Tensorflow - Machine Learning at Scale

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1 Introduction

This write-up is a brief summary of one paper, them being *TensorFlow: A System for Large-Scale Machine Learning*. The paper was thoroughly analyzed and then summarized. The below mentioned write-up is based upon the notes generated during the review of the paper. The links to the source of the paper is provided at the end of the document.

2 Review: Deep Learning

The paper provides a factual elaboration about tensorflow, a machine learning library created by Google. It works on mathematical abstractions called as Tensors which is able to map nodes over multiple graphs in order to generate a flow. The tensorflow data flow model is comprehensively elaborated in the paper.

2.1 Good points of the paper

The paper provides a detail foray into the multiple functionalities of tensorflow, it is worked onto by key researchers in the domain of scalable machine learning within google brain. The multiple pipelines that can be run over using the tensorflow data flow is well articulated by the authors. The organization, Google chose to make Tensorflow Opensource hence giving a boost in building up the deep learning community.

The paper also provides historic data over multiple frameworks that were used before tensorflow, most notable being DistBelief. The paper also provides a schematic representation of the dataflow - pipeline that is implemeneted during the construction of tensorflow. Also, the distributed execution engine combined with dynamic control flow mechanism makes tensorflow scalable to multiple clusters, gpu, tpu etc.

2.2 Shortcomings of the paper:

The paper fails to elaborate on the low level overview of applied tensorflow techniques, there are a lot of key representations and demonstrations that could be elaborated and benchmarks that could have been demonstrated. A tabular comparison of tensorflow benchmarks on standard data sets would be highly appreciated.

Also, there has been significant research in tensorflow version control, with the advent of tensorboard to tensorflow.js. The paper does not demonstrate any room for accomodation of these frameworks. Also, there is significant emphasis on computation over unstructured data. The paper does not bridge the gap over statistical machine learning model in comparison to similiar use case models built over tensorflow.

2.3 Future Scope mentioned by the paper:

The authors of this paper are researchers within Google Brain, they are building a framework/library that provides a higher flexibility towards mathematical computation. More specifically auto-differenceiation. There has been significant releases in gpu-acceleration libraries, namely CUDA - DNN and CUDA FTT. Hardware acceleration is the next step for their data flow pipeline and it has been very popular within their version control environment.

Furthermore, there has been significant research by theoretical deep learners. There are a plethora of scalable neural architectures that are released that are attaining the present state of the art benchmarks. The key upcoming domains with massive impact are one-shot learning, generative modelling , adversarial machine learning and reinforcement learning.

3 Links

Link - Tensorflow - Machine Learning at Scale