

Software Packages for Deep Learning

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Outline

Introduction

Python

TensorFlow

MxNET

Torch

Caffe

Comparison

Machine learning

- ML gives computers the ability to learn without being explicitly programmed [Samuel 1959]
- ML explores the study and construction of algorithms that can learn from and make predictions on data
- Data mining, computational statistics, optimization, ...
- Fourth paradigm, big data, deep learning, artificial intelligence

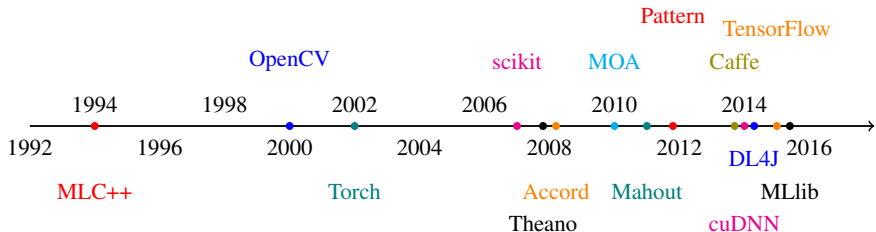


Figure: Machine learning packages

General tasks

- Classification: inputs are divided into two or more classes, and the learner must produce a model that assigns unseen inputs to one or more (multi-label classification) of these classes
- Regression: similar to classification, but the outputs are continuous rather than discrete
- Clustering: a set of inputs is to be divided into groups. Unlike in classification, the groups are not known beforehand, making this typically an unsupervised task
- Other tasks: density estimation, dimensionality reduction, ...

General machine learning code



Deep learning



Python



Computational graph



Programming interface



Visualization



Example 1



Programming interface



Example 1



Programming interface



Example 1



Programming interface



Example 1

Programming interface



Numerical tests



Numerical tests



Thank You!

