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LHC Olympics

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ABSTRACT:
We are at the beginning of a new era of data-driven, model-agnostic new physics searches at colliders that combine recent breakthroughs in anomaly detection and machine learning. This contribution will report on the LHC Olympics 2020, a community challenge accompanied by a set of simulated collider events. Participants in these Olympics have developed their methods using an R&D dataset and then tested them on black boxes: datasets with an unknown anomaly (or not). Methods made use of modern machine learning tools and were based on unsupervised learning (autoencoders, generative adversarial networks, normalizing flows), weakly supervised learning, and semi-supervised learning. We will review this challenge, including an overview of the competition, a description of methods deployed in the competition, lessons learned from the experience, and implications for data analyses with future datasets as well as future colliders.

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