Zhou has published widely in the field. He was the recipient of "CVIU 2012 Most Cited Paper Award", "MIUA2020 Best Paper Award", "ICPRAM 2016 Best Paper Award in the Area of Applications" and was shortlisted for "ICPRAM 2017 Best Student Paper Award" and "MBEC 2006 Nightingale Prize". He serves as:

Editor-in-Chief of Recent Advances in Electrical & Electronic Engineering, Associate Editor/EBM of IEEE Transactions on Human-Machine Systems, IEEE Journal of Biomedical and Health Informatics, Pattern Recognition, PeerJ Computer Science, Security and Safety, Scientific Reports, Machine Intelligence Research, International Journal of Image and Graphics, and IEEE Access, Editorial Board Member and Guest Editor of several refereed journals.

Modelling uncertainty in image analysis.

There are many questions to answer in image interpretation and understanding. Uncertainty in image analysis needs strong and powerful modelling tools to describe the objects in the images. Artificial intelligence (AI) plays a very important role in the design of a robust tool for image representation. Using some examples from his own work on uncertainty analysis, Prof. Zhou will explore how AI can stimulate new concepts or development of dealing with complicated problems and lead us to novel adventures through these applications.

SPEAKERS



Prof. Fuhua (Oscar) Lin

Athabasca University Alberta, Canada

Speech Time: 11:35-12:05 on February 1, 2023

Venue: Riddet Complex C, RCC 2.143, Presentation Lab.

Zoom ID: 858 3690 8819

Presenter's Local Time: 15:35-16:05 on January 31, 2023

BIO: I am a Full Professor of School of Computing and Information Systems, Faculty of Science and Technology, of Athabasca University, Canada. I am coordinating Research Cluster "Intelligent Systems and Machine Learning" of Faculty of Science and Technology of Athabasca University.

I am currently working on two projects. One is an NSERC-funded project entitled "Eliciting Adaptive Sequences for Online Learning" (2021-2025). Another is an AU Research Centre funded IDEA Lab project --- LTI-enabled interoperable infrastructure for integrating Open Educational Resources (OER) and Adaptive Learning Systems (ALS) (2021-2022). Moreover, I am working on intelligent systems (e.g., scheduling algorithms for autonomous vehicles and well operations in oil and gas sector) using Multiagent Systems and Reinforcement Learning.

I served as Program Director of MSc in Information Systems (2005-2009), Chair of the School of Computing and Information Systems (2010-2015), and then Associate Dean of Faculty of Graduate Studies (2016-2018) of Athabasca University. Also, I served as Editor-in-Chief of International Journal of Distance Education Technologies (2008-2010). I obtained his PhD from Hong Kong University of Science and Technology in 1998. I am a member of AIED and a member of EDM, a senior member of ACM and a senior member of IEEE. Prior to joining AU, I was a Research Officer of Institute of Information Technology at National Research Council of Canada. I was a postdoctoral fellow of the University of Calgary during 1998-1999.

Hybrid Human-Artificial Intelligent Educational Systems

AI technologies have been revolutionizing education in particular online education. Online educational systems are computerized and networked. Artificial intelligence (AI) can help us with quick data collection, analysis, and translation into meaningful insights and actions. Online education become fertile soil for AI that makes educational systems smart and efficient for both educators and learners. While AI methods are being applied to education, the researchers and practitioners have been facing a broad range of issues from human interaction with AI. Hybrid human-artificial intelligent educational systems (HAIIES) aims to research and develop intelligent systems that augment rather replace human teachers. Yet, research on HAIIES is still in a very early stage, and there are numerous challenges in conceptualizing and developing such systems. In this talk, I will discuss the research opportunities and challenges of developing and using hybrid human-artificial intelligent educational systems.

SPEAKERS



Prof. Dr. Imas Sukaesih Sitanggang

Bogor Agricultural University, Indonesia

Speech Time: 15:00-15:30 on February 2, 2023

Zoom ID: 858 3690 8819

Presenter's Local Time: 9:00-9:30 on February 2, 2023

BIO: Imas Sukaesih Sitanggang is a professor of Computer Science at IPB University Indonesia. Her research interests include spatio-temporal data mining, smart agriculture, and decision support system. She received her PhD Degree in Computer Science from the Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, in 2013. She has published 130 publications in a book chapter, conferences, and journals. She received international research grants from APT International Collaborative Research Japan, the International Tropical Timber Organization (ITTO) Japan, and Newton Fund UK to support research on information technology applications in forest and land fire modeling. She was the recipient of the award from the Coordinating Ministry for Political, Legal, and Security Affairs, Republic of Indonesia, for the Innovation of an Information System of Forest and Land Fire Prevention Patrol, as a Technology Development in the Field of Forest and Land Fire Control in 2020. She was the recipient of "The ICIMCIS 2022 Best Presenter Award" and "The USM-SDGs 2022 Best Presenter Award".

Machine Learning in Agriculture——Case study: Garlic Field Classification

Major drivers of change in the 21st century include population growth, urbanization, and aging; climate change; transboundary pests and diseases; conflicts, crises, and natural disasters; poverty, inequality, and food insecurity; and nutrition and health (FAO 2017). These changes lead to the need for smart agriculture. Machine learning is one of the technologies 4.0 is required in smart agriculture development. On-farm and off-farm data analysis has been conducted by applying supervised and unsupervised machine learning algorithms. In our study, supervised machine learning algorithms have been used to classify garlic fields in Sembalun, East Lombok, West Nusa Tenggara, Indonesia, using Sentinel 1-A satellite imagery. The garlic classification models were developed using several algorithms, including K-Nearest Neighbor (k-NN), Decision Tree (DT), Support Vector Machine (SVM), Random Forest (RF), and Convolutional Neural Network (CNN). The best model has an accuracy of 86.36%, which is obtained from CNN. The classification results can be used to estimate garlic production.

SPEAKERS



Assoc. Prof. Paul Pang

Federation University Australia, Australia

Speech Time: 18:30-19:00 on February 2, 2023

Zoom ID: 858 3690 8819

Presenter's Local Time: 16:30-17:00 on February 2, 2023

BIO: Dr. Pang is an Associate Professor of cyber security at the Institute of Innovation, Science and Sustainability, Federation University Australia. Before joining Federation University, he was a Professor of Data Analytics and Director of Center Computational Intelligence for Cybersecurity at the Unitec Institute of Technology, New Zealand.

Dr. Pang has acted as a Principle Investigator for over 13 research grant projects, totalling more than NZD\$3.5 million in funding by the Ministry of Business, Employment and Innovation, NZ (MBIE), the Ministry for Primary Industries, NZ (MPI), the Health Research Council, NZ (HRC), the National Institute of Information and Communications Technology, Japan (NICT), Telecom NZ, Mitsubishi Electric Japan, LuoJiaDeyi Technology China, and Lucent & Bell Lab USA.

His main research areas are Cognitive Cyber Security Intelligence, Cyber Resilience, and Applied Data Analytics for Digital Health. He published over 100-refereed articles with international journals and conferences including IEEE TPDS, TSMC-B, TKDE, TNN, Neural Networks, Pattern Recognition, IEEE Cloud, IoT, and IEEE/ACM UCC. He had so far 1 patent and filed 3 patent applications with 1 sold to a NZ company.

Dr. Pang is a Senior Member of IEEE, the Event Editor of Neural Network Journal Elsevier, the Vice President of Asia Pacific Neural Network Society (APNNS), a Global Judge for the 2018 AI summit London, and an Australian Research Council (ARC) Assessor for National Competitive Grant Program.

GrainSupp: Tracing Grain Quality over End-to-end Supply Chain in Australia

Digital traceability is fast gaining attention in the food and agriculture industries. Although substantial work has been done globally on advancing traceability technology for some food industries, e.g. horticulture and agriculture, there is only limited work focusing on grain quality assurance traceability specific to the Australian grain export supply chain. This talk introduces our ongoing blockchain data traceability research, GrainSupp, where we model grain trackability from farm to export as two blockchain processes 1) in-chain data: verify offline and/or in real-time the status of product through remote digital sensing to prevent disputes and build trust among all permissioned network members; and 2) on-chain certification: issue quality assurance certificate in supporting any auto trade between different supply chain actors. We discuss the architect and system design, criteria, and performance evaluation. In particular, we investigate the gaps to GrainSupp real-world implementation, and highlight the role of government in blockchain digital traceability applications.

ONSITE SESSIONS

* All schedules will be scheduled in **New Zealand Daylight Time (NZDT) (UTC+13)**

Session A

February 1, 2023 | Wednesday

Topic: Artificial Intelligence and Software Development
Session Chair: Dr. Richard B. Watson, Ryan Watson
Consulting Pty Ltd, Australia

13:30-15:45
Riddet Complex C, RCC 2.143,
Presentation Lab.
Room C (Passcode: 518749)
Zoom ID: 858 3690 8819

13:30-13:45
IM2-031

An Explainable Machine Learning-based Prediction Model for In-hospital Mortality in Acute Myocardial Infarction Patients with Typical Chest Pain
 HUILIN ZHENG, MALIK MUHAMMAD WAQAR, SABA ARIF, SYED WASEEM ABBAS SHERAZI, JONG YUN LEE
 Presenter: HUILIN ZHENG
 Chungbuk National University, South Korea

Abstract-Acute myocardial infarction (AMI) is the leading cause of hospital admissions and death all over the world and chest pain is the most common presenting complaint of AMI. Therefore, this paper proposes a machine learning (ML)-based prediction model for the in-hospital mortality in AMI patients with typical chest pain. To understand the principle of the black-box prediction model, a Shapley additive explanations (SHAP) method is applied to the ML-based prediction model. The experimental framework mainly includes three steps. First, we extract the experimental data from the Korea Acute Myocardial Infarction Registry National Institutes of Health (KAMIR-NIH), and then preprocess the selected data with missing value imputation, data normalization, and splitting. Thereafter, two kinds of data sampling methods such as synthetic minority oversampling techniques (SMOTE) and Adaptive Synthetic (ADASYN), are applied to handle the class imbalance problem on the experimental data. Second, different ML models such as decision tree, random forest, extreme gradient boosting (XGBoost), support vector machine, and logistic regression, are trained and evaluated on the preprocessed AMI patient data. Finally, the SHAP method is used to explain the best ML-based prediction model. The experimental results showed that the logistic regression with the ADASYN approach achieved the highest performance. Moreover, the SHAP technique enhanced the transparency of the ML model and can be a good reference for doctors to support their decisions in real life.

