Curriculum Vitae/Resume

Ekdeep Singh Lubana
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Education

Ph.D. Candidate, University of Michigan, Ann Arbor *August, 2019–May, 2024 (expected)*
Major: Embedded Machine Learning
GPA: 4.00/4.00

B.Tech., Indian Institute of Technology, Roorkee *July, 2015–May, 2019*
Major: Electronics and Communication Engineering
Thesis: Resource Efficient Techniques for Embedded Machine Vision (Nominated for Best Bachelor's Thesis)

Areas of Interest

· Resource Efficient Machine Learning, Statistical Physics, Interpretability, Causality

Experience

· **Research Affiliate**, Center for Brain Science, Harvard University *May, 2022–Present*
Host: Venkatesh Murthy and Hidenori Tanaka

· **Research Intern**, Bell Labs Cambridge, UK *Sept., 2021–Dec., 2021*
Mentor: Akhil Mathur

· **Research Intern**, Physics and Informatics Lab, NTT Research Inc. *May, 2021–Aug., 2021*
Mentor: Hidenori Tanaka

Preprints / Under Review

1. **Ekdeep Singh Lubana**, Eric J Bigelow, Robert P. Dick, David Krueger, and Hidenori Tanaka. A mechanistic lens on mode connectivity properties in neural loss landscapes. *arXiv preprint arXiv:2210.00638*, 2022

2. Liu Ziyin, **Ekdeep Singh Lubana**, Masahito Ueda, and Hidenori Tanaka. What shapes the loss landscape of self-supervised learning? *arXiv preprint arXiv:2210.00638*, 2022

Publications

1. Puja Trivedi and **Ekdeep Singh Lubana**, Mark Heimann, Danai Koutra, and Jay Jayaraman Thiagarajan. Analyzing Data-Centric Properties for Contrastive Learning on Graphs . In *Proc. Adv. in Neural Information Processing Systems (NeurIPS)*, 2022.

2. **Ekdeep Singh Lubana**, Ian Tang, Fahim Kawsar, Robert P. Dick, and Akhil Mathur. Orchestra: Unsupervised Federated Learning via Globally Consistent Clustering. In *Proc. Int. Conf. on Machine Learning (ICML)*, 2022. (Accepted for **Spotlight** presentation.)

3. **Ekdeep Singh Lubana**, Robert P. Dick, and Hidenori Tanaka. Beyond BatchNorm: Towards a Unified Understanding of Normalization in Deep Learning. In *Proc. Adv. in Neural Information Processing Systems (NeurIPS)*, 2021.

4. **Ekdeep Singh Lubana** and Robert P. Dick. A Gradient Flow Framework for Analyzing Network Pruning. In *Proc. Int. Conf. on Learning Representations (ICLR)*, 2021. (Accepted for **Spotlight** presentation.)

5. **Ekdeep Singh Lubana**, Puja Trivedi, Danai Koutra, and Robert P. Dick. How do Quadratic Regularizers Prevent Catastrophic Forgetting: The Role of Interpolation. In *Proc. Conf. on Lifelong Learning Agents (CoLLAs)*, 2022.

6. **Ekdeep Singh Lubana**, Robert P. Dick, Vinayak Aggarwal, and Pyari Mohan Pradhan. Minimalistic Image Signal Processing for Deep Learning Accelerators. In *Proc. Int. Conf. on Image Processing (ICIP)*, 2019.

7. **Ekdeep Singh Lubana**, Vinayak Aggarwal, and Robert P. Dick. Machine Foveation: An Application-Aware Compressive Sensing Framework. In *Proc. Data compression Conference (DCC)*, 2019.

8. **Ekdeep Singh Lubana** and Robert P. Dick. Digital Foveation: An Energy-Aware Machine Vision Framework. *IEEE Trans. Computer-Aided Design of Integrated Circuits and Systems*, pages 2371–2380, 2018.

Technical Awards

· Awarded the **BIRAC-GYTI award** by the **President of India.** *2018*
· Winner of the **Ericsson Innovation Challenge** held at the Nobel Museum, Stockholm, Sweden. *2017*
· Winner of the **Jury's choice award** at the **Accenture Innovation Challenge.** *2017*
· **Gold medal** and **winner of Engineers' Conclave** at **Inter-IIT Tech meet.** *2018*

Academic achievements & Scholarships

· Awarded the **KVPY (Kishore Vaigyanik Protsahan Yojna)** Fellowship by Govt. of India. *2015*
· Awarded the **NTSE (National Talent Search)** Scholarship by N.C.E.R.T., New Delhi. *2014*
· Ranked amongst **Top 300** students in **National Standard Examination in Astronomy.** *2015*
· Ranked amongst **Top 300** Students in the **Indian National Mathematics Olympiad.** *2015*