

# Framework for Hyperparameter Optimization in Machine Learning using the ATLAS Grid Computing Resource

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Application of machine learning methods in high energy physics has received tremendous success in recent years with rapidly growing use cases. A key aspect in improving the performance of a given machine learning model has been the optimization of its hyperparameters which is usually computationally expensive. A framework has been developed to provide a high-level interface for automatic hyperparameter optimization that utilizes the ATLAS grid computing resource with hardware acceleration from GPU machines. The framework is equipped with a wide variety of hyperparameter optimization algorithms, distributed optimization schemes, intelligent job scheduling strategy based on available resources, flexible hyperparameter configuration space generation, and adaptation to the ATLAS intelligent Data Delivery Service. An example use case for the hyperparameter optimization of a Boosted Decision Tree model in the  $HH \rightarrow b\bar{b}\gamma\gamma$  non-resonant analysis in  $pp$  collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector is also presented.

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No

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