13:45-14:00
IM2-028-A

Experiments on Shallow Neural Network for Functional Approximations
 Shih-Kai Chou, Tzon-Tzer Lu, Di Zhang
 Presenter: Tzon-Tzer Lu
 National Sun Yat-sen University, Taiwan

Abstract-Nowadays data science and artificial intelligence are hottest research tendencies in all disciplines. Machine learning plays a crucial role therein for their achievements. However, not many are known for the mystery why neural network is so successful. In this

	<p>talk we experiment on this black box and try to understand its underlined behaviors. We begin with the simplest shallow, feedforward, fully-connected neural network with only one single hidden layer to approximate single variable functions. The experiments on one hidden unit with few training points show its efficiency and limitation. Then we increase the number of hidden units to demonstrate its effectiveness to approximate functions of big range or high oscillation.</p> <p>For classification or clustering, we need to approximate integer functions, which are discontinuous. So our next goal is using MATLAB nftool to test neural network with one layer for noncontinuous, nondifferential or blowup functions. Approximation of bivariate function is also examined. We will report several interesting observations.</p>
<p>14:00-14:15 IM2-001-A</p>	<p>Development of Remote Monitoring Technology using Semantic Segmentation based on Image-level Classification Kyoung-Kyu Choi Presenter: Kyoung-Kyu Choi Soongsil University, Korea</p> <p>Abstract-In this study, a practical remote monitoring technology using semantic segmentation was developed for structural supervision for construction sites. Various images corresponding to construction sites were collected and labelled to secure training dataset for the development of remote monitoring technology. Digital scanning camera including Matterport and Lidar was used to capture diversiform construction site scene for the purpose of collecting various image dataset. An image labeling technology using image labeler of MATLAB software was adopted to the captured image data for classifying construction site components including steel re-bar, concrete, scaffolding, formwork, background. Moreover, data augmentation technologies from imgaug library of PYTHON software comprising Fliplr, Crop, GaussianBlur, LinearContrast, GaussianNoise, and Rotate function were adopted to labelled image data in order to increase the training dataset. The labelled image dataset could be transformed to two dimensional matrices, and verified by checking randomly 10 % of total image dataset after data augmentation finalized. A total of 500 images were transformed to training dataset and trained by using model of Deep-lab V3+. The training results in the present study indicated that semantic segmentation on construction site has IoU of 0.9574 with 500 dataset in Epoch 300 which has great data accuracy. In addition, a deep learning model with fine-tuning was proposed to practically applicate the semantic segmentation on the field of remote monitoring technology for structural supervision of construction sites. Overall, identification of semantic segmentation was demonstrated from the careful comparison with validation dataset and showed great data accuracy with reasonable agreement.</p>
<p>14:15-14:30 IM2-015-A</p>	<p>Automatic Detection of Restoration, Periodontal Disease, and Missing Teeth Using Dental Panoramic X-Rays Films Based on CNN Yen-Cheng Huang, Tsung-Yi Chen, Shih-Lun Chen, Chun-Wei Li, Yuan-Jin Lin, Chiung-An Chen, Patricia Angela R. Abu Presenter: Shih-Lun Chen Chung Yuan Christian University, Taiwan</p>

	<p>Abstract-Dental Panoramic Radiograph (DPR) film is a vital piece of data used for the initial diagnosis of dentistry and in comprehending the state of the teeth of a patient. Although artificial intelligence (AI) technology is getting more mature in many medical applications, dentistry still relies on manual techniques to detect DPR symptoms. Dentists spend a lot of time in manually judging the dental conditions of a patient. The goal of this study is to develop a smart health system to automatically detect three dental diseases by using the convolutional neural network (CNN) technology on dental panoramic (DPR) films. This study intends to improve the detection of lesions by integrating picture enhancements and data preprocessing approaches with advanced CNN to provide assistance to the dentists in performing the diagnosis and lessen the strain on dentists. Three CNN models namely AlexNet, GoogLeNet and ResNet50 were used after performing data augmentation and preprocessing. In order to improve the accuracy of the model, several noise spots and increased symptoms were filtered out from the images using a variety of image processing techniques. According to the experimental results, without any image preprocessing or enhancement, the trained network can identify the tooth condition with an average accuracy of 90.99% as shown in Figure 1. The accuracy can be improved to 92.51% by incorporating data augmentation. From Table 1, the average accuracy of restoration, periodontal disease, and missing teeth is 92.73% which is significantly better than those in previous studies with 81.00%, 87.50%, 92.00%, 92.24%, 90.24%, and 59.09% in [1], [2], [3], [4], [5] and [6], respectively. This paper does not only provide a higher performance in terms of accuracy. It also provides more functions than those in the previous studies, such as the GUI interface of the application side, the export table and image of the recognition results. By using the proposed models and technologies in this study, the dentists can provide a more precise and objective assessment information which allows the dentists to develop better diagnosis and treatment strategies as well as promote precision medicine. The proposed strategy does not only decrease the dentists' burden of manually doing the diagnosis, it also allows them to spend more of their time in providing professional clinical treatment. This research has been approved by the Research Institution Review Board (IRB) under application number 202002030B0.</p>
<p>14:30-14:45 IM-033</p>	<p>Knowledge and Skill Retention in Introduction to Programming Course Stephen Mujeye, Abigail Zissman, Laveena Pareek and Soumya Mungapatla Presenter: Stephen Mujeye Illinois State University, United States</p> <p>Abstract-Computer programming is a difficult and complicated subject for students to learn. It requires a combination of problem-solving skills, math skills, and knowledge of different types of syntax. Many students struggle with programming classes, especially introductory classes. This lack of understanding and resulting frustration often causes students to fail or decide to drop a class. It is a difficult subject to teach as well, with many professors not being able to effectively relay the material to the students, since every student's understanding of programming is different. This upsetting first experience unfortunately pushes many students away from technology-related majors. For this research, we selected the introductory programming class TEC 151 in the Technology Department at Illinois State University. This course was selected due to the high number of</p>

	<p>students who experience issues with the class. We distributed a survey to students who were enrolled in TEC 151 in the past four years. We asked questions about the pacing of the class, the professor’s teaching methods, and the usefulness of the course material. Data was collected and the responses were analyzed to better understand which aspects of this class could be improved to help students better understand programming. This report outlines the methods we used to distribute the survey, how we analyzed the data, and how it relates to the specific problem we hope to solve. The results from students who were previously enrolled in the class indicated that they had problems with the structure and speed of the class.</p>
<p>14:45-15:00 IM-007</p>	<p>A Systematic Review on Current Speech to Text Analysis to Help Programmers Dictate Code Isaac G Tijerina and Soma Datta Presenter: Soma Datta University of Houston Clear Lake, United States</p> <p>Abstract-The focus of this study is to survey the usage of Speech to Text in programming and the general application in other fields. The findings are then applied to further the application of Speech to Text with coding. It was found that the state of modern Speech to Text is in constant motion. Research and development are done in this field to improve Speech to Text and apply it to various fields. It applies to medical fields, education, machinery control, and others. It is being seen that while being used, there is still a struggle with a user's accent if it differs from the native accent of the language. This study selects 31 articles and has been split into content, application, and Speech To Text (STT).</p>
<p>15:00-15:15 IM-1001</p>	<p>The Relationship between Perceived Organizational Justice and Innovative Work Behavior through Knowledge Sharing Yusirawee Suwannawat, Pittawat Ueasangkomsate Presenter: Pittawat Ueasangkomsate Kasetsart University, Thailand</p> <p>Abstract-The purpose of this study was to investigate the relationship between perceived organizational justice, knowledge sharing, and innovative work behavior among Thai employees of either generation Y or generation Z in Thailand. Questionnaires were carried out to collect data from 565 participants. Descriptive statistics, correlation coefficients, and multiple linear regression were applied for the statistical analysis. In addition, t-tests were employed to compare the difference between generation Y and generation Z employees in relation to perceived organizational justice, innovative work behavior, and knowledge sharing. The results indicate that procedural justice, distributive justice, and spatial justice in the perceived organizational justice impacted directly on innovative work behavior at a significant level, while interactional justice impacted innovative work behavior through knowledge sharing as a mediator. However, procedural justice had no effect on innovative work behavior. Furthermore, generation Z's perceived organizational justice was higher than that of generation Y. For generation Z, knowledge sharing was higher than that of Generation Y at a significant level. On the other hand, generation Y's innovative working behavior was higher than that of generation Z. The study's findings can be used as</p>

	<p>guidance to improve workers' innovative work behavior in the organization.</p>
<p>15:15-15:30 IM2-035</p>	<p>A Deep Neural Network-based Predictive System for The Occurrence of Major Adverse Cardiovascular Events (MACE) in Males and Females Patients with Acute Myocardial Infarction SYED WASEEM ABBAS SHERAZI, HUILIN ZHENG, SABA ARIF, MALIK MUHAMMAD WAQAR, GYEONGTAE KIM, JONG YUN LEE Presenter: SYED WASEEM ABBAS SHERAZI Chungbuk National University, South Korea</p> <p>Abstract-Deep learning is an emerging technology in health informatics now a days. Therefore, this paper proposes a novel deep neural network (DNN)-based diagnosis system for cardiovascular disease (CVD) in patients with acute myocardial infarction (AMI). In this research, Korea Acute Myocardial Infarction Registry (KAMIR-IV) dataset is used and 11,189 subjects are extracted after data preprocessing, and then divided into two subdatasets such as males dataset and females dataset. Later on, all datasets are splitted into training and test dataset, and applied the synthetic minority oversampling technique (SMOTE) on training data for data imbalance problem. The proposed prediction model is trained on oversampled training data, and hyperparameters are tuned using grid search approach. After that, the performance of proposed model is evaluated using performance measures e.g., accuracy, precision, recall, F1-score, and AUC. The proposed DNN-based prediction model achieved the accuracy of 0.9835, precision 0.9835, recall 0.9835, F1-score 0.9834, and AUC 0.9943 on complete dataset; whereas accuracy of 0.9713, precision 0.9710, recall 0.9713, F1-score 0.9710, and AUC 0.9989 on males subdata; and accuracy of 0.9607, precision 0.9701, recall 0.9613, F1-score 0.9720, and AUC 0.9985 on females subdata. In addition, a web-based decision support system is developed and deployed on the local server for physicians, doctors, and CVD patients. Consequently, our finding was that the proposed diagnosis system is predicting efficiently for all patients and diagnosing the major adverse cardiovascular events (MACE) occurrences accurately in order to select the proper treatment for patients with AMI.</p>
<p>15:30-15:45 IM-067-A</p>	<p>A closer look at differences in behaviors and practices of security conscious users and regular users on mobile device security Stephen Mujeye Presenter: Stephen Mujeye Illinois State University, United States</p> <p>Abstract-The number of people using mobile devices worldwide has been on the increase. Several studies have confirmed that mobile devices have security weaknesses and vulnerabilities. Consequently, the number of security attacks on mobile devices have been on the increase. A research study was conducted seeking to investigate differences in security-conscious (group A) and regular user's (group B) behaviors and practices on mobile devices. Security conscious users were selected from university students who have enrolled and successfully completed advanced computing security courses. Regular users were selected from students who are enrolled non-technology majors. A survey with similar questions was administered separately to groups A and B. The survey results were</p>

analyzed and revealed a significant difference in security behaviors and practices for security conscious users and regular users. The results of security conscious students indicated they practiced more security practices such as not opening an attachment received in a text message. Security conscious students also reported practicing behaviors that protected their devices when compared to regular users. They also reported practicing more data backup and recovery practices on their mobile devices. Additionally, security conscious users reported a high number in their perception of mobile device security when compared with regular users. The study concluded that differences exist in the overall security behaviors and practices between security conscious users and regular users. Given the high number of mobile device security attacks, work need to be done in raising awareness and training on mobile device security of regular users.

