
TensorFlow
TM

ORIGINS

- Google Brain Team within Google's Machine Intelligence group
- Open sourced November 9, 2015

  27,696 stars

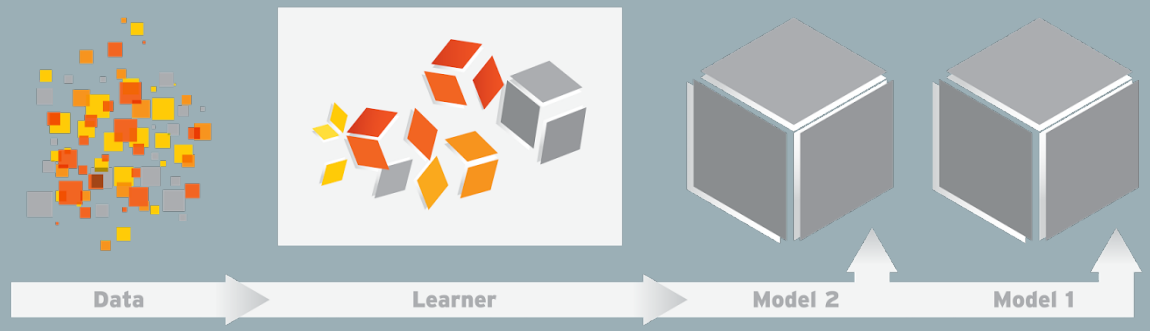
  11,163 forked copies

ORIGINALLY – DISTBELIEFV2

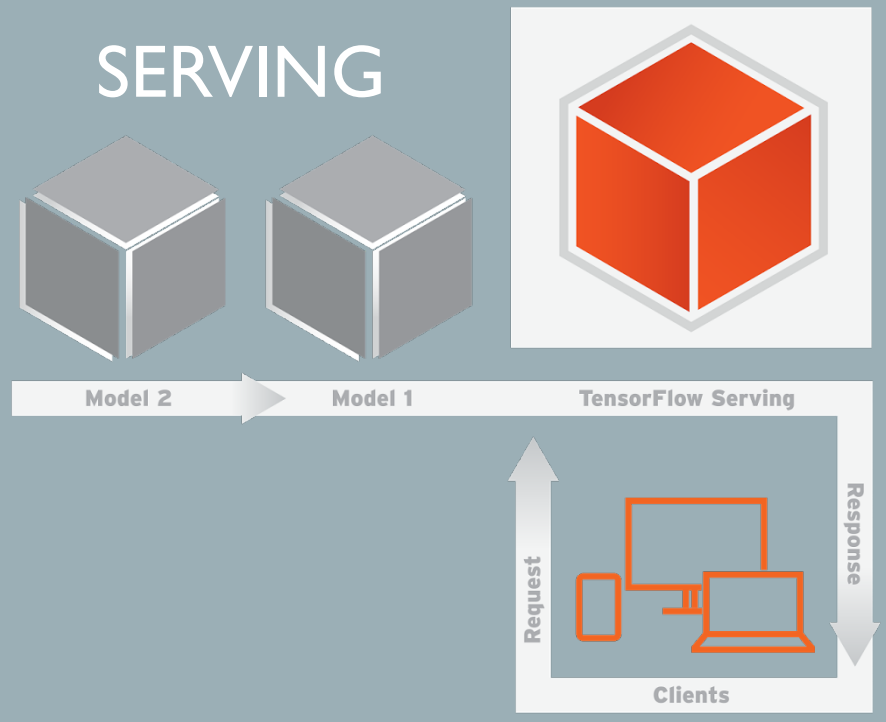
WHAT IS IT

- Open source software library for machine learning in various types of perceptual and language understanding tasks
- Flexible architecture to deploy computational models to one or more CPUs or GPUs in a desktop, server, or mobile device with a single API

