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Education

- **ETH Zurich** Sep.2020 – Present
  Master of Science, Statistics ***GPA: 5.5/6.0***

- **Indian Institute of Technology, Kanpur** Jul. 2015 – June 2020
  Bachelor of Technology, Electrical Engineering ***GPA: 9.0/10.0***
  Second Major in Mathematics and Scientific Computing

- **Maharishi International Residential School** Apr. 2013 – May 2015
  Class-XII(AISSCE) *98.4/100*

Relevant Courses

ETH Zurich	Statistical Modelling, Advanced ML, Probabilistic AI, Neural Network Theory, Causality, Inference(UZH), Guarantees in Machine Learning, ANOVA, Beyond iid Learning(Seminar)
IIT Kanpur	Regression Analysis, Statistical Simulation and Data Analysis, Applied Stochastic Processes, Probability Theory, Data Structures and Algorithms, Quantum Computing, Intro to ML, Analysis-I, Complex Analysis, Control Systems Analysis, Convex Optimization

Teaching Assistant

- **Tutorial TA for the course Probabilistic Artificial Intelligence** *Sept 2021 - Feb-2022*
  Lecturer: Prof. Andreas Krause, ETH Zurich *Link to Video accessible inside ETH*
  - Successfully presented a 2-hour tutorial session to 200 students introducing concepts in Bayesian Optimization and solving problems in Bayesian Neural Networks and Bayesian Optimization.
  - Along with another Phd TA prepared homework questions on Bayesian Neural Networks and Bayesian Optimization and managed 2 Q&A sessions explaining doubts from students.
  - Assisted 2 lectures and 2 tutorials by managing the questions from students watching online.

Research Project

- **Movement Penalized Contextual Bayesian Optimization** *April 2021 - Present*
  Advisors: Prof. Ilija Bogunovic, UCL, Prof. Andreas Krause, ETH Zurich
  - Proposed a novel GP-Mirror Descent algorithm for episodic contextual Bayesian optimization with movement costs. The algorithm crucially combines the online mirror descent (MD) algorithm with shrinking Gaussian Process (GP) confidence bounds to decide on which point to evaluate
  - Theoretically analyzed the performance of the algorithm and compared the performance with the episodic offline optimal sequences and provided $\alpha-$approximate regret guarantees.
  - Demonstrated through simulations that our algorithm is able to successfully outperform previous contextual Bayesian optimization approaches on both synthetic and real-world data in the presence of movement costs.

Research Internship

- **Automated Decoding for Polar Codes with Permuted Kernel** *Jun 2018 - Jul-2018*
  Advisor: Prof. Alexander Vardy,UC San Diego
  - Analyzed the implementation of the modified Successive Cancellation decoder for **permuted Arikan Kernel** which reduces required **blocklength** of polar codes
  - Developed an automated decoding algorithm in **C++** with a reduced error rate to look at **trade-offs** between permutations **efficiently** without having to code from scratch

Skills

- **Technical Languages**: MATLAB(Intermediate), Python(Proficient), C/C++(Intermediate), R(Intermediate)
- **Natural Languages**: Tamil(Native), English(Bilingual), Hindi(Fluent), German(A2), French(Basic)

Projects

- **Certifying Distributional Robustness with Principled Adversarial Training** *March 2021 - June 2021*
  Course Project for Guarantees in Machine Learning: Prof. Fanny Yang, ETH Zurich *Report*
  - Worked in a group of 2 to analyse in detail the aforementioned paper and present the analysis and improvements to the class(modified problem)
  - Thoroughly went through all the proofs in the paper and explained in some intermediate proofs not mentioned in the paper in our report.
  - Improved the bound on convergence rate using Modified Dudley's Integral bound and made it independent of covering number of the function class for the case of NN classifier(for more information refer the report attached above)
- **Bootstrap on Lasso when Errors are Heavy Tailed** *Jun 2019 - Dec 2019*
  Advisor: Prof. Debraj Das, IITK *Report*
  - Extensively studied the paper by Prof. K.B.Athreya proving how naïve bootstrap fails in the heavy tailed case and Dissertation of Aaron Goldsmith which focuses on Asymptotics of LASSO when errors are heavy tailed
  - Performed a literature survery on how different types of bootstrap is applied on Lasso and asymptotics of Lasso when errors are heavy tailed, especially when sample size is o(n)
  - Analyzed various methods from measure theoretic probability and tried to prove that residual bootstrap for LASSO with sample size o(n) converges to the original distribution.(for more information refer the report attached above)
- **House Price Prediction** *Feb 2019 – Apr 2019*
  Course project for Regression Analysis Prof.Sharmistha Mitra *Report*
  - Fitted a Multi Linear Regression Model to predict the price of a house with 2 other team members
  - Handled violations by variable transformation and outlier treatment, implemented Backward Elimination Algorithm for variable selection and incorporated categorical variables into the model using dummy variables
- **Quantum Error Correction** *Aug 2017 – Nov 2017*
  Course project for Quantum Computing Prof. Rajat Mittal *Report*
  - Studied The Theory Of Quantum Error Correction based on Classical Error Correction
  - Presented **Interaction and Recovery Operators** for Mid-Term Evaluation and Fundamentals of Quantum Error Correction and **State Independent Error Modelling** for End-term Project Evaluation
- **Study on Polar Codes** *May 2017 – Nov 2017*
  Undergraduate Project-I Prof. Adrish Banerjee *Report*
  - Extensively studied State of the Art error correcting codes such as turbo codes, LDPC codes, polar codes. Studied their construction, decoding and applications in various communication standards
  - Did a detailed literature survey on polar codes and analysed implementation of List decoding with CRC

Positions of Responsibilities

- **Manager: Josh** *April 2017*
  Annual Intra IIT-Kanpur sports extravaganza
  - Managed a team of **25 event coordinators** to plan and execute over **15 sport events** and ensured participation of the campus residents through various online and offline marketing strategies
- **Coordinator, Volleyball** *December 2016*
  Inter IIT Sports Meet – 2016
  - Co-organized the **Inter-IIT** Volleyball competition along with a team of 12 volunteers and 10 workers which saw participation of **350 players** from 16 IITs

Extra Curricular

- **Hammer Throw** *May 2016 – Dec 2019*
  Member of Institute Athletics Team
  - Won **Silver Medal** in **Inter IIT** Sports Meet' 2019 hosted by IIT Kharagpur
  - Won **Gold Medal** in District Athletics Meet organized by Kanpur Athletics Association
  - Won **Bronze Medal** in Udghosh' 17 and Udghosh'18 and **Silver Medal** in Udghosh' 19(Annual Inter College Sports Festival organized by IITK)