Ishank Arora

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Education

May 2019 — **Indian Institute of Technology (BHU) Varanasi**
Integrated Dual Degree (B.Tech + M.Tech) | CGPA: **9.65/10.0**
Major: Computer Science and Engineering (with Hons. in A.I.)

Work Experience

August 2019 - Present — *Bengaluru, India*
Nutanix
Software Engineer
Working on performance improvements for a log-structured persistent data store for random user writes - increased the I/O receptivity by over 20%.
- Enabled smoother background draining, resulting in lower frontend latencies.
- Parallelized the distributed recovery of the in-memory data index for disk rehosting.
- Optimized the write path for slice-unaligned sequential writes.

June - August 2019 — *Geneva, Switzerland*
CERN
Openlab Summer Student with the File Storage team
Developed a diagnosis and remediation platform through expert anomaly detection systems for the CERN cloud sync utility, which would enable the automation of mitigation procedures for troubleshooting tasks.

Jan - May 2019 — *Singapore*
National University of Singapore
Visiting Researcher under Prof. Jonathan Scarlett
Worked on developing novel high-dimensional Bayesian optimization algorithms using generalized tree-structured additive models defined on overlapping variable instances, making the kernel learning much more efficient. *(paper currently under review)*

May - July 2018 — *Hildesheim, Germany*
University of Hildesheim
Research Intern in Meta-learning under Prof. Lars Schmidt-Thieme
Worked on the extrapolation of partially trained learning curves across different datasets through deep CNNs, which outperform the state of the art Bayesian counterparts, to automate the process of architecture search.

May - July 2017 — *Bengaluru, India*
Nutanix
Software Developer Intern with the Stargate team
Worked on the development of hierarchical I/O throttling policies for VMs and Volume Groups through multiple interfaces. Also integrated the Undefined Behavior Sanitizer (UBSan) for GCC for catching bugs related to misaligned pointers at runtime.

May - July 2016 — *New Delhi, India*
Scientific Analysis Group, DRDO
Research Intern in Swarm Intelligence under Dr. S. K. Pal
Developed hybrid versions of nature-inspired swarm optimization algorithms by coupling with genetic techniques and introducing new control parameters.

Scholastic Achievements/ Extra Curricular Activities

- Won **Nutanix Hackathon 2020** in 'Strengthen the core' category from over 2200 participants.
- Won the **CERN Webfest 2019** hackathon organized by Openlab, CERN from over 60 participants.
- Ranked **1st** from over 400 teams in **Goldman Sachs Quantify 2017**.
- Awarded the **IIT (BHU) Honorable Mention award** for excellence in the field of programming, 2016-17.
- Awarded the prestigious **DAAD WISE 2018** scholarship by the German Academic Exchange Service.
- Ranked **14th** from 105 teams at the **ACM ICPC Asia Gwalior regionals 2017**, and **16th** from 255 teams at the **Amritapuri regionals 2017**. Also qualified for the ACM ICPC Asia Regionals in 2015 and 2016.
- All India Rank of 1136 in **IIT JEE Advanced 2014** attempted by about 150,000 students.
- All India Rank of 127 in **IIT JEE Mains 2014** attempted by about 1,200,000 students.
- Recipient of the **KVPY (Kishore Vaigyanik Protsahan Yojana) Scholarship 2014**, funded by Government of India.
- Received **CBSE Merit certificate** for being in **top 0.1%** in All India Senior Secondary School Examination.
- **Algorithmic problem setter** for Perplexed and Mathmania at Codefest 2017, ICM and CTF at Technex 2017, Prayaas and Mathletics at Technex 2016, and COPS Open Programming Contest 2016.

Publications

- Ishank Arora, et al. **"High-Dimensional Bayesian Optimization via Tree-Structured Generalized Additive Models."** IEEE International Symposium on Information Theory (ISIT) Recent Results, 2019.
- Ishank Arora, et al. **"Random projections of Fischer Linear Discriminant classifier for multi-class classification."** 2016 4th International Symposium on Computational and Business Intelligence. IEEE, 2016.

Research Projects

Jan - April 2018 | *Bachelor Thesis*
Novel iteration for Stochastic Proximal Gradient Descent with Adaptive Restart
Guide: *Prof. K. K. Shukla* IIT (BHU) Varanasi
Developed a new iterative scheme for Stochastic Proximal Gradient incorporating variance reduction and adaptive restart to significantly increase the rate of convergence of non-smooth optimization of the current state of the art.

Jan - April 2017 | *AI Stream Project*
Proof of Convergence for a two-stage Crossover for Multiobjective Optimization
Guide: *Prof. K. K. Shukla* IIT (BHU) Varanasi
Analyzed a two-stage crossover operator for more efficient exploration of the search space, studied the polynomial probability distributions involved and proposed a comprehensive proof, through the use of homogeneous Markov chains, that the operator maintains an elitist population and hence can be guaranteed to converge.

Aug - Nov 2015 | *Research Project*
Random projections as regularizers for Multi-Class classification
Guide: *Prof. K. K. Shukla* IIT (BHU) Varanasi
Employed ensembles of random projections of Fischer Linear Discriminant classifiers to perform multi-class classification for datasets with fewer samples than dimensions, wherein discriminant classifiers provide poor results due to non-invertibility of the covariance matrices. Also extended the theoretical generalization error bounds.

Key Projects

July 2019
Cross-Modal Chat Platform
A platform which helps people with different sensory disabilities attend guided visits through real-time translation among modalities including sign languages and speech.

March 2018
Generalized Reduced Gradient Algorithm
Implemented the generalized reduced gradient (GRG) algorithm based on implicit variable elimination to solve unconstrained optimization problems using Symbolic Python.

February 2017
Health-Keep
A Windows Universal application which notifies the user of the diseases spreading in their locality and precautionary measures to be taken, by forming clusters of the reported cases and testing whether the user's location lies in any of the clusters through various heuristics, using data scraped from Twitter.

October 2016
Relational Algebra implementation in C++
Implemented the procedural query language, which operates on relations using some specified operators, such as select, project, cartesian product, join and aggregate operations to answer user-defined queries.

November 2015
Nine Men's Morris for Windows Store
Developed the single player as well as the two-player implementation of Nine Men's Morris board game for Windows 10 using extensive AI through Alpha-Beta Pruning.

March 2015
Numerical Algorithms in Python
A web application to implement and illustrate through animations Linear system solvers - Gauss-Jordan eliminations and Gauss-Siedel method; Polynomial solvers - Secant Regula-Falsi and Newton-Raphson; and Lagrange's method of interpolation.

Positions of Responsibility

2016-2018 Teaching Assistant for CSE-530 Information Security and CSE-103 IT Python Workshop - I.

2017 Convener, Codefest 2017, the annual festival of Computer Engineering Society, IIT (BHU) Varanasi.

2016-2017 Joint Secretary, Club of Programmers, IIT (BHU) Varanasi.

2015-2016 Student Representative of DUGC, Department of Computer Science and Engineering, IIT (BHU).

Skills and Interests

Areas of interest: Machine learning, Bayesian statistics, Distributed systems, Computational intelligence.

Languages: C++, Python, Java, GNU Octave, HTML/CSS, JavaScript, R, MySQL.

Technologies: TensorFlow, Keras, Scikit-learn, Django, BASH, Git, Adobe Photoshop, LaTeX.