The Era of AI and Digitalization for structural applications

Lecture room B – 18/06/2024

Time	Title	Speaker	Affiliation
09:30 – 10:00	Welcome – Introduction	Dr. Dimitrios Zarouchas	TU Delft, NL
10:00 – 10:45	Fundamentals of machine learning for regression – from linear regression to Gaussian processes and recurrent neural networks (part 1)	Dr. Iuri Rocha	TU Delft, NL
Coffee Break	Meet your lecturers		
11:15 – 12:00	Fundamentals of machine learning for regression – from linear regression to Gaussian processes and recurrent neural networks (part 2)	Dr. Iuri Rocha	TU Delft, NL
Lunch Break	Meet your lecturers		
13:00 - 14:00	Data-driven material modelling – structure-preserving hyper-reduction, active learning, physically recurrent neural networks, graph neural networks (part 1)	Dr. Frans van der Meer	TU Delft, NL
14:00 – 14:45	RNNs versus PRNNs – curse of dimensionality and the power of physics-based bias	Workshop Dr. Iuri Rocha Dr. Frans van der Meer	TU Delft, NL
Coffee Break	Meet your lecturers		
15:15 – 16:15	RNNs versus PRNNs – curse of dimensionality and the power of physics-based bias	Workshop Dr. Iuri Rocha Dr. Frans van der Meer	TU Delft, NL
16:15 – 17:00	Data-driven material modelling – structure-preserving hyper-reduction, active learning, physically recurrent neural networks, graph neural networks (part 2)	Dr. Frans van der Meer	TU Delft, NL

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Lecture room B – 19/06/2024

Time	Title	Speaker	Affiliation
09:00 – 10:30	An introduction to Physics Informed Machine Learning for Engineering	Prof. Elizabeth Cross	University of Sheffield, UK
Coffee Break	Meet your lecturers		
11:00– 12:30	Application of Physics-Enhanced Machine Learning to Engineering – challenges and opportunities	Dr. Alice Cicirello	University of Cambridge, UK
Lunch Break	Meet your lecturers		
13:30 – 15:30	Hands-on application of physics-enhanced machine learning strategies to three case studies: 1. Introducing physical insight into a Gaussian Process regression – Elizabeth Cross 2. Disentangled representation learning for a beam with Physics-Informed Variational Autoencoder – Jan Koune 3. Identification of a frictional contact using Physics-Enhanced Sparse Identification. - Alice Cicirello	Workshop Prof. Elizabeth Cross Mr. Jan Koune Dr. Alice Cicirello	University of Sheffield, UK TU Delft, NL University of Cambridge, UK
Coffee Break	Meet your lecturers		
16:00 – 17:00	ASML & SAMXL lab tours		
Break			
18:00 – 22:00	Social Event: BBQ @ Xsport – TU Delft		

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Lecture room B – 20/06/2024

Time	Title	Speaker	Affiliation
09:00 – 10:30	Digital Twins and machine learning for prognostics of structures	Dr. Claudio Sbaruffati	POLIMI, IT
Coffee Break	Meet your lecturers		
11:00– 12:30	Structural Reliability analysis and Machine Learning	Dr. Francesco Cadini	POLIMI, IT
Lunch Break	Meet your lecturers		
13:30 – 15:30	iFEM and structural analysis	Workshop Dr. Claudio Sbaruffati Dr. Francesco Cadini	POLIMI, IT
Coffee Break	Meet your lecturers		
16:00 – 16:30	Adjourn	Dr. Dimitrios Zarouchas	TU Delft, NL