Practical Deep Neural Networks

GPU computing perspective

Machine Learning Basics

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Outline

1. Introduction
2. Learning Algorithms
   - Supervised Learning
   - Unsupervised Learning
3. Linear Regression
4. Generalization, Capacity, Overfitting and Underfitting
5. Maximum Likelihood Estimation

References

Assumed prerequisites

- ☆ Basic Linear Algebra (DL book chapter 2)
- ☆ Basic Probability and Information Theory (DL book chapter 3)
- ☆ Basic Numerical Computation (DL book chapter 4)

Suggest Readings

- CS229 lecture notes 1 and 4:

  `http://cs229.stanford.edu/notes/cs229-notes1.pdf`
  `http://cs229.stanford.edu/notes/cs229-notes4.pdf`
- Pattern Recognition and Machine Learning: Chapter 1 and 2.
- Machine Learning: A probabilistic perspective: Chapter 1 and 2.
- CS231n: Image Classification: Data-driven Approach, k-Nearest Neighbor, train/val/test splits
  `http://cs231n.github.io/classification/`

Definition of Learning Algorithm

"A computer program is said to learn from

- ✓ experience E with respect to
- ✓ some class of tasks T and
- ✓ performance measure P,

if its performance at tasks in T, as measured by P, improves with experience E" (Mitchell, 1997)

The task T

The performance measure P

The experience E

Q& A

References I

Mitchell, T. M. (1997). *Machien learning*. New York: McGraw-Hill.