Deep Learning – 102

Tips and Tricks

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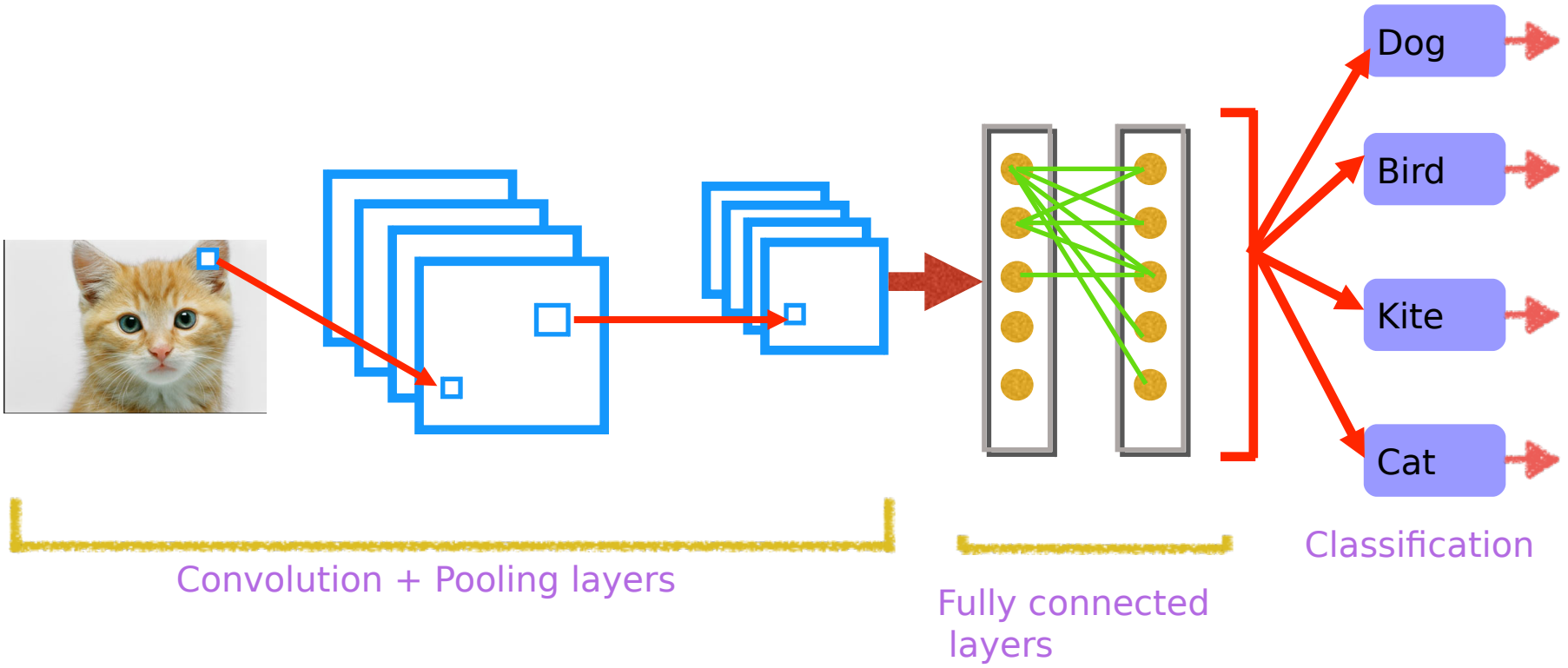
Dog
Bird
Kite
Cat
Convolution + Pooling layers
Fully connected layers
Classification

A word about the data

- All images / time series must be of same size – both during training phase and testing / validation phase
- Some preprocessing steps like intensity normalization may help improve the model accuracy for certain problems.
- The resolution of the image is generally found to affect the model accuracy.
- Convents mimic the behaviour of the human visual cortex, so if your eye can see the convnets should also be able to see.

