TensorFlow Manual

Anil Bas

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About

TensorFlow is an open source software library for machine learning across a range of tasks, and developed by Google to meet their needs for systems capable of building and training neural networks to detect and decipher patterns and correlations, analogous to the learning and reasoning which humans use.

TensorFlow is using data flow graphs. Nodes in the graph represent mathematical operations, while the graph edges represent the multidimensional data arrays (tensors) communicated between them. The flexible architecture allows you to deploy computation to one or more CPUs or GPUs in a desktop, server, or mobile device with a single API. TensorFlow was originally developed by researchers and engineers working on the Google Brain Team within Google's Machine Intelligence research organization for the purposes of conducting machine learning and deep neural networks research, but the system is general enough to be applicable in a wide variety of other domains as well.

Main Page: http://tensorflow.org
Github: https://github.com/tensorflow
Introduction Video: https://www.youtube.com/watch?v=oZikw5k_2FM

Install

on Windows: https://www.tensorflow.org/install/install_windows
on Mac OS X: https://www.tensorflow.org/install/install_mac

Tutorials

Getting Started With TensorFlow: https://www.tensorflow.org/get_started/get_started

Playground: http://playground.tensorflow.org/
Understanding neural networks with TensorFlow Playground:
https://cloud.google.com/blog/big-data/2016/07/understanding-neural-networks-with-tensorflow-playground

Learn TensorFlow and deep learning, without a PhD: https://cloud.google.com/blog/big-data/2017/01/learn-tensorflow-and-deep-learning-without-a-phd
Tutorial Video: https://www.youtube.com/watch?v=qyvlt7kiQoI

TensorFlow Examples: https://github.com/aymericdamien/TensorFlow-Examples/

Open sourcing the Embedding Projector: a tool for visualizing high dimensional data:
https://research.googleblog.com/2016/12/open-sourcing-embedding-projector-tool.html
Projector: http://projector.tensorflow.org/

Additional Resources

TensorFlow: A System for Large-Scale Machine Learning

Paper: https://www.usenix.org/system/files/conference/osdi16/osdi16-abadi.pdf

Abstract: TensorFlow is a machine learning system that operates at large scale and in heterogeneous environments. TensorFlow uses dataflow graphs to represent computation, shared state, and the operations that mutate that state. It maps the nodes of a dataflow graph across many machines in a cluster, and within a machine across multiple computational devices, including multi core CPUs, general purpose GPUs, and custom-designed ASICs known as Tensor Processing Units (TPUs). This architecture gives flexibility to the application developer: whereas in previous "parameter server" designs the management of shared state is built into the system, TensorFlow enables developers to experiment with novel optimizations and training algorithms. TensorFlow supports a variety of applications, with a focus on training and inference on deep neural networks. Several Google services use TensorFlow in production, we have released it as an open-source project, and it has become widely used for machine learning research. In this paper, we describe the TensorFlow dataflow model and demonstrate the compelling performance that TensorFlow achieves for several real-world applications.

TensorFlow: Large-scale machine learning on heterogeneous distributed systems

Paper: http://download.tensorflow.org/paper/whitepaper2015.pdf
Annotated notes and summaries: https://github.com/samjabrahams/tensorflow-white-paper-notes

Abstract: TensorFlow is an interface for expressing machine learning algorithms, and an implementation for executing such algorithms. A computation expressed using TensorFlow can be executed with little or no change on a wide variety of heterogeneous systems, ranging from mobile devices such as phones and tablets up to large-scale distributed systems of hundreds of machines and thousands of computational devices such as GPU cards. The system is flexible and can be used to express a wide variety of algorithms, including training and inference algorithms for deep neural network models, and it has been used for conducting research and for deploying machine learning systems into production across more than a dozen areas of computer science and other fields, including speech recognition, computer vision, robotics, information retrieval, natural language processing, geographic information extraction, and computational drug discovery. This paper describes the TensorFlow interface and an implementation of that interface that we have built at Google. The TensorFlow API and a reference implementation were released as an open-source package under the Apache 2.0 license in November, 2015 and are available at www.tensorflow.org.

Extras

Keras: Deep Learning library for Python. Convnets, recurrent neural networks, and more. Runs on Theano or TensorFlow.

Main Page: http://keras.io
Github: https://github.com/fchollet/keras

Magenta: Music and Art Generation with Machine Intelligence

Main Page: https://magenta.tensorflow.org
Github: https://github.com/tensorflow/magenta

How a Japanese cucumber farmer is using deep learning and TensorFlow:
https://cloud.google.com/blog/big-data/2016/08/how-a-japanese-cucumber-farmer-is-using-deep-learning-and-tensorflow