Aman Verma

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Scholastic Achievements

- Dual Degree Electrical Engineering, Indian Institute of Technology (IIT) Bombay *(2022 - 2027)*
  GPA: 9.2/10 with a Minor in Computer Science
- Achieved **98.3** Percentile in the **JEE Advanced** examination from among **0.15 million+** candidates ['22]
- Secured **99.78** Percentile in the **JEE Main** examination from among more than **1.1 million** candidates ['22]
- Scored **94** Percentage in the **Senior Secondary School Examination** ['22]
- Scored **98.6** Percentage in the **Secondary School Examination** ['20]

Research Experience

Domain Generalization, Model Calibration & Explainable AI *(July'25 – Ongoing)*

Guide: Prof. Amit Sethi

- Architected **end-to-end pipelines** for **domain-generalized**, **well-calibrated**, and **accountable vision models** by integrating **CLIP-based prompting**, **calibration techniques**, and **human-in-the-loop decision policies** across four open-source frameworks: **SentinelCLIP**, **DeMUX**, **xai-subtask-pipeline**, and **megatron_classifier**.
- Designed a **multi-stage calibration and uncertainty estimation stack** (**temperature scaling**, **isotonic post-calibration**, **conformal prediction**, **ensemble-** and **entropy-based measures**) to align **predictive confidence** with **empirical correctness (ECE)** while preserving **out-of-distribution (OOD) performance**.
- Developed **explainability and accountability mechanisms** including **question-based semantic probes** for class-level verification, **GPT-assisted disentanglement** of **domain-specific vs domain-invariant rationales**, and **adaptive thresholding policies** that trigger **human review** for **low-confidence or safety-critical cases**.
- Conducted **empirical evaluation** on **domain generalization benchmarks** (PACS, VLCS, OfficeHome, CIFAR variants), analyzing **accuracy–calibration trade-offs** and **policy-level metrics**; improved **SentinelCLIP zero-shot test accuracy** from ∼**0.86** to ∼**0.90** post-policy intervention.
- Released **reproducible research artifacts** including **public codebases**, **training and evaluation pipelines**, and a **technical report and presentation** documenting methodology, results, and limitations.

AI-Driven Non-Invasive Hemoglobin Estimation | Medical AI Research [Jan '25 – May '25]

Guide: Prof. Nirmal Punjabi

- Worked on **non-invasive hemoglobin (Hb) estimation** using **multisite physiological images** including **conjunctiva, tongue, fingers, and palm**, with **paired CBC hemoglobin values** as ground truth.
- Designed **color-palette–based normalization** and **illumination-invariant preprocessing pipelines** to mitigate **camera- and lighting-induced variability** and isolate **medically meaningful chromatic cues**.
- Formulated **regression and classification** approaches, incorporating **severity-aware classification**, **gender-conditioned modeling**, and **boundary-focused optimization** near **clinical anemia thresholds**.
- Trained **deep learning models** alongside **classical ML baselines**, integrating **anomaly and outlier detection**, **uncertainty-aware losses**, and **clinically relevant evaluation metrics** (MAE, RMSE, sensitivity/specificity).
- Conducted **comparative analysis across anatomical sites** to evaluate **predictive signal strength and robustness**, guiding **model selection and interpretability**.
- Built a **lightweight web-based interface** for **live image capture and inference**, demonstrating feasibility of **low-cost, contactless anemia screening** in **resource-constrained settings**.

Perception Subsystem| Unmesh Mashruwala Innovation Cell (UMIC) [Sep '23 - Present]

A team of 30+ students which designs, fabricates and assembles autonomous drones and has collaboration for Research projects for Mahindra and participates in competitions worldwide like Robodrive (ICRA)

- **Senior Machine Learning Engineer** [Feb '24 - Jul '24]
  · Studied **BEV-Fusion** for *Bird's Eye View (BEV)* generation using **Waymo** Dataset of 6 Cameras and LIDAR and applied **LSS** (Lift Splat Shoot) transform to convert **Camera** data to **BEV** features and applied *Cross-attention* between LIDAR and Camera features to get the best features **overall**
  · Developed a **robust** architecture for **Tiger Detection** using **ResNet-50** and **Pose Estimation** on the **ATRW** Dataset, achieving promising metrics like an accuracy of **91.11%** and an F1-Score of **0.78**
  · Read and implemented **research papers** on Meta Learning **(MAML)** and **Few Shot** Learning
- **Machine Learning Engineer** [Sep '23 - Feb '24]
  · Deployed Deep Learning models on **Amazon Web Services** for **scalable** and **efficient** performance
  · Processed images of **Night Vision Camera** using **Classical Image Processing** Algorithms

