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KAN we improve on HEP classification tasks? Kolmogorov-Arnold Networks applied to an LHC physics example

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Recently, Kolmogorov-Arnold Networks (KANs) have been proposed as an alternative to multilayer perceptrons, suggesting advantages in performance and interpretability. In this talk, we present the first application of KANs in high-energy physics, focusing on a typical binary classification task involving high-level features. We study KANs with different depths and widths and include a comparison to multilayer perceptrons in terms of performance and number of trainable parameters.
We find that the learned activation functions of a one-layer KAN resemble the log-likelihood ratios of the input features. In deeper KANs, the activations in the first KAN layer differ from those in the one-layer KAN, which indicates that the deeper KANs learn more complex representations of the data. For the chosen classification task, we do not find that KANs are more parameter efficient.
However, small KANs may offer advantages in terms of interpretability that come at the cost of only a moderate loss in performance.

Track

Interpretability

Authors: MAUSOLF, Florian Alexander (Rheinisch Westfaelische Tech. Hoch. (DE)); SPAEH, Jan Lukas (Rheinisch Westfaelische Tech. Hoch. (DE)); ERDMANN, Johannes (RWTH Aachen University)

Presenter: MAUSOLF, Florian Alexander (Rheinisch Westfaelische Tech. Hoch. (DE))

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