Ish Kumar Jain

2 Metrotech Center, FL-9
Brooklyn, NY, 11201
☎ +1 (347) 570 2502
✉ ishjain@nyu.edu
🖺 www.linkedin.com/in/ishjain

Education

May 2018   **Master of Science (MS)**, *New York University, Tandon school of Engineering*, Brooklyn, NY.
Major: Electrical Engineering, GPA: ***3.96 (out of 4)***
- Samuel Morse MS Fellowship 2016-2018 | Academic Excellence Award 2017.
- **Teaching:** Machine Learning, Spring-2018 and Fall-2017 | Internet Architecture and Protocols Lab, Spring-2017.
- **Selected Courses:** Advanced Machine Learning, Massive-MIMO, Networks & Mobile Systems, Network Modeling and Analysis, Probability and Stochastic Processes, Scientific Computing.

May 2016   **Bachelors of Technology (B.Tech.)**, *Indian Institute of Technology (IIT Kanpur)*, India.
Major: Electrical Engineering, ***GPA: 9.5 (out of 10)***
- Motorola Gold Medalist: Convocation award for the best all-round performance in Electrical Engineering 2016.
- Academic Excellence Awardee (top 7% of the batch) in academic terms 2012-13, 2013-14, and 2014-15.
- **Selected Courses:** Wireless Communications, Convex Optimization, Distributed Systems, Communication Networks, Advanced Image Processing, Digital Signal Processing, Robotics, C Programming, and Data Structures.

Master's Thesis

Title   *Blockage Modeling and System Analysis for mmWave communications*
Supervisor   Prof. Shivendra Panwar

- Evaluated blockage rate of UE-AP link in terms of blockers density and link lengths with mobile blockers.
- Modeled blocked/unblocked periods as an alternating renewal process with exponential duration.
- Developed Markov models and evaluated state probabilities of simultaneous blockage of multiple APs (Poisson Point Process) and calculated the average frequency and duration of those blockage events.
- Justified theoretical model with Matlab Simulations using Random Way Point mobility model of blockers.
- Our model is useful in finding the optimal density, height and other design parameters of APs in an area.

Technical Skills

Programming   C, C++, Python (TensorFlow, Keras, Torch)
Software   Matlab (CVX), Mininet, OpenCV, GitHub, LaTeX, Shell scripting

Research Internships

June–Aug 2017   **Nokia Bell Labs**, *Murray Hill, NJ*.
Topic: **Millimeter-Wave Beam-training Algorithm Design** | Mentor: Dr. Özge Kaya
- Developed an adaptive beam-training algorithm for mobile multi-user scenario in outdoor mmWave cellular networks.
- Achieved an average of over 60% reduction in beam-steering time over sequential search schemes.

May–July 2015   **University of Victoria**, *BC, Canada*.
Topic: **Rendezvous for Cognitive Radio Networks** | Mentor: Prof. Jianping Pan, Dept. of Computer Science
- Derived channel availability probability for SUs based on PU power control and spectrum sensing in cellular systems.
- Achieved an improvement in rendezvous performance when the channels are selected according to our model.

May–July 2014   **Indian Institute of Technology**, *Kanpur, India*.
Topic: **MIMO Two-Way Relay Networks (TWRN)** | Mentor: Prof. Ajit Chaturvedi, Dept. of Electrical Engineering
- Applied precoding design techniques at the two end devices as well as a Decode-and-Forward (DF) relay.
- Showed better diversity order and reduced bit error rate for DF scheme over the Amplified-and-Forward Protocol.

Publication

TPAMI 2018   **Ish Kumar Jain**, Anna Choromanska, "Extreme Multiclass Classification Criteria", submitted to *IEEE Transactions On Pattern Analysis and Machine Intelligence*, 2018.

GLOBECOM 2018   **Ish Kumar Jain**, Rajeev Kumar, Shivendra Panwar, "A Generalized LOS Blockage model for Millimeter-Wave Cellular Networks", to be submitted to *IEEE Global Communications Conference*, 2018.

Selected Graduate Projects

Jan 2017– Ongoing   **Multi-class Classification Tree**, *Research Project under Prof. Anna Choromanska*.
- Theoretically proving the boosting ability of a newly proposed objective function to reduce the overall misclassification error in a tree based classification framework.

Sep–Dec 2017   **Cell-Free Massive MIMO**, *Term Paper with Prof. Thomas Marzetta*.
- Presented a critical analysis of precoding and power optimization techniques for cell-free Massive MIMO system.

Sep–Dec 2017   **Active Queue Management (AQM) (*Bash, GENI Testbed*)**, *Course Project with Prof. Shiv Panwar*.
- Implemented AQM schemes such as ARED, CoDel, and PIE on Geni testbed and compared their throughput, latency, and fairness performance with default FIFO and other fairness queuing schemes.

Feb–May 2017   **Programmable IoT Platform (*Mininet, Python*)**, *Course Project with Prof. Lakshmi S., NYU Courant*.
- Simulated an IoT testbed (a controller and a large number of sensors) on Mininet
- The devices could send sparse amount of data on demand of the controller to save the battery life and data usage.
- Applied regression algorithms at the controller for an application to build the road-traffic-map of a city.

Selected Undergrad Projects

Jan–Apr 2016   **Convex Optimization in MIMO Detection (*MATLAB-CVX*)**, *Term Paper, Convex Optimization*.
- Implemented Semi-Definite Relaxation (SDR) techniques via rank-1 approximation for 16-QAM MIMO Detection using MATLAB-CVX tool and compared the results with traditional zero-forcing based detection scheme.

Jan–Apr 2016   **Tennis Ball Detection and Tracking using Kinect (*C++, OpenCV*)**, *Course Project, Robotics*.
- Implemented real-time algorithms for tennis ball detection using Kinect and applied Extended Kalman Filter for its prediction and tracking. This work is contributed towards a project to train a robot play table-tennis with humans.

Jan–Apr 2016   **Content based Image Retrieval (*Python*)**, *Course Project, Advanced Image Processing*.
- Implemented an Image Retrieval technique, which includes formation of a clique of semantically similar images called *superimage* using a trained SVM, indexing of superimages using K-means clustering, and online retrieval of superimages for a given test image. Reported a 75% precision value of this scheme.

Leader/Volunteer

May 2017   **Volunteer, Convocation Ceremony**, *NYU Tandon School*.
Helped in the enforcement of law and management at the NYU Tandon convocation ceremony of above 1000 students at Barclay Center, NYC.

2014–2015   **Coordinator, Fine Arts Club**, *IIT Kanpur*.
Organized Institute level Art Workshops, performed and coordinated stage performance like Speed Art and Sand Art along with a team of 4 members and 25 volunteers.

2013–2014   **Academic Mentor, Counselling Service**, *IIT Kanpur*.
Guided a group of academically weak students in elementary programming and electronics courses and helped them to adjust in the new academic environment.

Awards and Honours

- Awarded 1st Prize in 'Elec-trade', on-the-spot circuit design challenge, Techkriti, IIT Kanpur 2015.
- Selected for Indo European Winter Academy organized with FAU Erlangen & KTH Stockholm 2014.
- KVPY Scholar (Kishore Vaigyanik Protsahan Yojna), awarded to top 600 students in India 2012.
- Secured All India Rank 390 (amongst 0.5 million students) in IIT- Joint Entrance Exam 2012.
- Secured All India Rank 41 (amongst 0.15 million students) in NSTSE (National Science Talent Search Examination) 2012.