Assignment 2. Reading Assignment for Machine Learning Systems Comparison

Due date: 11:59pm Jan 31 2020

Files to submit:

- A report in PDF format. Select two popular systems from this link: **Papers for Assignment 2**. Then in the report, compare the two systems from various Systems aspect.

Submission Website:

GradeScope (We will NOT accept submissions via email and Canvas).

If you have any questions regarding GradeScope, please contact TA.

Learning Goal:

1. Understand, summarize and communicate a few common design principles through case study of popular machine learning systems;
2. Understand the architecture of parameter server;
3. Understand common approaches to data parallelism and model parallelism;
4. Understand Easy execution vesus. Lazy execution;
5. Analyze performance bottlenecks for each type of systems;

Tasks:

1. Select two papers from the list: Papers for Assignment 2

2. Study the systems through reading the papers. You are encouraged to find more relevant resources in internet by yourself.

3. Write a 2~4 page survey report, please cover following points:

1. Why do you select these two papers? What interests you the most about these two papers? (4pt)

2. What are the benefits and shortcomings of System A? (3pt)

3. What are the benefits and shortcomings of System B? (3pt)

4. What are the common features shared by System A and B? (3pt)

5. What are the difference between System A and B? (3pt)

6. What have you learned from the two papers? (4pt)

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Here are 12 papers for Assignment 2, which we discussed in classroom. You only need to select two papers to conduct the comparison study.

•Hogwild!

Hogwild A lock-free approach to parallelizing stochastic gradient descent.pdf

Recht, Benjamin, et al. Advances in neural information processing systems. 2011.

•DistBelief

Large scale distributed deep networks.pdf

Dean, Jeffrey, et al. Advances in neural information processing systems. 2012.

•Petumm

More effective distributed ml via a stale synchronous parallel parameter server.pdf

Ho, Qirong, et al. Advances in neural information processing systems. 2013.

Petuum A new platform for distributed machine learning on big data.pdf

Xing, Eric P., et al. IEEE Transactions on Big Data 1.2 (2015): 49-67.

•Project Adam

Project adam Building an efficient and scalable deep learning training system.pdf

Chilimbi, Trishul, et al. 11th USENIX Symposium on Operating Systems Design and Implementation (OSDI 14). 2014.

•MXNET

Scaling distributed machine learning with the parameter server.pdf

Li, Mu, et al. 11th USENIX Symposium on Operating Systems Design and Implementation (OSDI 14). 2014.

Mxnet A flexible and efficient machine learning library for heterogeneous distributed systems.pdf

Chen, Tianqi, et al. arXiv preprint arXiv:1512.01274 (2015).

{TVM} An automated end-to-end optimizing compiler for deep learning.pdf

Chen, Tianqi, et al. 13th USENIX Symposium on Operating Systems Design and Implementation (OSDI 18). 2018.

•TensorFlow

Tensorflow A system for large-scale machine learning.pdf

Abadi, Martín, et al. 12th USENIX Symposium on Operating Systems Design and Implementation (OSDI 16). 2016.

•Uber Horovod

Horovod fast and easy distributed deep learning in TensorFlow.pdf

Sergeev, Alexander, and Mike Del Balso. arXiv preprint arXiv:1802.05799 (2018).

•PyTorch

PyTorch An imperative style, high-performance deep learning library.pdf

Paszke, Adam, et al. Advances in Neural Information Processing Systems. 2019.

•TensorFlow Eager

Tensorflow eager A multi-stage, python-embedded dsl for machine learning.pdf

Agrawal, Akshay, et al. arXiv preprint arXiv:1903.01855 (2019).

Autograder Results

Results | Code | Leaderboard

This assignment does not have an autograder configured.

STUDENT
Parth Rajendra Doshi

AUTOGRADER SCORE
0.0 / 0.0

QUESTION 2

Why do you select these two papers? What interests you the most about these two papers? **4.0** / 4.0 pts

QUESTION 3

What are the benefits and shortcomings of System A? **3.0** / 3.0 pts

QUESTION 4