DR. AMMAR KAMOONA

CONTACT

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- Github projects
- in Ammar Kamoona
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SKILLS

Programming
Python ●●●●●
MATLAB ●●●●●
LaTeX ●●●●●
C++ ●●●○○
FPGA ●●●●○
HTML/CSS ●●○○○

Operating Systems
Windows ⊞ ●●●●●
Linux 🐧 ●●●●○

Software & Tools
**Deep Learning
Development tools** ●●●●●
(e.g. Pytorch, Tensorflow, Keras ...)
Visualisation ●●●●●
(e.g. matplotlib, gnuplot, ...)
Data handling/analysis
●●●●●
(e.g. numpy, scipy, pandas, ...)
**Word Office
applications** ●●●●○
**Blinder for 3D
modelling** ●●●●○

Teaching
Five years experience in teaching different electrical and electronic engineering subjects, such as

- Digital Fundamental Design OENG1206 course link
- Modelling and Simulation of Engineering System OENG 1116
- Engineering Electromagnetic field course link
- Digital Circuit Design

Languages
English ●●●●●
Arabic ●●●●●

PROFESSIONAL SUMMARY

☑ Dr Kamoona has seven years of teaching and five years of research experience. He completed his Ph.D. (RMIT University, Australia) in machine learning and computer vision majoring in Advanced Manufacturing Engineering. Ammar holds two excellence awards in stochastic modeling and Survival analysis and RF mixed design from the Swinburne University of Technology, Melbourne, Australia.

⚙ WORK HISTORY

📅 Feb/2022-ongoing
📍 RMIT University
Melbourne, Australia

Postdoctoral Researcher

Working on project "EV Living lab funded by the Victorian Government, aiming at meeting our zero-emission targets by efficiently decarbonizing the transport", also work on project" optimization of behind the meter DER generation assets within network constraints" in collaboration with Centre for New Energy Technologies, AGL and Ausnet Services". My role is to develop machine learning models for different aspects of EV using smart meter data.
Reference: A/Prof. Mahdi Jalili Email: mahdi.jalili@rmit.edu.au

📅 01/2020 - 12/2021
📍 RMIT University
Melbourne, Australia

Casual Academic Tutor

Teaching subject: Digital Fundamental,
Reference: Prof. Katrina Neville

📅 2019 - 2020
📍 RMIT University
Melbourne, Australia

Casual Academic Tutor

Teaching subject: Modelling and Simulation of Engineering Systems,
Reference: Prof. Pavel Trivailo

📅 2018 - 2019
📍 Cornerstone Solutions Pty
Melbourne, Australia

Research engineer

Responsibilities involve: Developing an automatic software system that uses camera sensors to detect workers in construction sites who do not wear safety vests.
The outcome of this work was also published as a research paper.
Reference:David Accadia

📅 2016 - 2018
📍 Faculty of Engineering, University of Kufa
Iraq

Lecturer

Responsibilities involve: The primary role is to teach, facilitate learning, and assess and mentor students in accordance with relevant curriculum and/or training package requirements. I also undertook professional duties and activities related to delivery. In order to maintain quality educational services. Teaching subjects:

Digital Circuit Design, Engineering Electromagnetic fields, English for academic purpose
Reference: Amer, Head of Electrical Engineering.

📅 2011 - 2013
📍 Faculty of Engineering, University of Kufa
Iraq

Electrical Engineer

Responsibilities involve: Designing, maintaining, implementing, or improving electrical instruments, facilities, components, equipment products, or systems for industrial, commercial, or domestic purposes. Performing a wide range of engineering tasks by operating computer-assisted design or engineering software and equipment. Ensuring that installation and operations conform to standards and customer requirements by preparing electrical systems specifications, technical drawings, or topographical maps. Writing reports and compiling data regarding existing and potential electrical engineering projects and studies.

