Dickson Neoh

Curriculum Vitae

Education

2012–2015 **Master of Electrical Engineering (MEE)**, *Universiti Tenaga Nasional*, Malaysia, *CGPA – 4.00*.

2007–2012 **Bachelor of Electrical and Electronics Engineering (BEEE)**, *Universiti Tenaga Nasional*, Malaysia, *CGPA – 3.71*.
First Class Honours

2016–present **PhD in Engineering Candidate**, *Universiti Tenaga Nasional*, Malaysia.

Specialized in Cognitive Robotics Software & Control, Predictive & Big Data Analytic, Deep Learning in Computer Vision & Time Series

PhD. Thesis (Ongoing)

Title State-of-Charge Estimation in Hybrid Electric Vehicles with Deep Learning.

Supervisor M A Hannan, (PhD).

Description This study explores the effectiveness of using deep learning algorithms to estimate the amount of available charge 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.

Masters 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.

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Bachelors 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.

Achievements:
Principal investigator of the following research grant:
- Hand Talk - Sign Language Recognition for the Speech and Hearing Impaired with Deep Learning - 2016.
- Towards Self Driving Vehicles in Malaysia: Object Recognition on Malaysian Roads using Deep Learning - 2017.
- Development of Educational Mechatronics Modules to Encourage STEM learning for Primary and Secondary school students - 2018.
- Development of community building energy management system for cost-effectiveness, sustainability and safety occupant well-being - 2018.

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 machine vision and autoencoder networks.
- Learned to use python scripts in Linux operating system.
- Programmed the NAO humanoid robot.
- Learned to use the Robot Operating System (ROS).
- Developed educational workshop robotics kits for students of primary, secondary and university students age range.
- Developed boiler header inspection inspection robots with using live vision inspection.
- Learned to design embedded controllers using Microcip PIC, Arduino, Rapberry 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 motherboard controller and printed circuit boards for mobile robots.
- Learned to program the AVR microcontollers for mobile robot tasks including maneuverings, gripping mechanisms.
- Developed algorithm for line-following robot, obstacle avoiding robot, etc.

Awards

2016 Recipient of the UNITEN BOLD PhD. Scholarship.

2012 Recipient of the Yayasan Tenaga Nasional Scholarship for Postgraduate (Masters) Studies. - M.Eng. Electrical

2007 Recipient of the Yayasan Tenaga Nasional Scholarship for undergraduate studies - B.Eng. Electrical & Electronics (Hons.)

2002 Recipient of the Tenaga Nasional Berhad Scholarship award for secondary education.

Computer skills

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, Microcip PIC, deep learning frameworks (Tensorflow, Keras, Caffe, Theano.)

Languages

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

Publications

[1] Adzly Anuar, Maryam Huda Ahmad Phesal, Azrul Abidin Zakaria, Goh Chin Hock, Sivadass Thiruchelvam, Dickson Neoh Tze How, Muhammad Fahmi Abdul Ghani, and Khairul Salleh Mohamed Sahari. Learning basic mechatronics through helicopter workshop. *International Journal of Asian Social Science*, 4(2):320–325, 2014.

[2] Yew Cheong Hou, Khairul Salleh Mohamed Sahari, Leong Yeng Weng, Dickson Neoh Tze How, and Hiroaki Seki. Particle-based perception of garment folding for robotic manipulation purposes. *International Journal of Advanced Robotic Systems*, 14(6):1729881417738727, 2017.

[3] 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.

[4] Dickson Neoh Tze How, Mohd Zafri Baharuddin, Syed Sulaiman Kaja Mohideen, Khairul Salleh Mohamed Sahari, and Adzly Anuar. Modular motor driver with torque control for gripping mechanism. *Procedia Engineering*, 41:1476–1482, 2012.

[5] Dickson Neoh Tze How, Chan Wai Keat, Adzly Anuar, and Khairul Salleh Mohamed Sahari. Robotic arm control based on human arm motion. In *The 8th International Conference on Robotic, Vision, Signal Processing & Power Applications*, pages 81–88. Springer, 2014.

[6] Dickson Neoh Tze How, Khairul Salleh Mohamed Sahari, Adzly Anuar, Mohd Zafri Baharuddin, Muhammad Fahmi Abdul Ghani, and Mohd Azwan Aziz. Image acquisition system for boiler header inspection robot. In *The 8th International Conference on Robotic, Vision, Signal Processing & Power Applications*, pages 521–528. Springer, 2014.

[7] Yuhuang Hu, Dickson Tze How Neoh, Khairul Salleh Mohamed Sahari, and Chu Kiong Loo. Learning sufficient representation for spatio-temporal deep network using information filter. In *System Integration (SII), 2014 IEEE/SICE International Symposium on*, pages 655–658. IEEE, 2014.

[8] Muhammad Fairuz Abdul Jalal, Khairul Salleh Mohamed Sahari, Mohd Azwan Aziz, Kamal Yunos, Adzly Anuar, Muhammad Fahmi Abdul Ghani, and Dickson Neoh Tze How. Design and development of robotic system for visual inspection of boiler tube inner surface. *Procedia computer science*, 105:304–309, 2017.

[9] Dickson Neoh, Hu Yuhuang, Chu Kiong Loo, and Khairul Salleh Mohamed Sahari. Multiple sequence behavior recognition on humanoid robot using long Short-Term memory (LSTM). In *IEEE 2014 International Symposium on Robotics and Manufacturing Automation (IEEE-ROMA2014)*, Kuala Lumpur, Malaysia, dec 2014. IEEE.

[10] Cheong Hou Yew and Khairul Salleh Mohamed Sahari. Real-time modeling and parameter approximation of dexterous garment folding by robot. *Artificial Life and Robotics*, pages 1–8, 2018.