PYTORCH VS TENSORFLOW

Pytorch vs Tensorflow which one is better and which one should you use?

Pytorch vs Tensorflow is a well-debated topic in the deep learning community. Both Tensorflow and Pytorch are widely used in Deep Learning. Today, Deep learning has extended itself into almost all fields and is being applied widely. But to build models, we need tools that can make our work easy and efficient.

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There are many deep learning libraries that are being used to build like Tensorflow, Pytorch, Theano, H2O.ai, etc. Of all these libraries the most famous ones are Tensorflow and Pytorch. But often people fall into a dilemma regarding which tool is better or which tool should be used to start learning deep learning. In this article, we will dive deep into each of these libraries and see the differences between these two libraries.

Overview

Tensorflow is a free and open-source python library that is used to train and visualize predictive models. It was developed by Google Brain and was released in the year 2017. Since its release, this library has garnered a lot of popularity among Deep Learning practitioners and is one of the widely used libraries. We can visualize many things using this library and it is very easy to use. It supports training models on GPUs. Tensorflow also has a pre-trained model hub from where we can directly import those pre-trained models for our project purpose. This library is also available in javascript as TF.js. The tools offered by Tensorflow facilitate us to build and deploy machine learning apps very easily.

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source: TensorFlow

Pytorch

Pytorch is also a free and open-source python library mainly used for building deep learning models and deep learning research. It is developed by Facebook AI Research(FAIR) labs. It was open-sourced on Github in the year 2017 and a stable version is released recently. It supports GPU training just like Tensorflow does. Pytorch also has a hub of pre-trained models from which we can import those models directly and use them. It is known for its simplicity, ease of use, and efficient memory usage.

source: PyTorch

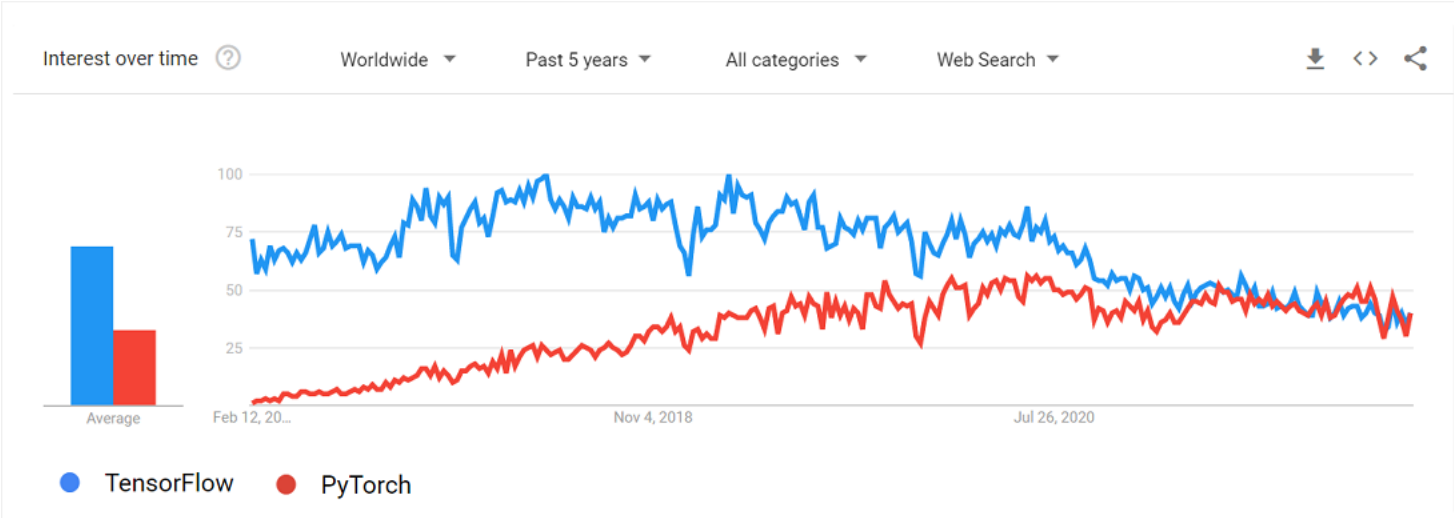
Differences Between Pytorch And Tensorflow

Both Pytorch and Tensorflow are being used by deep learning practitioners for various tasks. Though both serve the same purpose, these two libraries differ in the way work and the extent to which they are used for a particular purpose. Often, many deep learning practitioners debate about which library is good. Sometimes, beginners who want to learn deep learning get confused regarding which library to learn. So let's see some important differences between the two libraries.