⚙ WORK HISTORY

📅 2011 - 2013
📍 Faculty of Engineering, University of Kufa   Assistant lecturer
Iraq

Responsibilities involve:Teach as a member of a teaching team within an established programme of study. Teach in a variety of settings from small group tutorials to large lectures, ensuring content, methods of delivery and learning materials meet the defined learning objectives for individual teaching sessions. Develop your own teaching materials, methods and approaches taking into account established or agreed-on practices where necessary. Supervise the work of students, provide advice on study skills and help them with learning problems. Set and mark assignments and set examination questions as well as assess the work and progress of students by reference to defined criteria and provide constructive feedback to students.

🎓 EDUCATION

📅 08/2018 - 7/2022
📍 RMIT University, Melbourne   Ph.D in Machine vision & Machine learning

Majors: Advanced Manufacturing Engineering
Thesis Title:"Anomaly Detection in Machine Vision Applications"
Outcomes: 2 Published prestigious (Q 1 Top 25%, 90th percentile in engineering, and 85th percentile in computer science) international Journals and 1 international conference , 2 (Q 1 Top 25%, 97th percentile in engineering, 95th percentile in computer science applications) under-review journal publications

📅 08/2014 - 7/2016
📍 Swinburne University, Melbourne   Master of Electrical and Electronic Engineering (M.Sc.Eng)

Major: Electrical and Electronic Engineering
Thesis Title: "Intelligent Techniques for Medical Image Enhancement"
Outcomes: 1 Q.1 (Top 25%, 92th percentile) International journal and Second-best in world international conference on Evolutionary computation
Thesis score: 86/100

📅 08/2006 - 7/2010
📍 University of Kufa, Iraq   Bachelor of Electrical Engineering
Major: Electrical Eningeering
Ranked 4th among 80 graduates

ACHIEVEMENTS, HONOURS AND AWARDS

🏆 Ph.D scholarship Award, RMIT university, 2018-2022.

🏆 HDR Publication Incentive award, RMIT university, 2020.

🏆 Top-up scholarship Award, RMIT University, 2019.

🏆 Golden Key international honor society certificate, Atlanta, Georgia, United States, 2017.

🏆 Certificate of excellence award in RF circuit design, Swinburne University of Technology, 2014.

🏆 Certificate of excellence award in Stochastic Modelling and Survival Analysis, Swinburne University of Technology, 2014.

🏆 HCED Prime's Minster scholarship award, 2013-2016.

GRANTS

🏆 **CSIRO Next Gen Graduate Program - AI for Clean Energy and Sustainability**, RMIT & Monash, 2023.
Role: Co-investigator: I will bring my expertise and AI and data analytics to support supervising the next generation of HDR students in Clean Energy and Sustainability-based on government action **3.1A** .

🏆 **Imove Australia undergraduate grant**, 2023
Role: Chief-investigator: Supervising capstone student for project "Electric vehicle state of charge estimation using AI".

▶ TALKS

▣ ANZAAS talk (science talk): Transport electrification and integration of EVs within the electricity grid
"The transport sector is responsible for about 20% of greenhouse gas emissions, and electric vehicles (EVs) are the most important means to zero-emission transport systems. Commonwealth, State and Territory governments have introduced policies to support the electrification of the transport sector. For example, the Victorian Government has set a policy toward electrification of Victoria's Public Transport;by 2025 all new bus fleet purchases must be zero-emission. Mass electrification of the transport sector will have a significant impact on the grid and energy landscape. This talk covers technologies to efficiently integrate EVs within the grid, while also supporting increased penetration of renewables".▶ **Recorded youtube link**,
📍 Zoom talk, Melbourne, Australia, 📅 2022