Some guidline on choosing filter / kernel parameters

- The filters in the initial layers are generally larger compared to the ones in the last layers since you are constructing a pyramidal structure.

- Choose a filter size comparable to the smallest collective feature you think is important.

- If you are learning very fine details, make your strides very fine, ie. say stride=1

Dealing with overfitting and biases in your model

- Its desirable to have rougly the same number (ideally exactly same) of samples for each classes during training of any ML algorithm.

- Deep learing methods require very large number of samples to train on. (>10,000)

- Data augmentation – Making flipped and rotated versions will help increase the sample size.

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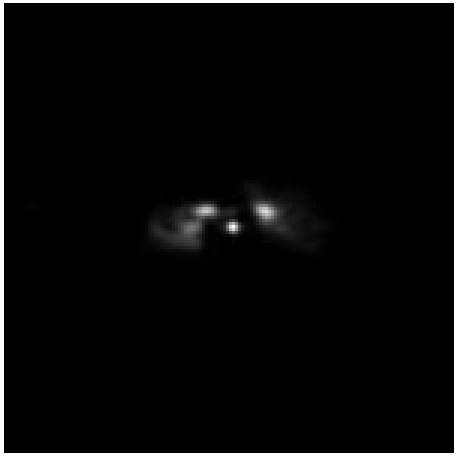

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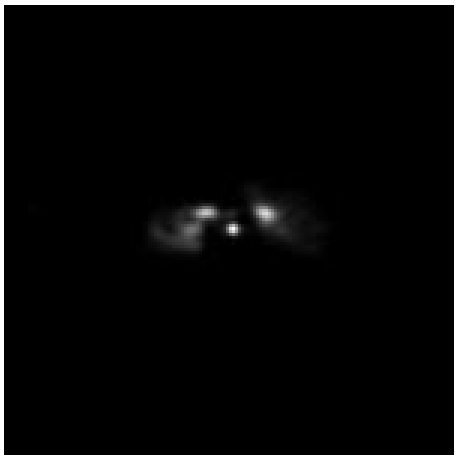
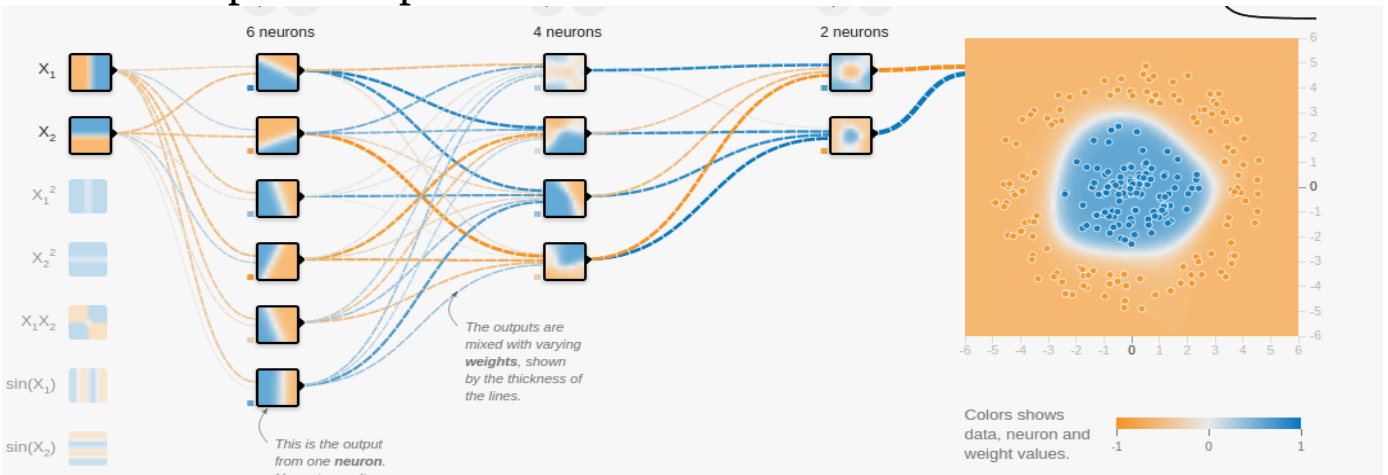
- **Dropout –** Take out weak connections

