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"Everything you don't know is something you can learn."

Summary

I am a passionate and innovative engineering professional with a track record of excellence. I currently hold the position of Research Fellow in Operations Analytics at the Institute for Intelligent Systems Research and Innovation (IISRI) at Deakin University. My primary role involves spearheading cutting-edge research to optimise operations in complex transportation networks, which builds upon my extensive experience. I have a Doctor of Philosophy (Engineering) from Deakin University, where my research focused on improving Integrated Operation Centres (IOCs) and developing state-of-the-art optimisation algorithms and machine learning models. I have also presented my findings at numerous national and international conferences. My journey started with a Bachelor of Civil Engineering (Honours) at Deakin University, where my final year project was recognised for its industry collaboration. Additionally, my practical experience as a Student Engineer at the City of Greater Geelong has honed my problem-solving skills. I am eager to explore opportunities that allow me to apply my expertise and drive innovation in the engineering domain. Let's connect and explore potential collaborations.

Experience

Institute for Intelligent Systems Research and Innovation (IISRI),Deakin University
Geelong, Australia

Research Fellow - Operations Analytics — *Aug. 2023 - Present*

- Engaging collaboratively to develop novel and high-quality research or creative activities.
- Initiating, designing, and conducting intra- and inter-disciplinary research collaborations, to enable major breakthroughs in knowledge and understanding and solutions to complex problems.
- Taking charge of initiating, designing, conducting, and leading industry partnerships and collaborations to facilitate groundbreaking solutions that can be translated into real-world impact.
- Supervising HDR students with timely completions and productive, high quality outcomes.

School of Engineering, Deakin University
Geelong, Australia

Research Assistant — *Nov. 2019 - Dec. 2019*

- Extended my final year project research to adopt an established methodology for analysing the ability of plant materials to remove heavy metals from wastewater.
- Discovered and identified new Australia native plant materials with the capabilities to adsorb heavy metals.

City of Greater Geelong
Geelong, Australia

Program Delivery - Student Engineer — *Dec. 2018 - Nov. 2019*

- Undertook engineering related projects involving formulation, generation and assessment of solutions.
- Investigated and liaised with members of the community for solving problems related to infrastructure.
- Prepared cost estimation and concise work instructions and guidelines for effective problem-solving.
- Created a tool that helps with selecting the appropriate thickness for maintaining asphalt roads and estimating the associated costs.
- Utilised asphalt road data to develop road maintenance plan and calculate maintenance costs.

Education

Institute for Intelligent Systems Research and Innovation (IISRI),Deakin University
Geelong, Australia

Doctor of Philosophy (Engineering) — *Jan. 2020 - Aug. 2023*

- Analysed and improved efficiency of an Integrated Operation Centre (IOC) for complex transportation networks.
- Developed state-of-the-art optimisation algorithms and machine learning models for real-world problems.
- Researched a human-computer teaming framework to improve efficacy of traffic monitoring, scheduling, and maintenance tasks for a next generation IOC in the transportation sector.
- Received financial and industrial support from Rail Manufacturing CRC in PhD research, https://rmcrc.com.au/yit-hong-choo/
- Created effective reports, writing scientific paper, and publishing research findings on journal articles.
- Attended several domestic and international conferences to present the analysis and results of the research project.

UCSI University & Deakin University

Malaysia & Australia

Bachelor of Civil Engineering (Honours) *May. 2015 - Oct. 2019*

- The International Degree Programme (IDP) offered by UCSI University allows for transfer to Deakin University, Australia.
- Conducted final year project on "Water treatment with plant-based material", which was showcased by School of Engineering, Deakin University. https://www.deakin.edu.au/engineering/showcase
- Investigated the ability of plant materials common in Victoria to remove heavy metals from water to determine feasibility of a low cost and sustainable water treatment regime.

