
Deep Learning Frameworks: Comparisons Documentation

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Alpesis

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CHAPTER 1

Overviews

2.1 Caffe2

2.1.1 Installations

2.1.1.1 Ubuntu

Ubuntu 14.04

1. Prerequisites

```
# dependencies
$ sudo apt-get update
$ sudo apt-get install -y --no-install-recommends \
    build-essential \
    cmake \
    git \
    libgoogle-glog-dev \
    libprotobuf-dev \
    protobuf-compiler \
    python-dev \
    python-pip
$ sudo pip install numpy protobuf

# gpu support
$ sudo apt-get update && sudo apt-get install wget -y --no-install-recommends
$ wget "http://developer.download.nvidia.com/compute/cuda/repos/ubuntu1404/x86_64/
↪ cuda-repo-ubuntu1404_8.0.61-1_amd64.deb"
$ sudo dpkg -i cuda-repo-ubuntu1404_8.0.61-1_amd64.deb
$ sudo apt-get update
$ sudo apt-get install cuda

# cudnn
```

```
$ CUDNN_URL="http://developer.download.nvidia.com/compute/redist/cudnn/v5.1/cudnn-8.0-  
→linux-x64-v5.1.tgz"  
$ wget ${CUDNN_URL}  
$ sudo tar -xzf cudnn-8.0-linux-x64-v5.1.tgz -C /usr/local  
$ rm cudnn-8.0-linux-x64-v5.1.tgz && sudo ldconfig  
  
# optional dependencies  
$ sudo apt-get install -y --no-install-recommends libgflags2  
$ sudo apt-get install -y --no-install-recommends \  
    libgtest-dev \  
    libiomp-dev \  
    libleveldb-dev \  
    liblmdb-dev \  
    libopencv-dev \  
    libopenmpi-dev \  
    libsnappy-dev \  
    openmpi-bin \  
    openmpi-doc \  
    python-pydot  
$ sudo pip install \  
    flask \  
    graphviz \  
    hypothesis \  
    jupyter \  
    matplotlib \  
    pydot python-nvd3 \  
    pyyaml \  
    requests \  
    scikit-image \  
    scipy \  
    setuptools \  
    tornado
```

2. caffe2

```
$ git clone --recursive https://github.com/caffe2/caffe2.git && cd caffe2  
$ make && cd build && sudo make install  
$ python -c 'from caffe2.python import core' 2>/dev/null && echo "Success" || echo  
→ "Failure"
```

2.2 Tensorflow

CHAPTER 3

Comparisons

3.1 Model Zoo

4.1 Frameworks

4.1.1 Tensorflow and Theano

- Tensorflow: [[website](#)][[codes](#)][[paper](#)]
- Theano: [[website](#)][[codes](#)][[paper](#)]

4.1.2 Caffe

- Caffe: [[website](#)][[codes](#)][[paper](#)]
- Caffe2: [[website](#)][[codes](#)][[paper](#)]

4.1.3 Torch

- Torch: [[website](#)][[codes](#)][[paper](#)]
- PyTorch: [[website](#)][[codes](#)][[paper](#)]
- NNGraph: [[website](#)][[codes](#)][[paper](#)]
- CUDA-ConvNet: [[website](#)][[codes](#)][[paper](#)]
- Chainer: [[website](#)][[codes](#)][[paper](#)]
- Kayak: [[website](#)][[codes](#)][[paper](#)]
- DyNet: [[website](#)][[codes](#)][[paper](#)]
- neon: [[website](#)][[codes](#)]

4.2 Libraries

4.2.1 Mathematics

4.2.1.1 CPU

Matrix

- Eigen: [\[website\]](#)[\[codes\]](#)

BLAS:

- CBLAS: [\[website\]](#)[\[codes\]](#)
- Lapack: [\[website\]](#)[\[codes\]](#)
- MKL: [\[website\]](#)[\[codes\]](#)

4.2.1.2 GPU

4.2.2 Memory

4.2.2.1 CPU

4.2.2.2 GPU

- CNMeM: [\[website\]](#)[\[codes\]](#)

4.2.3 Computation

4.2.3.1 CPU

- OpenMPI: [\[website\]](#)[\[codes\]](#)
- NNPack: [\[website\]](#)[\[codes\]](#)

4.2.3.2 GPU

- NervanaGPU: [\[website\]](#)[\[codes\]](#)

4.2.4 Communication

4.2.4.1 CPU

- Gloo: [\[website\]](#)[\[codes\]](#)

4.2.4.2 GPU

- NCCL: [\[website\]](#)[\[codes\]](#)

4.2.5 Data Processing

- ProtoBuf: [\[website\]](#)[\[codes\]](#)

4.2.6 Language APIs

- PyBind11: [\[website\]](#)[\[codes\]](#)
- PyOpenCL: [\[website\]](#)[\[codes\]](#)
- PyCUDA: [\[website\]](#)[\[codes\]](#)