Ansh Jain

Bengaluru, Karnataka, India
anshjain.reach@gmail.com | +91 8373900362
linkedin.com/in/anshjain-reach | github.com/ataylus

Education

PES University, Bengaluru

2023 – 2027 (Expected)

B.Tech, Electronics & Communication Engineering; Minor in Computer Science & Engineering

- Cumulative GPA: **7.55 / 10.0** (as of Semester 5). **Semester 5 SGPA: 8.54** (highest across all semesters).
- Merit Scholarship: Rs. 2,000 distinction award for CGPA > 7.75; awarded in Semesters 1, 3, and 5.

CS Minor Course	Grade	CS Minor Course	Grade
Data Structures & Applications	B	Design & Analysis of Algorithms	C
Database Management System	B	Operating Systems	C

Complete Coursework

Semester 1: Python for Computational Problem Solving, Engineering Mathematics I, Electronic Principles & Devices, Engineering Mechanics (Statics), Engineering Chemistry, Constitution of India, Cyber Law & Professional Ethics.

Semester 2: Problem Solving with C, Engineering Mathematics II, Elements of Electrical Engineering, Engineering Physics, Mechanical Engineering Sciences, Environmental Studies & Life Sciences.

Semester 3: Mathematics for Electronics Engineers, Signals & Systems, Computer Aided Digital Design, Analog Circuit Design, Network Analysis & Synthesis, Essentials of Innovation & Entrepreneurship I.

Semester 4: Digital Signal Processing, Digital VLSI Design, Control Systems, Electromagnetic Field Theory, Linear Algebra & its Applications, Essentials of Innovation & Entrepreneurship II.

Semester 5: Digital Communication, Embedded Systems, Artificial Neural Networks, Computer Communication Networks, Computer Organization & Design.

Semester 6 (current): High Performance Computing, Quantum Transport & Logic Gates, Deep Learning, Machine Learning & Applications, Transmission Lines, Waveguides & Antennas.

CS Minor (Summer): Design & Analysis of Algorithms, Operating Systems, Data Structures & Applications, Database Management Systems.

IIT Madras (Online Degree Programme)

2023 – 2024

Foundational Level Certificate in Programming and Data Science

- Foundation-level certification covering programming (Python), computational thinking, statistics, and mathematics for data science from India's top-ranked engineering institution.

Ryan International School, Bengaluru (CBSE)

2021 – 2023

Class XII (2023)	English 85	Hindi 90	Physics 89	Chemistry 75	Mathematics 81	**Comp. Science** **93**	**Overall** **85.5% (Dist.)**
Class X (2021)	English 88	Hindi 99	Hist/Civ/Geo 98	Science 91	**Mathematics** **100**	**Comp. Apps** **100**	**Overall** **∼98%**

- Completed the full Abacus programme (all levels). **Gold Medal, Brain-O-Brain Nationals** (national-level abacus competition).

Research Interests

My technical work sits at a consistent intersection: **systems that exhibit intelligent behaviour from principled design**. Whether that is a multi-agent robot swarm discovering emergent coordinated paths, a protein fitness model revealing that positional memorisation is the root of near-chance predictions,

or a control system that must stay stable while transferring mass mid-flight, the recurring themes are **Computational Modelling**, **Agent-Based Intelligence**, **Emergent Behaviour**, **Reinforcement Learning**, and **Control Theory**.

Demonstrated research directions include: swarm robotics and multi-agent coordination (IEEE RAS internship), computational biology and deep mutational scanning (FitPredict-ML), autonomous aerial systems with non-linear control (Capstone), biomedical signal processing for prosthetics (GestureIQ), geospatial ML for civic tech (Flood Risk Model), and embedded systems with human-computer interaction (REN-CONSOLE). Additionally involved with QForest (PES University's quantum computing club); quantum computing is a longer-term interest area.

Experience

Teaching Assistant Jan 2026 – May 2026

Centre for Innovation & Entrepreneurship (CIE), PES University. Course: EIE-2 (Entrepreneurship & Innovation Essentials), a mandatory, university-wide course covering the entire 2nd-year class across all departments; thousands of students.

