



Dickson Neoh

Curriculum Vitae

Online Profiles

- Google Scholar <https://scholar.google.com/citations?hl=en&user=CBGCEskAAAAJ>
- Research Gate <https://www.researchgate.net/profile/Dickson-Neoh>
- GitHub <https://www.github.com/dnth>
- LinkedIn <https://www.linkedin.com/in/dickson-neoh-3a6984b8/>

Education

- 2018–present **PhD. in Engineering**, *Universiti Tenaga Nasional*, Malaysia, Expected graduation in mid 2022.
- 2012–2015 **Master of Electrical Engineering (MEE)**, *Universiti Tenaga Nasional*, Malaysia, CGPA – 4.00.
- 2007–2012 **Bachelor of Electrical and Electronics Engineering (BEEE) (Hons.)**, *Universiti Tenaga Nasional*, Malaysia, CGPA – 3.71.
First Class Honours

PhD. Thesis

- Title [State-of-Charge Estimation with Self-Supervised Time Series Transformer.](#)
- Supervisor M A Hannan, (PhD.)
- Description This thesis explores the effectiveness of using deep learning algorithms to estimate state-of-charge (SOC) in the batteries of hybrid electric vehicles. The study conducts various in depth comparative analysis of state-of-the-art deep learning algorithms applied to charge estimation. The goal of the study is to develop a novel estimation algorithm capable of learning to estimate the remaining charge from the drivers' driving behaviors. This thesis proposes the use of self-supervised Transformer model to estimate SOC.

Master's Thesis

- Title [Behavior Recognition of Humanoid Robots using Long Short-Term Memory.](#)
- Supervisors Khairul Salleh Mohamed Sahari (PhD.) & Loo Chu Kiong, (PhD.)
- Description This thesis explored the idea of recognizing the behavior of humanoid robots using a Long Short-Term Memory (LSTM), a variation of recurrent neural networks. The LSTM network is shown capable of classifying robotic maneuvers from joint angle data.

Bachelor's Thesis

- Title [Modular Motor Driver with Torque Control for Gripping Mechanism.](#)
- Supervisors Zafri Baharuddin (PhD.) & Syed Sulaiman Kaja Mohideen.
- Description This thesis explored the idea of building a torque control DC motor driver using PWM techniques in combination with PID control algorithms.

Experience

- May 2016–Present **Lecturer**, *College of Engineering*, [Universiti Tenaga Nasional](#), Malaysia.
- Undergraduate level courses taught:
- Digital Logic Design (EEEEB1034).
 - Digital Logic Design Lab (EEEEB1041).
 - Random Process (EEEEB383).
 - Microprocessor Systems (EEEEB373).
 - Microprocessor Systems Lab (EEEEB371)
- Diploma level courses taught:
- Microcontroller & Interfacing Lab (EEED251).
 - Introduction to Microcontrollers (EEED253).
 - Digital Logic Lab (EEED2011).
 - Digital Logic Laboratory (EEED141).
- October 2015–April 2016 **Research Engineer**, *Center for Advanced Mechatronics and Robotics*, Universiti Tenaga Nasional, Malaysia.
- Achievements:
- Developed automatic number plate recognition pipeline using deep convolutional neural networks.
 - Developed RFID based crowd attendance system using Raspberry Pi and Arduino controller coupled with MySQL database system.
 - Created intuitive graphical user interface using open source tools with free licensing for commercialization of product.

2012–
October 2015 **Research Assistant**, *Center for Advanced Mechatronics and Robotics*, Universiti Tenaga Nasional, Malaysia.

Achievements:

- Developed algorithm to classify robot behavior using recurrent neural networks (RNN) with Long Short-Term Memory (LSTM) architecture.
- Worked with convolutional neural network and autoencoder deep learning models.
- Learned to use python scripts in Linux operating system.
- Programmed the NAO humanoid robot.
- Learned to use the Robot Operating System (ROS).
- Developed robotics learning modules for students of primary, secondary and university students using PIC and Arduino microcontrollers.
- Developed boiler header inspection robots with using live vision inspection.
- Learned to design embedded controllers using Microchip PIC, Arduino, Raspberry Pi microcontroller boards.