  Example : Dropout rate of 20%





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Scala ★ 7,287 ⑂ 827

PredictionIO, a machine learning server for developers and ML engineers. Built on Apache Spark, HBase and Spray.

scikit-learn/scikit-learn

Python ★ 6,615 ⑂ 3,962

scikit-learn: machine learning in Python

Related Showcases

Projects that power GitHub for Mac

http://caffe.berkeleyvision.org/

Caffe

Deep learning framework by the BVLC

Created by
Yangqing Jia
Lead Developer
Evan Shelhamer

View On GitHub

Caffe

Caffe is a deep learning framework made with expression, speed, and modularity in mind. It is developed by the Berkeley Vision and Learning Center (BVLC) and by community contributors. Yangqing Jia created the project during his PhD at UC Berkeley. Caffe is released under the BSD 2-Clause license.

Check out our web image classification demo!

Why Caffe?

Expressive architecture encourages application and innovation. Models and optimization are defined by configuration without hard-coding. Switch between CPU and GPU by setting a single flag to train on a GPU machine then deploy to commodity clusters or mobile devices.

Extensible code fosters active development. In Caffe's first year, it has been forked by over 1,000 developers and had many significant changes contributed back. Thanks to these contributors the framework tracks the state-of-the-art in both code and models.

Speed makes Caffe perfect for research experiments and industry deployment. Caffe can process **over 60M images per day** with a single NVIDIA K40 GPU*. That's 1 ms/image for inference and 4 ms/image for learning. We believe that Caffe is the fastest convnet implementation available.

Community: Caffe already powers academic research projects, startup prototypes, and even large-scale industrial applications in vision, speech, and multimedia. Join our community of brewers on the caffe-users group and Github.

* With the ILSVRC2012-winning SuperVision model and caching IO. Consult performance details.

https://developer.nvidia.com/digits

NVIDIA DIGITS

Interactive Deep Learning GPU Training System

The NVIDIA Deep Learning GPU Training System (DIGITS) puts the power of deep learning into the hands of engineers and data scientists. DIGITS can be used to rapidly train the highly accurate deep neural network (DNNs) for image classification, segmentation and object detection tasks.

DIGITS simplifies common deep learning tasks such as managing data, designing and training neural networks on multi-GPU systems, monitoring performance in real time with advanced visualizations, and selecting the best performing model from the results browser for deployment. DIGITS is completely interactive so that data scientists can focus on designing and training networks rather than programming and debugging.

DIGITS Download

DIGITS 4 is available as a free download to the members of the NVIDIA Developer Program. If you are not already a member, clicking "Download" will ask you join the program.

Download

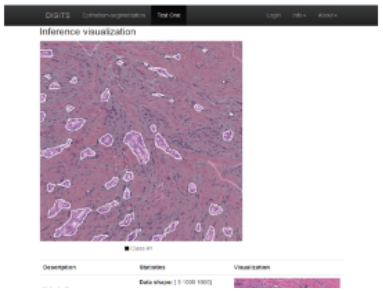
DIGITS Cloud Images

DIGITS 4 is available as a Amazon Machine Image (AMI) for on-demand usage. Get started instantly by clicking the "DIGITS AMI" button below. Learn more about GPU-accelerated cloud images from NVIDIA.