TRAINING



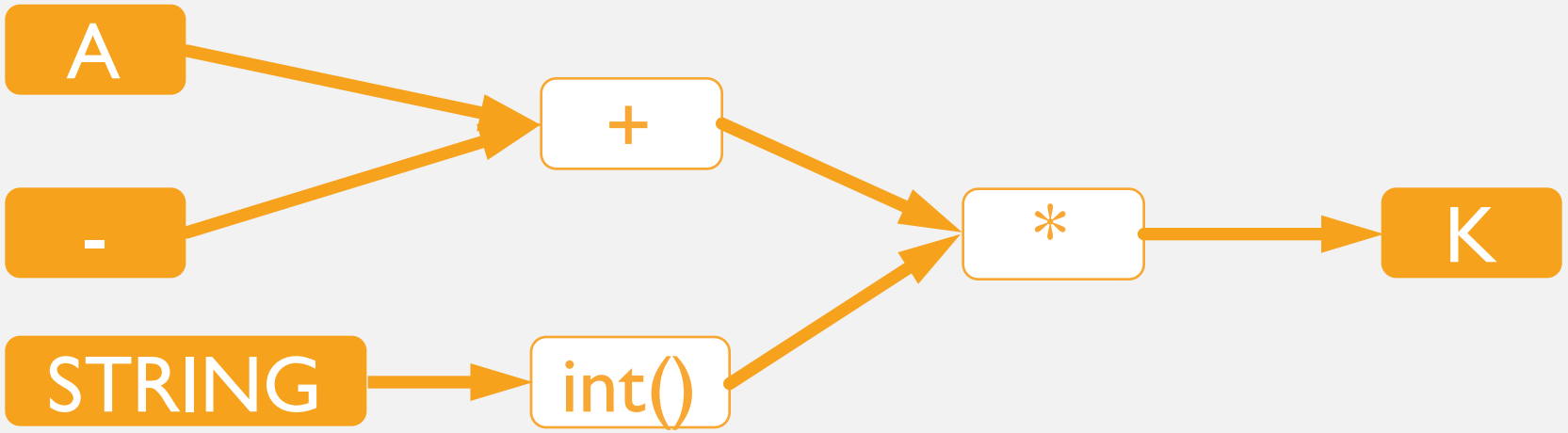
SERVING



HOW DOES IT WORK

- TensorFlow computations are expressed as stateful dataflow graphs

- Designed for neural networks but can support any domain where computation can be modeled as a data flow graph



- Nodes represent mathematical operations, while edges represent the multidimensional data arrays (tensors) communicated between nodes
- A Tensor is a typed multi-dimensional array. i.e. - a mini-batch of images can be represented as a 4-D array of floating point numbers with dimensions [batch, height, width, channels].

