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 in Hybrid Electric Vehicles with Deep Learning.
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 (EEEB1034).
- Digital Logic Design Lab (EEEB1041).
- Random Process (EEEB383).
- Microprocessor Systems (EEEB373).
- Microprocessor Systems Lab (EEEB371)

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

Basic Visual Basic.NET, C#, AVR microcontrollers

Intermediate LaTeX, 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

Member Institute of Electrical and Electronics Engineers (IEEE).

Graduate Engineer Board of Engineering, Malaysia (BEM).

Languages

English	**Native**	*Fluent in speaking and proficient in writing*
Malay	**Native**	*Fluent in speaking and proficient in writing*
Mandarin	**Intermediate**	*Conversationally fluent*
Korean	**Basic**	*Essential phrases and words*

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.