

Prakhar Ganesh

Research Interests and Career Goals : I am primarily interested in the investigative study of learning models through adversarial robustness, fairness, compression, interpretability, etc., in an attempt to decode the reasoning behind complex algorithm designs, and transcend the gap between theory and application. My long term goal is a career in research and academia in the field of AI.

CONTACT

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EDUCATION

National University of Singapore (NUS)
 Master of Computing (AI specialisation)
 Aug 2021 - Dec 2022 (Expected)
 Current CAP: 4.70/5

Indian Institute of Technology (IIT) Delhi
 BTech in Computer Science and Engr.
 2015 - 2019 | Department GPA: 8.16/10
 IIT-JEE All India Rank : 96 out of 1,17,231

WORK EXPERIENCE

Advanced Digital Sciences Center (ADSC)
 Illinois at Singapore (UIUC)
 Research Engineer | June '19 - July '21

WealthNet Advisors
 New Delhi, India
 Analyst (Intern) | May '18 - July '18

SKILLS

Reviewer

- Computer Speech and Language
- Signal, Image and Video Processing
- Winter Conference on Application of Computer Vision (WACV 2021, 2022)
- AAAI Conference on Artificial Intelligence (AAAI 2021)

Technical Blogs

From LeNet to EfficientNet | Pre-trained Language Models | Human Pose Estimation | Attention Mechanism in Deep Learning | Time Series Analysis | AutoDL | Knowledge Distillation | Model Compression | Growing RNN Cells | Automatic Lip Reading (ALR) | Twitter Information Network | Automatic Text Summarization | Object Detection

Languages & Libraries

Python, C/C++, Pytorch, Tensorflow, Keras, OCaml, Prolog, VHDL, OpenMP, Git

REPRESENTATIVE PAPERS

- [P Ganesh](#), H Chang, M Strobel, R Shokri, "On The Impact of Machine Learning Randomness on Group Fairness", *Under Review*
- [P Ganesh](#), Y Chen, Y Yang, D Chen, M Winslett, "YOLO-ReT: Towards High Accuracy Real-time Object Detection on Edge GPUs", *IEEE WACV*, 2022 [[link](#)]
- [P Ganesh](#), Y Chen, X Lou, M Khan, Y Yang, H Sajjad, P Nakov, D Chen, M Winslett, "Compressing Large-Scale Transformer-Based Models : A Case Study on BERT", Published in *Transactions of the Association for Computational Linguistics*, 2021 [[link](#)]
- L Kong, [P Ganesh](#), T Wang, J Liu, Y Chen, L Zhang, "Free Lunch for Co-Saliency Detection: Context Adjustment", *Under Review* [[arxiv](#)]
- [P Ganesh](#), X Lou, Y Chen, R Tan, D Yau, D Chen, M Winslett, "Learning-based Simultaneous Detection and Characterization of Time Delay Attack in Cyber-Physical Systems", *IEEE Transactions on Smart Grid*, 2020 [[link](#)]

SELECTED MAJOR PROJECTS

Investigating the Impact of Training Non-Determinism on Fairness | Oct'21-Present | NUS

- Established high variance in performance of minority groups even across identical training runs.
- Explored and manipulated the immediate impact of training data order on model fairness.
- Proposed highly efficient bias mitigation techniques competitive to state-of-the-art results.

Lightweight Object Detection on Edge Devices | Aug'20-May'21 | ADSC

- Designed a lightweight object detection model that can run real-time (>30 FPS) on Jetson Nano.
- Scrutinized the practise of complete backbone transfer learning with empirical results.
- Exploited multi-scale feature interaction to improve accuracy without hurting execution speed.

Compressing Large-Scale Transformer-Based Models | Jan'20-Jun'20 | ADSC

- Performed in-depth analysis of transformer models like BERT to uncover possible redundancies.
- Wrote a systematic experimental survey comparing the effectiveness of various existing BERT compression methods and their pros and cons, providing effective practical recommendations.

Protection against Time Delay Attacks | Jun'19-Jan'20 | ADSC

- Proposed a hierarchical LSTM with the ability of online processing to provide timely warnings.
- Improved upon existing postmortem data-driven approaches by providing quick approximate predictions and then gradually improve them with more data for accurate characterization.
- Achieved ~68% decrease in error against the baselines with 1/3rd reaction latency.

Deep Learning in High Frequency Trading | May'18-July'18 | WealthNet Advisors

- Proposed a novel hybrid LSTM architecture, named VLSTM, capable of processing extremely long sequences by extracting 'multi-context' features in high-frequency trading setting.
- Achieved a tremendous boost of ~4% increase in F-score against existing state-of-the-art.

Encoding Methods in Genomics | May'17-Dec'17 | IIT Delhi

- Developed a novel heuristic genome encoding method using distributed vector representation.
- About 3 times faster and more sensitive than BLAST, the official database search tool for NCBI.

SELECTED MINOR PROJECTS

- Restructuring Conversations for Zero-shot Abstractive Dialogue Summarization [[arxiv](#)]
- Very-Long Short Term Memory Networks (VLSTMs) in High Frequency Trading [[arxiv](#)]
- Automated Bio-Mechanical Analysis in Sports | Intern at Krida.ai [[website](#)]
- Literature Survey on Finding Influential Communities in Large Scale Networks [[arxiv](#)]
- Audio Tactile Reader for the Visually Challenged [[code](#)] [[blog](#)]