Homework 4

[IE801/KSE801] Special Topics in Industrial Engineering II <Machine Learning for Knowledge Service>
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HW Description

In this homework, you have to summarize the papers for the final project. The research fields of the final projects are beyond the scope of our lecture and there will be some prerequisite for each projects. Therefore, we will give you the project papers in advance to progress the project well. Followings are the topics of final projects, and the papers you should summarize.

- **Adversarial Attack**

    - Explaining and Harnessing Adversarial Examples [3]
    - Adversarial Machine Learning at Scale [5]

- **Adaptive Computation**

    - SkipNet: Learning Dynamic Routing in Convolutional Networks [7]
    - URNet: User-Resizable Residual Networks with Conditional Gating Module [2]

- **Source Separation**

    - Singing voice separation with deep U-Net convolutional networks [4]
    - Wave-u-net: A multi-scale neural network for end-to-end audio source separation [6]

- **Distributed Deep Learning**

    - Sparse Communication for Distributed Gradient Descent [1]
    - TernGrad: Ternary Gradients to Reduce Communication in Distributed Deep Learning [8]

You should select the one among four, and summarize the papers listed in above. For summaries, we expect you to include the followings.

- Identify the article title and author.

- Explain the purpose of the article

- Describe the issues addressed by this article

- Explain the essential aspects of the methods

- Describe and explain the main results.

- Identify the key contributions of this article

- write your pros and cons of the method in this article

Homework 4 May 8, 2019

About the Submission

- The deadline for submission is **23:59 on 15 May (Wed)**, and late submission is not permitted.

- The report should be submitted the only one per team.
  (Please write down your team name and all student IDs of members on your report)

- The report should include the both summaries and be no more than **3 pages**.

- Please convert .doc file to **.pdf file**

- File name should be **[hw4]Teamname.pdf**
  (e.g., [hw4]Teamname.pdf) (If you do not keep this naming, there will be a disadvantage.)

- If you have a question about hw4, **please use Lecture Q&A on KLMS.**

References

[1] Alham Fikri Aji and Kenneth Heafield. Sparse communication for distributed gradient descent. *arXiv preprint arXiv:1704.05021*, 2017.

[2] Simyung Chang, Sang-ho Lee, and Nojun Kwak. Urnet: User-resizable residual networks with conditional gating module. *arXiv preprint arXiv:1901.04687*, 2019.

[3] Ian Goodfellow, Jonathon Shlens, and Christian Szegedy. Explaining and harnessing adversarial examples. In *International Conference on Learning Representations*, 2015.

[4] Andreas Jansson, Eric Humphrey, Nicola Montecchio, Rachel Bittner, Aparna Kumar, and Tillman Weyde. Singing voice separation with deep u-net convolutional networks. 2017.

[5] Alexey Kurakin, Ian J. Goodfellow, and Samy Bengio. Adversarial machine learning at scale. *CoRR*, abs/1611.01236, 2016.

[6] Daniel Stoller, Sebastian Ewert, and Simon Dixon. Wave-u-net: A multi-scale neural network for end-to-end audio source separation. *arXiv preprint arXiv:1806.03185*, 2018.

[7] Xin Wang, Fisher Yu, Zi-Yi Dou, Trevor Darrell, and Joseph E Gonzalez. Skipnet: Learning dynamic routing in convolutional networks. In *Proceedings of the European Conference on Computer Vision (ECCV)*, pages 409–424, 2018.

[8] Wei Wen, Cong Xu, Feng Yan, Chunpeng Wu, Yandan Wang, Yiran Chen, and Hai Li. Terngrad: Ternary gradients to reduce communication in distributed deep learning. In *Advances in neural information processing systems*, pages 1509–1519, 2017.