	Tensorflow	Pytorch
Novelty	Tensorflow is matured and developed library.	Pytorch is a relatively new library.
Popularity	This is extensively used among industry professionals.	This is used among researchers.
Deployment	It has features to deploy models into production.	We need to use third-party tools to deploy models into production.
Visualization	Provides better visualization of model training through Tensorboard.	It doesn't provide many visualizations compared to Tensorflow.
Language	The core of Tensorflow is written in C++, CUDA.	The core of Pytorch is written using Torchscript and C++.
Speed	Tensorflow gives high performance with high speed.	Pytorch is also very fast with high performance.

Pytorch vs Tensorflow

The popularity of Pytorch is increasing day by day. It is being mainly used for research purposes. Researchers seek flexibility, short training duration, and debugging capabilities. Pytorch offers all these things effectively when compared with Tensorflow. It runs on Linux, macOS, and Windows. Tensorflow on the other hand is a favorite tool of industry professionals and researchers thanks to its well-documented framework and abundantly available study tutorials and trained models. So Tensorflow is more popular among industry professionals and Pytorch is more popular among researchers as per the latest available data. A Pytorch vs Tensorflow comparison of trends is given below



PyTorch vs TensorFlow google trend

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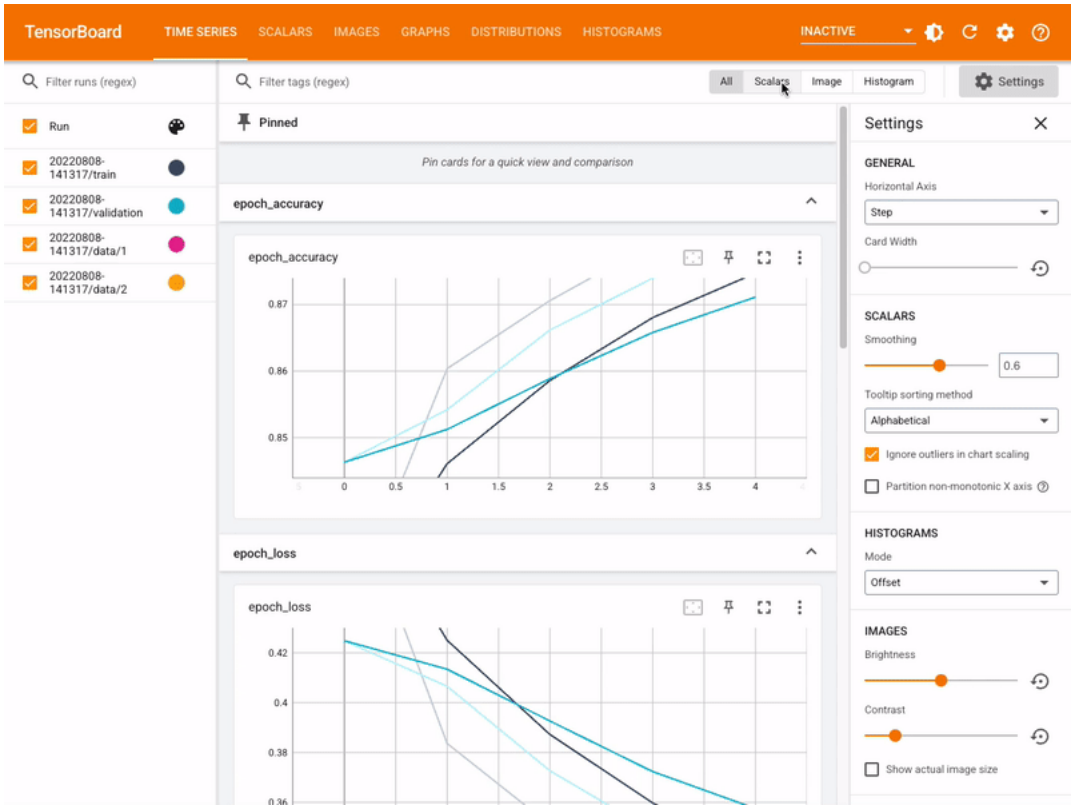
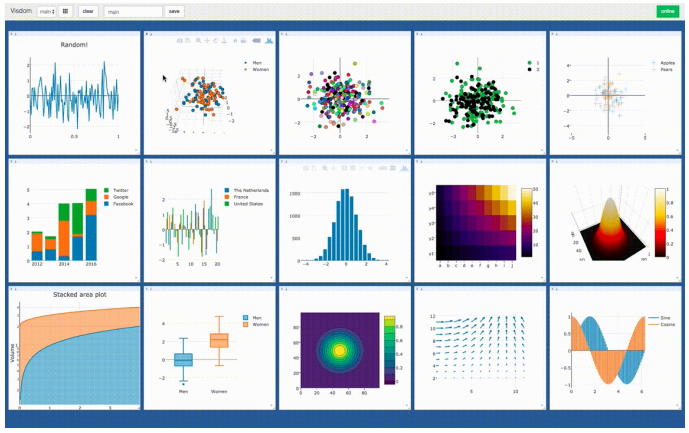
Tensorflow offers better visualization than Pytorch which enables developers to debug the models better and track the training process. Tensorboard of Tensorflow enables us to do this. Pytorch also offers Visdom that shows the visualizations but it is not as efficient as Tensorboard. A Pytorch vs Tensorflow of the visualizations from both libraries is given below.