- **Application of IoT anomaly detection in construction sites**
  "The Internet of Things (IoT) has gained worldwide momentum in both industry and research community due to their potential applications. One of the applications of IoT is in the construction site for cost reduction, cutting delay and importantly reducing safety hazards. These smart entities generate a large amount of data. For example, the data generated by smart cameras connected to the internet. Detection of anomalies in these data has several benefits to industry. This work aims to highlight the advantages of detecting visual anomalies in such a data acquired by a camera using Random Finite Set (RFS) theory. The main goal of this work is to detect hazards in construction sites, mainly the hazard of low visibility for the workers who do not wear a safety vest. We model this problem as an anomaly detection problem where workers who do not wear safety vest would be considered as novel data. We compare our method with state of art deep neural network for anomaly detection"
  ⚐ RMIT Internet of things Forum, Melbourne, Australia, 🗓 2019

- **An enhanced cuckoo search algorithm for solving optimization problems**
  In this talk, we present our research paper an enhanced cuckoo search (ECS) algorithm based on Gaussian diffusion random walks and greedy selection approach. Despite wide applications of cuckoo search (CS) algorithm, it suffers from low convergence speed and lacks balance between local and global search. To overcome these limitations, ECS algorithm is proposed. It employs Gaussian diffusion random walks instead of Lévy flights random walks to enhance the local search. In addition, the greedy selection approach is employed to ensure that ECS reaches the optimum solution. Twenty one IEEE benchmark functions are used to evaluate the performance of the proposed ECS algorithm against CS and a recent adaptive cuckoo search (ACS) algorithms. The ECS shows excellent performance in reaching optimum values with a high convergence speed compared to CS and ACS algorithms. In addition, with several experiments, the effects of population size and the abandon probability are carried out for the three algorithms and experiments shown that ECS is more robust than CS and ACS algorithms. Furthermore, superior performance of ECS algorithm against four other competitive algorithms has also been shown.
  ⚐ 2018 IEEE Congress on Evolutionary Computation (CEC), Rio de Janeiro, Brazil, 🗓 2018

PROJECTS

📄 **The electrification of Victoria's future fleet** 🗓 Feb 2022-ongoing

The goal of this project at meeting our zero-emission target by efficiently decarbonising the transport sector. This project is colabration between C4NET, Australian Energy Market Operator (AEMO), Monash university, and Latrobe university. The project have four streams and the stream that we are working on is on "Developing an EV Analytics and AI platform". This task will begin by identifying all the stakeholders that will be interested and informed by the data accumulated in this repository from the electrification HCDE. These stakeholders should include, the grid, DNSPs, retailers, regulatory and policy-making bodies, EV aggregators, public transport operators, EV users, and battery operators. The dashboards will provide hindsight, foresight, predictions, and scenario modelling capabilities to the accumulated multi-source, multimodal data streams. Taking into account, spot energy price, weather, characteristics of EV charging as well as demand, fuel mix, intra-regional flows, and FCAS requirements, this task will design, develop and evaluate a hybrid AI model composed of reinforcement learning and metaheuristics capabilities for the determination of the optimal charging times, frequencies, and durations for a given n number of EVs, batteries, providers and consumers Project link1 project link2.

📄 **Optimization of behind the meter DER generation assets within network constraints** 🗓 March 2022-Aug 2022

This project is a collaboration between RMIT, C4NET, AGL, and AusNet. The work involves applying machine learning and data analytics for better performance Demand Response (DER) baseline calculations used for calculating momentary benefits. The project uses the smart meter data collected by AGL based on AGL DR response trial in victoria final report and technical white paper

📄 **Crowd tracking and visual analytics for rapidly deployable imaging devices**"

This project aims to develop visual analytics technology that adds machine intelligence to a rapidly deployable time-lapse imaging platform. Such devices can operate on solar and wind power, and be remotely programmed (via a cellular network) to take photos and send them to a server at given times. This project, which focuses on monitoring crowds of objects of interest, is expected to introduce "smart" imaging platforms that could be triggered and shoot high-quality photographs when "events of interest" occur. This project could make Australia both a world leader in video analytics and secure through on-line threat detection, and improve traffic control and agriculture. In this project, I worked on safety vest detection in complex environment, such as construction site by utilizing deep learning and computer vision. Intelligent Abnormal behaviour detection in the large-scale surveillance videos using deep learning for videos analysis and decision making, and automated defect detection for manufacturing products. grant info..