Contactless Biometrics | Undergraduate Research Programme [Dec '23 - Jul '24]

Guide: Prof VM Gadre, Electrical Engineering IIT Bombay

- Worked on contactless biometrics for **Unique Identification Authority of India (UIDAI)** Aadhaar
- Developed a classifier which acts as an initial security check to detect **deepfake** images of **fingerprints** trained on the **PolyU** dataset of fingerprints with deepfake images generated using **Diffusion Models**
- Implemented the **ATME** paper and **StyleSwin** to generate stable **deepfake** images of fingerprints
- Worked on **Shearlets** and **Contourlets**, and wrote a paper attempting to prove that the global features captured by the Multi-Head Attention layer of **Vision Transformer (ViT)** are similar to those of Shearlets
- Tested on metrics like *cosine similarity* **(0.98)**, *Structural Similarity Index Measure (SSIM)* **(0.83)**, and *normalized correlation coefficient (NCC)* **(0.75)** between the **Shearlet** and **Attention Map**

Professional Experience

Software Engineer Intern | Texas Instruments [May '25 – Jul '25]

Texas Instruments India Pvt. Ltd.

- Worked on **developer tooling** for internal **SDK workflows**, improving **build reliability**, **automation**, and **cross-platform** developer experience
- Enabled **Docker** for SDK tools, ensuring **reproducible builds** across **local development** and **CI pipelines**
- Designed **Jenkins**-based **end-to-end automation** for SDK **build**, **validation**, and **deployment**
- Built **source-to-installer pipelines** for **Windows**, **Linux**, and **macOS**, streamlining SDK distribution
- Integrated **Pull Request Reviewer Bot** in **Atlassian - Bitbucket** for MCU-SDK with **SDK-specific checks**, **build validation**, and **automated quality gates**
- Implemented **AI-based code review** with **inline suggestions**, **context-aware fixes**, and **error-severity classification** (**High / Medium / Low**), and coupled it with **Klocwork static-analysis checks** to enforce **coding standards** and improve **software quality** at scale.
- Offered a **Letter of Recommendation**

AI Intern | PhnyX Lab [Jun '24 - Jul '24]

Backed by SK Networks, Palo Alto | California

- Generated evaluations for **30** embedding multilingual and Korean models on **18** tasks in **Natural Language Understanding** and **Inference** using the **MTEB** *(Massive Text Embedding Benchmark)* models
- Added a **Korean** tab on the **MTEB** *(Massive Text Embedding Benchmark)* **Huggingface** leaderboard
- Studied about **fine-tuning** for Enterprise search with **multilingual and Korean embedding models** and fine-tuning on **Korean documents** *(domain-specific)* using **RAG** *(Retrieval Augmented Generation)*
- Fine tuned **Korean Models** on **Retrieval** and **Reranking** tasks using **Ko-StrategyQA** dataset on **AWS** instance by preparing the **Data Module** and the complete **Retrieval Module** and the **whole pipeline**

Key Projects

Multimodal Real-Time Anomaly Detection & Industrial Monitoring [Nov '25]

arXiv:2511.18698 | GitHub

- *Architected a **real-time multimodal room/industrial monitoring system** combining **hybrid object detection** (YOLOv8 + DETR), **ByteTrack** multi-object tracking, and a **multi-model audio ensemble** (AST, Wav2Vec2, HuBERT) with learned audio fusion for robustness across diverse acoustic conditions.*
- *Designed an **efficient bidirectional cross-modal attention fusion** backbone (visual ↔ audio) and **cross-detector NMS** , enabling richer contextual reasoning and improved anomaly detection in complex scenes.*
- *Implemented a **multi-method anomaly scoring stack** (statistical z-score, convolutional autoencoder reconstruction, event-based classification) with weighted scoring, artifact archival, and a **Streamlit-based live UI**; demonstrated real-time performance and reported per-frame latency and industrial case-study evaluations.*