ONSITE SESSIONS

* All schedules will be scheduled in **New Zealand Daylight Time (NZDT) (UTC+13)**

Session B

February 1, 2023 | Wednesday

Topic: Information management and multimedia technology

Session Chair: Asst. Prof. Stephen Mujeye, Illinois State University, United States

16:15-18:30

Riddet Complex C, RCC 2.143, Presentation Lab.

Room C (Passcode: 518749)

Zoom ID: 858 3690 8819

**16:15-16:30
IM-027**

A Comparison of Lossless Compression Methods in Microscopy Data Storage Applications
Logan Walker, Ye Li, Maggie McGlothlin and Dawen Cai
Presenter: Logan Walker
University of Michigan, United States

Abstract-Modern high-throughput microscopy methods such as light-sheet imaging and electron microscopy can produce petabytes of data inside of a single experiment. Storage of these large images, however, is challenging because of the difficulty of moving, storing, and analyzing such vast amounts of data, which is often collected at very high data rates (>1GBps). In this report, we provide a comparison of the performance of several compression algorithms using a collection of published and unpublished datasets including confocal, fMOST, and pathology images. We also use simulated data to demonstrate the efficiency of each algorithm as image content or entropy increases. As a result of this work, we recommend the use of the BLOSC algorithm combined with ZSTD for various microscopy applications, as it produces the best compression ratio over a collection of conditions.

**16:30-16:45
IM2-007-A**

Consumers' Intention to Use Smart Healthcare Services Based on Big Data
Hyunjung Kim
Presenter: Hyunjung Kim
Sunchon National University, Republic of Korea

Abstract-Smart healthcare services are innovative medical services that enable consumers to get health care anytime and anywhere by combining medical services with new ICT technologies such as big data and artificial intelligence. In the era of an aging society, the number of the elderly in need of continuous health care is rapidly increasing. Accordingly, previous studies related to smart healthcare services have been actively conducted mainly in the development of advanced ICT technologies or new services. However, there are insufficient studies on ways to identify consumers' needs and promote the use of smart healthcare services. Therefore, this study analyzed the effects of user characteristics including self-efficacy and personal innovativeness on their intention to use smart healthcare services through performance expectancy, effort expectancy, social influence, hedonic motivation, etc. In addition, the moderating effects of consumers' gender, age, and experience on these effects were investigated. The research model was developed based on

	<p>UTAUT2, the extension of Unified Theory of Acceptance and Use of Technology (UTAUT). As a result of the analysis, it was confirmed that self-efficacy had a significant positive effect on performance expectancy, social influence, and personal innovativeness on performance expectancy, hedonic motivation, and price value. Moreover, performance expectancy, effort expectancy, social influence, and hedonic motivation, etc. were found to have a significant positive effect on consumers' intention to use health care services. Lastly, consumers' gender, age, and experience had a significant moderating effect on these effects. This study contributed theoretically to the field of medical industry and presented useful practical implications for the spread of health care services.</p>
<p>16:45-17:00 IM2-018-A</p>	<p>An Intelligent Water Level Detection and Automatic Control System Based on IoT, Big Data and Artificial Intelligence for Smart City Tsung-Yi Chen, Shih-Lun Chen, Chun-Hsiang Huang, Liang-Yu Li, Chih-Yun Chen, Yu-Yu Chen, Chie-Peng Chen, Je-Sheng Huang, Li-Yu Chen, Yi-Pei Hsu, Yi-An Hung, Jyh-Haw Tang, Ching-Hui Huang, Wen-Hui Chang Presenter: Tsung-Yi Chen Chung Yuan Christian University, Taiwan</p> <p>Abstract-Affected by global warming, the precipitation in various regions changes extremely. The development of novel water management techniques of ponds, therefore, performs an important role in smart city for water collection and water supply to modify and reduce disaster losses, particularly caused by the abnormal water resources. Hence, this study proposes a low-cost, energy-saving, and high-efficiency intelligent water resource monitoring IoT system. The IoT measuring system contains a distance sensor, a turbidity sensor, a PH sensor, an oxygen sensor, a motor, a pump, a drain, an MCU, a solar panel, a battery, and a wireless communication module. A schematic representation of the pumping system used in the study may be seen in Figure 1. The standard water level height, the resource allocation threshold, and the real-time balance of water resources are the three components of the proposed system. To determine the standard water level, the area's rainfall for the previous 10 years is calculated at first. After that, a machine learning-based adaptive adjustment of the water level sensor threshold makes it less location-specific. Then, machine learning is used to implement adaptive adjustment of the water level sensor threshold, so that it is no longer limited to a single environmental area. Finally, the threshold value controls the solenoid valve or bumping motor in the field end, which collects or releases water. This study intends to use sensors to monitor water level and quality, as well as to incorporate artificial intelligence for big data analysis, which is used to improve environmental protection and city development sustainability. According to Table 1, the measuring method used in this study can increase sensor accuracy by more than 40% when compared to state-of-the-art [1] [2] technologies. And as demonstrated in Table 2, the proposed multi-step measurement improves sensor accuracy by more than 30% compared to previous devices [3][4]. In addition, the reduction of cost is more than 60%. The significance of this study lies in the success of the detection functions of the proposed system including water quality measurement and an intelligent control system, and of the self-optimizing power-saving algorithm increasing battery life by more than</p>

	<p>200%. Thus, the application of the proposed method can not only effectively reduce the avert disasters caused by droughts, floods, or severe rains, but also reserve and distribute water resources for smart city efficiently.</p>
<p>17:00-17:15 IM-006</p>	<p>CREDERE: A Modular Blockchain Implementation for the Issuance, Sharing, and Verification of Digital Credentials Christian Pulmano, Maria Regina Justina Estuar, Marlene De Leon, Lenard Paulo Tamayo, Abraham Magpantay, Hans Calvin Tan, Nicole Allison Co Presenter: Christian Esteban Pulmano Ateneo de Manila University, Philippines</p> <p>Abstract-Shared loosely online through multiple unsecured platforms necessitates priority in the development of more secured tracking of issuance, sharing, access, and usage of digital credentials. This paper presents the design and development of CREDERE, a Blockchain-enabled platform for storage, processing, and sharing of digital credentials within the context of academic credentials and national identification. Blockchain technology is considered a potential solution to addressing gaps in existing credentials management systems. To set up the platform, a Hyperledger Fabric network was first deployed. A permissioned Blockchain model was selected because identity management is needed in maintaining the privacy of personal information and preventing unauthorized access to digital credentials. Chaincode was developed and deployed in specific Channels in the network. A web interface was also developed to allow users to interact with the Blockchain network and initiate transactions. The initial implementation shows that the development of a modular Blockchain-based web application for digital credentials is feasible. Two types of digital credentials were initially implemented to test the modularity of the Blockchain design. Future work includes the full deployment of a decentralized Hyperledger network, issuance of actual digital credentials, testing and validation of new types of digital credentials, and user validation and satisfaction studies.</p>
<p>17:15-17:30 IM-012</p>	<p>Sentiment Analysis of Social Media: Techniques, Applications, and Reliability Peter Ryan and Richard Watson Presenter: Richard Watson Ryan Watson Consulting Pty Ltd, Australia</p> <p>Abstract-Big data analytics can be used by smart cities to improve their citizens' liveability, health, and wellbeing. Social surveys and also social media can be employed to engage with their communities, and these require sophisticated analysis techniques. Twitter and Reddit are ideal social media tools for natural language processing since they have predominantly text-based content. Data from these social media systems can be analysed to provide sentiment on issues of importance in near real-time for decision makers. Techniques such as word clouds can provide initial qualitative analysis while quantitative analysis can produce bar charts and time series of sentiment values. Access to the Twitter and Reddit APIs are described together with analysis techniques using Python libraries. The advantages and disadvantages of this type of analysis are discussed. Social media users tend to be concentrated in the more youthful and socially progressive social cohorts, which may cause bias.</p>

