

Machine Learning to Empower Engineering Organizations: Technology & Applications

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To tackle new challenges, engineers need radically new capabilities, including more effective ways to harness our computational resources.

Because of their historical origin, simulation tools are not well adapted to design optimization in fast-paced production and design environments. It is extremely hard for design teams to leverage insights provided by advanced simulations and by the specialized teams who develop them. Deep Learning technologies can be used to integrate knowledge from simulation and design optimization tools in the workflow of the design engineers, instead of delegating this task to separate expert teams.

In this talk, we explain how recent algorithms based on Geometric Deep Learning, allow shortcutting any simulation chain through a predictive model that outputs post processed simulation results and optimization suggestions, right from the CAD design. These models are being used in engineering companies to simplify processes and to emulate the expertise of simulation engineers in the hands of product or design engineers early in the development process. Thus, the number of iterations between teams are reduced while accelerating the design activities.

We will also present recent developments and application examples in Geometry Generative Design tools, which can be combined with the predictive models, as well as real use cases of these technologies, enabling optimization within a fragment of the time necessary with traditional simulation techniques.

non-exhaustive list of possible applications:

- heat exchanger design (cfd simulations)
- durability (FEA simulations, transient and static)
- external aerodynamics (cfd simulations)
- internal flows (cfd simulations, turbomachinery, pipes, etc.)
- PCB drop tests (transient fea simulations)
- process simulations (warping prediction for injection molding, stamping, etc.)