EE 782 | Advanced Topics in Machine Learning *[Jul '25 – Nov '25]*

Instructor: Prof. Amit Sethi

Remote-Sensing Image Captioning (RSICD)

- ***Modeling Implementation:** Built and compared two end-to-end captioners (ResNet-18 / MobileNet encoder + LSTM decoder; CNN encoder + Transformer decoder), implemented feature-cache and last-layer fine-tune modes, and resolved multiple LLM-assisted debugging failures (padding/masks, device placement, shape mismatches).*
- ***Evaluation Explainability:** Evaluated with BLEU-4 / METEOR and slice analyses (bright/dark, short/long captions), produced Grad-CAM overlays and attention saliency maps*

Course Project — Enhanced Voice-Activated Security System

- ***System Design Modules:** Implemented a modular Python prototype integrating real-time face recognition, voice activation, motion detection and a professional UI for monitoring.*
- ***Intrusion Escalation Evidence:** Developed staged escalation logic (query → alarm + snapshot), automated snapshot capture for forensic evidence, and dual logging (continuous guard.log + event.json) for auditability.*

Image Super-Resolution using Enhanced CNN (InsaneSRNet) *[Apr '25]*

Course Project, Prof: Biplab Banarjee, GNR638 – Deep Learning for Computer Vision GitHub]

- *Designed and implemented a custom **CNN-based super-resolution architecture (InsaneSRNet)** inspired by **Residual-in-Residual Dense Blocks (RRDB)** for high-fidelity image reconstruction.*
- *Engineered **dense feature reuse, multi-level residual learning**, and **pixel-shuffle based upsampling** to achieve **4×** **spatial super-resolution** on a custom gaming image dataset.*
- *Incorporated a **global skip connection via bilinear interpolation** to preserve low-frequency structure while enhancing high-frequency textures.*
- *Built a **memory-efficient training pipeline** using **mixed precision (AMP)**, Adam optimization, automated checkpointing, and epoch-wise submission generation.*
- *Evaluated performance using a custom **Joint Metric (40×SSIM + PSNR)**, achieving consistent improvements across validation epochs and superior perceptual quality.*
- *Implemented inference and evaluation system with **base64-encoded CSV outputs** for large-scale benchmarking.*

AutoResearch Copilot: Multi-Agent RAG System *[Dec '25]*

LLM-based Research Assistant with Retrieval & Verification

- *Built an end-to-end **AI research copilot** using **Retrieval-Augmented Generation (RAG)** and a **multi-agent architecture** for answering complex queries with citations.*
- *Designed a **5-agent LangGraph workflow** (Planner, Retriever, Reasoner, Critic, Final Answer) enabling **query decomposition, evidence synthesis, and hallucination detection**.*
- *Implemented a **production-grade FastAPI backend** with **LlamaIndex + FAISS** for document indexing and retrieval, supporting confidence scoring and follow-up question generation.*
- *Delivered a full-stack system with a **Streamlit UI**, **Dockerized deployment**, async APIs, and transparent **agent-level traces** for explainable AI behavior.*

OTAP: Open Telemetry & Analytics Platform *[Dec'25]*

Production-Grade Data Engineering & Analytics Platform

- *Built a **cloud-native, end-to-end telemetry platform** supporting **high-throughput ingestion, real-time stream processing, and lakehouse analytics** using only **open-source technologies**.*
- *Implemented **CDC pipelines** (PostgreSQL → Debezium → Kafka) and **Flink streaming jobs** for enrichment, deduplication, CEP, and windowed aggregations at scale.*
- *Designed a modern **lakehouse architecture** with **Apache Iceberg + MinIO** (bronze/silver/gold), integrated with **ClickHouse, Cassandra, Trino, and dbt** for sub-second OLAP and ELT workflows.*
- *Deployed the platform on **Kubernetes** with **GitOps CI/CD** (GitHub Actions, ArgoCD, Helm, Terraform) and full **observability** using **Prometheus, Grafana, Loki, and Jaeger**.*

