

Arpit Bansal

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Research Interests

My broad research interest lies in improving the understanding of Deep Neural Networks empirically and hence improving its training and inference. My research work ranges from algorithmic synthesis with neural networks to watermarking neural networks to investigating neural network's behaviors. Currently, I am understanding the mechanisms behind the working of diffusion models and thus improving them for different AI generation tasks.

Education

University of Maryland, College Park

PHD IN COMPUTER SCIENCE (4.0/4.0)

- Advisor: Prof. Tom Goldstein
- Dean's Fellowship

College Park
Jan 2021 - present

Indian Institute of Technology, Kharagpur

BACHELORS + MASTERS IN ELECTRICAL ENGINEERING

- Minor in Computer Science
- Advisor: Prof. Rajiv Ranjan Sahay

Kharagpur, India
Aug 2014 - May 2019

Industry Experience

- July 2019 - Dec 2020 **Software Developer**, Visa Incorporated, India
May 2018 - July 2018 **Software Developer Intern**, Visa Incorporated, India
May 2017 - July 2017 **Software Developer Intern**, Fission Labs, India

Publications

End-to-end Algorithm Synthesis with Recurrent Networks: Logical Extrapolation Without Overthinking

A. Bansal*, A. Schwarzhild*, E. Borgnia, Z. Emam, F. Huang, M. Goldblum, T. Goldstein
Conference on Neural Information Processing Systems (NeurIPS) 2022

Certified Neural Network Watermarks with Randomized Smoothing

A. Bansal*, P. Yeh Chiang*, M. Curry, R. Jain, C. Wigington, V. Manjunatha, J. P Dickerson, T. Goldstein
International Conference on Machine Learning (ICML - Spotlight) 2022

Can You Learn the Same Model Twice? Investigating Reproducibility and Double Descent from the Decision Boundary Perspective

G. Somepalli, L. Fowl, **A. Bansal**, P. Yeh Chiang, Y. Dar, R. Baraniuk, M. GoldBlum, T. Goldstein
Conference on Computer Vision and Pattern Recognition (CVPR - Oral) 2022

Preprints

Cold Diffusion: Inverting Arbitrary Image Transforms Without Noise

A. Bansal, E. Borgnia, H. Chu, J Li, H. Kazemi, F. Huang, M. Goldblum, J. Geiping, T. Goldstein

MetaBalance: High-Performance Neural Networks for Class-Imbalanced Data

A. Bansal, M. Goldblum, V. Cherepanova, A. Schwarzschild, C Bayan Bruss, T. Goldstein

Datasets for studying generalization from easy to hard examples

A. Schwarzschild, E. Borgnia, A. Gupta, A. Bansal, Z. Emam, F. Huang, M. Goldblum, T. Goldstein

Preventing unauthorized use of proprietary data: Poisoning for secure dataset release

L. Fowl, P. yeh Chiang, M. Goldblum, J. Geiping, A. Bansal, W. Czaja, T. Goldstein

Pag-net: Progressive attention guided depth super-resolution network

A. Bansal, S. Jonna, R. R Sahay

Teaching Experience _____

Fall 2021 **Control Systems**, Teaching Assistant
Spring 2021 **Operating Systems**, Teaching Assistant

University of Maryland, College Park
University of Maryland, College Park

Relevant Course-work _____

Machine Learning	Information Retrieval (IIT), Machine Learning (IIT), Speech and NLP (IIT), Deep Learning (UMD) Algorithms in Machine Learning (UMD)
Signal Processing	Digital Signal Processing (IIT), Statistical Signal Processing (IIT), Probability and Stochastic Processes (IIT), Random Processes (UMD), Information Theory (UMD), Numerical Analysis I (UMD), Advanced Numerical Optimization (UMD)