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Benchmarking New Hardware For Machine Learning In Particle Physics

The popularity of Deep Learning (DL) has grown exponentially in all scientific fields, included particle physics. The amount of data and its complexity has grown as well, and the computing power required to perform inference can nowadays hardly be managed. Central Processing Units (CPUs) are affordable but their ability to run Artificial Intelligence (AI) is very limited. In recent years, Graphics Processing Units (GPUs) have been used with interesting results but they expensive and require a lot of power. Recently, Google has produced the Edge Tensor Processing Unit (TPU) made explicitly to perform inference. It is cheap, it consumes less power, and it comes with portable size. A generic Liquid Argon Time-Projection Chamber (LArTPC) has been simulated and images produced by fictitious neutrino interactions have been used to benchmark the Edge TPU. Its performance running different popular DL algorithms has been tested and compared with CPUs and GPUs.

Mini-abstract

First benchmark with particle physics data of new hardware made for artificial intelligence

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