CollabBoard: Real-Time Collaborative Platform *[Dec '25]*

Trello/Notion-style Collaboration System

- *Architected a **real-time, multi-tenant collaboration platform** with **React (Web)** and **React Native (Mobile)** clients backed by a **microservices architecture**.*
- *Implemented a **polyglot backend** using **Spring Boot** (API Gateway, command services) and **Go** (read models, async workers) following **CQRS** and event-driven design.*
- *Designed a scalable data layer with **PostgreSQL** (transactions), **Redis** (caching & locks), **Elasticsearch** (search), and **Kafka/RabbitMQ** for real-time events and background processing.*
- *Provisioned and deployed the system on **Kubernetes** using **Docker, Helm, and Terraform**, emphasizing horizontal scalability, fault isolation, and production-ready infrastructure.*

Conductor Platform: Real-Time Collaborative Studio *[Dec '25]*

Remix + Node.js Microservices with Real-Time Collaboration

- *Architected a **real-time collaborative platform** using **Remix** (frontend), **Express.js** (REST APIs), and a dedicated **WebSocket (Socket.io)** service for low-latency interactions.*
- *Designed a **service-oriented backend** with **JWT-based auth**, **Prisma ORM**, and **PostgreSQL**, supported by **Redis** for caching/pub-sub and session coordination.*
- *Implemented **event-driven background processing** using **RabbitMQ** and **Kafka**, with worker services for async jobs, notifications, and workflow execution.*
- *Containerized and deployed the platform with **Docker Compose** and production-ready **Kubernetes/Terraform scaffolding**, enabling scalable local-to-cloud development.*

Field Ops Platform: Real-Time Operations System *[Distributed Systems Project]*

Collaborative Platform for Coordinating Distributed Field Teams

- *Designed a **real-time field-operations platform** using **NestJS (Fastify)** with **MongoDB** for transactional workflows and **Cassandra** for high-throughput, time-series operational data.*
- *Built multi-surface clients across **Angular (Web)**, **React Native (Mobile)**, and **Electron + React (Desktop)** from a shared **TypeScript monorepo** with reusable DTOs and UI components.*
- *Deployed and managed services on **Kubernetes** using **Helm** and **ArgoCD (GitOps)**, enabling safe rollouts, environment parity, and horizontal scalability.*
- *Implemented end-to-end **observability** with **OpenTelemetry**, **Prometheus**, and **Grafana** for metrics, tracing, and production debugging.*

Voice-Controlled Computer Navigation System *[AI Automation Project]*

Natural Language Voice Interface for Windows OS

- *Built a **natural-language voice assistant** for **hands-free computer control**, enabling application launch, file management, system actions, and web navigation on **Windows**.*
- *Implemented **speech recognition** with Google Speech API and a modular **NLU pipeline** for robust command parsing across multiple phrasings and parameters.*
- *Engineered a secure **automation execution layer** using Python and Windows APIs, with **safety confirmations** and fail-safes for destructive operations.*
- *Designed a **config-driven, extensible architecture** (JSON-based commands/settings) allowing rapid addition of new skills, applications, and wake-word–based interaction.*

Social Media Algorithms and Attention *[Nov '25]*

Course Project – Introduction to AI, Data, and Policy

- *Conducted a **policy analysis** of **engagement-driven social media algorithms** using literature from **public policy***
- *Analyzed **design mechanisms** such as **infinite scroll, autoplay, and notifications***
- *Evaluated **global regulatory frameworks** and enforcement gaps in **algorithmic transparency, and governance**.*
- *Proposed **evidence-based policy interventions** including **algorithm audit** and **well-being-oriented design**.*

Hospital OPD Patient-Flow Simulation using AnyLogic *[Nov '25]*

Course Project, IE 630: Simulation and Modelling

- *Developed an end-to-end **discrete-event simulation** of OPD operations using **AnyLogic**.*
- *Modeled patient arrivals and services using **empirically-fitted distributions** (Exponential, LogNormal, and **mixture models**) calibrated from **NAMCS/literature**.*
- *Evaluated system performance via **KPIs** including mean and **95%ile waiting/sojourn times**, **resource utilization**, and **LWBS** to identify bottlenecks and specialist saturation.*
- *Performed **server-capacity sensitivity analysis** and delivered **actionable staffing and throughput recommendations** supported by visual AnyLogic flow diagrams.*

