HAIWEN HUANG
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EDUCATION

University of Tübingen, Tübingen, Germany   **Jan. 2022 –**
PhD candidate in Machine Learning
- Autonomous Vision Group, Bosch Industry-on-Campus lab
- Supervisor: Andreas Geiger, Dan Zhang

University of Oxford, Oxford, UK   **Oct. 2020 – Sept. 2021**
Master of Science in Computer Science, Department of Computer Science
- **Distinction**
- Dissertation: "On Representation Learning for Deterministic Uncertainty Estimation"
- Supervisor: Yarin Gal

Peking University, Beijing, China   **Sept. 2015 – July 2019**
Bachelor of Science in Information and Computing Science, School of Mathematical Sciences
- Cumulative GPA: 3.73/4.00,   Major GPA: 3.80/4.00,   Rank: 7/162
- Outstanding Graduate of Beijing (top 1% in the university)

University of California, Los Angeles, USA   **Sept. 2017 – Dec.2017**
Exchange Student in Department of Statistics
- CSC Scholarship Recipient
- GPA: 4.0/4.0

RESEARCH EXPERIENCE

Nov. 2020 – Sept. 2021   ***Master dissertation project, Oxford Applied and Theoretical Machine Learning Group***
- **Topic: Representation Learning for Deterministic Uncertainty Estimation**
  Supervisor: Yarin Gal
  Summary: The dissertation includes my work in two papers. The first paper aims to investigate the theoretical and empirical effects of bi-Lipschitzness for uncertainty estimation. The second paper studies the decomposition of representations to improve the performance and interpretability of uncertainty estimation.
  My Role: For the first paper, I took part in a small part of the theoretical analysis and conducted a large part of the experiments in the paper. For the second paper, I derived the theories and conducted all the experiments and writing.

Feb. 2019 – Sept. 2020   ***Researcher, Megvii Technology (previously known as Face++)***
- **Topic: Out-of-Distribution (OoD) Detection   (Jan. 2020 – Sept. 2020)**
  Collaborators: Zhihan Li, Xinyu Zhou, Bin Dong
  Summary: This work investigated a novel characteristic of OoD samples, used training dynamics to understand it, and utilized it to achieve SoTA OoD detection performance. See code and paper: link.
  My Role: I discovered the new characteristic, led the whole research project, and conducted most of the experiments and writing.

- **Topic: Annotation of Billion-scale Face Recognition Datasets   (Feb. 2019 – Dec. 2020)**
  Collaborators: Xinyu Zhang, Lulu Wang, Xinyu Zhou
  Summary: This work successfully solved the challenge of annotation of billion-scale face recognition dataset and facilitated the downstream model training greatly.
  My Role: I worked the algorithm development for the data annotation. I also wrote most of the paper that summarized our work formulated in a more academic way (rejected by CVPR2020).

Mar. 2018 – June 2019   ***Undergraduate Researcher, Dong Group***
Advisor: Bin Dong
- **Topic: Optimization Algorithms for Deep Learning and Computer Vision.**
  Collaborators: Chang Wang, Bin Dong

Summary: This work proposed a new optimization algorithm that fixed the flaws of the famous algorithm Adam. It was accepted by and presented at *IJCAI 2019*. The paper can be found here.
My Role: I conducted most of the works in this paper (which was also my Bachelor's thesis).

*Sept. 2017 – Dec. 2017 **Undergraduate Researcher, Center for Vision, Cognition, Learning and Autonomy***
Advisor: Songchun Zhu, Yingnian Wu

- **Topic: Implement the paper "Interpretable Convolutional Neural Network" in Tensorflow**
  Collaborators: Quanshi Zhang
  My Role: I re-implemented an early-stage interpretable deep learning method. See my part of the work and the paper.

PUBLICATIONS AND PREPRINTS

1. **Haiwen Huang,** Joost van Amersfoort, Yarin Gal, *"Decomposing Representations for Deterministic Uncertainty Estimation."* Bayesian Deep Learning workshop at NeurIPS 2021.
2. Lewis Smith, Joost van Amersfoort, **Haiwen Huang,** S. Roberts, Yarin Gal, *"Can convolutional ResNets approximately preserve input distances? A frequency analysis perspective."* (Submitted to AISTATS 2022)
3. **Haiwen Huang**, Zhihan Li, Lulu Wang, Sishuo Chen, Xinyu Zhou, Bin Dong, *"Feature Space Singularity for Out-of-distribution Detection."* **(Best Paper Candidate)** Safe AI 2021 workshop at the AAAI-2021 conference. (Citations: 4)
4. **Haiwen Huang**, Chang Wang, and Bin Dong. *"Nostalgic Adam: Weighting More of the Past Gradients when Designing the Adaptive Learning Rate."* Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence (Citations: 35)

AWARDS AND HONORS (SELECTED)

Outstanding Graduate of Beijing. The highest honor for graduates in Beijing. Top 1% in the university. 2019
"One of the Two Thousand and Two" Scholarship. 6 students with outstanding academic and extracurricular performance were awarded annually. 2018
Award for Social Contributions. 5 students with dedication to public good were awarded annually. 2018
Outstanding Undergraduate Scholarship. Top 5% in mathematical academic performance. 2016
Yang Fuqing & Wang Yangyuan Academician Scholarship.Top 1% in academic merit and potential. 2016

SELECTED COURSES

Mathematical Analysis I, II, III	90 avg.(3.81/4.0)	Advanced Algebra I, II	90 avg.(3.81/4.0)
Geometry	92(3.88/4)	Introduction to Computing	92(3.88/4.0)
Learning by Research	92(3.88/4)	Probability Theory	A(4.0/4.0)
Applied Regression Analysis	A+(4.0/4.0)	Mathematical Statistics	A+(4.0/4.0)
Optimization Methods	90(3.81/4.0)	Algorithms for Big Data Analysis	90(3.81/4.0)
Deep Learning: Algorithm and Application	90(3.81/4.0)	Numerical Linear Algebra	90(3.81/4.0)
Ordinary Differential Equation	92(3.88/4.0)	Numerical Analysis	93(3.91/4)
Data Structures and Algorithms	88 (3.73/4.0)	Functional Programming	65 (Merit)
Machine Learning	82 (Distinction)	Probability and Computing	68 (Merit)
Topics in Computational Biology	82 (Distinction)	Advanced Topics in Machine Learning	78(Distinction)