Projects

Classification of Inflammatory Gene Expression Patterns with Machine Learning Models

Geelong, Victoria

PhD Student *Apr. 2023 - Apr. 2023*

- Analysis of inflammatory gene expression patterns in the parietal cortex (PCx) and temporal cortex (TCx) from a human brain RNA-seq data set.
- Aimed to derive insights into underlying mechanisms associated with dementia.
- Used five machine learning and statistical methods to classify inflammatory gene expression patterns associated with dementia.
- Our study revealed better gene expression data classification results using PCx-related gene patterns, as compared with those from the TCx.
- This study is presented at 2023 IEEE The 4TH International Conference on Pattern Recognition and Machine Learning (PRML 2023)

Optimising Network Intrusion Detection Systems with Ensemble Multi-objective Harris' Hawks Optimiser

Geelong, Victoria

PhD Student *Nov. 2022 - Dec. 2022*

- Trained the network intrusion detection systems with UNSW-NB15 dataset.
- Utilised well-known decision tree classifier to classify the normal network activity and network anomalies.
- Improved the machine learning model with Ensemble Multi-objective Harris' Hawks Optimiser to minimise the number of features and maximise the model accuracy.
- The model is presented at Defence and Security Symposium 2022.

Decision Support Tool for Rollingstock Maintenance

Auburn Maintenance Centre, NSW

PhD Student *Jan. 2020 - Dec. 2022*

- Spearheaded the development of a comprehensive decision support tool for rollingstock maintenance scheduling.
- Expertly collected and analysed historical maintenance data to create predictive maintenance models.
- Leveraged Python libraries such as pandas, sklearn, and matplotlib to conduct data analysis, prediction, and visualisation.
- Employed Harris' Hawk Optimisation to enhance predictive models by optimising feature selection and maximising accuracy.
- Successfully predicted brake maintenance durations, contributing to effective maintenance scheduling.
- Conducted regular stakeholder meetings to gather critical information, business rules, constraints, and requirements.
- Formulated mathematical models for multi-objective optimisation of maintenance scheduling tasks.
- Developed a simulation-based optimisation model and utilised What-if scenario analysis to evaluate the schedule.
- Made significant contributions to the improvement of rollingstock maintenance operations, ensuring efficiency and reliability.

Conferences

International

2023	**Presenter/Participant**, 2023 IEEE International Conference on Industry 4.0, Artificial Intelligence, and Communications Technology (IAICT 2023)	*Bali, Indonesia*
2022	**Presenter/Participant**, 2022 IEEE Industrial Electronics and Applications Conference (IEACon 2022)	*Kuala Lumpur, Malaysia*

Domestic

2022	**Presenter/Participant**, Defence and Security Symposium	*Melbourne, Australia*
2022	**Participant**, Horizons Program 4.0 - Shaping the Technical Future of Rail	*Melbourne, Australia*

Writing

Enhancing the Harris' Hawk Optimiser for Single- and Multi-Objective Optimisation

Journal

First and Corresponding Author — *Published - 2023*

- This paper proposes an enhancement to the Harris' Hawks Optimisation (HHO) algorithm to solve single- and multi-objective optimisation problems.
- https://doi.org/10.1007/s00500-023-08952-w

Optimisation of Multi-Objective Rolling Stock Maintenance Scheduling with Harris' Hawk Optimiser

Conference Paper

First and Corresponding Author — *Published - 2023*

- This paper proposes an enhanced multi-objective Harris' Hawk optimiser to devise the maintenance schedules subject to various competing objectives based on information derived from a rolling stock maintenance company.
- http://doi.org/10.1109/IAICT59002.2023.10205863

Enhancing the Whale Optimisation Algorithm for Single- and Multi-objective problem

Journal Paper

Co-author — *Published - 2023*

- This paper proposes a novel enhanced Whale Optimisation Algorithm (EWOA) to solve single- and multi-objective optimisation problems.
- https://doi.org/10.1007/s00500-023-09351-x

Classification of inflammatory gene expression patterns with machine learning models

Conference Paper

Co-Author — *Published - 2023*

- This paper focuses on the analysis of inflammatory gene expression patterns in the parietal cortex (PCx) and temporal cortex (TCx) from a human brain RNA-seq data set using machine learning algorithms.
- https://doi.org/10.1109/PRML59573.2023.10348265

A Clustering-Based Whale Optimisation Algorithm for Multi-Objective Flexible Job Shop Problems

