Bo Li, PhD student in ML

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lyn1874 | Bo Li | Scholar | Website
"Work to become, not to acquire"

Summary

A self-motivated, organised and dedicated Ph.D. with proven mathematical skills and a desire to learn more. 7+ years of experience using machine learning and deep learning for analysing various data types (medical images, spectra, and surveillance videos). Reliable team player and skilled at analytical thinking and creative problem-solving. Super fascinated by coding.

Research: Machine/Deep Learning | Optimization | Federated learning | Uncertainty estimation | Anomaly detection | PyTorch & Python | Computer vision | Spectroscopy analysis

Education

2021 – Now, Denmark
PhD, Technical University of Denmark Applied Mathematics and Computer Science
Topic: *Federated Machine Learning for Raman spectra and Surface-Enhanced Raman spectra (SERS)*

2022 – 2023, Germany
Visiting PhD student, CISPA Helmholtz Center for Information Security
Topic: *Accelerating the convergence of federated learning algorithms under high data heterogeneity*

2016 – 2018, Denmark
M.Sc., Technical University of Denmark Mathematical Modelling and Computation
Thesis: *Active multitask learning for object recognition in images using deep neural networks*

2012 – 2016, China
B.Sc., Jilin University Financial Engineering
Thesis: *The analysis of monetary factor in the context of capital market*

Work Experience

2019 – 2021, Belgium
Researcher Ghent University - Imec, Supervisor: *Dr. Sam Leroux, Prof. Pieter Simones*
- *Develop deep neural networks for detecting anomalies in surveillance videos under adverse weather*
- *Develop distillation-learning based hardware-efficient framework for traffic counting*

2018 – 2018, Denmark
Research Assistant Technical University of Denmark, Supervisor: *Prof. Tommy Alstrøm*
- *Explore uncertainty calibration within active learning for medical image segmentation*
- *Develop region-based acquisition strategy to reduce labelling effort*

2018 – 2022, Denmark
Teaching Assistant Technical University of Denmark
- *Deep learning, 2021, 2023* • *Bayesian machine learning, 2022* • *Advanced data analysis, 2018*

Publications

1. **B. Li**, Y. Esfandiari, M. N. Schmidt, T. S. Alstrøm, and S. U. Stich, *Synthetic data shuffling accelerates the convergence of federated learning under data heterogeneity*, 2023. arXiv: 2306.13263 [cs.LG].
2. **B. Li**, M. N. Schmidt, T. S. Alstrøm, and S. U. Stich, "On the effectiveness of partial variance reduction in federated learning with heterogeneous data," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2023, pp. 3964–3973.
3. **B. Li**, G. Zappalá, E. Dumont, *et al.*, "Nitroaromatic explosives' detection and quantification using an attention-based transformer on surface-enhanced raman spectroscopy maps," *Analyst*, 2023. URL: http://dx.doi.org/10.1039/D3AN00446E.

4. **B. Li***, X. Jiang*, M. N. Schmidt, T. S. Alstrøm, and S. U. Stich, *An improved analysis of per-sample and per-update clipping in federated learning*, 2023.
5. **B. Li**, M. N. Schmidt, and T. S. Alstrøm, "Raman spectrum matching with contrastive representation learning," *Analyst*, 2022. DOI: 10.1039/D2AN00403H.
6. **B. Li***, S. Leroux*, and P. Simoens, "Automated training of location-specific edge models for traffic counting," *Computers Electrical Engineering*, vol. 99, p. 107 763, 2022, ISSN: 0045-7906.
7. **B. Li***, S. Leroux*, and P. Simoens, "Multi-branch neural networks for video anomaly detection in adverse lighting and weather conditions," in *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, Jan. 2022, pp. 2358–2366.
8. **B. Li**, S. Leroux, and P. Simoens, "Decoupled appearance and motion learning for efficient anomaly detection in surveillance video," *Computer Vision and Image Understanding*, vol. 210, p. 103 249, 2021, ISSN: 1077-3142.
9. **B. Li** and T. Alstrøm, "On uncertainty estimation in active learning for image segmentation," in *Proceedings of 2020 International Conference on Machine Learning: Workshop on Uncertainty and Robustness in Deep Learning*, 2020.

Projects supervision

1. 2021, Master thesis: *Segmentation of cardiac structures based on MRI data using neural networks with analysis and evaluation of anatomical implausible segmentation errors (coding support)*, Katrine M. Ejlev and Michala Z. Blicher
2. 2021, Project: *Unsupervised representation learning*, Till A. Aczel, Victor T. Olesen, Rasmus S. Mikkelsen, and David B. Ludvigsen
3. 2022, Project: *Federated machine learning*, Asger L. Schultz, Søren W. Holm, and Gustav L. Moesmand
4. 2023, Bachelor theis: *Explore representation learning in federated learning*, Victor T. Olesen, and Rasmus S. Mikkelsen

Skills and hobbies

Languages	Native Chinese, Proficient English, Basic Dutch
Coding	Python, PyTorch, R, Bash script, MATLAB, TensorFlow, Linux, AWS
Web Dev	Basic level for React
Hobbies	Yoga, read thriller books, hiking, sewing, and knitting

Awards

2022 – 2023	**Otto Mønsted Foundation funding**
2016 – 2018	**Danish Innovation Scholarship under DABAI**

Referees

1. Associate Professor Tommy S. Alstrøm, Technical University of Denmark, tsal@dtu.dk
2. Associate Professor Mikkel N. Schmidt, Technical University of Denmark, mnsc@dtu.dk