Har Ashish Arora

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Experience

Research Engineer at **RamAIn (YC 26)** - developing autonomous Computer Use Agents *Jan 2026 - Present*

Education and Academic Details

Indian Institute of Technology, Delhi *(Computer Science and Engineering)* *July 2024 – May 2028*

- **CGPA: 9.52/10**, **Department Rank:** 16
- **Relevant Coursework:** Data Structures and Algorithms, Digital Logic and System Design, Discrete Mathematical Structures, Probability and Stochastic Processes, Linear Algebra and Differential Equations, Computer Architecture*, Programming Languages*, Signals and Systems* **(in progress)*

Scholastic Accomplishments

- **Semester Merit Award** - Placed among the top 7% of students at IIT Delhi in Semesters I & II (2024–25)
- **Foreign Exchange Programme** - Ranked **1st** in the ForEx Test conducted by IIT Delhi (Jan 2026)
- Secured **Department Change** from Electrical to Computer Science Department based on first-year CGPA
- Ranked **2nd** in the Electrical Engineering Department out of **120 students** after the first year at IIT Delhi
- **JEE:** JEE Advanced: **AIR 476/180,200** and JEE Mains: **AIR 726/1.4 million**, with a percentile of **99.96**
- **NSEC 2023-24:** Ranked among the top 1% of 3413 candidates of the state of Uttar Pradesh at NSEC 2023.
- Selected as one of the **531 candidates** invited to appear in InChO 2024 on the basis of NSEC performance.
- Awarded a scholarship for being in the top 100 candidates out of over **100,000** aspirants in **LPUNEST** 2024

Research

- DISSOLVR: **Interpretable and Fast Solubility Prediction** (Preprint on *ChemRxiv*) *Jul 2025 – Jan 2026*
  Advisors: Prof. Tarak Karmakar, Department of Chemistry; Prof Sayan Ranu, CS Department, IIT Delhi
  - Developed DISSOLVR, an interpretable GBDT-based framework achieving state-of-the-art solubility prediction by approaching the aleatoric limit of uncertainty across major benchmarks (AqSolDB, BigSolDB).
  - Engineered novel Interaction Transformer utilizing cross-attention to model solute–solvent coupling and integrated an LLM-augmented mechanistic explainer to translate complex model outputs into chemical narratives.
  - Optimized computational efficiency to achieve reductions in training and inference costs relative to deep learning architectures while ensuring thermodynamic consistency through physics-constrained boosting.

Projects

- **FPGA System Design** — *COL 215: Digital Logic and System Design* *July – Nov 2025*
  - Built memory-driven systems integrating ROM and RAM for vector operations and Data Structures.
  - Built a car racing game in Verilog with VGA, writing sprite interaction logic with on-board controls.
  - Implemented base modules like Multiplier Accumulator units, Display drivers, debouncers, etc.
- **SocialNet Simulator** — *COL106: Data Structures and Algorithms* *Oct – Nov 2025*
  - Built graph-based **social network backend** with friend recommendations, posts, and shortest-path queries.
  - Implemented **custom AVL Trees** for time-ordered posts and **hashed graphs** for friendship management.
  - Designed modular architecture with efficient memory handling and an interactive command-line interface.
- **Basic Version Control** — *COL106 - Data Structures and Algorithms* *Sep 2025*
  - Developed an **in-memory version control system**, supporting **branching, rollback**, and commit history.
  - Designed and implemented **trees, custom hashmaps**, and **heaps** to manage versioning and analytics.
  - Extended functionality to handle **snapshots, rollbacks**, and **system-wide queries** such as version count.
- **RNNs & Backpropagation Through Time from Scratch** — *Independent Learning* *Jun 2025*
  - Implemented a vanilla **Recurrent Neural Network** using only NumPy, deriving gradients analytically, and coding full BPTT (without ML libraries), implementing gradient clipping and MSE loss.
  - Trained on toggle and sinusoidal sequences achieving $R^2 > 0.99$ across validation and test sets.
  - Co-authored a beginner-oriented paper — "A Complete Guide to RNNs, from First Principles to BPTT".

Technical Skills

- **Programming & Tools:** Python, C/C++, Rust, OCaml, Typescript, Bash, Git, GitHub, LaTeX, Linux/Unix.
- **ML & AI4Science:** PyTorch, GNNs, Transformers, Scikit-learn, Decision Trees, NumPy, RDKit, DeepChem.
- **Systems & Hardware Engineering:** RISC-V, Verilog HDL, Xilinx Vivado, RTL Design, FPGA Prototyping.

Positions of Responsibility & Extracurriculars

- **Machine Learning Research Executive, ARIES (AI/ML Club, IIT Delhi)**
- **Journalist, Board for Student Publications (BSP)**: Recognised as *Top Contributor (Jun 2025).*