<p>17:30-17:45 IM-035</p>	<p>A Proposal on How to Use Blockchain to Secure Communications in 5G Ecosystem. Stephen Mujeye, Jihad Qaddour, Sameeh Ullah, Susana Calderon, Rob Rhykerd and Charles Edamala Presenter: Stephen Mujeye Illinois State University, United States</p> <p>Abstract-5G provides businesses with high-speed Internet access, faster bandwidth, and low latency. The use of IoT and 5G-enabled sensors provides new opportunities within networks. There are several use cases of 5G with IoT health care, agriculture, remote learning, logistics, manufacturing, government, and retail. However, some security and privacy problems must be addressed within the 5G ecosystem. There is a need to secure user and device associations and data integrity as 5G is becoming more and more popular. In this research-in-progress, we seek to solve security and privacy problems in 5G by applying Blockchain technology to secure 5G connections. The research will consist of an interdisciplinary team of researchers from Illinois State University (ISU) and non-academic-industry partners. During the study, we will build a prototype that solves problems in agriculture and healthcare. A private 5G network will be installed at ISU. Moisture sensors and IoT devices will be installed at the university farm to monitor soil moisture. Tracking soil moisture will help to conserve water. Additionally, we will also work with a local clinic and provide underserved patients with chronic illnesses with sensors and IoT devices that help them track and monitor their chronic conditions. The patients will have monitors that track blood pressure and blood sugar. The IoT devices and sensors will send collected data to a database accessible by healthcare professionals at the clinic. This will help the patients receive care that helps them manage their conditions better. Blockchain will be applied during the proposed study to secure communications between the sensors at the university farm and the private 5G network. Blockchain will also be applied to secure communications between the patients and healthcare providers at the clinic. The collected results will be analyzed to see if there is a significant difference in suspicious activities in agriculture and healthcare communications. The results have a broader impact, including helping underserved community members to receive good care in managing their chronic conditions. The results will also help secure other use cases of 5G with IoT devices.</p>
<p>17:45-18:00 IM2-006-A</p>	<p>The Impact of the Block Chain on the Supply Chain Research: Using Text-Mining Jiyoon Angela Son Presenter: Jiyoon Angela Son Seoul National University, South Korea</p> <p>Abstract-Interest in blockchain and digital currency has shown an exponential growth in recent years. We investigate the possibility of applying the blockchain to the supply chain by analyzing the increasing trend of related topics in articles and literature. This study uses data analysis methodology through text mining technique.</p>
<p>18:00-18:15 IM2-046</p>	<p>Artificial Intelligence of Things (AIoT) for Disaster Monitoring using Wireless Mesh Network Mau-Luen Tham, Yi Jie Wong, Ban-Hoe Kwan, Xin Hao Ng, Yasunori Owada</p>

	<p>Presenter: Mau-Luen Tham Universiti Tunku Abdul Rahman, Malaysia</p> <p>Abstract-The inherent characteristics of IoT networks such low computation power of IoT nodes and transmission reliability of IoT links demand a new paradigm for efficient data processing and dissemination. This is especially true for disaster situations with high possibility of communication breakdowns. On one hand, the concept of artificial intelligence of things (AIoT) has been introduced as a technology to push data storage and computing closer to the network edge. On the other hand, wireless mesh network offers a strong self-healing capability and network robustness against disaster damages. To enable smart disaster monitoring applications, we first implement a lightweight multi-task model that performs joint disaster classification and victim detection. These AI outputs are then wirelessly synchronized via a mesh network solution called NerveNet, which are developed by Japan NICT. Experimental results validate the effectiveness of the proposed solution, where text and images can be synchronized within two minutes across a multi-hop Wi-Fi network.</p>
<p>18:15-18:30 IM2-013-A</p>	<p>Exploring differences in news media and public opinion concerns through text mining and sentiment analysis Li-Ching Ma, Jia-Yi Ji Presenter: Li-Ching Ma National United University, Taiwan</p> <p>Abstract-As Taiwan's population ages, the need for long-term care is increasing. With the outbreak of COVID-19, it has spread all over the world. Taiwan is also greatly affected, especially by the high mortality rate of the elderly. The Taiwan Centers for Disease Control has declared the Covid-19 outbreak a Level 3 alert in May 2021. Several new regulations were promulgated, and the services of some long-term care institutions were urgently suspended, which aroused great concern in society and was widely discussed among public opinion and the news media. Taking the impact of the COVID-19 epidemic on long-term care issues as an example, this study analyzes the differences in news media and public opinion concerns before and after the Level 3 alert. First, this study collected long-term care articles and public opinion from e-news and public forums. Second, use text mining techniques to identify high-frequency words, and then find out the positive or negative emotional tendencies of these words through sentiment analysis. Finally, the results are displayed in a 2-dimensional plot using a multidimensional scaling method. This study can present a large number of news reports and public opinions in a simpler and faster way, which greatly reduces the time readers spend browsing e-news or public forums on the Internet.</p>

ONLINE SESSIONS

* All schedules will be scheduled in **New Zealand Daylight Time (NZDT) (UTC+13)**

Session 1

February 1, 2023 | Wednesday

Topic: Machine learning model and algorithm

16:15-18:30

Session Chair: Assoc. Prof. Soma Datta, University of Houston - Clear Lake, United States

Room A

Zoom ID: 815 2493 0618

**16:15-16:30
IM-010**

Deep Learning techniques for stock market forecasting: Recent trends and challenges
Manali Patel, Krupa Jariwala and Chiranjoy Chattopadhyay
Presenter: Manali Patel
Sardar Vallabhbhai National Institute of Technology, India

Abstract-Stock market forecasting has been a very intensive area of research in recent years due to the highly uncertain and volatile nature of stock data which makes this task challenging. By accurately predicting a particular stock's price investors can gain maximum profit out of their investment. With the great success of Deep Learning methods in various domains, it has attracted the research community to apply these models for financial domain also. These DL methods have been proven to achieve better accuracy and predictions compared to econometric and traditional ML methods. This work reviews recent papers according to various Deep Learning models which included: Artificial Neural Networks, Convolution Neural Networks, Sequence to Sequence models, Generative Adversarial Networks, Graph Neural Networks and Transformers applied for stock market forecasting. Furthermore this work also reviews datasets, features, evaluation parameters and results of various methods. From the analysis done on various DL models we found that Graph Neural Networks and Transformer models have potential to interpret dynamic and non-linear patterns of financial time series data with greater accuracy. In addition to this, correlation among various stock indices and investors sentiment along with historical data has great influence on the prediction accuracy. We also identified the benchmark datasets for stock market forecasting based on market capitalization value of an economy. The aim of this paper is to provide insight into most recent work done in the finance domain and identify future directions for more accurate predictions.

**16:30-16:45
IM2-010**

How to Find Social Robots exactly?
Jianwei Ding, Zhouguo Chen
Presenter: Jianwei Ding
30th Research Institute of China Electronics Technology Group Corporation, China

Abstract-With the rapid development of artificial intelligence and natural language processing, there are more and more social robots applied in the social networks such as Twitter, intended to lead public opinion or crawling private information illegally. The problem of detection social robots, which is automated social accounts governed by artificial intelligence software, pretend to be a human user. There are some technologies proposed to detect the social robots automatically applied to the real social network for verification. Hence, conventional social robot detecting technologies proposed before are

	<p>applied to detect by the account’s metadata or account posted tweet content respectively. With the help of pre-trained language model such as BERT, this paper propose a deep neural network model based on contextual long short-term memory (LSTM) architecture named DeepBot, which exploits tweet content and account’s metadata features. The architecture of DeepBot contains three phases: (1) it uses the pretrained model such as BERT to extract the embedding vector from the tweet content of the specific account, and (2) it choose more discriminative account metadata to extract a metadata vector, and then (3) it combines the auxiliary embedding vector and metadata vector into decoder layer to train a detecting model. What’s more, in this paper, we review the labelling social robots datasets proposed in public, and get a mixture datasets of labelling social datasets to verify and compare the experimental results of our proposed DeepBot and other conventional methods. We also present empirical results of DeepBot and our ongoing experimentation with it, as we have gained experience applying it to the mixture labeling social robot dataset, including over 10000 accounts. The experimental results show that DeepBot outperforms previous state-of-the-art methods, with leveraging a small and interpretable set of features.</p>
<p>16:45-17:00 IM2-057</p>	<p>Diagnosing Prostate Cancer: An Implementation of Deep Machine Learning Fusion Network in MRI Using a Transfer Learning Approach Ariful Islam Mahmud Badhon, Md Sadman Hasan, Md. Samiul Haque, Md. Shafayat Hossain Pranto, Saurav Ghosh, Md. Golam Rabiul Alam Presenter: Md Sadman Hasan BRAC University, Bangladesh</p> <p>Abstract-Of all the terminal cancers that plague men, prostate cancer remains one of the most prevalent and ubiquitous. Data shows prostate cancer is the second leading cause of cancer death worldwide among men. About 11% of men have prostate cancer at some time during their lives. As it happens, we have dedicated our entire research to developing an approach that can improve the existing precision of prostate cancer diagnosis. In our research, we have dedicated a Transfer Learning approach for the Deep Learning model to compare the accuracy in results using Machine Learning classifiers. In addition, we evaluated individual performance in classifications with different evaluation measures using a Deep Learning pre-trained network, VGG16. During our evaluation, we assessed several performance metrics such as Precision, Recall, F1 Score, and Loss Vs. Accuracy for performance analysis. Upon implementing the Transfer Learning approach, we recorded the optimum performance using the VGG16 architecture compared to other popular Deep learning models such as MobileNet and ResNet. It is important to note that we have used the convolutional block and dense layers of VGG16 architecture to extract features from our image dataset. Afterward, we forwarded those features to Machine Learning classifiers to tabulate the final classification result. Upon successful tabulation, we have secured significant accuracy in prognostication using the Deep Machine Learning method in our research.</p>
<p>17:00-17:15 IM-060</p>	<p>Customer Value Evaluation Model for SMEs Based on K-means Clustering Algorithm BU Yantao and LIU Shanshan Presenter: LIU shanshan</p>

	<p>Guizhou university of commerce, Guiyang, China</p> <p>Abstract- With the acceleration of the process of global economic integration, the market competition has become increasingly fierce, and the competition among SMEs has changed from the competition and technologies to the competition of customer value. The purpose of this paper is to build a customer value evaluation model for SMEs based on k-means clustering algorithm. Based on customer value theory, it analyzes the functions and costs that customers care about. Explore ways to maximize customer value through analysis of customer functions and customer costs. The AHP is used to determine the weight coefficient. After the weight is determined, based on the customer's questionnaire, data analysis is performed on the questionnaire to determine the proportion of each level of customer function indicators in the indicator area, and then according to the fuzzy Comprehensive evaluation to determine the function coefficient. The survey results show that the factors that affect customer value can be attributed to two points, namely customer function and customer cost. In terms of improving customer function, corporate image accounts for 46% and has the largest weight; Currency costs accounted for 26 percentage points higher.</p>
<p>17:15-17:30 IM2-024</p>	<p>An Extractive Text Summarization Based on Reinforcement Learning Kai Du, Guoming Lu, Ke Qin Presenter: Kai Du University of Electronic Science and Technology of China, China</p> <p>Abstract-In recent years, with the rapid development of network information technology, network text information also presents an explosive growth trend. As an efficient information processing technology in the digital age, text summarization can bring the advantage of focusing on key information in all directions in massive text information. However, text summarization is still faced with some problems such as difficulty in extracting long text and information redundancy. Therefore, combining with the deep learning framework, this paper proposes an extractive text summarization that uses reinforcement learning to optimize the long text extraction process and uses the attention mechanism to achieve the effect of redundancy removal. On CNN/Daily Mail datasets, the automatic evaluation shows that our model outperforms the previous on ROUGE, and the ablation experiment proves the effectiveness of the de-redundant attention module.</p>
<p>17:30-17:45 IM2-008</p>	<p>Causal Inference and Conditional Independence Testing with RCoT MAYANK AGARWAL, ABHAY H KASHYAP, JYOTI SHETTY, Shobha G, Presenter: Abhay H Kashyap RV College of Engineering,India</p> <p>Abstract-Conditional Independence (CI) testing is a crucial operation in causal model discovery and validation. Effectively performing this requires a linearly scalable and robust algorithm and its implementation. Previous techniques, such as cross-correlation, a linear method; KCIT, and a kernel-based algorithm, do not scale well with dataset size and pose a bottleneck for CI algorithms. An improved version of kernel-based algorithms which use linear mapping to decrease computational time is the Randomized conditional Correlation</p>

