SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
Faculty of Engineering
Website: https://www.eng.nus.edu.sg/ece/

Area: Control, Intelligent Systems & Robotics

Host: Assoc Prof Xiang Cheng

TOPIC	**:**	**Data Driven Intelligent Systems and Control**
SPEAKER	**:**	**Mr Seng Aik Ann** **Graduate student, ECE Dept, NUS**
DATE	**:**	**17 December 2019, Tuesday**
TIME	**:**	**2pm to 3pm**
VENUE	**:**	**E3-06-01, Engineering Block E3, Faculty of Engineering, NUS**

ABSTRACT

This project implements an alternative control method on non-linear systems. The original NARMA system is approximated using its first order Taylor approximation around the input, resulting in multiple NARMA-L2 systems that each operates on a different part of the operating range. Each of the NARMA-L2 system can be modelled by training Multilayer Perceptrons with the appropriate data. A switching controller that minimizes the designed cost function can then be used to achieve control of the system, without the problem of the "curse of dimensionality" that common piecewise affine models have when the regressor space is high. Simulation studies shows that the controller can be effectively used when the number of NARMA-L2 models are high enough. The project then further extends into multiple-input and multiple-output systems. The boundaries where the solution of the cost function might reside when the constraints are exceeded are narrowed down and clearly defined. Simulation studies are then conducted, which demonstrated the effectiveness of this controller at following a desired set of outputs. However, the effort required for higher dimension systems is high, and might not be feasible.

BIOGRAPHY

Aik Ann is currently pursuing his M.Eng degree in Electrical and Computing Engineering with specialization in control systems since 2018. His research interest includes the application of neural networks in control designs.