

Aodong Li

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SUMMARY

- Fourth-year Ph.D. candidate in Machine Learning at UC Irvine;
- Interested in solving machine learning problems from a probabilistic view, especially distribution shifts related topics;
- Experienced in anomaly detection, Bayesian time series, changepoint detection, continual learning, temporal word embeddings, deep reinforcement learning, and neural machine translation;
- Publication records in mainstream machine learning conferences NeurIPS/ICML;

PUBLICATIONS

[A. Li*](#), C. Qiu*, M. Kloft, P. Smyth, S. Mandt, M. Rudolph. **Zero-Shot Anomaly Detection without Foundation Models**. Under review.

[A. Li*](#), C. Qiu*, P. Smyth, M. Kloft, S. Mandt, M. Rudolph. **Deep Anomaly Detection under Labeling Budget Constraints**. ICML 2023.

C. Qiu*, [A. Li*](#), M. Kloft, M. Rudolph, S. Mandt. **Latent Outlier Exposure for Anomaly Detection with Contaminated Data**. ICML 2022.

[A. Li](#), A. Boyd, P. Smyth, S. Mandt. **Detecting and Adapting to Irregular Distribution Shifts in Bayesian Online Learning**. NeurIPS 2021.

[A. Li](#), R. Bamler, S. Mandt. **Quantifying Gender Bias Over Time Using Dynamic Word Embeddings**. SoCal Machine Learning Symposium 2020.

B. Foy, [A. Li](#), J. McClung, R. Ranganath, J. Higgins. **Data-driven Physiologic Thresholds for Iron Deficiency Associated with Hematologic Decline**. American Journal of Hematology 2019.

[A. Li](#), L. Sun, C. Li, Y. Wang, Y. Liu. **360-degree Video Streaming by Deep Reinforcement Learning**. Technical Report, November, 2018.

[A. Li](#), S. Zhang, D. Wang. **Enhanced Neural Machine Translation by Learning from Draft**. APSIPA '17.

WORK EXPERIENCE

Bosch Center for Artificial Intelligence (BCAI) Jun. 2022 - Sept. 2022
Machine Learning Research Intern, work with Maja Rudolph

Research topic and delivery: **deep active anomaly detection**; one paper submission at ICML 2023 for review.

- Determine a set of conditions that generalize the anomaly score rankings from the queried to the unlabeled;
- Based on the conditions, we analyze querying strategies and propose k-means++-based diverse queries;
- Propose a novel semi-supervised anomaly detection loss that exploits both queried data and unlabeled data;
- Our proposed method significantly outperforms baselines on image, video, and tabular benchmarks.

Research topic: **continuous-time latent switching dynamic models**.

Qualcomm Technologies, Inc. Jun. 2021 - Sept. 2021
Software Engineering Intern, work with Hilmi Enes Eğilmez

Work topic: **neural video compression for autonomous driving**.

- Apply state-of-the-art neural video compression to in-car fish-eye videos;
- Analyze the video noise patterns and develop a temporal denoising filter for better compression performance;
- The proposed method reaches the same performance as the best manually-designed video codec HEVC.

RESEARCH EXPERIENCE

University of California, Irvine Sept. 2019 - Present
Graduate Student Researcher, work with Stephan Mandt

Research topic and delivery: **online changepoint detection and adaptation**; one NeurIPS 2021 paper.

- Consider online learning with distribution shifts that occur at an unknown rate and of unknown intensity.
- Derive a novel Bayesian online learning procedure to jointly infer and adapt to distribution shifts.
- Experiments on real-world data with concept shifts, image data with covariate shifts, and *large-scale* temporal texts show systematic improvements over baselines.

Research topic and delivery: **deep anomaly detection**; one ICML 2022 paper; one paper submission at ICML 2023 for review.

- Consider a new, practical problem setup when the training data contains unobserved anomalies;
- Propose a novel unsupervised anomaly detection algorithm inspired by outlier exposure.
- Experiments on three image datasets, 30 tabular data sets, and a video benchmark show consistent and significant improvements over the baselines.

Research topic and delivery: **quantifying gender bias in texts (NLP)**; one SoCal ML symposium 2020 paper.

- Quantify gender bias evolution through *temporal word embeddings*;
- Analyze three large temporal corpora (100M+ tokens) and automatically select the top gender-biased words;
- Find changes of gender bias align with historical events such as feminist movements.

CILVR Lab at New York University

Sept. 2018 - Jun. 2019

Graduate Student Researcher, work with Rajesh Ranganath

Research topic and delivery: **Inference and machine learning for healthcare**; one journal at American Journal of Hematology 2019.

- Consider the problem of estimating red blood cell's age distribution, which contributes the glycation in blood;
- Given very limited number of glucose measurements, infer the age distribution by deconvolving the glycation;
- Propose a data-driven method to re-define the iron-deficiency threshold for different gender groups.

New York University Video Lab

Jun. 2018 - Jun. 2019

Graduate Student Researcher, work with Yao Wang

Research topic and delivery: **deep reinforcement learning on video streaming**; one technical report.

- Apply *advantage actor-critic algorithm (A2C)* to manage the playback buffers in 3D VR video streaming;
- Incorporate the user vision information to improve the scheduler;
- Our system improves the video quality of a baseline system by 18%.

Center for Speech and Language Technologies at Tsinghua University

May 2016 - June 2017

Research Intern, work with Dong Wang

Research topic and delivery: **neural machine translation (NLP)**; one APSIPA 2017 paper.

- Propose a two-stage drafting and refinement approach for neural machine translation;
- The proposed method improves the baseline by 0.9-2.5 BLEU score.

Compose Chapter 1 of the book *Modern Machine Learning Techniques* published by Tsinghua University Press.

EDUCATION

2019 - Present Ph.D. in Computer Science at **University of California, Irvine**

2017 - 2019 M.S. in Computer Science at **New York University**

2014 - 2017 M.Eng. in Electronic and Communication Engineering at **BUPT**

2010 - 2014 B.Eng. in Communication Engineering at **BUPT**

MISCELLANEOUS

Teaching Assistants

Fall 2021, 2022 **Deep Generative Models**, UC Irvine

Fall 2019 **Introduction to Machine Learning**, UC Irvine

Spring 2019 **Machine Learning**, NYU

Fall 2018 **Foundamental Algorithms**, NYU

Honors

Fall 2019 **Dean's Award**, ICS@UC Irvine

Fall 2018 **M.S. Thesis/Research Fellowship**, CS@NYU

Academic Services

Reviewer for AISTATS 2021, ICML 2021, 2022, NeurIPS 2021, 2022, ICLR 2022, 2023.

Skills

Python (PyTorch, TensorFlow, Numpy, Theano), L^AT_EX, Bash, C/C++, JAVA, JavaScript, PHP, HTML, SQL.