Changjian Shui

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Research Interest

Machine Learning, Distribution Shift, Transfer Learning (multi-task learning, domain adaptation), Active Learning

Education

Department of Electric Engineering, Université Laval **Quebec, Canada**
PhD in Machine Learning, GPA - 4.2/4.3 *2017-2021.11 (expected)*
Supervisors: Christian Gagné, Boyu Wang

Thesis Title: *Principled Deep learning approaches for learning limited labeled data through distribution matching*

Evaluation committee: Aaron Courville, Mario Marchand, Thierry Duchesne

École normale supérieure Cachan **Cachan, France**
Master of Science in Applied Mathematics, cum laude, 14.75/20 *2015.09-2016.10*

Telecom ParisTech **Paris, France**
Diplome d'ingenieur (Graduate Engineer) *2013.08-2015.06*

Selected Publications & Reprints

The full publication list is on Google Scholar

- **Aggregating From Multiple Target-Shifted Sources.** Changjian Shui, Zijian Li, Jiaqi Li, Christian Gagné, Charles Ling, Boyu Wang. International Conference on Machine Learning (ICML), 2021
- **Deep Active Learning: Unified and Principled Method for Query and Training.** Changjian Shui, Fan Zhou, Christian Gagné, Boyu Wang. International Conference on Artificial Intelligence and Statistics (AISTATS), 2020.
- **A Principled Approach for Learning Task Similarity in Multitask Learning.** Changjian Shui, Mahdieh Abbasi, Louis-Émile Robitaille, Boyu Wang, Christian Gagné. International Joint Conference on Artificial Intelligence (IJCAI), 2019
- **Task Similarity Estimation Through Adversarial Multitask Neural Network** Fan Zhou, Changjian Shui, Mahdieh Abbasi, Louis-Émile Robitaille, Boyu Wang, Christian Gagné. IEEE Transactions on Neural Networks and Learning Systems.
- **On the benefits of representation regularization in invariance based domain generalization.** Changjian Shui, Boyu Wang and Christian Gagné, arXiv preprint arXiv:2105.14529
- **Beyond H-divergence: Domain adaptation theory with jensen-shannon divergence.** Changjian Shui and Chen, Q and Wen, J and Zhou, F and Gagné, C and Wang, B, arXiv preprint arXiv:2007.15567

Research Experience

PhD Research Assistance at Laval University

- (2018.10-2019.10) **Task relationship extraction in multi-task learning**
  ▷ We studied the *task similarity* as the indicator of task relation and derived a theoretical principled approach in deep multi-task learning, where the proposed approach automatically extracted a robust task relation coefficient. We further applied this approach in the medical application through estimating the relations between different Parkinson patients.
- (2019.06-2020.01) **Deep active Learning through unified query and training approach**
  ▷ We proposed a principled query strategy with explicitly considering uncertainly and diversity trade-off through optimizing our proposed theoretical upper bound. In addition, we theoretically verify the benefits of leveraging unlabeled data in active learning, as the way to control the generalization error. Our proposed approach reveals a strong empirical improvement.
- (2020.06-2021.03) **Multi-source Domain adaptation**
  ▷ We address the problem of multi-source domain adaptation when the label and conditional distributions of the sources are different. Our approach provided a unified prospective in understanding different domain adaptation scenarios: limited-label, unsupervised and partial-domain adaptation.

Master Intern in Armines

- (2016.03-2016.09) **Characterization of granular media in gas-solid systems by image analysis**
  ▷ Supervised by Prof. Johan DEBAYLE. Development mathematical and numerical approach for analysis granules in chemical process and simulate the graunles via Stochastic Geometry.

Master Intern in Pasteur Institute

- (2014.08-2015.02) **Spatial-temporal deconvolution in super-resolution microscopy**
  ▷ Supervised by Prof Christophe ZIMMER. Development of temporal models based on Markov continuous time model to improve the resolution of super-resolution microscopy.

Research Service

Program Committees of Scientific Journals

- Reviewer, Machine Learning Journal. 2020
- Reviewer, IEEE Trans on Image Processing. 2021

Program Committees of Scientific Conferences

- Reviewer, Neural Information Processing Systems (NeurIPS). 2020-2021
- Reviewer, International Conference on Machine Learning (ICML), 2021
- Reviewer, International Conference on Learning Representations (ICLR), 2020-2022
- Reviewer, Artificial Intelligence and Statistics (AISTAS), 2021
- Reviewer, Association for the Advancement of Artificial Intelligence (AAAI), 2021

Awards & Scholarships

- Best Reviewer (Top 10%), ICML 2021
- Outstanding Reviewer, ICLR 2021
- Top 25% Reviewer, AAAI 2021
- 3rd Prize in the Presentation of *Journée de la relève en intelligence et données*, Québec, 2021
- Mitacs, NSERC Canada scholarships (2017-2020)
- Travel Award, IJCAI 2019
- Scholarships of Insitut Mines-Télécom, 2013-2014

Skills

Programming Languages MATLAB, Python, Latex , C/C++, HMTL
Library Pytorch, Tensorflow

Language

English, French (Professional working proficiency), Chinese (Native)

Teaching Experiences

TA GIF7005 Introduction to Machine learning (2018-2020). Laval University.

Last update: July 24, 2021