📄 **Intelligent Technique for Medical Image Enhancement for Improved Diagnosis** ☑ Jan 2016-Jul 2016

Medical images, such as X-ray images and Magnetic Resonance Images (MRI), play a crucial role in the diagnosis of different kinds of diseases these days. Due to the low contrast of these images, image interpretation becomes difficult and may result in a wrong diagnosis. Therefore, different techniques are used to enhance the medical images for further processing and help physicians diagnose. For example, Histogram equalisation is used to enhance the contrast of medical images, but this technique is not valid for all images. Therefore, it cannot be used as a pre-processing step for medical image processing. Optimisation algorithms are a branch of artificial techniques recently used for image enhancement. These algorithms work automatically where no human interaction is required and can be adapted for medical image enhancement. In this project, a new medical images contrast enhancement using an adaptive Cuckoo search algorithm and the proposed hybrid Cuckoo search are implemented

📄 Design of Linear Controller of Inverted pendulum using MATLAB   📅 Feb 2016-Jun 2016

In this project, Modeling of Inverted pendulum has been presented. A full state feedback controller is developed using pole place-ment method. The purpose of state feedback controller is to enhance the system performance or stabilize the system. After that full state observer has been design if the state are not accessible. All mathematical modeling are presented and simulation and their analysis were done using MATLAB software

**📄 Implementation of QPSK Modulation and Demodulation using FPGA for SDR**   📅 Aug 2015-Dec 2015

Software Defined Radios (SDR) technology provides the capability of realising the third and next generations of digital wireless communications infrastructure.SDR has the ability of realizing the whole radio using software and upgrading can be done by re-programming the software. There are various options for SDR implementation and field programmable gate arrays (FPGAs) is the most attractive option among them because of the performance, power consumption and the flexibility. QPSK is one of digital modulation technique that has different applications, such as digital video broadcasting, CDMA and deep space communication. In this project,detailed information about implementation of QPSK modulation and demodulation for SDR purpose. Xilinx DSP system generator was used to design, test and implement the design.

🏢 PROFESSIONAL MEMBERSHIPS

📅 2018- ongoing   Institute of Electrical and Electronics Engineers (IEEE) membership

📅 2017- ongoing   Golden Key international honor society membership

📅 2016- ongoing   Iraqi Engineers Association

PROFESSIONAL COLLABORATIONS
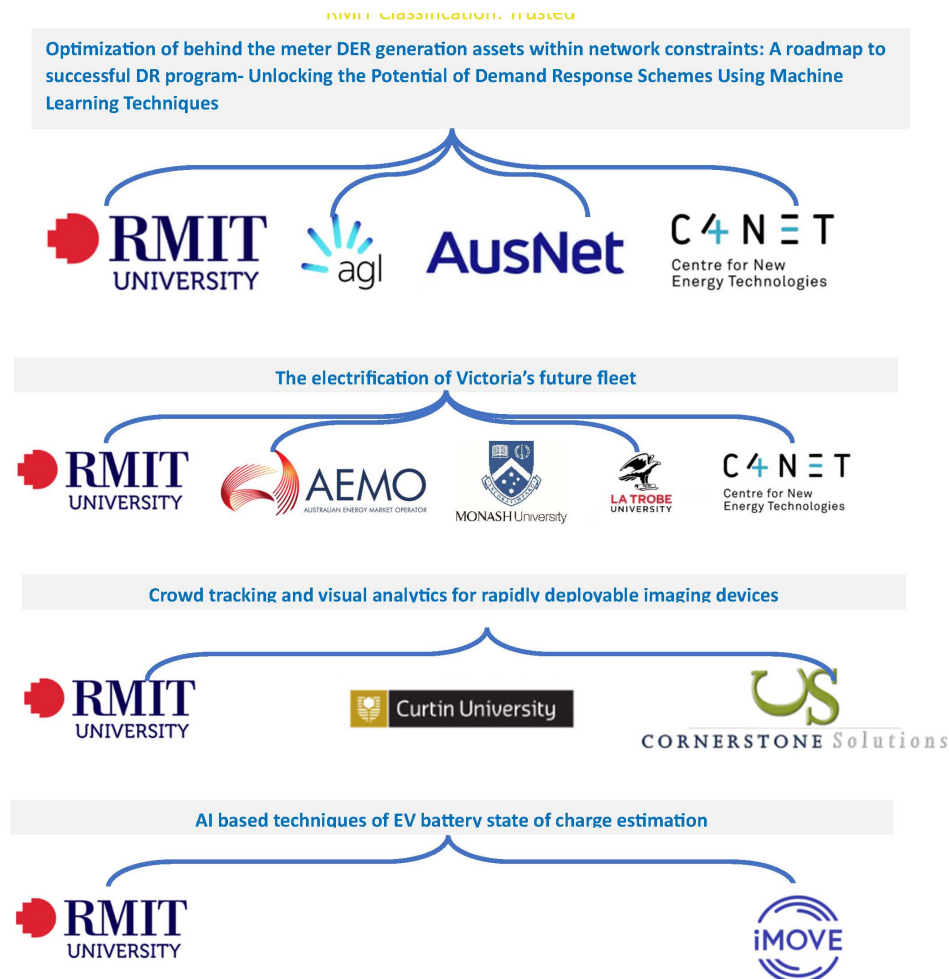
PUBLICATIONS