- Supported instructional delivery at scale for a mandatory entrepreneurship course reaching thousands of 2nd-year students across every department, working directly under CIE faculty to maintain course quality.
- Revamped and developed comprehensive course materials including redesigned lecture slides, final examination question banks with rigorous quality auditing (balanced answer distribution, option length parity, no answer leaking), and structured workshop facilitation frameworks.
- Facilitated interactive workshops on innovation, ideation, and entrepreneurship fundamentals, mentoring student teams through early-stage concept development and problem-framing exercises.
- **Managed 105 competing teams (509 students) single-handedly** for CIE Ignite Competition (Phase 2 through Finale): individual team follow-ups via email and WhatsApp, scheduling, mentor assignments, finalist coordination, top-20 team selection, and all communications end-to-end.

Professional Debate Adjudicator (Independent Adjudicator; Paid) 2024 – Present

National & International British Parliamentary Circuit. Being a paid independent adjudicator as an undergraduate is uncommon in the Indian circuit; this is a professional-level engagement involving structured evaluation, argument weighing, bias control, and public oral reasoning under pressure.

- Appointed as **Invited Independent Adjudicator (paid)** at IIT Madras Parliamentary Debate 2026 (12 rooms): chaired 2 rounds, served on the Novice Finals panel at one of India's most prestigious collegiate tournaments.
- Invited as **paid IA at Oxford Schools India Qualifiers 2026** (30 rooms): one of the most competitive school-circuit tournaments in India, adjudicating top school debaters from across the country.
- Broke as **Invited IA at NLUO Parliamentary Debate 2026**: selected, competed in the adjudicator break, demonstrating both credibility and competitive relevance.
- Served as **paid judge at NLSIU** for internal competitive debate, demonstrating institutional trust in feedback quality and adjudication standards.
- Panelist at **Open Semi-Finals, Bhaavarth 2.0 Pre-WUDC 2025** (12 rooms): chaired all in-rounds, evaluated the highest-stakes elimination round at a pre-World Schools qualifier.
- **NSF Panel, NALSAR IVDC 2025** (33 rooms; India's largest debate tournament): chaired 3 in-rounds, judged elimination rounds at the biggest tournament in the country.
- Consistently broke as adjudicator at NUALS PD (2025, NF Panel, 1 in-round chaired), PESDT (2024, NF Panel), and multiple other national tournaments.

Summer Intern, IEEE Robotics & Automation Society (RAS) Jun – Jul 2024

Project: Swarm Robotics for Waste Collection. Bengaluru, India.

- Engineered a multi-robot leader-follower algorithm in ROS 2, building a master bot (inclined treadmill-style with magnetic follower bins) and a fleet of TurtleBot3 follower bots with LiDAR-based navigation for a decentralised swarm coordination proof-of-concept.
- Deployed and configured simulation environments in Gazebo and NVIDIA Isaac Sim, validating

emergent coordinated pathfinding to dynamic targets: demonstrating that complex collective behaviour can arise from simple individual agent rules.
- Gained hands-on exposure to the full ROS 2 stack including node communication, sensor integration (LiDAR), and inter-robot coordination; foundational experience later extended in the Capstone aerial docking project.

Summer Intern, RAPID Research Centre, PES University Jun – Jul 2024

Project: IoT-based HVAC Energy Efficiency System. Bengaluru, India.

- Engineered an end-to-end IoT data pipeline using an ESP32 microcontroller and ThingSpeak cloud platform to collect, transmit, and visualise real-time environmental (thermal) data for system modelling.
- Explored computational modelling of room thermal dynamics from collected sensor data, investigating the potential design of a predictive, energy-efficient HVAC control system.

PROJECTS

Machine Learning & Computational Biology

FitPredict-ML: Protein Fitness Predictor 2025 – 2026

Role: Multi-Modal Fusion Lead (effectively solo on fusion architecture). Deep Learning elective course project. Publication-quality outputs with genuine novel diagnostic contribution.