	<p>Test (RCoT) and Randomized Conditional Independence Test (RCIT). This paper describes their use and implementation in Python. This paper then compares the time complexity of the RCoT algorithm with a previously implemented Discretization-based algorithm Probspace. The results show that the accuracy of the previous and current models are similar but the time taken to get these results has been reduced by 50%. The implemented algorithm takes about 3s to run the testcases (the data used and testcases generated are described in Section 4.3).</p>
<p>17:45-18:00 IM2-060</p>	<p>Exploring the Sentiments and Emotions in Tweets to Analyze the Impact of Covid-19 Vaccine in the Philippines Mary Jane Samonte Presenter: Mary Jane Samonte Mapua University, Philippines</p> <p>Abstract-The Coronavirus disease or COVID-19 is a viral disease caused by SARS-CoV-2, and by March 11, 2020, it was declared a pandemic by the World Health Organization (WHO). The COVID-19 pandemic did not only cause stress due to the illness itself, but it has also brought in severe and complex issues when it comes to quality of life. Passed studies have shown that Twitter was used in public health research, where most focused on evaluating the contents of the tweets. With that being said, during the COVID-19 pandemic, multiple research papers have used Twitter to create datasets pertaining to tweets related to COVID-19. In this study, data from an existing dataset was analyzed. After applying data scraping and identifying the frequencies of concerning variables, the study's main findings show that the most dominant sentiment category from March 2020 to December 2021 was the NEGATIVE category, while the most dominant emotion category was the JOY category. Regarding topics, Topic 1, Topic 2, and Topic 3 were the three most dominant topics throughout the considered time period. Lastly, most of the identified users were Male, and the keyword 'covid' was the most used keyword in the gathered tweets.</p>
<p>18:00-18:15 IM2-043</p>	<p>Evaluation of Price Prediction Models for Cryptocurrencies based on convolutional neural networks trained on Candlestick Charts Tomohiko Hagio, Mutsuo Sano Presenter: Mutsuo Sano Osaka Institute of Technology, Japan</p> <p>Abstract-In the past few years, there has been a growing interest in cryptocurrencies. However, the risk of incurring losses is high due to their large price fluctuations. Therefore, we want to reduce this risk by predicting the rise and fall of their prices. In this study, we use a convolutional neural network model trained on candlestick charts to make price predictions. In this experiment, the system was trained on the image pattern data of a set of five candlesticks, and predictions were made on whether the price would go up or down. The novelty of this research is that we apply the stock price prediction method using visual candlestick patterns, which has been empirically judged, to virtual currency prediction based on their visual pattern transition model with deep learning. The model trained on the data from 1-minute intervals gave the best results, with a predictive accuracy of 58.69% and a bankruptcy probability of only 1.678%.</p>

ONLINE SESSIONS

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Session 2

February 2, 2023 | Thursday

Topic: Data storage and management

Session Chair:

Prof. Rolysent Paredes, Misamis University, Philippines

Asst. Prof. Markdy Orong, Misamis University, Philippines

15:30-17:15

Room A

Zoom ID: 815 2493 0618

**15:30-15:45
IM-039**

CNDAS-WF: Cloud Native Data Analysis System Based On Workflow Engine

Xin Zhou and Yuxuan Wu

Presenter: Xin Zhou

Beijing University of Post and Telecommunications, China

Abstract-With the development of modern big data technology, data size in daily life is expanding rapidly and data relationship is more complex. However, the requirements of data analysis for different resources continuous to surging. Therefore, how to handle a large number of data analysis tasks with complex dependencies efficiently become the challenge. In this paper, we design and implement a cloud native data analysis system based on workflow engine. The system arranges the data analysis tasks, which deployed by containers, with dependency through the workflow engine based on cloud native technology. Flexibility of container cloud makes data analysis procedure effective and efficient. In addition, we designed a workflow engine and an operation and maintenance subsystem for overall system platform anomaly detection. Finally, we verify the effectiveness and efficiency of the system through scientific workflow data. The cloud native data analysis system based on workflow engine has passed all tests and has been applied in small and medium-sized enterprises.

**15:45-16:00
IM2-009**

Handling Class Imbalance in Google Cluster Dataset using A New Hybrid Sampling Approach

Jyoti Shetty, Shobha G

Presenter: Shobha G

RV College of Engineering,India

Abstract-Class imbalance is a classical problem in data mining, where the classes in a dataset have a disproportionate number of instances. Most machine learning tasks fail to work properly with an imbalanced dataset. There exist various approaches to balance a dataset, but suffer from issues such as overfitting and information loss. This manuscript proposes a novel and improved cluster-based undersampling method for handling two and multi-class imbalanced dataset. Ensemble learning algorithm integrated with the pre-processing technique is used to address the class imbalance problem. The proposed approach is tested using a publicly available imbalanced Google cluster dataset, In case of imbalanced dataset the F1-score value for each class has to be checked, it is observed that the existing approaches F1-score for class 0 was not good, whereas the proposed algorithm had a balanced F1-score of 0.97 for class 0 and 0.96 for class 1. There is an improvement

	<p>in F1-score of about 2% compared to the existing technique. Similarly for multi-class problem the proposed novel algorithm gave balanced AUC values of 0.87, 0.83 and 0.97 for class 0, class 1 and class 2 respectively.</p>
<p>16:00-16:15 IM-021</p>	<p>Sustainable Next Generation Network Design using Social Aware and Delay Tolerant Approach Ambreen Memon, Jeff Kilby, Rashmi Munjal and Maria Elena Villapol Presenter: Ambreen Memon WITT(Western Institute of Technology New Plymouth Campus, New Zealand)</p> <p>Abstract-With the ever-growing popularity of smartphones, new services are emerging where the local and positioning aspects become more important. Additionally, new routing algorithms are being developed based on various networking technology such as Delay Tolerance Networks (DTN), Device-to-Device communication, Opportunistic Network, etc. DTN is categorized as stable and unstable, a continuous path between the source and the destination node. Here, communication is done by carrying the message through the intermediate relay node on the store and carry forward paradigm. In this work, a Sustainable Energy Delay Tolerance Approach (SEDA) considering nodes mobility patterns for energy-efficient data transmission. This routing model is based on the appropriate usage of node information along with node mobility and its contacts for data dissemination. Next step is applying some techniques to predict the most likely position for next encounter. We will design and implement a social relation-aware routing relation-awareness the social relation as a part of the routing matrix. We assume that most of the movement of nodes are included in various numbers of social contacts; therefore, there is a higher probability of message delivery to the destination. Simulation results show that the proposed routing protocol improves the delivery ratio by reducing network size and distance, which also impacts energy saving.</p>
<p>16:15-16:30 IM-043</p>	<p>CMSDPP: Cloud-native Multi-source Streaming Data Processing Platform Haoran Du, Yuxuan Wu and Honglu Gan Presenter: Haoran Du Beijing University of Post and Telecommunications, China</p> <p>Abstract-As the digital transition process of enterprises continues to advance, streaming data processing platforms are becoming the most important part of the enterprise data infrastructure. Meanwhile, cloud-native, an emerging service pattern of cloud computing, gains more and more attention for its ability to reduce the cost of application deployment and maintenance and enhance the effectiveness. In this paper, we design and implement a Cloud-native Multi-source Streaming Data Processing Platform (CMSDPP). It provides various capabilities, such as data access, data aggregation, data analysis and other data processing capabilities, for streaming data processing platform on cloud environment. Besides, we provide a unified registry of data processing components to realize the management of various streaming data processing capabilities. Relying on the extensibility and flexibility of cloud, convenient deployment and management of data application are provided in CMSDPP.</p>
<p>16:30-16:45</p>	<p>Robust low rank tensor multi-view clustering</p>

<p>IM2-051</p>	<p>Xintong Zou, Yunjie Zhang, Yanrong Yang Presenter: Xintong Zou Dalian Maritime University, China</p> <p>Abstract-Multi-view Spectral Clustering (MVSC) is a hot research direction in computer vision and machine learning. In recent years, scholars have proposed many MVSC methods based on tensor low rank representation. However, most of them are more suitable for processing noiseless data, but not ideal for noisy data. Inspired by the noise representation idea of hyperspectral noise images, this paper proposes a robust low rank tensor MVSC method for Gaussian and salt and pepper noise data based on MVSC-TLRN method. Similar to MVSC-TLRN method, the proposed method represents the multi-view clustering problem of noise data as a low rank tensor learning problem, which is solved by inexact augmented Lagrangian method. The experimental results on five image datasets and two document datasets show that the proposed method is much better than the existing methods.</p>
<p>16:45-17:00 IM2-002</p>	<p>A Weighted Ensemble of VAR and LSTM for Multivariate Forecasting of Cloud Resource Usage Jyoti Shetty, Karthik Cottur, Dr. Shobha G, Prajwal Y R Presenter: Shobha G RV College of Engineering,India</p> <p>Abstract-Forecasting resource usage values of a cloud service has ample applications such as service performance management, auto-scaling, capacity planning, and so on. While univariate forecasting techniques are the focus of current research, multivariate forecasting is rarely explored. This research work focuses on multivariate forecasting of resource usage values believing that there exists interdependency among the features of the underlying system that must be considered while forecasting. At first, the interdependency among the attributes is verified using Granger causality tests. Then the research explores various forecasting approaches - univariate MLP (Multi-Layer Perceptron), univariate LSTM (Long Short Term Memory), multivariate VAR (Vector Autoregression), and multivariate stacked LSTM. Further based on the observations of performances of these models the research proposes an implementation of a weighted ensemble of VAR and LSTM models to forecast key cloud resource usage metrics. The models thus proposed are implemented and validated using the publicly available GWA-T-12 Bitbrains time series dataset. The results show that the multivariate models outperform univariate models with lesser NRMSE (Normalised Root Mean Square Error) values. Also, the multivariate stacked LSTM outperforms VAR and the proposed ensemble forecasting model with lesser NRMSE values within a range of 1-5% for various resources across different lag values.</p>
<p>17:00-17:15 IM2-025</p>	<p>Study on the influence of social network for college students' mental health through big data technology Lei Hong Presenter: Hong Lei University of Electronic Science and Technology of China, China</p> <p>Abstract-At present, mental issues have become the main factor leading to college students'</p>

