Changjian Shui

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Research Summary

My research aims to develop *reliable* and *responsible* Machine learning (ML) algorithms, especially in real-world scenarios such as healthcare. **Reliable ML** not only provides accurate predictions, but also adheres to robustness, fairness, and transparency, thus instilling confidence in its use and outcomes. (see more in AI Safety). **Responsible ML** ensures ethical decision-making and equitable outcomes while considering the broader societal impact. (see more in Responsible ML).

Education

Université Laval — **Canada**
Ph.D in Electrical Engineering — *2017.05-2022.03*
Supervisors: Prof. Christian Gagné, Prof. Boyu Wang

Université Paris Saclay — **France**
Master in Applied Mathematics, Affiliated to École Normale Supérieure Paris Saclay — *2015.09-2016.10*
cum laude, 14.75/20

Télécom ParisTech — **France**
Diplôme d'ingenieur — *2013.08-2015.06*

Southeast University — **China**
Bachelor of Electronic Science and Engineering — *2009.07-2013.06*

Working Experience

Vector Institute — **Toronto, Canada**
Postdoctoral Fellow — *2023.12-Now*
Mentor: Rahul G. Krishnan

McGill University — **Montreal, Canada**
Postdoctoral Fellow, Affiliated to Mila (Quebec AI Institute) — *2022.05-2023.05*
Supervisor: Prof. Tal Arbel

Selected Publications

Detailed publications can be found in Google Scholar

Reliable Machine Learning

- **On the Stability-Plasticity Dilemma in Continual Meta-Learning: Theory and Algorithm.** Qi Chen, Changjian Shui, Ligong Han, Mario Marchand. *Neural Information Processing Systems (NeurIPS), 2023, acceptance rate = 26.1%*

- **On Learning Fairness and Accuracy on Multiple Subgroups.** Changjian Shui, Gezheng Xu, Qi Chen, Jiaqi Li, Charles Ling, Tal Arbel, Boyu Wang, Christian Gagné. *Neural Information Processing Systems (NeurIPS), 2022, acceptance rate = 25.6%*

- **Fair Representation Learning through Implicit Path Alignment.** Changjian Shui, Qi Chen, Jiaqi Li, Boyu Wang, Christian Gagné. *International Conference on Machine Learning (ICML), 2022,*

acceptance rate = 21.9%

- **Generalization Bounds For Meta-Learning: An Information-Theoretic Analysis.** Qi Chen, Changjian Shui, Mario Marchand. *Neural Information Processing Systems (NeurIPS), 2021, spotlight, 3% of the submissions*.

- **On the benefits of representation regularization in invariance based domain generalization.** Changjian Shui, Boyu Wang and Christian Gagné. *Machine Learning Journal (MLJ), 2022.*

Applications

- **Latent Trajectory Learning for Limited Timestamps under Distribution Shift over Time** Qiuhao Zeng, Changjian Shui, Long-Kai Huang, Peng Liu, Xi Chen, Charles Ling, and Boyu Wang. *International Conference on Learning Representations (ICLR), 2024, oral, 1.2% of the submissions*.

- **Mitigating Calibration Bias Without Fixed Attribute Grouping for Improved Fairness in Medical Imaging Analysis.** Changjian Shui, Justin Szeto, Raghav Mehta, Douglas Arnold, Tal Arbel. *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2023, early acceptance rate= 14%*

- **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, acceptance rate = 21.5%*

- **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, acceptance rate = 28.7%*

PhD Thesis

Principled deep learning approaches for learning limited labeled data through distribution matching
Université Laval, Quebec, 2022.03
Evaluation committee: Aaron Courville, Mario Marchand, Thierry Duchesne

Honors and Awards

- Vector Postdoctoral Fellowship.
- UNIQUE Conference Travel Grants (Unifying Neuroscience and Artificial Intelligence, Québec), 2023
- Expert Reviewer, TMLR, 2023
- Travel Grant Award, NeurIPS, 2022
- Top Reviewer Award (Top 10%), NeurIPS, 2022
- Honorable Prize, Presentation in *Semaine NumériQC*, Québec, 2022
- Highlighted Reviewer Award (Top 10%), ICLR, 2022
- Outstanding Reviewer Award (Top 8%), NeurIPS, 2021
- Best Reviewer Award (Top 10%), ICML, 2021

- Outstanding Reviewer Award (Top 10%), ICLR, 2021
- Top 25% Reviewer, AAAI, 2021
- 3rd Prize, Presentation in *Journée de la relève en intelligence et données*, Québec, 2021
- Travel Grant Award, IJCAI, 2019
- Scholarships of Insitut Mines-Télécom, 2013-2014

Research blogs

- Invariance and Learning Fair Representation
- Fast sequential decision-making via prior knowledge

Skills

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

Languages

- Chinese (Mother language)
- English (Advanced)
- French (Advanced)