DIGITS AMI

What's New in DIGITS 5

- Train Image Segmentation neural networks to partition images into regions such as tumors from healthy tissue, and buildings and cars from free space
- Decrease training time and improve model accuracy with pre-trained models from the DIGITS Model Store



QUICKLINKS

Accelerated Computing - Training

CUDA GPUs

Tools & Ecosystem

OpenACC: More Science Less Programming

CUDA FAQ

GPU Computing Follow

CUDA, GPU Computing
@GPUComputing

A new #AI app developed by @FDNA uses #deeplearning + #GPUs to identify rare diseases from a selfie. nvda.ws/2j20ncF

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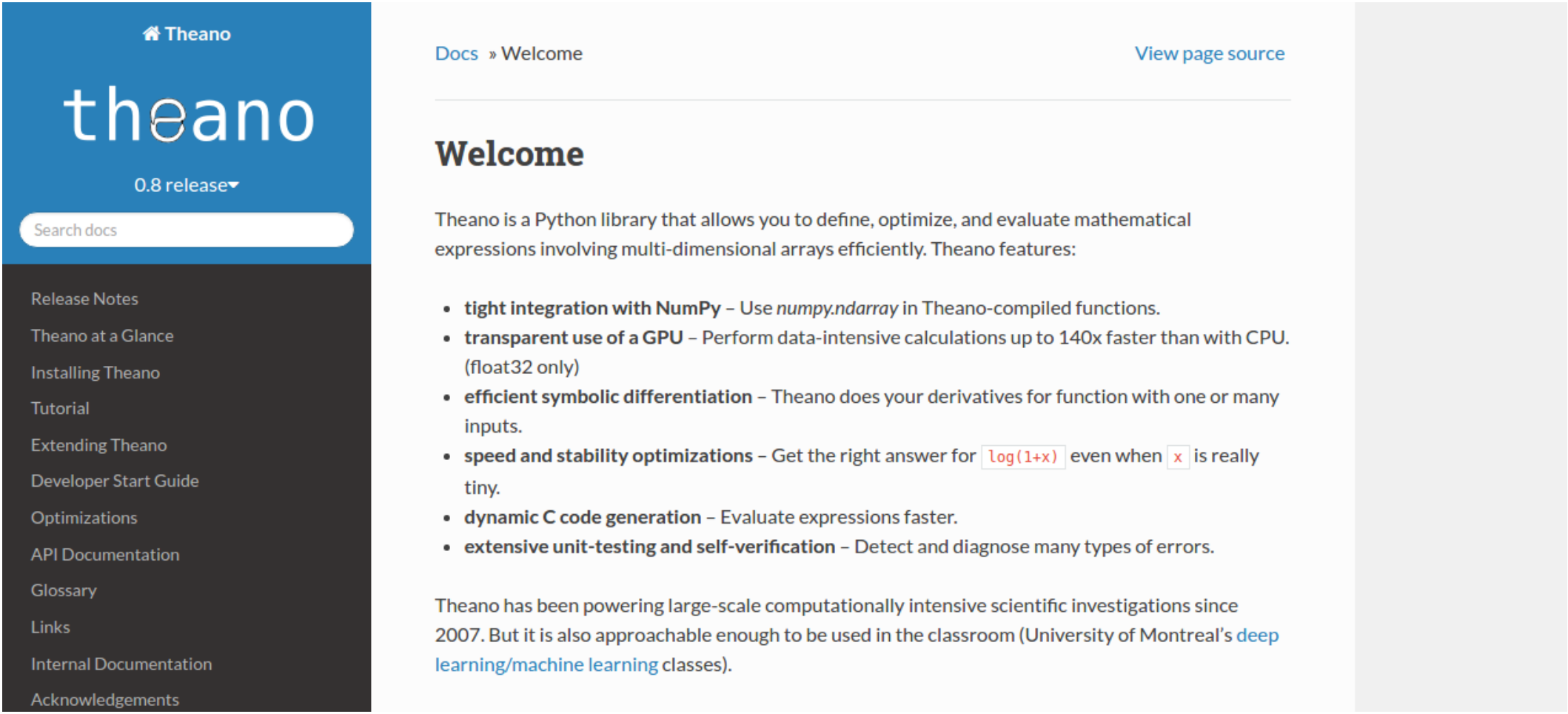
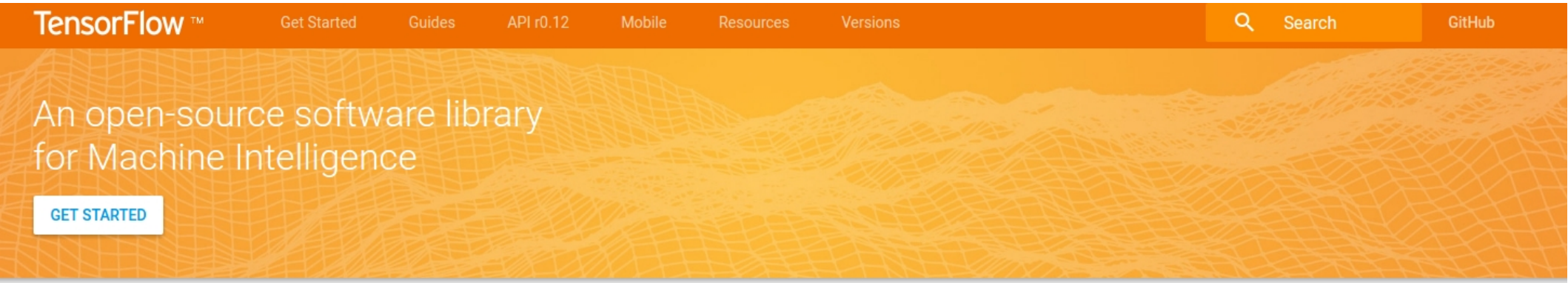
http://deeplearning.net/software/theano/



