JAPNEET SINGH

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Education

Purdue University	**Aug 2022 - Jan 2026 (Expected)**
Ph.D. in Electrical and Computer Engineering, West Lafayette, IN, USA	*GPA: 4.0 / 4.0*
Indian Institute of Technology Kanpur	**Jul 2017 - May 2022**
B.Tech-M.Tech (Dual Degree) in Electrical Engineering, Kanpur, India	*B.Tech GPA: 9.6/10.0, M.Tech GPA: 10.0/10.0*

Professional Experience

Amazon | Applied Scientist Intern | Sunnyvale, CA, USA — **May 2025 - Aug 2025**
- Designed a lightweight adaptive video-language model that extracts temporal features from compressed video streams.
- Proposed a plug-in method to enrich spatial features in vision transformers without altering the core model architecture.
- Trained model end-to-end on multi-GPU setup and benchmarked it across multiple video- and image-based Q&A tasks.
- Demonstrated that the proposed technique maintains comparable performance even at 50% lower frame rate on videos.

Purdue University | Graduate Research Assistant | West Lafayette, IN, USA — **Aug 2022 - present**
- Developed a testing framework to evaluate the goodness of fit of comparison data to a Bradley-Terry-Luce(BTL) model.
- Established the minimax optimality of the test and conducted evaluations on real-world datasets using Python.
- Extended the testing framework to generalized Thurstone models based on maximum likelihood based techniques.
- Evaluated how accurately real-world datasets, such as NFL matches, LMSYS LLM leaderboard, and preference datasets for LLM and RL reward models, etc, conform to an underlying BTL or a Thurstone model based on the hypothesis test.
- Working on extending the framework to contextual BTL models used for modeling preferences in fine-tuning of LLMs.

Indian Institute of Technology Kanpur | Researcher (Master's Thesis) | Kanpur, UP, India — **Jan 2021 - Apr 2022**
- Researched on weighted matrix completion and analyzed the impact of subspace information on the reconstruction error.
- Designed a weighted nuclear-norm minimization algorithm, provided its convergence analysis and Python simulations.
- Quantified performance gains in multi-user wireless networks, demonstrating a 20% increase in per-user data rate.

University of California Santa Cruz | Research Intern | Remote — **May 2021 - Jul 2021**
- Introduced two new architectures that achieve a 1000x reduction in storage costs and a 200x decrease in communication costs associated with blockchain's historical data and simultaneously provide the confidentiality of the stored data.
- Developed a construction of the secret sharing scheme satisfying the requirements of the protocol.

Indian Institute of Technology Kanpur | SURGE Research Fellow | Kanpur, UP, India — **May 2019 - Jul 2019**
- Trained conditional generative models in *TensorFlow* to combat slowing down of MCMC algorithms near criticality.
- Used trained generative adversarial network (GAN) models for unsupervised phase transition detection.
- Proposed a hybrid conditional GAN & MCMC algorithm adapting to distribution errors and improving accuracy by 10%.

Technical Skills

Languages: Python, C, C++, SQL, Bash, LaTeX, MATLAB
Software's/Libraries: Git, Docker, Weights & Biases, DeepSpeed, TensorFlow, PyTorch

Selected Publications

- *Minimax Hypothesis Testing for the Bradley-Terry-Luce Model.* IEEE Trans. on Information Theory, Sept 2025. [Link]
- *Hypothesis Testing for the Generalized Thurstone model.* Proceedings of ICML 2025. [Link]
- *Bounds on Maximal Leakage over Bayesian Networks.* Proceedings of ISIT 2025. [Link]
- *Doeblin Coefficients and Related Measures.* IEEE Trans. on Information Theory, Feb 2024. [Link]
- Testing for the Bradley-Terry-Luce model. Proceedings of IEEE ISIT 2023. [Link]
- *Conditional Generative Models for Sampling and Phase Transition Indication in Spin Systems.* SciPost Phy. 2021 [Link]

Awards

- **2022**: Recipient of the **Dr. Vijay K. Varma Talent Award**, graduation award at IIT-Kanpur.
- **2021**: **Qualcomm Innovation Fellowship 2022**, India.
- **2017-21**: **Academic Excellence Award**, for 4 consecutive years at IIT-Kanpur.
- **2016**: **KVPY Scholarship Awardee**, India.