Aditya Kusupati

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Education

University of Washington, Seattle *2019 - present*
PhD student in Computer Science and Engineering
Advisors: Prof. Ali Farhadi & Prof. Sham Kakade

Indian Institute of Technology Bombay *2013 - 2017*
B.Tech (Honours) in Computer Science and Engineering with Minor in Electrical Engineering
Advisor: Prof. Soumen Chakrabarti

Work Experience

NVIDIA Toronto AI Lab *June - September, 2020*
Research Scientist Intern
Advisors: Prof. Sanja Fidler & Prof. Antonio Torralba

Microsoft Research India *2017 - 2019*
Research Fellow in Machine Learning and Optimization Group
Advisors: Dr. Manik Varma & Dr. Prateek Jain

Publications

Preprints

* - equal contribution

1. **In the Wild: From ML Models to Pragmatic ML Systems.**
Matthew Wallingford, **Aditya Kusupati***, Keivan Alizadeh-Vahid*, Aaron Walsman, Aniruddha Kembhavi and Ali Farhadi.
arXiv:2007.02519 (under review), 2020.

Conference Publications

5. **RNNPool: Efficient Non-linear Pooling for RAM Constrained Inference.**
Oindrila Saha, **Aditya Kusupati**, Harsha Vardhan Simhadri, Manik Varma and Prateek Jain.
*Neural Information Processing Systems (**NeurIPS**), 2020*
WiCV workshop @ CVPR, 2020.

4. **Soft Threshold Weight Reparameterization for Learnable Sparsity**.
Aditya Kusupati, Vivek Ramanujan*, Raghav Somani*, Mitchell Wortsman*, Prateek Jain, Sham Kakade and Ali Farhadi.
*International Conference on Machine Learning (**ICML**), 2020* **(Virtual Talk)**.

3. **Extreme Regression for Dynamic Search Advertising**.
Yashoteja Prabhu, **Aditya Kusupati**, Nilesh Gupta and Manik Varma.
*International Conference on Web Search and Data Mining (**WSDM**), 2020* **(Long Oral)**.
Workshop on eXtreme Classification: Theory and Applications @ ICML, 2020.

2. **One Size Does Not Fit All: Multi-Scale, Cascaded RNNs for Radar Classification**.
Dhrubojyoti Roy*, Sangeeta Srivatsava*, **Aditya Kusupati**, Pranshu Jain, Manik Varma and Anish Arora.
*International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (**BuildSys**), 2019.*
🏆 **Best Paper Runner-Up Award**.
*Invited Paper in ACM Transactions on Sensor Networks (**TOSN**) - under review.*

1. **FastGRNN: A Fast, Accurate, Stable and Tiny Kilobyte Sized Gated Recurrent Neural Network**.
Aditya Kusupati, Manish Singh, Kush Bhatia, Ashish Kumar, Prateek Jain and Manik Varma.
*Neural Information Processing Systems (**NeurIPS**), 2018.*

Technical Reports

1. **Adapting Unstructured Sparsity Techniques for Structured Sparsity**.
Aditya Kusupati.
Technical Report, Paul G. Allen School of Computer Science and Engineering, University of Washington, 2020.

Demos

1. **Lightweight, Deep RNNs for Radar Classification**.
   Dhrubojyoti Roy*, Sangeeta Srivatsava*, Pranshu Jain, **Aditya Kusupati**, Manik Varma and Anish Arora.
   *International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (**BuildSys**), 2019.*

Theses

1. **Efficient Spatial Representation for Entity-Typing**.
   Anand Dhoot*, **Aditya Kusupati*** and Soumen Chakrabarti.
   Undergraduate Thesis, Computer Science and Engineering, IIT Bombay, 2016 - 17.

Software

1. **EdgeML: Machine Learning for resource-constrained edge devices**.
   Don Kurian Dennis, Yash Gaurkar, Sridhar Gopinath, Sachin Goyal, Chirag Gupta, Moksh Jain, Ashish Kumar, **Aditya Kusupati**, Chris Lovett, Shishir Girish Patil, Oindrila Saha and Harsha Vardhan Simhadri.
   Microsoft Research India, 2017 - present.
   Stats as of August 2020: ★ 884, 242, >175,000, >2,700.