- Diagnosed and remediated a fundamental failure mode in supervised protein fitness prediction: demonstrated that mean-pool ESM-2 embeddings cause models to memorise position-fitness mappings from training labels, producing near-chance ($\rho = 0.038$) Spearman correlation on positional-extrapolation splits for MK01_HUMAN; a problem invisible on standard contiguous splits.
- Developed multi-modal fusion architectures (v1 through v8) in PyTorch integrating ESM-2 650M embeddings, structural features (DSSP), ESM-1v evolutionary scores, and multiple sequence alignment (MSA) features. Systematic ablation: Ridge → MLP → Fusion v1–v5 (mean-pool) → v6 (concat) → v7 (per-residue only, best) → v8 (cross-attention, worse).
- Recovered **+0.233 Spearman** ρ on MK01_HUMAN positional-extrapolation splits by substituting mean-pool embeddings with per-residue embeddings at the mutation site (Fusion v7 vs. v5): $\rho = 0.271$ vs. near-chance $\rho = 0.038$.
- Validated across two unrelated proteins: BLAT_ECOLX (β-lactamase; 4,996 variants) and MK01_HUMAN (ERK2 kinase; 6,809 variants). Fusion v7 achieved $\rho = 0.758$ on BLAT.
- Evaluated against ProteinGym cross-validation schemes (contiguous and positional-extrapolation splits); corrected data leakage and path bugs.

Method	BLAT Contiguous	MK01 Contiguous	MK01 Positional
Fusion v5 (mean-pool)	0.684	∼0.038 (near-chance)	–
Fusion v7 (per-residue) ✓	**0.758**	**0.271**	**+0.233 recovery**

Stack: PyTorch, HuggingFace Transformers (ESM-2 650M, ESM-1v), BioPython, DSSP, Scikit-learn, SciPy, Pandas, NumPy, Python 3.

GestureIQ: sEMG Hand Gesture Classification Jan – May 2026

Co-developer. Team: Ansh Jain, Anshita Sharma, Arnav Rao. ML elective course project (UE23EC352B). Full pipeline targeting prosthetic hand control.

- Designed and executed a complete ML pipeline: preprocessing → EDA → feature extraction (MAV, RMS, ZCR, Waveform Length per channel) → outlier detection (One-Class SVM) → dimensionality reduction (PCA + LDA) → K-Means clustering → KNN, Decision Tree, and SVM classifiers on 58,006 windows of NinaPro DB2 sEMG data (10 subjects, 6 gestures, 12 channels at 2000 Hz), extracting 48-dimensional feature vectors.
- Achieved **92.6% test accuracy and macro-F1 of 0.760 with KNN (K=3)**, outperforming SVM-RBF (88.3%, F1 0.728) and Decision Tree (79.9%, F1 0.492). Used Macro-F1 as primary metric given 76% rest-class imbalance.

- Demonstrated the kernel trick's necessity for biomedical signal data: LinearSVC achieved only F1 ≈ 0.35; switching to RBF kernel jumped to 0.73.
- Built an interactive real-time gesture predictor demo as the centrepiece of the course presentation.

Classifier	Test Accuracy	Test Macro-F1
KNN (K=3)	**92.6%**	**0.760**
SVM-RBF (C=10)	88.3%	0.728
Decision Tree (depth=18)	79.9%	0.492

Stack: NumPy, SciPy, Pandas, Scikit-learn, Matplotlib, Python 3. Dataset: NinaPro DB2.

Robotics & Autonomous Systems

Autonomous Parallel Docking for In-Air Payload Exchange Aug 2025 – Present

Role: Team Lead. Team of 4: Aditi Chandra, Ansh Jain, Arnav Rao, Ishan Goyal. Guide: Dr. Shikha Tripathi (Chairperson, ECE, PES University). Phase 2: Jan–May 2026.

- Completed comprehensive literature review identifying that vertical docking has a documented 20% failure rate even with learned downwash compensation; selected side-by-side parallel geometry to eliminate axial wake interference.
- Initiated simulation environment in NVIDIA Isaac Sim + Pegasus Simulator with PX4-SIL (software-in-the-loop), building multi-drone simulation scenes on cRAIS hardware.
- Developing depth-camera-to-relative-pose algorithmic logic using Intel RealSense D435i, enabling each drone to track the other's position for autonomous approach.
- Implemented PX4-based obstacle avoidance scripts; spearheaded project documentation and GitHub management.
- Target metrics: >95% docking success, <10 cm positioning error, <5° attitude deviation, <0.2 s recovery post payload transfer.

Stack: NVIDIA Isaac Sim, Pegasus Simulator, PX4-SIL, ROS 2, MAVROS, ArduPilot, Python 3, C/C++, MATLAB/Simulink, SolidWorks/Fusion 360, Altium Designer/KiCAD, Intel RealSense D435i, Jetson TX2/Orin Nano.

