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Fair Universe HiggsML Uncertainty Challenge

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The Fair Universe project organised the HiggsML Uncertainty Challenge, is taking place from September 2024 to 15 March 2025. This is a [NeurIPS 2025 competition] (https://blog.neurips.cc/2024/06/04/neurips-2024-competitions-announced/).

This groundbreaking competition in high-energy physics (HEP) and machine learning was the first to place a strong emphasis on uncertainties, focusing on mastering both the uncertainties in the input training data and providing credible confidence intervals in the results.

The challenge revolved around measuring the Higgs to tau+ tau- cross section, similar to the HiggsML challenge held on Kaggle in 2014, using a dataset representing the 4-momentum signal state. Participants were tasked with developing advanced analysis techniques capable of not only measuring the signal strength but also generating confidence intervals that included both statistical and systematic uncertainties, such as those related to detector calibration and background levels. The accuracy of these intervals was automatically evaluated using pseudo-experiments to assess correct coverage.
Techniques that effectively managed the impact of systematic uncertainties were expected to perform best, contributing to the development of uncertainty-aware AI techniques for HEP and potentially other fields. The competition was hosted on Codabench, an evolution of the Codalab platform, and leveraged significant resources from the NERSC infrastructure to handle the thousands of required pseudo-experiments.

Link to the competition
Link to white paper

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Classification de Session: Friday morning

Classification de thématique: Training, courses, tutorials, open datasets and challenges