suicide, crime and other malignant events. As the key process in mental health education, it is vital to utilize technology to predict psychological problems in advance for the healthy growth of college students. In the past, the commonly used psychological crisis screening methods only consider individual psychological scale, a great quantity of data from social network has not been analyzed in depth. Thanks to data mining technologies, it is possible to build psychological portrait for each student to deeply excavate some hidden information and knowledge. Based on the survey and behaviour research of college students' Internet social networking in the era of Internet plus, this paper analyses the influence of social network on college students' mental health according to the law of college students' psychological development. Moreover, this paper also explores the mental health education strategy in the behaviour guidance of social network, providing theoretical support for the research and work of ideological and political education in colleges and universities.

ONLINE SESSIONS

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Session 3

February 2, 2023 | Thursday

Topic: Information system model and multimedia technology

Session Chair:

Dr. Roseclaremath Caroro, Misamis University, Philippines

Dr. Iwan Aang Soenandi, Krida Wacana Christian University, Indonesia

15:00-16:45

Room B

Zoom ID: 828 7868 7524

**15:00-15:15
IM-090**

The role of social media in news avoidance: A cognitive load and technology affordance perspective
Xiao Jiang
Presenter: Xiao Jiang
Carleton University, Canada

Abstract-The role of social media in news avoidance has become increasingly prominent in recent years. The article has attempted to investigate the effects of social affordances, news overload, and "news finds me" perception on people's news avoidance. Building on the understanding of the conceptualization and operationalizations of news avoidance, a research model of social media affordance influencing news avoidance is constructed based on the perspective of cognitive load and technology affordance. A structural equation modeling technique has been employed to check the relationships proposed in the study. The model was empirically tested using data from a sample of 1435 social media users in China. The findings of the study revealed that perceived news overload and "news finds me" perception both significantly affect news avoidance; the three dimensions of social media affordance, social articulation, social transparency, and user-generated content, all have significant effects on "news finds me" perception, while social articulation also has a significant effect on perceived news overload. Theoretically, the study has contributed to the literature on social media and journalism by finding evidence of linkages between social media affordance and news avoidance. Finally, the practice implications of these findings are discussed.

**15:15-15:30
IM2-022**

Interpretable Fake News Detection on Social Media
Xiwei Xu, Ke Qin
Presenter: Xiwei Xu
University of Electronic Science and Technology of China, China

	<p>Abstract-With the development of information technology, public opinion can quickly spread to all over the world, permeate every corner of social life, and have a great impact on human's lives. Extracted from large-scale and multi-mode social media, user-generated information is anonymous and noisy. It is found that users' social interaction helps to detect fake news. At present, most methods focus on effectively detecting fake news with potential characteristics, but most models are lack of interpretability. Therefore, this paper studies the interpretable detection of fake information in public social media platform, and proposes a model based on in-depth sentence-comment interactive reasoning network. The model uses fake information content and user comments to capture the most worth checking information sentences from user comments, in order to detect fake information and provide some explanation. This paper solves the following challenges: (1) how to detect fake news while improving the detection performance and interpretability; (2) how to extract the correlation between false content and user comments in the social media platform.</p>
<p>15:30-15:45 IM-051</p>	<p>Pruning Networks Using Filters Similarity Stability Haicheng Qu and Xuecong Zhang Presenter: Xuecong Zhang Liaoning Technical University, China</p> <p>Abstract-Current filter pruning methods rely too much on pretrained weights and have many super parameters, resulting in obvious performance degradation and too long parameters adjustment time. In our research, we found that the cosine similarity distribution between filters can achieve stable in a few epochs during training. Therefore, a cluster pruning method named ECP(Early Cluster Pruning) based on the cosine similarity between filters in the early stage of training is proposed to compress the deep neural networks. First, in the early stage of training, the filters were clustered with a gradually increasing threshold, and then the reserved filters were selected randomly in each cluster. The pruned models could be obtained with only a few super parameters and a single training progress, leading to an obvious reduction in algorithmic complexity and large savings in training time. The experimental results on CIFAR-10 and CIFAR-100 datasets show that ECP method outperforms recent pruning methods in terms of model accuracy maintenance, training time, and model compression rate.</p>
<p>15:45-16:00 IM-003</p>	<p>Research on the Status and Performance of Enterprise Environmental Protection Investment in Metallurgical Industry: Based on the Case of Baosteel Liu Yang, Xiang Liu, Yulun Wu, Shengjie Su Presenter: Xiang Liu Guangxi University of Finance and Economics, China</p> <p>Abstract-The metallurgical industry is one of the key monitoring industries to achieve the carbon peaking and carbon neutrality goals ("double carbon" goal for short). Environmental protection investment is an effective way to achieve the "double carbon" goal. By using case study and comparative analysis, this paper systematically analyzes the scale, structure, economic performance and environmental performance of environmental protection investment of Baoshan Iron and Steel Co., Ltd. ("Baosteel" for short). It is found</p>

	<p>that (1) The environmental protection investment of enterprises has increased year by year, but the proportion of environmental protection investment in the total investment is low. (2) In the environmental protection investment structure of enterprises, the expensive investment is more than the capitalized investment. (3) Environmental protection investment of enterprises has produced significant environmental performance in environmental quality, environmental management, operation of environmental protection facilities and resource utilization, but environmental protection technology innovation needs to be improved. (4) Environmental protection investment of enterprises has produced certain economic performance in reducing financial risks, saving energy-saving costs, sales of environmental protection products, environmental protection taxes and government subsidies. The research results provide a theoretical reference for strengthening the main responsibility of environmental protection investment of metallurgical enterprises, improving the efficiency of environmental protection investment, promoting green development of enterprises, and helping to achieve the goal of "double carbon".</p>
<p>16:00-16:15 IM-009</p>	<p>Analysis of Smart City Construction Under the Trend of New Urbanization Taking Xinyang City, Henan Province as an example Bin Hu, Fang Pan and Shuqi Yao Presenter: Bin Hu Nanjing University of Aeronautics and Astronautics, China</p> <p>Abstract-This paper analyzes the construction of smart cities in the context of the development of new urbanization. It constructs a quality evaluation indicator system for new urbanization and smart city. The entropy method is utilized to conduct empirical analysis and research on Xinyang City, Henan Province and other more developed cities in the country. The quality differences among them are sorted out, analyzed and summarized. Through comparison, the gap between the new urbanization and smart city construction of the city and its original goal is found. The study could provide reference for the development of new towns in underdeveloped areas in China.</p>
<p>16:15-16:30 IM-1005</p>	<p>Research on the symbiosis of traditional and new energy vehicles manufacturing industries ——Based on the symbiotic game model Xiaoying Cui, Hai Shen, Xiaogang Zhao and Jiawei Liu Presenter: Xiaoying Cui Business school of Xi'an International Studies University, China</p> <p>Abstract-Using the symbiotic evolution theory to construct a game model between new energy vehicles and traditional vehicles, for the decision-making of automakers and the establishment of government subsidy mechanisms. Introduce the Lotka-Volterra equation in the symbiosis theory into the game model, analyze the interaction of relevant factors, build a symbiotic evolutionary game model between new energy vehicles and traditional vehicles, and analyze the stability points of the model and the stability of each stable point. Then analyze different numerical simulation of different variables to predict decision-making results. Simulation experiments show that, for new energy decisions under limited market capacity, this method effectively provides support for manufacturers' production decisions and government subsidies. The game model based on symbiotic</p>

	<p>evolution theory has good applicability, and provides an effective way for manufacturers and governments to make reasonable and scientific decisions on new energy vehicle projects.</p>
<p>16:30-16:45 IM2-036</p>	<p>An Approach to Improving Intrusion Detection System Performance Against Low Frequent Attacks Yasir Abdelgadir Mohamed, Dina Abbasher Salih, Akbar Khanan Khanan Presenter: Yasir Abdelgadir Mohamed A'Sharqyah University, Oman</p> <p>Abstract-Network security is crucial in contemporary company. Hackers and invaders have regularly disrupted huge company networks and online services. Intrusion detection systems (IDS) monitor and report on harmful computer or network activities. Intrusion detection aims to detect, prevent, and react to computer intrusions. Researchers have suggested the fuzzy clustering-artificial neural network to improve intrusion detection systems. A hybrid Artificial Neural Network technique combines fuzzy clustering and neural networks to increase intrusion detection systems' accuracy, precision, and resilience. We built fuzzy clusteringmodified artificial neural networks to increase low-frequency attack detection and training time. This approach can be improved in terms of training duration and low-frequency attack accuracy. Our novel technique, Fuzzy Clustering-Artificial Neural Network-modified, beats the fuzzy clustering-artificial neural network algorithm by 39.4% in identifying low-frequent assaults and decreases the projected training time by 99.7%.</p>