TensorBoard

EVENTS IMAGES GRAPH HISTOGRAMS

Fit to screen

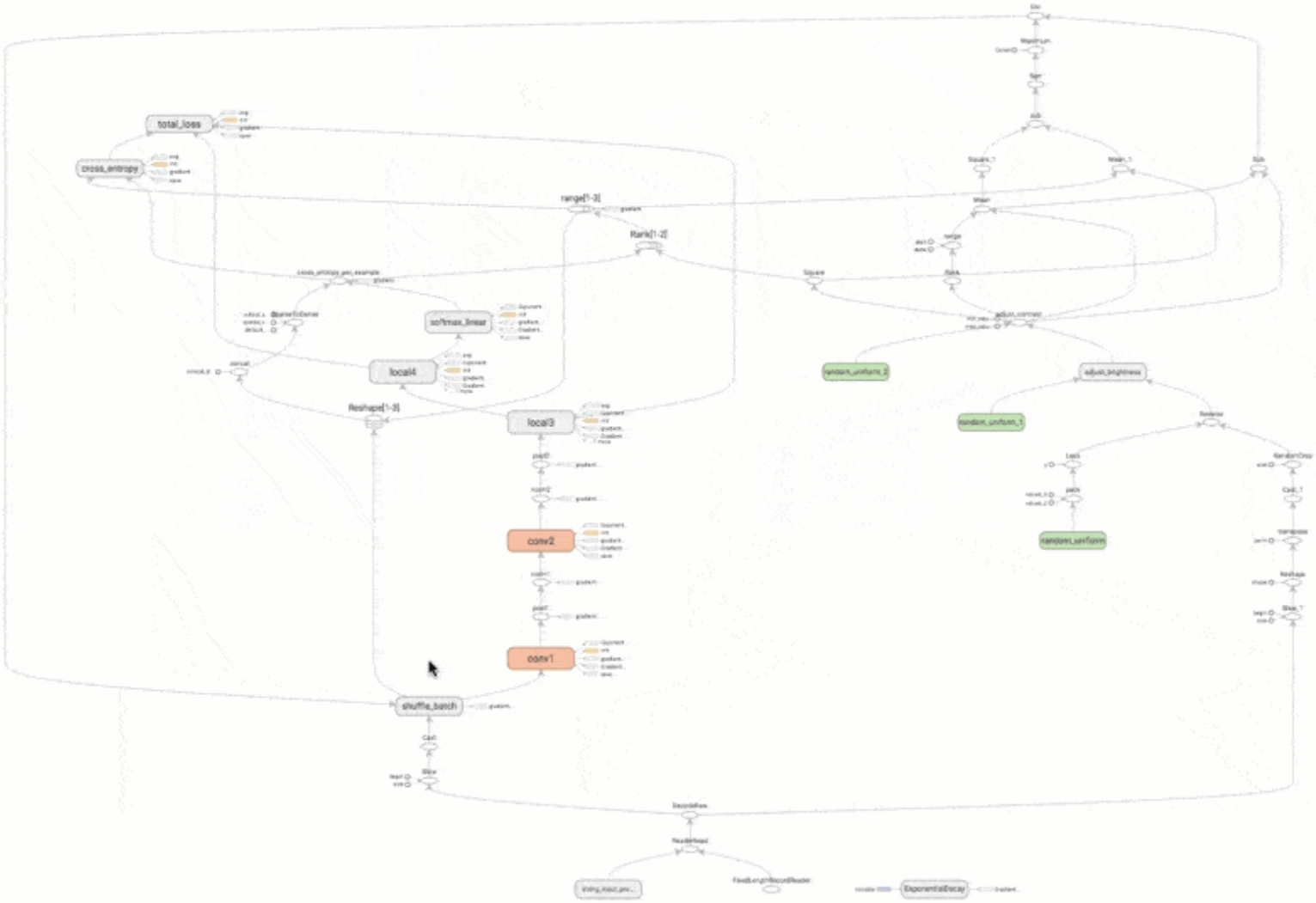
Run cifar-train

Upload Choose File

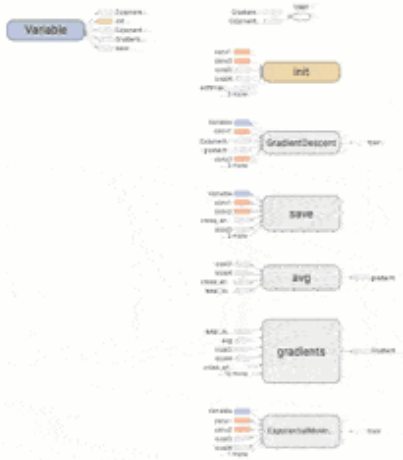
Color Structure

color: same substructure
gray: unique substructure

Main Graph



Auxiliary nodes



Graph (* = expandable)

- Namespace*
- OpNode
- Unconnected series*
- Connected series*
- Constant
- Summary
- Dataflow edge
- Control dependency edge
- Reference edge

WHY

- Simplify the deployment of large machine learning models to a variety of hardware setups

- Aid in portability so that research models could be applied to commercial grade applications

USE CASES

- **RankBrain**: Deep neural nets for search ranking on www.google.com
- **Inception Image Classification**: Deep convolutional neural network for highly accurate computer vision (Google reverse image recognition)
- **SmartReply**: Deep (LSTM) long short term memory model to automatically generate email responses
- **Massively Multitask Networks for Drug Discovery**: Deep neural network model for identifying promising drug candidates.
- **On-Device Computer Vision for OCR**: On device computer vision model to do optical character recognition to enable real-time translation

THANK YOU