Politecnico di Torino
SmartData@PoliTO

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Pierrick is a PhD student at Politecnico di Torino (DISMA), supervised by Francesco Vaccarino and Giovanni Petri. He comes from France where he graduated as an engineer, with experience in the industry. His current research focuses on topological data analysis tools for machine and deep learning, and he also keens on graphs and geometric deep learning.

Topological and geometric methods in AI

ABSTRACT

A trained (deep) learning model is a sequence of maps and spaces. Data, old and new, are mapped through the model strata from input to output. The main ingredients are a training set of samples from an unknown distribution, a suitable loss function, and an algorithm for empirical loss minimization. Our aim is to extract topological and geometric information, either from data as represented internally by trained models or from the space of parameters learned during the training process. In particular, we are interested in understanding how topology and geometry intertwine with the process of learning via Morse theory, Geometric Invariant Theory and Discrete Exterior Calculus.