Embedded Systems & IoT

REN-CONSOLE: Arduino Pong & Snake with Gesture Control 2025

Embedded Systems elective project. Dual retro games on a single microcontroller with touchless controls and self-hosted WiFi scoreboard.

- Architected dual-game embedded system (Pong + Snake) on Arduino UNO R4 using the built-in 8×12 LED matrix; full game logic, collision detection, and scoring on a single microcontroller.
- Implemented touchless gesture control using two HC-SR04 ultrasonic sensors: Pong maps each sensor to a player's paddle; Snake maps wave-left/right to counter-clockwise/clockwise turns, eliminating physical buttons.
- Built the Arduino itself as a live web server using WiFiS3: hosts a real-time HTML scoreboard ("REN-CONSOLE") auto-refreshing every 1 second, with zero external infrastructure.
- Added hardware polish: potentiometer for variable game speed, active-low buzzer for audio feedback; full interaction loop from sensor input to display to audio.

Stack: Arduino C++, WiFiS3, Arduino_LED_Matrix; Hardware: Arduino UNO R4, HC-SR04 × 2, potentiometer, buzzer.

Civic Tech & Geospatial

Bengaluru Flood Risk Prediction Model 2025

Synapse Hackathon, PESU. Team project.

- Built a civic-tech geospatial ML tool integrating a hyperlocal weather prediction model with Bengaluru's lakebed geospatial data, overlaying predicted overflow scenarios against lakebed proximity zones.
- Developed a user-facing risk assessment interface: users input their location and receive a real-time

evaluation of flood risk during heavy rainfall.

Stack: Scikit-learn, geospatial data processing, Python.

Web & Software

Django Web Application Deconstruction 2024

Solo personal learning project.

- Reverse-engineered a full-stack Django application from an existing GitHub repository to trace the Model-View-Template (MVT) data flow end-to-end; isolated authentication flows, database schema management, and ORM patterns through deliberate structural modification.

Minor & Coursework

FPGA Traffic Light Controller 2024

- Implemented traffic light control system on FPGA using Verilog/VHDL on Xilinx toolchain.

Leadership & Positions of Responsibility

TEDxPESU

Clubhead (Jan 2026 – Present) Aug 2024 – Present
Event Production Head (Aug 2024 – Dec 2025)

One of PES University's most prestigious international event brands. TEDx license holder.

As Clubhead:

- Leading overall strategy, operations, and vision, managing a **30+ member core team** across production, curation, design, marketing, and operations.
- Overseeing speaker curation, event conceptualisation, sponsorship acquisition, and cross-functional coordination.

As Event Production Head:

- Directed a **20+ member production team** managing all on-stage execution: audio-visuals, stage management, lighting, and live streaming for **two consecutive TEDx events** (∼200 attendees each).

TEDxPESU 2024: "Mosaics of Modernity" (∼200 attendees)
Speakers: Nikhil Narendran (Partner, Trilegal), Sudiptaa PC (CMO, Shorter Loop), Swathi Vellal (Founder, Ishanya Foundation), Pradyun P Rao (Entrepreneur, PESU '25), Aditi Arya Kotak (Co-founder, Alum-n-i; Miss India 2015), Sanchit Batra (Mentalist).

TEDxPESU 2025: "Tessellations of Time" (Nov 15, 2025; ∼200 attendees)
Speakers: Dr. Deepti Navaratna (Neuroscientist, NIAS/IISc), Virupakshappa Hovale (Head Robotics, L&T), Vivek Vijayakumaran (Our Theatre Collective; Forbes India), Pooja Maheshwari Salwan (AJIO), Nidhi Srivatsa (IP Lawyer, PES), Dr. Vijayagovindarajan (GVMCH).

IEEE Robotics & Automation Society (RAS), PES University

Secretary / Clubhead (Jan 2026 – Present) Dec 2024 – Present
Major Domain Head & Hackathon Co-Head (Dec 2024 – Dec 2025)

PES University's premier robotics society. 100+ members across technical and non-technical verticals.

As Secretary:

- Directing the strategy and operations of a **100+ member** technical society: all verticals including robotics projects, workshops, hackathons, competitions, industry outreach, marketing, content, and media.
- Representing the chapter at inter-university and industry events; building partnerships with external organisations.

