

Andi Zhang

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Education

University of Cambridge

PhD in Computer Science

Oct. 2019 - Jul. 2024

- Supervised by Dr. Damon Wischik, focused on Bayesian neural networks and probabilistic generative models, delved into applications related to the robustness of deep learning models, including adversarial examples and Out-Of-Distribution (OOD) detection.

MASt in Mathematics (Part III)

Oct. 2018 - Jun. 2019

- Relevant modules: Statistical Learning in Practise, Convex Optimization, Astrostatistics, Bayesian Modelling and Computation, Modern Statistical Methods

MPhil in Advanced Computer Science

Oct. 2017 - Jun. 2018

- Relevant modules: Machine Learning for Natural Language Processing, Algebraic Path, Deep Learning for Natural Language Processing, Advanced Functional Programming, Probabilistic Machine Learning

University of Manchester

BSc (Hons) in Computer Science and Mathematics

Sep. 2014 - Jun. 2017

- Relevant modules: Machine Learning, Quantum Computing, Compilers, Convex Optimization, Probability, Statistical Methods, Functional Analysis, Topology, Number Theory

Experience

University College London

London, United Kingdom

Visitor | Mentor: Dr. David Barber

July. 2023 - Oct. 2023

- Working on a new image generative model that based on Diffusion models.
- Working on Amortized LoRA, a more principle and probabilistic way to generate LoRA parameters than Hyperdreambooth.

Kirin AI Group, Huawei

Cambridge, United Kingdom

Research Intern (Part-time) | Mentor: Mr. Arnau Raventos

Nov. 2021 - Oct. 2022

- Conducted a comprehensive evaluation of various traditional and AI-based frame interpolation methods, providing insights for the product department to leverage in their decision-making processes.
- Contributed to an AI global illumination project, successfully implemented various samplers within the Mitsuba 3 framework.

Noah's Ark Lab, Huawei

Shenzhen / Beijing, China

Research Intern | Mentor: Dr. Yitong Sun and Dr. Shifeng Zhang

Sep. 2020 - Sep. 2021

- Co-developed the local autoregressive model, which significantly advanced the state-of-the-art in Out-Of-Distribution (OOD) detection and lossless compression. The empirical evidence supporting this enhancement was recognized and published in NeurIPS 2021.
- Contributed to a computer vision project through researching deep learning uncertainty for active learning applications. The outcomes of this work were recognized and published in BMVC 2021.
- Contributed to an indoor positioning project leveraging WiFi signal strength. I specifically conducted research on Deep Gaussian Processes, leading our team to enhance indoor positioning accuracy. The successful results of this work were published in IPIN 2021.

University of Cambridge

Cambridge, United Kingdom

Course Supervisor (Teaching Assistant)

Oct. 2019 - Present

- Supervised IA Algorithms (2020 Lent, 2023 Lent), IA Machine Learning in Real World (2020 Lent), IA Introduction to Probability (2020 Easter, 2021 Easter), IB Further Java (2020 Michaelmas), IB Data Science (2022 Michaelmas, 2023 Michaelmas), IB Further Graphics (2022 Michaelmas) and II Machine Learning and Bayesian Inference (2023 Lent)

MRC Biostatistics Unit, University of Cambridge

Cambridge, United Kingdom

Research Assistant | Supervisor: Dr. Sofia Villar and Dr. David Robertson

Jul. 2019 - Sep. 2019

- Developed a simulation system to tackle the multi-armed bandit problem (MABP) in clinical trial settings and pioneered a unique test statistic for binary response MABP situations. Although the time constraints prevented this work from being formalized into a publication, it provided substantial practical and theoretical insight.

Tencent (WeChat AI)

Beijing, China

R & D Intern | Mentor: Dr. Jie Zhou

Jul. 2018 - Sep. 2018

- Engaged in comprehensive exploration and research in deep reinforcement learning and evolution strategies. While this research did not culminate in a tangible output, the experience gained in these cutting-edge fields has proven invaluable.

Amazon (Alexa)

Cambridge, United Kingdom

Applied Scientist Intern | Mentor: Dr. Emilio Monti

Jun. 2017 - Sep. 2017

- Employed the Seq2Seq model, the predecessor of the Transformer, with the Attention mechanism for semantic parsing tasks. Semantic parsing involves translating natural language into a structured internal language used for database or knowledge base querying.

Robotics Institute, Carnegie Mellon University

Pittsburgh, United States

Student Intern | Supervisor: Dr. Stelian Coros

Jun. 2016 - Sep. 2016

- Contributed to the implementation of a general stance controller for 3D-printable robotic creatures. The controller's adaptability enables it to be used with any human-designed multi-foot robots, hence its designation as 'general'.

Publications

Your Finetuned Large Language Model is Already a Powerful OOD Detector

Arxiv Preprint

Andi Zhang, Tim Z. Xiao, Weiyang Liu, Robert Bamler, Damon Wischik

<https://arxiv.org/abs/2404.08679>

Constructing Semantics-Aware Adversarial Examples with Probabilistic Perspective

Arxiv Preprint

Andi Zhang, Mingtian Zhang, Damon Wischik

<https://arxiv.org/abs/2306.00353>

SR-OOD: Out-of-Distribution Detection via Sample Repairing

Arxiv Preprint

Rui Sun*, Andi Zhang*, Haiming Zhang*, Yao Zhu, Ruimao Zhang, Zhen Li

<https://arxiv.org/abs/2305.18228>

Falsehoods that ML researchers believe about OOD detection

NeurIPS 2022 Workshop

Andi Zhang, Damon Wischik

In ML Safety Workshop, 36th Conference on Neural Information Processing Systems

Out-of-Distribution Detection with Class Ratio Estimation

NeurIPS 2022 Workshop

Mingtian Zhang*, Andi Zhang*, Tim Z. Xiao, Yitong Sun, Steven McDonagh

In ML Safety Workshop, 36th Conference on Neural Information Processing Systems

On the Out-of-distribution Generalization of Probabilistic Image Modelling

NeurIPS 2021

Mingtian Zhang*, Andi Zhang*, Steven McDonagh

In Neural Information Processing Systems annual meeting, 2021

Measuring Uncertainty in Signal Fingerprinting with Gaussian Processes Going Deep

IPIN 2021

Ran Guan, Andi Zhang, Mengchao Li, Yongliang Wang

In International Conference on Indoor Positioning and Indoor Navigation, 2021

Towards dynamic and scalable active learning with neural architecture adaption for object detection

BMVC 2021

Fuhui Tang, Dafeng Wei, Chenhan Jiang, Hang Xu, Andi Zhang, Wei Zhang, Hongtao Lu, Chunjing Xu

In British Machine Vision Conference, 2021

Solipsistic Reinforcement Learning

ICLR 2021 Workshop

Mingtian Zhang*, Peter Noel Hayes*, Tim Z. Xiao, Andi Zhang, David Barber

In Self-Supervision for Reinforcement Learning Workshop - International Conference on Learning Representations, 2021

Honors & Awards

Top Reviewer (10%) of AISTATS 2023

Feb. 2023

The Williams/Kilburn Medal for outstanding final year student

Jul. 2017

School of Computer Science, University of Manchester

The medal is awarded on an occasional basis to students of exceptional distinction whose performance throughout their undergraduate course has been of outstanding merit.

University awards for outstanding academic achievement

Jul. 2017

University of Manchester

The university will consider the top 0.5% of undergraduates (nominated by each school) for this award.

*Equal contribution.