Japneet Singh

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Education

Purdue University **Aug 2022 -present**
PhD 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

Purdue University | Graduate Research Assistant **Aug 2022 - present**
- Developed a hypothesis testing framework to evaluate the goodness of fit for a BTL model to pairwise comparison data.
- Established the minimax optimality of the test and conducted evaluations on real-world datasets using Python.
- Currently working on extending the hypothesis test to Thurstonian models and finding complementary lower bounds.

Indian Institute of Technology Kanpur | Researcher (Master's Thesis) **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 **May 2021 - Jul 2021**
- Introduced two new architectures which reduce the storage and communication costs associated with blockchain's historical data and simultaneously provides 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 **May 2019 - Jul 2019**
- Trained conditional generative models in *TensorFlow* to combat slowing down of MCMC algorithm near criticality.
- Used trained Generative Adversarial Networks models for un-supervised phase transition detection.
- Proposed a hybrid conditional GAN & MCMC algorithm adapting to distribution errors and improving accuracy by 10%.

Projects

IEEE Signal Processing Cup 2021 | *MATLAB, Python* **Jan 2021 - Apr 2021**
- Developed channel estimation techniques for frequency selective channels through Dictionary Learning.
- Optimized IRS configuration for maximizing spectral efficiency using gradient ascent and Newton's Algorithm.

BAJA SAE, IIT-K Motorsports | *MATLAB, Solidworks* **Mar 2018 - Mar 2019**
- Designed and implemented a multi-link suspension system for both front and rear of an All-Terrain vehicle.
- Utilized MATLAB for suspension kinematics, optimization, and graphical analysis for valuable insights.

Technical Skills

Languages: Python, Java, C, C++, SQL, LaTeX, MATLAB
Software's/Libraries: Linux, Github, TensorFlow, PyTorch, Solidworks, Simulink

Publications

- A. Makur and **J. Singh**. On properties of Doeblin coefficients. Proceedings of IEEE ISIT 2023. [Link]
- A. Makur and **J. Singh**. Testing for the Bradley-Terry-Luce model. Proceedings of IEEE ISIT 2023. [Link]
- **J. Singh**, M. Scheurer, and V. Arora. Conditional generative models for sampling and phase transition indication in spin systems. SciPost Physics, 2021. [Link]

Relevant Coursework

- Statistical Machine Learning
- Optimization for Deep Learning
- Convex & Stochastic Optimization
- Detection and Estimation Theory
- Data Structures and Algorithms
- ML for Signal Processing
- Optimization for Big Data
- Information and Coding Theory
- Wireless Communications

Awards

- **2022**: Recipient of the **Dr. Vijay K. Varma Talent Award**, graduation award at IIT-Kanpur.
- **2021**: **Qualcomm Innovation Fellowship 2022**, India.
- **2019**: **Summer Undergraduate Research Grant for Excellence (SURGE)**, IIT-Kanpur.
- **2017-21**: **Academic Excellence Award**, for 4 consecutive years at IIT-Kanpur,
- **2016**: **KVPY scholarship Awardee**, India.