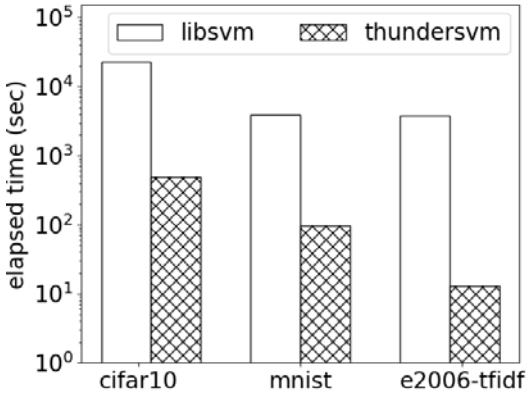
ThunderML: Next-Generation Machine Learning Platforms on Many-Core Architectures

The recent advancement of machine learning technologies (such as deep learning) is not only because of new algorithms to improve accuracy, but also because of new algorithms to exploit the high-performance hardware (such as Graphics Processing Units) and multi-core CPUs to improve efficiency. Graphics Processing Units (GPUs) have been used to accelerate the solutions of many real-world applications [1].

ThunderML aims to help practitioners apply machine learning techniques easily and solve problems at hand quickly. ThunderML exploits high-performance hardware (such as GPUs, multi-core CPUs and many-core CPUs) to accelerate the training and inference. Currently, ThunderML includes ThunderSVM and ThunderGBM, and we strive to support more machine learning algorithms.

Features

- Fast: exploit high-performance hardware.
- Easy-to-use: identical user interface and input options to allow practitioners easily switch to ThunderML.
- Various interfaces: python, R, MATLAB, etc.
- Various functionalities: classification, regression, and distribution estimation.
- Cheaper: achieve more cost effective for performance price ratio.



Significant speedup of ThunderML

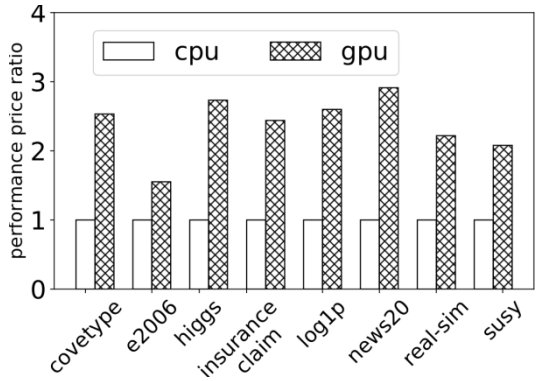
Applications

- Document classification; email spam filtering
- Stock price forecasting; time series analysis
- Network attack detection; anomaly detection
- Product recommendation; ranking

Various interfaces

Benefits

- High-performance at low-price
- Completely transparent to the programmer
- Switch to exploit high-performance hardware at minimum effort



Achieving performance more cost effectively

[1] Dittamo, Cristian, and Antonio Cisternino. "GPU White paper." (2008).

COMPUTING TRANSLATIONAL RESEARCH & DEVELOPMENT CENTRE
C-TReND

NUS | Computing
National University of Singapore

c-trend@comp.nus.edu.sg | www.c-trend.comp.nus.edu.sg