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The F.A.S.T. toolset: Using YAML to make tables out of trees

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The Faster Analysis Software Taskforce (FAST) is a small, European group of HEP researchers that have been investigating and developing modern software approaches to improve HEP analyses. We present here an overview of the key product of this effort: a set of packages that allows a complete implementation of an analysis using almost exclusively YAML files. Serving as an analysis description language (ADL), this toolset builds on top of the evolving technologies from the Scikit-HEP and IRIS-HEP projects as well as industry-standard libraries such as Pandas and Matplotlib. Data processing starts with event-level data (the trees) and can proceed by adding variables, selecting events, performing complex user-defined operations and binning data, as defined in the YAML description. The resulting outputs (the tables) are stored as Pandas dataframes or FlatBuffers defined by Aghast, which can be programmatically manipulated. The F.A.S.T. tools can then convert these into plots or inputs for fitting frameworks. No longer just a proof-of-principle, these tools are now being used in CMS analyses, the LUX-ZEPLIN experiment, and by students on several other experiments. In this talk we will showcase these tools through examples, highlighting how they address the different experiments' needs, and compare them to other similar approaches.

Consider for promotion

Yes

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