

Introduction to Deep Neural Networks

GPU computing perspective

Getting Started

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Introduction

Prerequisites

- ★ Basic training in Calculus
- ★ Basic training in Linear Algebra
 - Matrix operations
 - Matrix properties: transform, rank, norm, determinant, etc
 - Eigendecomposition, Singular Value Decomposition.
- ★ Basic programming skills
 - If-else conditioning
 - Loops
 - Function, class, library
 - Source code control: Git (optional)

Software and Tools

- ★ Ubuntu 14.04
- ★ CUDA Toolkit 6.5
- ★ Python 2.7.9 (Why not 3.*?)
- ★ Theano
- ★ numpy, scipy, etc
- ★ Eclipse+PyDev

Ubuntu 14.04 Installation

Nvidia Graphics Driver

CUDA Toolkit

Anaconda

Anaconda: post installation

Eclipse and PyDev

Scalar, Vector, Matrix and Tensor

Matrix Operations

Matrix Properties

Singular Value Decomposition (SVD)

Optimization Problem: Hypothesis

Optimization Problem: Cost function

Dataset: How to split the data?

Dataset: Cross validation

MNIST

CIFAR-10

Mean subtraction

Unit variance

PCA

ZCA Whitening

SGD

Jacobian

Hessian

Summary