kfmResearch

Center for
Augmented Computational
Design in Architecture,
Engineering and Construction

Scientific Machine and Deep Learning for Design and Construction in Civil Engineering

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Start of lecture: 27.09.2021
Lecture/Exercise: Monday: 14:00 – 18:00 (in class & streamed on Zoom)
Lecture notes: https://mkrausai.github.io/lectures/2021_SciML/
Examination: 13. + 20.12.2021
Credit Points: 3
Study course: Master Civil Eng. | PhD Civil / Architecture / Integrated Building

Machine Learning (ML) is the science of making computers act without being explicitly programmed. This course provides a comprehensive introduction to machine and deep learning, data mining and statistical pattern recognition. Topics include:

(i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks, deep learning).
(ii) Unsupervised learning (clustering, dimensionality reduction, deep learning)
(iii) Best practice in machine learning
(iv) Incorporation of first principles and domain knowledge to create Scientific ML

The course will relate content to applying ML in design and construction via numerous case studies and applications. Students thus learn how to apply and develop ML algorithms for creating intelligent predictive models for design, text comprehension, computer vision, and further areas.

Besides providing sound theoretical background on Machine and Deep Learning, students also acquire practical know-how via hands-on exercises in order to enable for quick transfer and application of ML techniques to new problems.