As Major Domain Head & Hackathon Co-Head:

- Led all non-technical operations (marketing, content, outreach); effectively the single point of ownership for everything outside the technical pipeline.
- Served as Co-Head for **RoboFest 4.0**: developed the foundational framework including talks, ideathon structure, problem statements, judging rubrics, and participant experience.

ReRO (Remote Robotics Lab) Hackathon: Co-hosted a first-of-its-kind remote robotics hackathon **twice** during tenure. Participants remotely upload code to live physical line-follower robots on campus, receive real-time video feed of their robot's performance, and compete asynchronously. Attracted **international participation** from outside India.

MINERVA: The Media Club, PES University

Clubhead (Jan 2026 – Present) 2024 – Present
Events & Media Head (previously)

PES University's premier media club. The entire JMC (Journalism & Mass Media Communication) department works under and with MINERVA. Runs a website with weekly articles across topics.

As Clubhead:

- Leading content strategy, multimedia production, and branding across campus events and digital platforms.
- Managing designers, videographers, photographers, and content creators; expanding into podcasts and documentary projects.
- Establishing partnerships with other student organisations and external media entities.

As Events & Media Head:

- Conceptualised and executed **Tri-Media-Thon**: an overnight hackathon for media, design, and cross-disciplinary students. Built 20–30 cases of fictional companies in crisis; participants revamped brand identities and media strategy under time pressure. Live crisis injections mid-event. Judged by **CEO of Surge Productions** (who offered internships on the spot). Sponsored by **Adobe**.

PES Debate Society

Marketing Head & Equity Panel Member Aug 2024 – Present

100+ member debate society.

- Developed and executed marketing strategies for two consecutive years, growing visibility and tournament participation.
- Co-hosted **PESDT 2024** (the society's annual tournament, 8 rooms). Tab: pesdt24.calicotab.com
- **Drafted PES Debate Society's equity framework from scratch** (2025 onwards): reviewed equity documentation from global debate circuits, built the society's own framework, ran equity sessions for the full 100+ member society, handles all equity complaints and proceedings.
- Actively mentored junior debaters on competitive strategy and adjudication; co-managed annual recruitment.

Additional Roles

Organising Committee, PR & Campaigning Jan – May 2024

Aatmatrisha 2024: PES University's largest annual cultural festival.

- Managed PR and promotional campaigns: led a volunteer team, on-ground outreach at external venues (Church Street, other colleges), produced promotional social media reels, day-of event management.

Content Creator & Technical Writer 2023 – 2025

CIE Newsletter, Write Angle (literature club), QForest (quantum computing club).

- Secured and conducted interviews with high-profile figures for the CIE newsletter: **Harsha** (CTO of PES University, Founder of 4good.ai), **Adhilash** (Founder, Consuma.ai; interviewed with full team), and **Dr. Shikha Tripathi** (Chairperson, ECE). Published full interview pieces.

- Contributed to content teams for Write Angle and QForest: articles, event coverage, technical writing across domains.

Marketing & Design Contributor 2023 – 2025

Hackerspace, Silicon, Write Angle.

- Developed promotional campaigns and content strategies for multiple technical and non-technical clubs.
- Designed official club merchandise (hoodies, t-shirts), contributing to club branding and identity.

Co-Head, Community Service Aug 2023 – May 2024

Rotaract Club of PES University.

- Led the community service vertical: organised Annadanam (warehouse food donation), RAHI charity drive, and an additional donation drive; raised Rs. 5,000 to 15,000 across events.

Debate & Adjudication Record

Adjudication Record

Tournament	Year	Rooms	Result
Oxford Schools India Qualifiers	2026	30	Invited IA (paid)
IIT Madras Parliamentary Debate	2026	12	Invited IA (paid), NF Panel, 2 chaired
NLUO Parliamentary Debate	2026	–	Broke as Invited IA (paid)
Bhaavarth 2.0 Pre-WUDC	2025	12	OSF Panel, all in-rounds chaired
IVDC / NALSAR Inter-Varsity	2025	33	NSF Panel, 3 in-rounds chaired
NPD / NUALS	2025	10	NF Panel, 1 in-round chaired
PESDT / PES Debate Society	2024	8	NF Panel
NLSIU (Internal)	2025–26	–	Paid Judge

Competitive Record

Tournament	Year	Format	Result	Score
Bengaluru Pre-UADC	2026	BP	3rd Best Novice Speaker	–
SBSPD	2024	BP	Novice Finals; Runner Up	92
RCL	2024	BP	Novice Finals; 2nd Best Novice Speaker	30
NPD / NUALS	2024	BP	Novice Finals; Top Breaking Novice Team	14
CUPD	2024	AP	10th Best Novice Speaker	26

Note: Speaker scores are on different scales across tournaments (BP individual scores, team tab points). Verify scale before external citation.

