Higgs boson machine-learning challenge

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Last week, CERN was among several organizations to announce the Higgs boson machine-learning challengeExternal Links icon – your chance to develop machine-learning techniques to improve analysis of Higgs data.

The discovery of the Higgs boson was confirmed by the CMS and ATLAS experiments on 4 July 2012. The following year saw a number of prestigious awards for the discovery, including a Nobel prize for Peter Higgs and François Englert. But for physicists, the discovery of a new particle is just the beginning of a long and difficult quest to meticulously measure its characteristics and determine if it fits their model of matter.

A key property of any particle is how often it decays into other particles. The ATLAS experiment at the Large Hadron Collider (LHC) at CERN searches for new particles and processes using head-on collisions of protons of extraordinarily high energy. The ATLAS experiment has recently observed a signal of the Higgs boson decaying into two tau particles, but this decay is a small signal buried in background noise.

The goal of the Higgs boson machine-learning challenge is to explore the potential of advanced machine-learning methods to improve the analysis of data produced by the experiment. Machine learning is a branch of artificial intelligence in which computers are trained to recognize patterns in data. The machines learn to recognize elements of data sets and can then apply this to new, unseen data. For the challenge, no knowledge of particle physics is required. Using simulated data with features characterizing events detected by ATLAS, your task is to

classify events into "tau tau decay of a Higgs boson" versus "background."

The top three scores on the leaderboard when the contest ends in September will receive cash prizes. The winning method may eventually be applied to real data and the winners may be invited to CERN to discuss their results with high-energy physicists.

Interested in machine learning? Now is your chance to teach the machines and improve humankind's understanding of the universe.

More information: www.kaggle.com/c/higgs-boson/

Provided by CERN