2011–2012 **Final Year Project**, *Universiti Tenaga Nasional*, Malaysia.

Achievements:

- Developed torque-control algorithms for DC motors using PWM techniques.
- Developed PID algorithms for general robot gripping mechanism.
- Learned to program the Arduino/PIC series microcontroller.

2010–2011 **Summer Intern**, MYROBOTZ ENTERPRISE, Malaysia,

Achievements:.

- Organized robotics workshop for school students.
- Designed and develop custom use printed circuit boards (PCB).

2007–2010 **Mobile Robotics Club**, *Universiti Tenaga Nasional*, Malaysia.

Achievements:

- Developed proprietary controller boards and developed printed circuit boards.
- Learned to program the AVR microcontrollers for mobile robot tasks including maneuverings, gripping mechanisms.
- Developed algorithms for line-following robot, obstacle avoiding robot, etc.
- Competed in ABU Asia-Pacific Robot Contest (ABU Robocon) for 5 consecutive years.

Research Grant Awards

2016-2017 **Principal investigator**, *Hand Talk - Sign Language Recognition for the Speech and Hearing Impaired with Deep Learning*.

2017-2018 **Principal investigator**, *Towards Self Driving Vehicles in Malaysia: Object Recognition on Malaysian Roads using Deep Learning*.

2018-2019 **Principal investigator**, *Development of Educational Mechatronics Modules to Encourage STEM learning for Primary and Secondary school students*.

2019-2020 **Principal investigator**, *Development of community building energy management system for cost-effectiveness, sustainability and safety occupant well-being*.

2020-2021 **Principal investigator**, *A Deep Learning-based Image Processing Algorithm for the Identification of the Growth Phase of Microalgae*.

2021-2022 **Principal investigator**, *Real-time Broiler Activity Detection for Early Disease Detection: A Deep Learning Approach*.

2020-2022 **Member**, *An optical chromaticity-based deep learning algorithm for early detection of Escherichia coli infection in broiler chickens*.

- 2020-2021 **Member**, *Development of Low Intelligent Network System (LINES) For Predictive Maintenance and Non-Technical Loss Detection.*
- 2020-2022 **Member**, *Optimized Hybrid Algorithms of a Charging and Discharging Controller, Scheduling Controller and Sizing for an Efficient Energy Storage System.*

Skills and Proficiencies

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| Basic | Visual Basic.NET, C#, AVR microcontrollers |
| Intermediate | L ^A T _E X, OpenOffice, Linux, Matlab, C++, Robot Operating System (ROS), MySQL |
| Advanced | Computer Hardware and Support, PYTHON, Arduino, Microchip PIC, deep learning frameworks (Tensorflow, Pytorch, FastAI, Keras, Caffe, Theano.) |

Professional Membership

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| Member | Institute of Electrical and Electronics Engineers (IEEE). |
| Graduate Engineer | Board of Engineers Malaysia (BEM). |

Languages

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| English | Native | <i>Fluent in speaking and proficient in writing</i> |
| Malay | Native | <i>Fluent in speaking and proficient in writing</i> |
| Mandarin | Intermediate | <i>Con conversationally fluent</i> |
| Korean | Basic | <i>Essential phrases and words</i> |