Multitasking recurrent neural network for photovoltaic power generation prediction

Hui Song, Nameer Al Khafaf, **Kamoona A.M**, Samaneh Sadat Sajjadi, Ali Moradi Amani, Mahdi Jalili, Xinghuo Yu, Peter McTaggart

2023   *Energy Reports, Vol.9, Pages 369-376*   ADS

Unlocking the potential of demand response schemes using machine learning techniques

Hui Song, **Kamoona A.M**, Mahdi Jalili, Richardt Wilkinson, Kedem Levy, Xinghuo Yu, Brendan McGrath, Kazi Hasan, Lasantha Meegahapola

2022   *C4NET White paper*   ADS

Multiple Instance-Based Video Anomaly Detection using Deep Temporal Encoding-Decoding

Kamoona A.M, Gostar AK, Bab-Hadiashar A, Hoseinnezhad R

2022   *Expert systems with applications*, 119079   ADS

Point Pattern Features for Anomaly Detection of Defect, in The Random Finite Set Framework

Kamoona A.M, Gostar AK, Bab-Hadiashar A, Hoseinnezhad R

2021   *IEEE Access*, vol. 9, pp. 158672-158681   ADS

Anomaly Detection of Defect using Energy of Point Pattern Features within Random Finite Set Framework

Kamoona A.M, Gostar AK, Bab-Hadiashar A, Hoseinnezhad R

2021   Submitted to IEEE transcations on industrial informatics   arXiv

Sparsity-Based Naive Bayes Approach for Anomaly Detection in Real Surveillance Videos

Kamoona A.M, Gostar AK, Bab-Hadiashar A, Hoseinnezhad R

2019   Processing of 2019 IEEE International Conference on Control, Automation and Information Sciences (ICCAIS), pp. 1-6   ADS

Random Finite Set-Based Anomaly Detection for Safety Monitoring in Construction Sites

Kamoona A.M, Gostar AK, Bab-Hadiashar A, Hoseinnezhad R

2019   IEEE Access   ADS

A novel enhanced cuckoo search algorithm for contrast enhancement of gray scale images

Kamoona A.M, and J. Ch. Patra

2019   Applied soft computing   ADS

An Enhanced Cuckoo Search Algorithm for Solving Optimization Problems,"2018 IEEE Congress on Evolutionary Computation

Kamoona A.M, and J. Ch. Patra

2018   Proceedings of 2018 IEEE Congress on Evolutionary Computation (CEC), Rio de Janeiro, 2018, pp. 1-6   ADS