Ishank Arora

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Education

May 2019 (Expected) — **Indian Institute of Technology (BHU) Varanasi**
Integrated Dual Degree (B.Tech + M.Tech) | CGPA: **9.64/10.0**
Major: Computer Science and Engineering (with Hons. in AI)

2014 — **Delhi Public School Rohini**, Delhi (Central Board of Secondary Education)
All India Senior School Certificate Examination | Score: 98%

2012 — **Delhi Public School**, Agra (Central Board of Secondary Education)
All India Secondary School Examination | CGPA: 10.0/10.0

Work Experience

May - July 2018 — **Research Intern at University of Hildesheim**
Worked with the Information Systems and Machine Learning Lab (ISMLL) under Prof. Lars Schmidt-Thieme 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 and meta-modeling.

Aug 2016 - May 2018 — **Teaching Assistant, Introduction to Programming and IT Workshop at IIT (BHU)**
Responsibilities included taking hands-on laboratory and tutorial sessions for the students, moderating discussions, setting assignment and lab exam problems and mentoring the students on their course projects.

May - July 2017 — **Software Developer Intern at Nutanix Inc.**
Worked with the Stargate team on the development and automation of user-defined hierarchical I/O throttling policies for VMs and Volume Groups through interfaces such as RPC, CLI and REST. Also integrated the Undefined Behavior Sanitizer (UBSan) for GCC for catching bugs related to integer overflows and misaligned pointers at runtime.

May - July 2016 — **Research Intern in Swarm Intelligence at Scientific Analysis Group, DRDO**
Worked under Dr. S. K. Pal on developing hybrid versions of nature inspired swarm optimization algorithms, Artificial Bee Colony and Firefly algorithm, by coupling with genetic and evolution techniques and introducing new control parameters, for solving NP Hard problems such as Integer Factorization and the Set Covering Problem.

Publications

- Ishank Arora, Anant Dadu, Mridula Verma, K. K. Shukla, **"Random Projections of Fischer Linear Discriminant Classifier for Multi-Class Classification"**, in proceedings of the 4th International Symposium on Computational and Business Intelligence, September 2016, Olten, Switzerland.

Research Projects

Sep - Nov 2017 — *Bachelor Thesis*
Novel iteration for Stocachastic Proximal Gradient Descent with Adaptive Restart
Guide: *Prof. K. K. Shukla* — IIT (BHU) Varanasi
Developed a new iterative scheme (currently under evaluation) 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 (TSX) operator for more efficient exploration of the search space for situations where the operator can be guaranteed to converge to a global optimum. 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.

Scholastic Achievements/ Extra Curricular Activities

- 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.
- Ranked **1st** from over 400 teams in **Goldman Sachs Quantify 2017**.
- Ranked **14th** from 105 teams at the **ACM ICPC Asia Gwalior regionals 2017**, and **19th** from 255 teams at the **Amritapuri regionals 2017**. Also qualified for the ACM ICPC Asia Regionals in 2015 and 2016.
- Awarded the **IIT (BHU) Honorable Mention award** for excellence in the field of programming, 2016-17.
- Ranked **26th** from 1410 participants in **NSE ISB CodeSprint**, organized on Hackerrank.
- Recipient of the **KVPY (Kishore Vaigyanik Protsahan Yojana) Scholarship 2014**, funded by Department of Science and Technology, Government of India.
- Received **CBSE Merit certificate** from the Human Resource Development Minister of India for being in **the top 0.1%** in All India Senior Secondary School Examination 2014.
- **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.
- Received a full grant to attend **PyCon CZ 2018** at Czech Technical University, Prague.
- Amongst the top 300 from the country to qualify for **Indian National Chemistry Olympiad 2013**.
- Amongst the top 30 from all over India to qualify for the onsite round of **Topcoder Humblefool Cup 2017**.
- Ranked **8th** worldwide in Perplexed, the constrained programming contest, Codefest 2016, IIT (BHU).

Key Projects

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.
April 2016	**Live Gesture Recognition** An application to detect the arm gestures of the subject using the gyroscope sensors in android phones and deep neural networks in TensorFlow, implemented through socket programming.
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

2017	Convener, Codefest 2017, the annual festival of Computer Engineering Society, IIT (BHU) Varanasi.
2016-2017	Joint Secretary, Club of Programmers, IIT (BHU) Varanasi.
2016	Co-coordinator of A-Mazed, the autonomous grid-following robotics event of Technex 2016.
2015-2016	Student Representative of DUGC, Department of Computer Science and Engineering, IIT (BHU).

Skills and Interests

Areas of interest:	Machine Learning, Bayesian Statistics, Computational Intelligence, Web Development.
Languages:	C++, Python, GNU Octave, HTML/CSS, JavaScript, R, MySQL.
Technologies:	TensorFlow, Keras, Scikit-learn, Django, BASH, Git, Adobe Photoshop, LaTeX.