Conference Paper

Co-Author — *Published - 2023*

- This paper introduces the C-MOEWOA, a specialised clustering-based Whale Optimisation Algorithm for tackling Multi-Objective Flexible Job Shop Problem (MOFJSP).
- https://doi.org/10.1109/IoTaIS60147.2023.10346077

Multi-Objective Flexible Job-Shop Scheduling with an Ensemble Optimisation Model

Conference Paper

First and Corresponding Author — *Published - 2022*

- This paper proposes an ensemble-based Harris' Hawk Optimisation (EN-HHO) model to create an efficient scheduling system that can minimise the production cost and maximise machine utilisation in the era of Industry 4.0.
- http://doi.org/10.1109/IEACon55029.2022.9951770

Conversion of Agricultural Wastes into Biochar and Its Characteristics

Book Chapter

Co-author — *2021*

- This book chapter provides an elaboration on the agricultural productivity, resources, and waste management of Asian countries particularly on high-value crops such as rice, corn, pineapple, coconut, sugarcane, and oil palm.
- https://doi.org/10.1007/978-981-16-4059-9_12

Skills

Programming Python, LaTeX, Tableau, PowerBI, Machine Learning algorithms
Microsoft Office Suite Word, Excel, PowerPoint
Languages English, Mandarin, Cantonese, Malay

Memberships

Present **Graduate Member**, Engineer Australia — *Australia*
Present **White Card Holder**, WorkSafe Victoria — *Australia*
2016 **Trainee**, Construction Industry Development Board (CIDB) Malaysia — *Malaysia*

Extracurricular Activity

Ultimate Victoria
Victoria, Australia

Ulti-mates Coach/Victorian U22 Coach — *Jan. 2021 - Present*

- Recently promoted to the Head Coach position for the Victorian U22 team for 2023, demonstrating leadership and expertise in coaching strategies and player development.
- Fostering sportsmanship, inclusiveness, and enjoyment of Ultimate Frisbee among primary and secondary school children as an Ultimates Coach.
- Assisting in preparing the Victorian U22 team for competition by developing and executing training programs, devising game strategies, managing player performance, and ensuring effective team dynamics.
- Providing constructive after-action reviews, feedback, and guidance to players for continuous improvement based on training sessions and game observations.
- Participating in the selection process for the 2022 Australian Under-22 "Green and Gold" merit teams, showcasing skills in talent evaluation and team formation.

Geelong Mudlarks Ultimate Frisbee Club
Geelong, Australia

Treasurer/Active player — *Sep. 2017 - Present*

- Managing all financial matters of the club, including budgeting, expenses tracking, and financial reporting.
- Competing in the Australia Ultimate Championship, demonstrating commitment to high-level performance and teamwork.
- Contributing to the club's success as a three-peat champion in 2018, 2021, and 2022, showcasing consistency and dedication to excellence.
- Actively seeking sponsorship opportunities to support the club's growth, enhance its resources, and foster long-term partnerships with local businesses and organisations.

UCSI University Student Council
UCSI University, Malaysia

Sport Director — *May 2015 - Dec. 2016*

- Chaired monthly meetings with club members to collaboratively discuss and strategize the club's future plans, address needs, and set goals for growth and development.
- Organised and executed promotional events to raise awareness of the sports club within the university community.
- Engaged students and staff in club activities and fostered a sense of camaraderie and school spirit.

UCSI Hurricane Ultimate Frisbee Club
UCSI University, Malaysia

President/Founder/Captain — *May 2015 - Dec. 2016*

- Planned and coordinated training sessions for the team and leading the team in tournaments.
- Organised inter-university competition to help club members improve their skills and enhance exposure.
- Chaired meetings with committee members to formulate and strategise the club's future plans.

UCSI Facilitation Program
UCSI University, Malaysia

Facilitator/Committee member — *Jan 2015 - Dec. 2016*

- Engaged with external industries and partners to provide support and sponsorship for our events.
- Planned and distributed tasks among the facilitators for delivering programs.
- Chaired meetings with other members and facilitators to ensure the program runs smoothly before an event.