Selected Publications

- [1] MZ Baharuddin, DNT How, KSM Sahari, AZ Abas, and MK Ramlee. Object detection model training framework for very small datasets applied to outdoor industrial structures. In *International Visual Informatics Conference*, pages 540–551. Springer, Cham, 2021.
- [2] MA Hannan, DNT How, MS Lipu, M Mansor, Pin Jern Ker, ZY Dong, KSM Sahari, SK Tiong, KM Muttaqi, TM Mahlia, et al. Deep learning approach towards accurate state of charge estimation for lithium-ion batteries using self-supervised transformer model. *Scientific reports*, 11(1):1–13, 2021.
- [3] Mahammad A Hannan, Dickson NT How, MS Hossain Lipu, Pin Jern Ker, Zhao Yang Dong, M Mansur, and Frede Blaabjerg. Soc estimation of li-ion batteries with learning rate-optimized deep fully convolutional network. *IEEE Transactions on Power Electronics*, 36(7):7349–7353, 2020.
- [4] Mahammad A Hannan, Dickson NT How, Muhamad Bin Mansor, Md S Hossain Lipu, Pin Jern Ker, and Kashem M Muttaqi. State-of-charge estimation of li-ion battery using gated recurrent unit with one-cycle learning rate policy. *IEEE Transactions on Industry Applications*, 57(3):2964–2971, 2021.
- [5] Dickson N. T. How, M. A. Hannan, M. S. Hossain Lipu, and Pin Jern Ker. State

of charge estimation for lithium-ion batteries using model-based and data-driven methods: A review. *IEEE Access*, 7:136116–136136, 2019.

- [6] Dickson Neoh Tze How, Wan Zul Fahmi Bin Wan Ibrahim, and Khairul Salleh Mohamed Sahari. A dataglove hardware design and real-time sign gesture interpretation. In *2018 Joint 10th International Conference on Soft Computing and Intelligent Systems (SCIS) and 19th International Symposium on Advanced Intelligent Systems (ISIS)*, pages 946–949. IEEE, 2018.
- [7] Dickson Neoh Tze How, Chu Kiong Loo, and Khairul Salleh Mohamed Sahari. Behavior recognition for humanoid robots using long short-term memory. *International journal of advanced robotic systems*, 13(6):1729881416663369, 2016.
- [8] Dickson Neoh Tze How and Khairul Salleh Mohamed Sahari. Character recognition of malaysian vehicle license plate with deep convolutional neural networks. In *2016 IEEE International Symposium on Robotics and Intelligent Sensors (IRIS)*, pages 1–5. IEEE, 2016.
- [9] Dickson Neoh Tze How, Khairul Salleh Mohamed Sahari, Yew Cheong Hou, and Omar Gumaan Saleh Basubeit. Recognizing malaysia traffic signs with pre-trained deep convolutional neural networks. In *2019 4th International Conference on Control, Robotics and Cybernetics (CRC)*, pages 109–113. IEEE, 2019.
- [10] Dickson Neoh Tze How, Khairul Salleh Mohamed Sahari, Hu Yuhuang, and Loo Chu Kiong. Multiple sequence behavior recognition on humanoid robot using long short-term memory (Lstm). In *2014 IEEE international symposium on robotics and manufacturing automation (ROMA)*, pages 109–114. IEEE, 2014.
- [11] DNT How, MA Hannan, MS Hossain Lipu, PJ Ker, M Mansor, KSM Sahari, and KM Muttaqi. Soc estimation using deep bidirectional gated recurrent units with tree parzen estimator hyperparameter optimization. In *2021 IEEE Industry Applications Society Annual Meeting (IAS)*, pages 1–8. IEEE, 2021.
- [12] DNT How, MA Hannan, MS Hossain Lipu, KSM Sahari, PJ Ker, and KM Muttaqi. State-of-charge estimation of li-ion battery in electric vehicles: A deep neural network approach. In *IEEE Transactions on Industry Applications*, volume 56, pages 5565–5574. IEEE, 2020.
- [13] MS Hossain Lipu, MA Hannan, Aini Hussain, Afida Ayob, Mohamad HM Saad, Tahia F Karim, and Dickson NT How. Data-driven state of charge estimation of lithium-ion batteries: Algorithms, implementation factors, limitations and future trends. *Journal of Cleaner Production*, 277:124110, 2020.