

AI-assisted design of experiments at the frontiers of computation: methods and new perspectives

Saturday 20 July 2024 17:19 (17 minutes)

Designing the next generation colliders and detectors involves solving optimization problems in high-dimensional spaces where the optimal solutions may nest in regions that even a team of expert humans would not explore.

Resorting to Artificial Intelligence to assist the experimental design introduces however significant computational challenges in terms of generation and processing of the data required to perform such optimizations: from the software point of view, differentiable programming makes the exploration of such spaces with gradient descent feasible; from the hardware point of view, the complexity of the resulting models and their optimization is prohibitive. To scale up to the complexity of the typical HEP collider experiment, a change in paradigm is required.

In this talk I will describe the first proofs-of-concept of gradient-based optimization of experimental design and implementations in neuromorphic hardware architectures, paving the way to more complex challenges.

Alternate track

I read the instructions above

Yes

Primary author: Dr VISCHIA, Pietro (Universidad de Oviedo and Instituto de Ciencias y Tecnologías Espaciales de Asturias (ICTEA))

Presenter: Dr VISCHIA, Pietro (Universidad de Oviedo and Instituto de Ciencias y Tecnologías Espaciales de Asturias (ICTEA))

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