Summary: 4 paid adjudication engagements (IIT Madras, Oxford Schools, NLUO, NLSIU). Adjudicator breaks: OSF + NSF + 3×NF panels. 3× Novice Finalist, 3× Top Novice Speaker. Largest tournament judged: NALSAR IVDC 2025 (33 rooms; India's largest). Format expertise: British Parliamentary (primary), Asian Parliamentary.

Tab Links: SBSPD '24 · RCL '24 · NPD '24 · CUPD '24 · IVDC '25 · NPD '25 · PESDT '24

Awards & Achievements

Academic

- **Merit Scholarship**, PES University: Rs. 2,000 distinction award (CGPA > 7.75), Semesters 1, 3, and 5.
- **Gold Medal, Brain-O-Brain Nationals** (abacus; national-level win). Completed full Abacus programme.
- Class 10 CBSE: ∼**98% overall**, Mathematics **100/100**, Computer Applications **100/100**.
- Class 12 CBSE: **Distinction (∼85.5%)**, Computer Science 93/100.

Innovation & Entrepreneurship

- **3rd Place, PES University E-Cell Ideathon**: novel startup concept of a physical book library with virtual interface, enabling users to borrow and return physical books without ownership.
- Synapse Hackathon, PESU: team project (Bengaluru Flood Risk Prediction Model).

Debate

- 4 paid IA appointments (IIT Madras, Oxford Schools India, NLUO, NLSIU).
- Invited panelist at India's largest (NALSAR IVDC 2025; 33 rooms). OSF Panel, Bhaavarth Pre-WUDC 2025.
- **3rd Best Novice Speaker**, Pre-UADC 2026. **Runner-Up**, SBSPD '24. **2nd Best Novice Speaker**, RCL '24.
- **Highest Breaking Novice Team**, NPD/NUALS 2024. 3× Novice Finalist, 3× Top Novice Speaker.

Technical Skills

- **Programming Languages:** Python 3, C/C++, Arduino C++, SQL, Verilog/VHDL.
- **Machine Learning / Deep Learning:** PyTorch, HuggingFace Transformers (ESM-2 650M, ESM-1v), Scikit-learn, SciPy, Pandas, NumPy, Matplotlib, BioPython, DSSP.
- **Robotics & Simulation:** ROS 2, NVIDIA Isaac Sim, Pegasus Simulator, PX4-SIL, Gazebo, MAVROS, ArduPilot.
- **Hardware & Embedded:** ESP32, Arduino UNO R4 (WiFi, LED Matrix), HC-SR04, Intel RealSense D435i, Jetson TX2/Orin Nano, LiDAR, TurtleBot3.
- **EDA & CAD:** Xilinx, MATLAB/Simulink, SolidWorks/Fusion 360, Altium Designer/KiCAD, Cadence, Renesas e^2 Studio, QUCS, Ripes Simulator.
- **Web & Frameworks:** Django (MVT, authentication, schema management).
- **Networking:** Wireshark, GNS3.
- **Development Tools:** Git, GitHub, Linux/CLI.

Certifications

Certificate	Institution	Year
Foundational Level Certificate in Programming & Data Science	IIT Madras (Online)	2023–2024

Publications & Academic Output

Status: No publications yet; active planning phase.

Strongest publication candidates:

1. **FitPredict-ML**: genuine novel contribution to protein fitness prediction (positional memorisation diagnostic + fix, replicated across two proteins, ProteinGym benchmarks). Publication-ready outputs.
2. **Aerial Docking Capstone**: conference paper candidate once simulation results mature.

Languages

- **English:** Professional / Native-level proficiency (primary language for debate adjudication and all academic work).
- **Hindi:** Native proficiency.