Tensorflow's Tensorboard – source



PyTorch's Visdom – source

In terms of deploying models to production, Tensorflow beats Pytorch because of its Tensorflow serving framework. But to deploy Pytorch we need third-party APIs to serve the models into production because Pytorch doesn't offer any such frameworks to deploy models into production. We have to use Django or Flask as a backend server.

Pytorch beats Tensorflow in Data Parallelism by relying on native support for asynchronous execution through python. In Tensorflow we have to manually code and optimize every operation to allow distributed training. Tensorflow provides a dynamic way of computational graphs using Tensorflow fold but Pytorch has it in inbuild.

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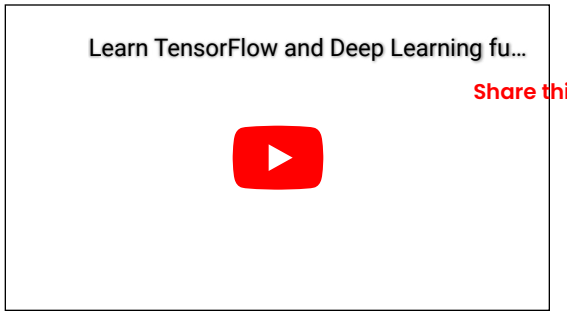
Conclusion

So finally, if someone asks about Pytorch vs Tensorflow you can say something based on the discussion. Tensorflow is a matured and developed library with a lot of available resources at hand. Tensorflow offers options to use for high-level model deployment. It has production-ready deployment options and also it has support for mobile platforms through Tensorflow Lite(TF Lite).

Whereas Pytorch is relatively new and still in development and is extensively used by research communities. If you are into research, then Pytorch is a better choice to start with. So if you are starting with deep learning I recommend you to start with Tensorflow and get the experience of building models using Tensorflow and later you can pick up Pytorch easily.

One of the best introductions to Tensorflow that I have come across is given in the below youtube videos. These tutorials are beginner-friendly and one can learn Tensorflow easily from these tutorials.



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