RITVIK KAPILA

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EDUCATION

University of California, San Diego — Sep'22 onwards
Masters, Computer Science

Indian Institute of Technology Delhi — Jun'17 - May'21
*B.Tech, Electrical Engineering, Awarded **Academic Merit Scholarship*** — *CGPA: **9.113/10***

Institut National des Sciences Appliquées de Lyon, France — Sep'19 - Dec'19
Computer Science, Semester Exchange — *CGPA: **3.9/4.0***

WORK EXPERIENCE

NK Securities Research, *High Frequency Trading Quantitative Researcher* — Jul'21 - Present
- Designed mathematical models using **time series data** to predict the movement of the derivatives market
- Implemented cutting edge statistical analysis techniques for improved consistency across market variations
- Performed optimization on support-resistance strategy using hyper-parameter tuning for futures & options

Goldman Sachs, *Market Risk Analyst* — May'20 - Jul'20
- Designed a software for modelling predictions of repurchase and overnight rates for USD & EUR currencies
- Managed the firm's risk associated with repo rates using **Interest-Repo Rate** Stress Test model projections
- Employed parallel diddles and interpolations to inspect price and flooring functions using scenario generation

RESEARCH EXPERIENCE

Channel Estimation using Deep Learning [thesis] — Jul'20 - Dec'20
Undergraduate Thesis Project, Prof. Manav Bhatnagar — *IIT Delhi*
- Modelled MIMO channel features as 2D image and used blind estimation by implementing **CNNs & GANs**
- Designed a linear super resolution framework cascaded with de-noising neural network for best performance
- Achieved MSE of 0.0011 and reduced training time by **28%**, optimized trainable parameters from 8129 to 26

Network Automation using Machine Learning — Dec'19 - May'20
- Designed an **LSTM** based optical character recognition framework to perform graph digitization in real time
- Developed automated configurable **XML database parser** for live integration with Nokia framework [code]
- Formulated regression analysis and heat maps on performance of network through performance indicators

Smart Building Energy Consumption Analysis [code] — Sep'19 - Dec'19
Member of CITI Lab Research Group, Prof. Frédéric Le Mouël — *INSA Lyon, France*
- Implemented pattern recognition and modelled energy usage **time series sensor data** in smart buildings
- Designed software for outlier detection and feature extraction; implemented regression models for prediction
- Formulated **spatio-temporal summarization** and obtained **94.8%** accuracy on room location and time

Tree Structured Neuron Classification [code], *Prof. Jayadeva, IIT Delhi* — Jan'20 - May'20
- Formulated a constructive algorithm for **binary nonlinear classification** in multi dimensional input space
- Designed linear programming framework for optimization & **twin SVM** classifier to tackle class imbalance
- Achieved accuracy of over **96.5%** on UCI dataset with more than **26%** reduction in training time of model

Robust Neural Network and SVR design, *IIT Delhi* — Jan'20 - Feb'20
- Developed customized python library for neural networks with **98.2%** accuracy on MNIST dataset [code]
- Published open source library for implementation of ϵ-**SVR** and **RH-SVR** using convex optimization [code]

Reconfigurable Beacon, Demonstrated at **Open House**'19 [blog] — Jan'19 - May'19
- Configured bluetooth low energy modules as economical, compact beacons for use in the way-finding project
- Developed android app to configure the beacon using AT commands for modification of beacon services

Web Search Engine, Data Structures [code] — Sep'18 - Oct'18
- Designed data structure displaying results via ranking algorithm; used **hash maps** for OR & AND queries
- Developed search functionality and ranked documents using the tf-idf scoring model and **AVL trees**

ACADEMIC EXPERIENCES AND ACHIEVEMENTS

- **IITD Academic Merit Award**: Ranked amongst top 7% students, achieving SGPA of **10/10** (2017-21)
- **Industrial R&D, IIT Delhi and NOKIA Fellowship**: Selected for fully funded research program(2020)
- **Summer Undergraduate Research Award**: Conferred SURA Award for outstanding research (2019)
- **Courses Done**: Machine Learning, Data Structures and Algorithms, Software Engineering, Operating Systems, Networks, Signal and Image Processing, Data Mining, High Speed Networks, Computer Architecture
- **Programming skills**: C, C++, Java, Python, MATLAB, OCaml, HTML/CSS, Git, Linux, LaTeX