COMPSCI 690AB SYSTEMS FOR DEEP LEARNING
Reading Assignment 2

TensorFlow: A system for large-scale machine learning– Summary

Due to the large demand for complex models and huge datasets, there is a need for an efficient system for machine learning experiments. The paper addresses this by giving an overview of TensorFlow which serves as a machine learning platform used in large-scale operations. It uses dataflow graphs to show computation in an algorithm and the state of the algorithm. The development of TensorFlow was inspired mainly by identifying the limitations of DistBelief, Google's prior system. TensorFlow encourages developers to explore innovative optimizations through various parallelization techniques allowing for flexible programming across the system and it follows a unified approach, making development, training and deployment of machine learning models easier. It is used in a huge range of applications, including training and inference of deep neural networks. TensorFlow supports CPUs, GPUs and TPUs through common abstraction for heterogenous accelerators making it distinguishable from frameworks like Caffe, Torch, Theano, etc. Its approach is different from batch dataflow systems in terms that it supports simultaneous executions and allows individual vertices to be in a mutable state. The framework also supports dynamic control flow constructs. The paper also includes details of implementation and evaluation of TensorFlow. TensorFlow's architecture is mainly implemented by C++ with over 200 standard operations that are optimized for various hardware platforms and evaluation is mainly done by accessing TensorFlow's performance across various workloads. TensorFlow is also evaluated on its scalability in training deep neural networks and resulted in TensorFlow's superior performance in comparison to MXNet in asynchronous training. Overall, the paper focuses on TensorFlow's adoption and capabilities. It has proven to be successful and popular among both Google and broader communities. The authors also acknowledge ongoing research areas of TensorFlow for better optimization as one drawback of TensorFlow is that it might not work in optimal for all users due to its default policies.

Srimathi Mahalingam