

# StatPatternRecognition: A C++ Package for Multivariate Classification of High Energy Physics Data

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Modern analysis of high energy physics (HEP) data needs advanced statistical tools to separate signal from background. A C++ package has been implemented to provide such tools for the HEP community. The package includes linear and quadratic discriminant analysis, decision trees, bump hunting (PRIM), boosting (AdaBoost), bagging and random forest algorithms, and interfaces to the feedforward backpropagation neural net and radial basis function neural net implemented in the Stuttgart Neural Network Simulator. Supplemental tools such as random number generators, bootstrap, estimation of data moments, and a test of zero correlation between two variables with a joint elliptical distribution are also provided. Input data can be read from ascii and Root files. The package offers a convenient set of tools for imposing requirements on input data and displaying output. Integrated in the BaBar computing environment, the package maintains a minimal set of BaBar dependencies and can be easily adapted to any other HEP environment. It has been tested at BaBar on several physics-analysis datasets.

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