Rishabh **Tiwari**

Graduate Student, UC Berkeley

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Education

Aug 2024 **Present**	**University of California, Berkeley** PhD in EECS	Advisor: Prof. Kurt Keutzer	**GPA: 4/4**
Aug 2022 **Jul 2018**	**Indian Institute of Technology, (ISM) Dhanbad** Bachelor of Technology in Engineering Physics, Minor in Artificial Intelligence › Received full tuition scholarship in recognition of exceptional academic performance.	**GPA: 9.02/10** *Dept. Rank 2*

Industry Research Experience

Jul 2022 **Aug 2024**	**Pre-Doctoral Researcher, Google Research** *Advisor: Dr. Pradeep Shenoy* Research Topics: Interpretable AI [C6], Simplicity Bias [C7], Robust distillation [C8]	**Bangalore, India**
May 2021 **Apr 2022**	**Student Researcher, Google Research** *Advisors: Dr. Pradeep Shenoy, Prof. Rishabh Iyer* Research Topics: Continual Learning [C5]	**Bangalore, India**
May 2021	**Co-Founder and Senior Researcher, Transmute AI Labs** *Advisor: Dr. Deepak K. Gupta, Prof. Dilip K. Prasad* Research Topics: Network Compression [C3], Meta Learning [C4]	**UiT Norway**

Conference Publications

[C.9] **QuantSpec: Self-Speculative Decoding with Hierarchical Quantized KV Cache** [%]
Rishabh Tiwari*, Haocheng Xi*, Aditya Tomar*, Coleman Hooper, Sehoon Kim, Maxwell Horton, Mahyar Najibi, Michael W. Mahoney, Kurt Keutzer, Amir Gholami
Under Review **[2025]**

[C.8] **Using Early Readouts to Mediate Featural Bias in Distillation** [%]
Rishabh Tiwari, Durga Sivasubramanian, Anmol Mekala, Ganesh Ramakrishnan, Pradeep Shenoy
IEEE/CVF Winter Conference on Applications of Computer Vision **[WACV'24]**

[C.7] **Overcoming Simplicity Bias in Deep Networks Using a Feature Sieve** [%]
Rishabh Tiwari, Pradeep Shenoy
Fortieth International Conference on Machine Learning **[ICML'23]**

[C.6] **Interactive Concept Bottleneck Models** [%]
Kushal Chauhan, **Rishabh Tiwari**, Jan Freyberg, Pradeep Shenoy, Krishnamurthy Dvijotham
The 38th Annual AAAI Conference on Artificial Intelligence **[AAAI'23]**

[C.5] **GCR: Gradient Coreset based Replay Buffer Selection for Continual Learning** [%]
Rishabh Tiwari, Krishnateja Killamsetty, Rishabh Iyer, Pradeep Shenoy
The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2022 **[CVPR'22]**

[C.4] **Dynamic Kernel Selection for Improved Generalization and Memory Efficiency in Meta-learning** [%]
Rishabh Tiwari*, Arnav Chavan*, Udbhav Bamba, Deepak K. Gupta
The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2022 **[CVPR'22]**

[C.3] **Chipnet: Budget-aware pruning with heaviside continuous approximations** [%]
Rishabh Tiwari, Udbhav Bamba, Arnav Chavan, Deepak K. Gupta
The Ninth International Conference on Learning Representations **[ICLR'21]**

[C.2] **Rescaling cnn through learnable repetition of network parameters** [%]
Arnav Chavan, Udbhav Bamba, **Rishabh Tiwari**, Deepak K. Gupta
The 28th IEEE International Conference on Image Processing **[ICIP'21]**

[C.1] **On designing light-weight object trackers through network pruning: Use CNNs or transformers?** [%]
S. Aggarwal, T. Gupta, P. Sahu, A. Chavan, **Rishabh Tiwari**, Dilip K. Prasad, Deepak K. Gupta
2023 IEEE International Conference on Acoustics, Speech and Signal Processing **[ICASSP'23]**

Workshop Organization @ ICCV '23

[W.1] **Workshop on Resource Efficient Deep Learning for Computer Vision** [🔗]
Rishabh Tiwari*, Arnav Chavan*, Deepak K. Gupta* et. al.
Speakers: Prof. Song Han, Prof. Anima Anandkumar, Dr. Prateek Jain, Prof. Efstratios Gavves
Competitions Organized: Training Track, Inference track   [**ICCV-W'23**]

Selected Research Projects

Mitigating Featural Biases in Neural Nets   Google Research
Advisors: Dr. Pradeep Shenoy, Dr. Praneeth Netrapalli

> Developed an interventional method for **addressing simplicity bias** in DNNs, called as *feature sieve*.
> Obtained upto **11.4% relative gain** in accuracy over state-of-the-art methods on Imagenet-A. [ICML'23]
> Proposed an early readout mechanism to produce more robust models via distillation. [WACV'24]
> Improved resnet18 student model by **5.2% in worst-group accuracy** on CelebA.

Interactive Concept Bottleneck Models   Google Deepmind
Advisor: Dr. Pradeep Shenoy, Dr. Krishnamurthy (Dj) Dvijotham

> Extended concept bottleneck models to interactive predictive settings. [AAAI'23]
> Achieved accuracy gains of **5-10%** with only 5 interactions over competitive baselines on the Caltech-UCSD Birds, CheXpert and OAI datasets.

Replay Buffer Selection for Continual Learning   UT Dallas
Advisors: Dr. Pradeep Shenoy, Prof. Rishabh Iyer

> Proposed an optimization-driven criterion for **selecting and updating coresets** in continual learning. [CVPR'22]
> Works in **all settings** - offline/online, task/class-incremental
> Achieved over **2-4% improvements** in offline settings and upto **5%** in online settings over sota.

Resource Efficient Machine Learning   University of Amsterdam
Advisor: Dr. Deepak K. Gupta

> Developed a flexible **budget aware structured pruning** approach *ChipNet* that is stable for extreme pruning. [ICLR'21]
> Outperformed sota structured pruning methods by remarkable margins of **16.1% accuracy**.
> A framework to produce **compressed task specific models** in meta-learning achieving **3x FLOPs reduction** on mini-ImageNet dataset. [CVPR'22]

Selected Honors and Awards

> **Kaggle Competitions Master:** Became the **youngest Indian** Kaggle Competitions Master at the age of 18 in 2020. [Profile]
> **Winner** of first ever national level **Amazon ML Challenge 2021** with over 3k+ participating teams, received an internship offer and a cash price of 1 lakhs INR.
> **Winner** at Innerve 4.0, Pune's largest hackathon; developed a AI assisted medical system '*Medidoc*' to detect severe yet curable diseases at an early stage. [Demo]
> **Received Scholarship** to attend Naamii 2019, the second Nepal Winter School of AI held at Pokhara, Nepal; awarded to international students with exceptional profile.

Notable Positions of Responsibility

> **Workshop Organization**
> > Resource Efficient Deep Learning for Computer Vision   ICCV'23
> **Mentorship**
> > Aarush Jain, Intern, Google Research India   2023
> > Saksham Aggarwal, Taneesh Gupta, Pawan Kumar Sahu, Research Intern, Transmute AI Research   2021-23
> **Volunteer** at COLT 2023, Bangalore   2023
> **Student Coordinator** at Cyber Labs, the official cyber society of IIT (ISM), Dhanbad   2020-22

Key Courses Undertaken

Machine Learning	CS288 NLP (UC Berkeley), AI Systems (UC Berkeley), CS231n (Stanford University), Machine Learning (Stanford University)
CS and Maths	Data Structures and Algorithms, Linear Algebra, Numerical, Statistical Methods