ONLINE SESSIONS

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Session 4

February 2, 2023 | Thursday

Topic: Software testing and application system development Session Chair: Assoc. Prof. Nithinant Thammakoranonta, National Institute of Development Administration, Thailand		19:00-21:30 Room A Zoom ID: 815 2493 0618
19:00-19:15 IM-015	<p>An Artificial Neural Network Model based on Binary Particle Swarm Optimization for enhancing the efficiency of Software Defect Prediction Ruchika Malhotra, Sonali Chawla and Anjali Sharma Presenter: Sonali Chawla Delhi Technological University, India</p> <p>Abstract-With the rise in the growth of the software industry, it is essential to identify software defects in earlier stages to save costs and improve the efficiency of the software development lifecycle process. We have devised a hybrid software defect prediction (SDP) model that integrates Binary Particle Swarm Optimization (Binary PSO), Synthetic Minority Oversampling Technique (SMOTE), and Artificial Neural Network (ANN). BPSO is applied as a wrapper feature selection process utilizing AUC as a fitness function, SMOTE handles the dataset imbalance, and ANN is used as a classification algorithm for predicting software defects. We analyze the proposed BPSO-SMOTE-ANN model's predictive capability using the AUC and G-mean performance metrics. The proposed hybrid model is found helpful in predicting software defects. The statistical results suggest the enhanced performance of the proposed hybrid model concerning AUC and G-mean values. Also, the hybrid model was found to be competitive with other machine learning(ML) algorithms in determining software defects.</p>	
19:15-19:30 IM-070	<p>Deepening Research and Upgrading of Configuration Software ViGET Yawei Chang, Weipeng Liu, Huan Hu and Haibin Liu Presenter: Yawei Chang XJ Electric Co.,Ltd, China</p> <p>Abstract-ViGET is a Programmable Logic Controller (PLC) programming software for HVDC engineering. It is used to complete the editing, compiling, on-line and monitoring of control and protection programs in HVDC engineering. In view of the shortcomings of ViGET software and the user needs, this paper completes the reconstruction of the software framework and the embedding of the editor through Visual Studio Shell and Visual Studio Package technology, and completes the optimization and upgrading of the CFC graphical editor, version management, On-line and other functions. Improve the usability of ViGET software and the overall operation efficiency of the program, ViGET V2.0 has been released to provide better services for secondary engineering development.</p>	
19:30-19:45 IM-1002	<p>The Design of Enterprise Management Information System Based on Cloud Computing Haohui Ma and Xuemei Sun</p>	

	<p>Presenter: Haohui Ma Beijing Technology and Business University, China</p> <p>Abstract-At present, the enterprise management information system has the problems of low information storage efficiency and low quality of information resource integration. Therefore, the cloud computing technology is introduced to design the enterprise management information system which can be used in the following areas: . divide the data layer, service layer, application layer and user layer, determine the general logic and architecture of enterprise management information system; integrate the enterprise internal information resources; process the basic data in enterprise management information, manage various types of information uniformly, generate project information export and statistical report, and complete the design of enterprise management information system based on cloud computing. The comparative experiment has proved that the designed information system can effectively improve the efficiency of information storage in the practical application, ensure the quality of information resource integration, and provide technical support for the development of enterprise management work.</p>
<p>19:45-20:00 IM-038</p>	<p>The Effect of System Quality, Information Quality, and Service Quality on the Continued Usage of Mobile Payment Application in Thailand Montipat Nilapun and Tanapon Jentsuttiwetchakul Presenter: Montipat Nilapun King Mongkut’s University of Technology North Bangkok, Thailand</p> <p>Abstract-Recent years, researchers shifted their focus from mobile payment application acceptance to mobile payment continuous use intention. This study continues the line by proposing a research model to explain the intention to continue by combining the Information Systems Success Model (IS Success Model) and the Expectation Confirmation Model (ECM). A survey conducted online as used to collect data from 315 respondents in order to assess and confirm the suggested theoretical model by the structural equation model (SEM). The findings revealed that information quality, service quality, confirmation, post-usage perceived usefulness, and satisfaction are the most crucial predictors of continued intention to use mobile payment application. The model R2 is 0.532, indicating that these factors could adequately explain the continuous use intention.</p>
<p>20:00-20:15 IM-011</p>	<p>On the Relationship Between Linter Warning Density and Software Maintainability: An Empirical Study of JavaScript Projects Tjaša Heričko and Boštjan Šumak Presenter: Tjaša Heričko University of Maribor, Slovenia</p> <p>Abstract-A common practice in software development is to include linters, static analysis tools that warn developers about potential issues in the code, in the software quality assurance process. Actionable warnings generated by linters upon violations of defined rules help detect, resolve, and reduce coding errors, quality flaws, code style inconsistencies, and deviations from best coding practices and conventions. However, little empirical evidence exists to fully understand the relationship between linter warnings and</p>

	<p>external software quality factors. To this end, an empirical investigation of the source code of 40 open-source JavaScript project releases was conducted to study whether there is a relation between software maintainability measured by the Maintainability Index and the density of linter warnings per Logical Lines of Code. The findings suggest a very weak to strong negative correlation between warning density and the value of the Index at a project- and a module-level. Changes in warning density between projects only slightly inversely correspond to changes in maintainability. Additionally, a statistically significant difference in maintainability was found between projects defining linters in their manifest file and those that do not, in favor of the former</p>
<p>20:15-20:30 IM-002</p>	<p>Application of In-Memory Databases (IMDB) and Object-Oriented Programming (OOP) in material Micro Texture (MiTx) analysis from data collected by Energy Dispersive Laue Diffraction (EDLD) experiments using pnCCD cameras AMIR TOSSON, AYUSH SHARMA, MOHAMMED SHOKR, ULLRICH PIETSCH Presenter: Amir Tosson the University of Siegen, Germany</p> <p>Abstract-One of the most pioneering advantages of the Energy Dispersive X-ray Laue Diffraction (EDLD) is the one-shot experiment for investigation of polycrystalline materials. Using a 2D energy-dispersive detector, the EDLD is measuring simultaneous position- and energy signals. This makes the EDLD a cutting-edge experiment in Micro Texture (MiTx) characterization of polycrystalline materials. However, real-time analysis of the generated images requires innovative techniques to extract grain-wise structural information. Employing synchrotron radiation, high-performance computing, and data management approaches are required to perform one-shot experiments and on-the-fly analysis. In this article we show how the EDLD experimental analysis can be encapsulated with the fast-computing methodology of the in-memory database system, incorporating the cube architecture, and enhancing data accessibility and warehousing.</p>
<p>20:30-20:45 IM-073</p>	<p>Mobile application for the possible detection of melanoma in the skin by digital photography: A preliminary feasibility study Miguel Tarazona-Odar, Wendel Palomino-Dávalos and Wilver Auccahuasi Presenter: Wilver Auccahuasi Universidad Continental, Peru</p> <p>Abstract-Early detection of skin cancer is essential for its treatment. In this sense, there are numerous techniques and instruments for medical personnel to make the respective diagnosis; however, these instruments can be expensive or simply not available. Therefore, this study proposes a mobile application for the possible detection of melanoma in the skin by digital photography, which has achieved 96% accuracy in the tests performed using 80 images of skin lesions of which 40 are benign and 40 malignant. The application takes the image and sends it to the server for processing, which is based on the criteria of asymmetry and irregularity of the border of the photographed sample.</p>
<p>20:45-21:00 IM-076</p>	<p>Methodology for the execution of programs based on different programming languages Christian Ovalle, Wilver Auccahuasi, Sandra Meza, Tamara Pando-Ezcurra, Oscar Linares, Kitty Urbano, Aly Auccahuasi, Nicanor Benites, Alfonso Fuentes and Edwin Felix</p>

	<p>Presenter: Wilver Auccahuasi Universidad Continental, Peru</p> <p>Abstract-Currently, in the programming ecosystems, there are different programming languages, each of the languages work with their libraries dedicated to special tasks, among the most used languages are Python, R, Matlab, C, C++ among others, in this work, we demonstrate a method to perform work with the use of different programming languages, in order to exploit the benefits of each one, all of them in a single development environment, which takes advantage of the available hardware that we can have in the workstations, as is the case of CPUs and GPUs that may have. As a result we present the architecture and programming modes that can be developed with each language, the programming mode considered is to perform partial jobs, defined in taking the file to work, perform the necessary processes, then store them in new files so that it can be worked by another language, the method can be applied in multiple tasks mainly in those that can work with matrices and vectors.</p>
<p>21:00-21:15 IM-086</p>	<p>Development of a Web Application for the control of human rabies in Peru Percy Aza-Yanque, Manuel Paz-Carpio, Cristian Elguera-Arenas and Wilver Auccahuasi Presenter: Wilver Auccahuasi Universidad Continental, Peru</p> <p>Abstract-With the advance of Information and Communication Technologies, different processes are being improved so that they can be optimized and reliable information can be obtained to make the best decisions. Therefore, in the process of human rabies control in Peru, it is very important to have a record of the vaccines that must be completed according to the vaccination schedule assigned to the patient. The stored information should be accessible to the health personnel in charge of patient care in any of the micro-networks. In this work, a web application called "Rabies Vaccine" was developed with the aim of controlling the vaccination of patients who have been bitten by an animal that transmits rabies, for this purpose a record of the patient will be made and, if necessary, the health personnel will assign a vaccination schedule that the patient must comply with. The developed prototype of the web application was implemented in the Miraflores Health Center of the Edificadores Misti Micro-Network, which belongs to the Arequipa - Caylloma Health Network, located in the district of Miraflores, Arequipa, Peru, in order to improve vaccination control. Finally, the results of the performance tests that were used to measure the influence of the web application will be shown. For these tests, observation sheets were used where records of before and after the web application was used were kept and they were called "Pre-test" and "Post-test". This web application has more secure and reliable data, it is scalable so that it can be used by other health centers and easy to access with only internet access.</p>

ONLINE SESSIONS

* All schedules will be scheduled in **New Zealand Daylight Time (NZDT) (UTC+13)**

Session 5

February 2, 2023 | Thursday

Topic: Information Education and Service Management

Session Chair:

Dr. Ketut Agustini, Ganesha University of Education, Indonesia

Dr. Dian Anggraini Kusumajati, Bina Nusantara University, Indonesia

18:30-20:45

Room B

Zoom ID: 828 7868 7524

<p>18:30-18:45 IM-066</p>	<p>Effectiveness of Hybrid Learning as Technology Based Learning Model in the New Normal Era Dian Kusumajati, Rina Chairiyani, Fransiska Kusumastuti and Niniek Setianingsih Presenter: Dian Anggraini Kusumajati Bina Nusantara University, Indonesia</p> <p>Abstract-Hybrid learning (HL) has become one of the learning models used when entering the new normal. Although various studies have measured HL, the effectiveness of HL model usage remains a concern for universities, especially Bina Nusantara University (BINUS) Jakarta. The main problem is that the use of hybrid learning conducted by BINUS is new. The purpose of this study was to determine the effectiveness of hybrid learning as technology-based learning by students in BINUS Jakarta. The population in this study was active students of BINUS Jakarta, totaling 127 students. The technique of collecting the sample was using random sampling. The statistical method uses Pearson correlation analysis and description. Based on the descriptive analysis the results found that hybrid learning was reflected in the role of technology (helps students in finding the information needed for learning by using gadgets and computers), campus commitment (providing internet facilities, Wi-Fi, computers, audio connectors, television, cameras, internet, and InFocus in each class), learning activities (presentations and discussions, independent assignments, group assignments in the form of projects (problem based), and final tests), and student readiness (previously using a blended learning process). There are 81.1% of students in BINUS Jakarta who feel that the hybrid learning system is effective in the learning process carried out during the Covid-19 condition, at the same time preparing for the new normal era. Hybrid learning, which is most effective for students in BINUS Jakarta, can be felt when there is the role of technology, campus commitment, learning activities, and students' readiness to participate in learning.</p>
<p>18:45-19:00 IM2-041</p>	<p>Using Analytic Hierarchy Process and Technique for Order of Preference by Similarity to Ideal Solution for Multi-Criteria Decision-Making Approach in Evaluating Science High School Campus Sites Mary Jane Samonte, Guada Ramos-Dimaya Presenter: Mary Jane Samonte Mapua University, Philippines</p>

	<p>Abstract- The study aims to evaluate the Philippine Science High School (PSHS) campus site using a multi-criteria decision-making approach, particularly Analytics Hierarchy Process (AHP) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). The criteria used to determine the campus sites are the following: existence of a PSHS campus in the region, location and environment, topography, size, accessibility, Internet access, and geologic hazard. Using descriptive analytics, data indicate that PSHS can only accommodate 0.044% of the total population belonging to the 10–19-year-old age range due to the limitation in campus capacity. Results also show that spill-overs from the National Capital Region were enrolled in almost all PSHS regional campuses except for PSHS Central Mindanao Campus and Southern Mindanao Campus as 14% of the total number of students in the last 10 years came from this region. Upon evaluation of the results, venue of future PSHS campus should be evaluated independently per region based on the following relative weights of 20% for location and environment; 18% for geologic hazard; 17% for accessibility; 16% for internet access; 15% for size; and 14% for topography, which can be attributed mainly to the current location and needs of the PSHS campuses. Based on the Performance Score, using TOPSIS, the alternatives were rank and a northern part campus location (Ilocos Region - 0.6647) was ranked as the best alternative having acquired the maximum value.</p>
<p>19:00-19:15 IM-036</p>	<p>The effect of IT Capability on Customer Relationship Performance for Non-Profit Organization: Mediating Role of External Capability Sakulrat Yangyuen and Tanapon Jensuttiwetchakul Presenter: Sakulrat Yangyuen King Mongkut’s University of Technology North Bangkok, Thailand</p> <p>Abstract-This research contemplates to investigate the relationship between organization capability and customer relationship performance. The proposed research model consists of three parts 1) Internal capability, 2) External capability, and 3) Customer relationship performance. First, internal capability is the organizational competence focused on management skills, IT skills. Second, external capability is the organizational agility focused on speed and responsiveness of decision-making, and customer knowledge in sense of capability to identify and action towards the external change. Finally, customer relationship performance is benefit in term of customer perspective focused on customer satisfaction and customer retention. This study also invents the mediating role of external capabilities on the relationship between the internal capabilities and customer relationship performance for a non-profit organization.</p>
<p>19:15-19:30 IM-063</p>	<p>The Performance of Trust in Knowledge Sharing Activities using the SECI Model in Online Teamwork Murty Magda Pane and Arcadius Benawa Presenter: Murty Magda Pane Bina Nusantara University, Indonesia</p> <p>Abstract-This research’s objective is to get the information about the performance of trust of the students in the knowledge sharing activities the students have done. The specific model chosen in this research for knowledge sharing is the SECI Model. It used an</p>

	<p>experimental model combined with quantitative method. It used 92 respondents from several departments and second semester. It used questionnaires for SECI Model and Organizational Commitment, and they got > 0.250 for corrected total item correlations and Cronbach alpha, so all the itmes in the questionnaires are valid and reliable. The respondents tend to choose the scale of 4 (47.04% in average), 3 (26.944% in average) and 5 (18.082% in average). The correlations between trust and every process of SECI Model are 0.985, 0.636, 0.480 and 0.581. These results show that organizational commitment of the respondents have positive linear relationships with every process of SECI Model.</p>
<p>19:30-19:45 IM-087-A</p>	<p>Comparison of Topic Modeling Methods for Topic Trends on Organic Agriculture Scientific Articles Roberto Carlos Morales-Hernández, Joaquín Gutiérrez and David Becerra-Alonso Presenter: Roberto Morales-Hernández Universidad Loyola Andalucía, Spain</p> <p>Abstract-Mining the topics of scientific articles remains a critical and essential task to recognize trends in research topics. This study aims to evaluate the performance of three topic modeling methods, Latent Dirichlet Assignment (LDA), Non-negative Matrix Factorization (NMF), and BERTopic. With the creation of a dataset of scientific articles (Titles and Abstracts) on organic agriculture, qualitative and quantitative results on topic modeling have been obtained where it turns out that BERTopic shows better results and coherence in topic modeling. Whereas LDA generates negative values for the coherence score (NPMI), NMF obtains acceptable values, and BERTopic produces the best results. For topic trends, results allowed positive recognition of hot, cold, and warm topics, identifying the evolution in organic agriculture articles from 2015-2021.</p>
<p>19:45-20:00 IM-065</p>	<p>The Students' Performance of Digital Sustainable Development Education in Gaining Competitive Advantage in ASEAN's Business Competition in the Post-Pandemic Era Murty Magda Pane and Christian Siregar Presenter: Murty Magda Pane Bina Nusantara University, Indonesia</p> <p>Abstract-This study is a preliminary one aims to find out the performance of the attitudes and behaviors of Binus University students towards sustainable development to gain the competitive advantages in ASEAN business competition in the post-pandemic era. It was taken using the convenience sampling technique to 225 students from varied semester and departments. It used the quantitative method (corrected item total correlations for both variables are 0.433 and 0.419 (>0.3), α for both are 0.750 and 0.773 (> 0.5)) with Likert scale to measure the performance of agree and disagree for managing and interpreting the data. The respondents are 250 students from varied semesters and departments. The performance of the most chosen variable of attitudes are: scale 4 is chosen by 44.44% and scale 5 is chosen by 35.56% of respondents. Whilst the performance of the most chosen variable of behaviors is:</p>

	<p>scale 4 is chosen by 39.56% and scale 5 is chosen by 27.56% of respondents. These results indicated that the sustainable development awareness of Bina Nusantara students tends to the level of moderate to high.</p>
<p>20:00-20:15 IM2-040</p>	<p>Application of Customer Clustering and Analytical Hierarchy Process in Optimizing Delivery of Government Science and Technology Interventions Mary Jane Samonte, Giselle Eve Siladan Presenter: Mary Jane Samonte Mapua University, Philippines</p> <p>Abstract-The study aims to evaluate the Philippine Science High School (PSHS) campus site using a multi-criteria decision-making approach, particularly Analytics Hierarchy Process (AHP) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). The criteria used to determine the campus sites are the following: existence of a PSHS campus in the region, location and environment, topography, size, accessibility, Internet access, and geologic hazard. Using descriptive analytics, data indicate that PSHS can only accommodate 0.044% of the total population belonging to the 10 - 19-year-old age range due to the limitation in campus capacity. Results also show that spill-overs from the National Capital Region were enrolled in almost all PSHS regional campuses except for PSHS Central Mindanao Campus and Southern Mindanao Campus as 14% of the total number of students in the last 10 years came from this region. Upon evaluation of the results, venue of future PSHS campus should be evaluated independently per region based on the following relative weights of 20% for location and environment; 18% for geologic hazard; 17% for accessibility; 16% for internet access; 15% for size; and 14% for topography, which can be attributed mainly to the current location and needs of the PSHS campuses. Based on the Performance Score, using TOPSIS, the alternatives were rank and a northern part campus location (Ilocos Region - 0.6647) was ranked as the best alternative having acquired the maximum value.</p>
<p>20:15-20:30 IM-049</p>	<p>Analyzing critical success factors for a successful implementation of artificial intelligence in agile industry 4.0 Fadoua Tamtam, Larbi Yacoubi and Amina Tourabi Presenter: Fadoua Tamtam National School of Applied Sciences, Morocco</p> <p>Abstract-In industry 4.0, artificial intelligence (AI) promises to achieve persuasive operational transformations. Yet, agility is one of the prominent concepts in the organizational capability to gain competitive advantage in the global conditions that emerge with industry 4.0. However, a successful implementation of AI depends also on the ability to identify critical success factors (CSFs) that are important to be considered when implementing AI. While previous literature has already revealed CSFs that are important to be considered, this paper is the first of its kind that has used the M-TISM (Modified Total Interpretative Structural Modelling) methodology for the identification and prioritization of CSFs of AI in an agile industry 4.0 firm. With this background, this paper reveal 19 factors related to the technological, organizational and environmental dimensions. Then, the fuzzy MICMAC process is used to classify the CSFs based on driving and dependence power.</p>

<p>20:30-20:45 IM-075</p>	<p>Method for monitoring stress and vital signs in teachers when conducting online classes, using wearable devices Christian Ovalle, Wilver Auccahuasi, Sandra Meza, Tamara Pando-Ezcurra, Oscar Linares, Kitty Urbano, Aly Auccahuasi, Nicanor Benites, Alfonso Fuentes and Edwin Felix Presenter: Wilver Auccahuasi Universidad Continental, Peru</p> <p>Abstract-The applications where images and video are exploited are developed based on the Python programming language, due to its practicality and the power of its libraries, which is why its use has become widespread [6]. As well as working with images and videos based on the analysis of data organized in matrices, we find works where signals are analyzed such as medical signals, which are based on the use of data organized in vectors [7]. In the development of applications related to Artificial Intelligence, we find many applications related to the exploitation of large-scale data, that is why they work with high performance hardware as well as accompanied by programming languages and libraries that can perform these automatic processes, so there are many programming languages such as Python, Matlab, R, which can perform the construction of applications based on Artificial Intelligences [8]. In this analysis, we can identify that for certain applications certain programming languages are used, hence their exclusive use. In this paper, we present a method to exploit the advantages provided by each of the programming languages, using each of the libraries and taking advantage of the hardware of the same computer, we present how we can exploit the languages Python, C, C++, R and Matlab.</p>
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