Selected Awards and Honors

- University of Washington graduate and CSE student conference grants to attend **WSDM '20** *2020*
- **Best Paper Runner-Up Award** at **BuildSys '19** *2019*
- **Best reviewer** (top 400) award for **NeurIPS '19** *2019*
- Young Researcher at Heidelberg Laureate Forum (**HLF '19**) with Romberg Grant & MSR Travel Grant *2019*
- **Facebook AI Research International Scholarship** for DPhil at VGG, Oxford (2019 - 22, declined) *2019*
- IIT Bombay CSE **Teaching Assistant of the month** (Feb '16 and Feb '17) award *2016 - 2017*
- **All India Rank 44** in JEE Advanced (IIT-JEE) 2013 among 150,000 candidates *2013*
- Gold Medal and rank **6 out of top 40** in India at OCSC for International Chemistry Olympiad '13 *2013*
- Awarded KVPY Fellowship from Government of India - All India Rank 22. *2011*
- Awarded NTSE Scholarship from Government of India. *2008*

Talks

- **Soft Threshold Weight Reparameterization for Learnable Sparsity**
  - International Conference on Machine Learning (ICML) *July 2020*
  - NVIDIA Research *July 2020*
  - Deep Learning: Classics and Trends *June 2020*
- **The Edge of Machine Learning**
  - University of Washington CSE Colloquium & Sensor Systems Seminar *October 2019*
  - VGG @ Oxford University, UK *April 2019*
  - Microsoft Research Redmond *March 2019*
  - Microsoft Research India *August 2018*
- **The Extremes of Machine Learning**
  - Microsoft Bing Bellevue *March 2019*

Professional Responsibilities

- *Reviewing:* IEEE TPAMI, NeurIPS (2019 - present), ICML (2020 - present), ICLR (2021 - present).
- *Mentorship*
  - Students
    * Manish Singh
      Bachelor's Thesis, IIT Delhi (w\ Dr. Manik Varma) → PhD Student @ MIT EECS *2017 - 18*
    * Sheshansh Agrawal
      Bachelor's Thesis, IIT Bombay (w\ Prof. Soumen Chakrabarti) → RSDE @ MSR India *2018 - 19*

    - Sahil Bhatia
      Research Fellow, MSR India (w\ Dr. Prateek Jain) → PhD Student @ UC Berkeley EECS *2018 - 20*
    - Oindrila Saha
      Research Fellow, MSR India (w\ Dr. Prateek Jain) *2019 -*
    - Sachin Goyal
      Research Fellow, MSR India (w\ Dr. Prateek Jain) *2019 -*
  - New In ML 2019 session @ NeurIPS '19 *2019*
  - MSR India Summer Workshop 2018: Machine Learning on Constrained Devices *Summer 2018*
- *Undergraduate Teaching Assistantship* - Computer Science and Engineering, IIT Bombay
  - Digital Logic Design - *Prof. Supratik Chakraborty* - **TA of the month, Feb '17** *Spring 2017*
  - Software Systems Lab - *Prof. Sharat Chandran* *Autumn 2016*
  - Digital Logic Design - *Prof. Supratik Chakraborty* - **TA of the month, Feb '16** *Spring 2016*
  - Computer Programming and Utilisation - *Prof. Varsha Apte* *Autumn 2015*
  - Computer Programming and Utilisation - *Prof. Kavi Arya* *Spring 2015*
- *Faculty Recruiting Liason* - Paul G. Allen School of CSE, University of Washington *2020 - 2021*
- *Department General Secretary* - Computer Science and Engineering, IIT Bombay *2016 - 2017*

Selected Research Projects

Exploration for Stronger Non-Linear Activation Functions *Aug 2017 - Oct 2017*
Advisor: Dr. Manik Varma, *Microsoft Research India*

- Explored the domain of activation functions systematically in the context of CNNs and discovered Swish in the same timeline as the "Searching for Activation Functions" paper with similar performance and analysis.
- Experimented with residual activation functions with 2 kernels to achieve 1% gain on CIFAR-100 using DenseNet.

Gloss: A Continuous Contextual Shape Descriptor *Mar 2017 - May 2017*
Advisor: Prof. Siddhartha Chaudhuri - *Digital Geometry Processing, IIT Bombay*

- Proposed a continuous shape descriptor for 3D objects using the 3D context of the scene and environment around.
- Solution based on self-supervised learning inspired from Word2vec to capture the structurally rich representations.
- Learns global and local properties of the scene to help auto-completion, decorative suggestions for a given setting.