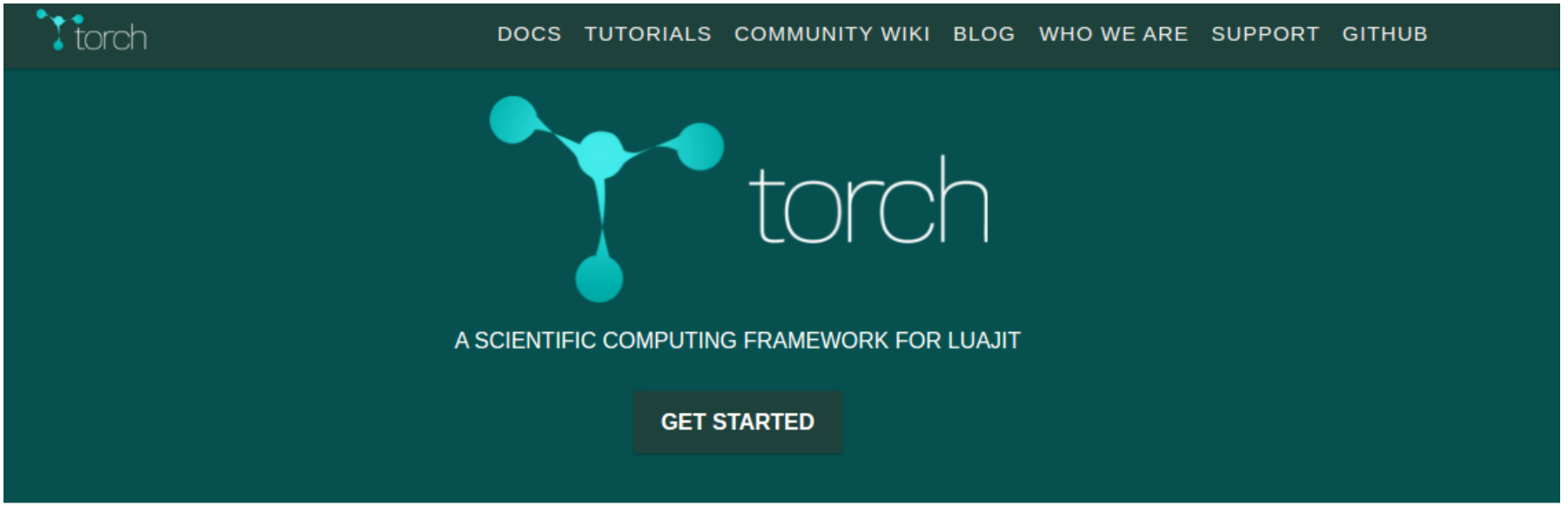
https://www.tensorflow.org/



About TensorFlow

TensorFlow™ is an open source software library for numerical computation 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.

