Politecnico di Torino
Department of Mechanical and Aerospace Engineering
Corso Duca degli Abruzzi, 24
10129 Torino, ITALY

Seminar by Ph.D. Paolo Panarese
MathWorks – Academia Team

"Deep learning with MATLAB and Simulink for Automotive"

Dept. of Mechanical and Aerospace Eng. (DIMEAS), Meeting room, 3rd floor,
Wednesday, February 12th, 2025, 11:00 – 12:30

Abstract

In recent years, deep learning has emerged as a transformative technology in mechatronics and automotive industry, offering innovative solutions to complex challenges. This seminar will delve into the application of deep learning framework in MATLAB environment for automotive systems, with a specific focus on regression tasks and time-series forecasting.

As an example, we will describe how to estimate the battery State of Charge (SoC), a critical component in the management of electric vehicles (EVs). The accurate estimation of SoC is essential for optimizing battery performance, ensuring safety, and extending the lifespan of EV batteries. Traditional methods often struggle with inaccuracies due to the nonlinear and dynamic nature of battery systems. Deep learning presents a promising alternative, leveraging sophisticated models to predict SoC with higher precision and reliability. We will also show how to train an auto-regressive neural network to provide a sensor-less solution to estimate the rotor position of a PMSM, which is critical to implement a field-oriented control (FOC).

This seminar will offer a chance to explore various deep learning architectures and training options, looking at integrability of AI models into Simulink and interoperability with open-source platforms. Additionally, we may address some challenges, such as compressibility of neural networks. By the end of this seminar, participants will gain a comprehensive understanding of how to implement an end-to-end AI workflow and the broader implications for the automotive industry.

Registration page:
https://it.mathworks.com/company/events/seminars/polito-seminar-deep-learning-with-matlab-and-simulink-for-automotive-4700560.html

Short CV

Paolo Panarese has been working at MathWorks since 2002. He worked as a trainer for 20 years. Since 2021 he is Principal EDU Customer Success Engineer in MathWorks Academia Team. His primary focus are AI applications and deep learning techniques. He enjoys using his background in mathematical modelling to support professors, researchers, and students for both curriculum development and research projects, optimizing the usage of MATLAB and Simulink.

Paolo earned his Ph.D. in Mathematics from University of Bologna, where his research centred around functional analysis, PDEs and spectral theory.