Manupriya Gupta | Curriculum Vitae

guptamanupriya.iitd@gmail.com (+91) 9911560700

Academic Qualifications

- **Bachelor of Technology in Computer Science and Engineering** 2018 - present
  Indian Institute of Technology (IIT) Delhi GPA: 8.762/10
- **All India Senior School Certificate Examination** (2018) The Mother's International School Percentage: 94.3%
- **All India Secondary School Examination** (2016) The Mother's International School GPA: 10/10

Research Experience

Robust Federated Learning for Fault Mitigation at Edge Nodes **Jul 2021 - present**

Prof. Huzur Saran, Prof. Rajeev Shorey : Department of Computer Science and Engineering, IIT Delhi

- Devised a fault mitigation strategy based on latency, computational power and load parameters for Edge Devices which outperforms other models like FedAvg upto 20% in terms of latency while maintaining the same accuracy for different CNNs run on MNIST dataset.
- *Key Outcomes* :
  Submitted consolidated results in a paper to the COMSNETS 2021-22 Conference, paper is under review

Cloud Cost Modelling for Software Service Providers **May - Sep 2021**

Dr. Atanu Sinha, Dr. Shiv Kumar Saini : Adobe Research Lab, Bengaluru

- From AEP's data on 60+ usage metrics, derived the best metric for equitable distribution of direct and indirect cloud cost among users of 20+ services. Also derived the performance-cost trade-off based on infrastructure constraints and identified under-utilisation of resources at 15 min granularity
- Developed Time-Series forecasting model for Cost of Goods Sold (COGS) with 93.4% accuracy upto 30 days tested on Azure metrics
- *Key Outcomes* :
  Filed 2 patents (currently under review) for cost attribution and identifying underutilization

Robust training of Noisy Deep Bayesian Neural Networks **May - June 2020**

Prof. Steve Kroon : Department of Computer Science and Engineering, Stellenbosch University

- Worked on novel techniques like Flipout and Self-stabilising Priors and designed experiments to compare 5 such techniques in terms of variance reduction (max 76%), improved accuracy and performance time (upto 20%) with all models converging at 1000 epochs.
- *Key Outcomes* :
  Improved mathematical proofs, buildup and results in ICML reviewed research paper

Academic Projects

Artificially Intelligent Pacman (Prof. Rohan Paul, Artificial Intelligence) **Dec 2020**

- Designed a 2-player Pacman game (taking Berkeley Pacman project as the base) with adversarial maze search techniques like expecti-minimax, alpha-beta pruning for good time-bound decision making. Our pacman defeated several teams in the class

DBMS UI for Road Accidents (Prof. Maya Ramnath, Database Management Systems) **Apr 2021**

- Developed a time-efficient Query-cum-Modification interface in PostGreSQL supported by frontend (using Flask) operating on 1.5MB data of road accidents in USA (20+ attributes like date, location, weather). Defined all key constraints for inter-tabular relationships

Decision Trees and Random Forests (Prof. Parag Singla, Machine Learning) **Nov 2020**

- Implemented a recursively growing Decision Tree on FMNIST data and measured accuracy against depth (97% max accuracy). Augmented with top-down pruning giving results 5x faster. Implemented Random Forest using scipy after one-hot-encoding of data

MIPS Processor Simulator (Prof. Preeti R Panda, Computer Architecture) **Aug 2020**

- Simulated 5-stage pipeline architecture including utilities of Hazard Checking, Stalling and Forwarding of signals with HIT rate of 92/100. Constructed the MIPS memory model in C++ tested using recursive functions and commands written in assembly language

PINTOS Projects (Prof. Kolin Paul, Operating Systems) **Apr 2021**

- Built prototyoe of an Operating System by implementing System Calls (File Management Library) from base code in C adpated from PINTOS source. Implemented Multi-Thread Architecture by building priority-based Thread Scheduling with Alarm-clock scheme

Job Scheduler for Load Management (Prof. Subodh Kumar, Data Structures and Algorithms) **Oct 2019**

- Implemented multiple Data Structures (RB Tree, Trie, Priority Queue) in Java for storing/modifying generic data, handling jobs of different users/projects and executing them on basis of priority and budget with Timed Operations on Dynamically Queued jobs

Mobile Gripper Robot (Robotics Club IIT Delhi, Techfest IIT Bombay) **Jul - Dec 2018**

- Built manually controlled compact robot with wired control system (using L298 circuiting and signalling) for motion and grip. Programmed ARDUINO Mega Board using C++
- Qualified to represent IIT Delhi at Cozmoclench National Event, Techfest IIT Bombay in 2018

Scholastic Achievements

- **Google Women Tech Makers Scholarship** (2020) : Awarded to 74 excellent female students in technology across Asia-Pacific nations
- **Student I4 Challenge IIT Delhi** (2020) : secured best in category and 5th position among 71 teams for ideation and innovation challenge by Industrial R&D unit, IIT Delhi
- **All India Rank 220 in Joint Entrance Examination (JEE) Advanced** 2018 and ranked in Top 15 among girls
- **All India Rank 492 in Joint Entrance Examination (JEE) Mains** 2018 among 1.5 million candidates
- **K.V.P.Y. Fellowship** (2017-18) : Secured All India Rank 51 and awarded fellowship by Indian Institute of Science (IISC) Bangalore
- **National Standard Examination** in Chemistry & Physics (2017) : National Top 1% in olympiads conducted by APTI and BARC
- **Junior Science Talent Search Examination (JSTSE)** 2015 : awarded scholarship for State Rank 5 in NCT of Delhi
- **Grandmasters in Mental Arithmetic** Certificate by Aloha International (2014)

Skills

Programming C/C++, Python, Java, SQL, MATLAB, Octave, OCaML, Prolog, Javascript, Flutter, MIPS
Libraries/Tools Vivado, Arduino, QTSpim, Flask, TensorFlow, Pytorch, Scikit, Statsmodels, Latex, lex-yacc, Git

Relevant Coursework

Computer Science Discrete Mathematics, Data Structures and Algorithms, Digital Logic and Hardware Design, Computer Architecture, Programming Language Paradigms, Analysis and Design of Algorithms, Computer Networks, Principles of Artificial Intelligence, Machine Learning, Automata and Theory of Computation, Parallel and Distributed Programming, Operating systems, Database Management Systems, Data Mining*
Mathematics Linear Algebra, Probability and Stochastic Processes, Calculus, Algebra, Statistical Methods*

Extracurricular Activities

- **Chairperson, ACES-ACM** (Official ACM student chapter and Computer Science Department Society of IIT Delhi) Apr 2021 - present
  - Managed a team of 17, organized techno-cultural events for CS students like guest lectures, interactive sessions and mentorship
  - Organized competitive events in CS and Mathematics in Tryst (Technical festival of IIT Delhi) with nation-wide 45K participants
- **Each One Teach One** Drive 2017 : mentored a middle-school student for 1 month - she improved grades in English and Mathematics
- **Indian Road Safety Campaign** : organising team member and delegate of International Conference on Safer Mobility (May 2019)
- **Sports Competitions** :
  - Sportech 2019 : part of institute **Lawn Tennis** Team for inter-college national event and reached Round 2
  - C.B.S.E. Zonal Competition : vice captain of **Volleyball** team and reached semi-finals
  - Inter-hostel Championship : 3rd position in **Long Jump** and **Discuss Throw**
  - Hostel Annual Fest : Runners Up in **Badminton**
- **Languages** : professional proficiency in English, French and Hindi