http://torch.ch/



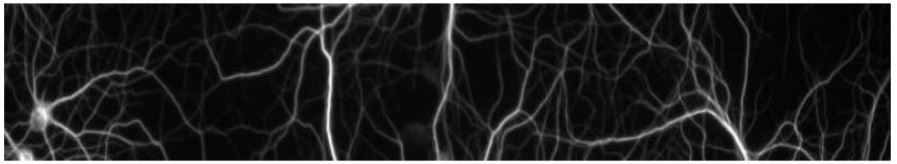
What is Torch?

Torch is a scientific computing framework with wide support for machine learning algorithms that puts GPUs first. It is easy to use and efficient, thanks to an easy and fast scripting language, LuaJIT, and an underlying C/CUDA implementation.

A summary of core features:

- a powerful N-dimensional array
- lots of routines for indexing, slicing, transposing, ...
- amazing interface to C, via LuaJIT
- linear algebra routines
- neural network, and energy-based models
- numeric optimization routines
- Fast and efficient GPU support
- Embeddable, with ports to iOS, Android and FPGA backends

http://deeplearning.net/



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Welcome to Deep Learning

Deep Learning is a new area of Machine Learning research, which has been introduced with the objective of moving Machine Learning closer to one of its original goals: Artificial Intelligence.

This website is intended to host a variety of resources and pointers to information about Deep Learning. In these pages you will find

- a **reading list**,
- links to **software**,
- **datasets**,
- a list of **deep learning research groups and labs**,
- a list of announcements for deep learning related jobs (**job listings**),
- as well as **tutorials** and cool **demos**.
- announcements and news about **deep learning**

For the latest additions, including papers and software announcement, **be sure to visit the Blog section and subscribe to our RSS feed** of the website. **Contact us** if you have any comments or suggestions!

Last modified on December 1, 2015, at 9:31 am by Caglar Gulcehre

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http://gitxiv.com/

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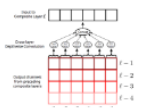
1 

DelugeNets: Deep Networks with Massive and Flexible Cross-layer Information Inflows

Impressive DelugeNets (Kuen et al.) beating ResNets and in some cases Wide ResNets

CONVOLUTIONAL NEURAL NETWORKS (CNN) MACHINE LEARNING

graphific 1 point 21 hours ago **0 Comments** 0

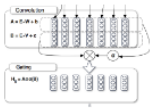
2 

The Predictron: End-To-End Learning and Planning

Markov reward process, that can be rolled forward multiple "imagined" planning steps

MACHINE LEARNING MONTE CARLO

samim 1 point 3 days ago **0 Comments** 0

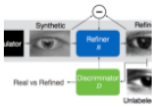
3 

Language Modeling with Gated Convolutional Networks

Gated Convoluational Networks for language model

CONVOLUTIONAL NEURAL NETWORKS (CNN) NATURAL LANGUAGE PROCESSING (NLP)

samim 2 points 5 days ago **0 Comments** 0

4 

Learning from Simulated and Unsupervised Images through Adversarial Training.

Simulated+Unsupervised (S+U) learning in TensorFlow

ADVERSARIAL NETWORKS

samim 3 points 6 days ago **0 Comments** 0

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SalGAN: Visual Saliency Prediction with Generative Adversarial Networks

Adversarial training improves a binary cross-entropy loss in most saliency metrics

ADVERSARIAL NETWORKS COMPUTER VISION CONVOLUTIONAL NEURAL NETWORKS (CNN) DEEP LEARNING (DL)

Xavier Giró-i-Nieto 2 points 7 days ago **0 Comments** 0