3-DOF Robotic Arm — Learning & Replay *[Jan–Apr '25]*

Course Project, Guide: Siddharth Tallur, Electronic Design Lab

- *Designed and fabricated mechanical modules (disk & elbow) using **Autodesk Fusion 360**, with parts produced via **3D printing** and **laser cutting**; integrated an **electromagnet** end-effector for pick-and-place.*
- *Engineered the power-distribution **PCB** in **KiCad** to route voltages according to individual **servo** loads, included encoder interfaces and electromagnet driver; PCB was printed and assembled for robust power delivery.*
- *Developed real-time control firmware on a **Raspberry Pi Pico** to manage **3 servo motors + encoders**, accept **joystick** teleoperation, and implement **motion recording & replay** using **inverse kinematics** and **Catmull–Rom** interpolation*
- *Integrated hardware and software to demonstrate reliable **pick-and-place** cycles, characterized servo performance under load, and delivered full documentation (mechanical files, KiCad PCB, and firmware) for reproducible lab deployment.*

Cryptanalysis of Symmetric & Post-Quantum Cryptography *[Course Project, May '25]*

Topics in Cryptology, Guide: Virendra Singh

- *Implemented the **AES block cipher from scratch**, including **SubBytes, ShiftRows, MixColumns, and Key Expansion**, and validated correctness against standard test vectors.*
- *Performed **key-recovery cryptanalysis** under a **partial leakage setting**, analyzing scenarios where **intermediate round outputs** and final ciphertext are known to infer key information.*
- *Conducted an in-depth **cryptanalysis study of post-quantum schemes** by formulating **Learning With Errors (LWE)** as **LP, ILP, and MILP** optimization problems to recover secrets under bounded noise.*
- *Implemented end-to-end attacks in **Python (PuLP/LP solvers)**, evaluated **success regimes, solver scalability, and parameter hardness**, and highlighted why cryptographic-scale PQC parameters resist optimization-based attacks.*

Implementation of RISC *[May '23]*

Course Project, Prof: Virendra Singh ,Microprocessors and Digital Circuits

- *Designed **flowcharts, control logic, and datapath** for computing systems with their respective **ISAs***
- *Implemented a multi-cycle processor, **IITB-CPU**, for a 16-bit computer system, incorporating **8 registers** and point-to-point communication infrastructure utilizing VHDL's capabilities to model the hardware components*
- *Developed a 16-bit, 6-stage pipelined microprocessor, **IITB-RISC-23**, based on the Little Computer Architecture.*
- *Optimized the performance using hazard mitigation techniques like **data forwarding** and **branch prediction***

Assembly & Embedded C - Embedded Systems with Intel 8051 *[Jan '23 - Apr '23]*

Course Project, Prof. Nikhil Karamchandani | Microprocessors Lab

- *Programmed Intel **8051** based **Pt-51 micro-controller** using **Assembly and Embedded C***
- *Implemented keyboard interfacing, **LCD** display, and used **timers and external interrupts** for stopwatch*
- *Used **serial port interface (SPI)** to interface an analog-to-digital converter **(ADC) MCP3008***
- *Established serial communication using a **USB-UART** module and successfully executed a **2-Layered Neural network** and displayed the output on **LCD Screen***

Robotic Arm | Line Follower Bot *[Jan '23]*

Course Project, Guide: Prof. DK Sharma, Joseph John, Department of Electrical Engineering

- *Developed a **Robotic Arm** on a **line follower** that used **an ultrasonic sensor** to **detect and pick** up obstacles on its path and drop them, used **3 servo motors** in the **arm** to **pick and move** the **object***
- *Gained valuable expertise in **Arduino** and **Embedded C** components, including IR sensors, and motor driver*
- *Ranked among the **top 24 teams out of 120+**, and **showcased** our project to **the Director** and senior faculty members and alumni of IIT Bombay*

RL-based Stock Optimization | FinSearch *[May-Jul'23]*

Finance Club, Undergraduate Academic Council

- *Evaluated and compared **Reinforcement** Learning (RL) and **ARIMA** models for **NIFTY-50** stock analysis*
- *Applied RL algorithms: **Q-learning** and **PPO** using **OpenAI Gym**, simulating various market scenarios*
- *Analysed using Key metrics: **Annualized Mean Returns** - 12.5%, 9.8%, 7.3%; **High Volatility Ratio** - 0.15, 0.22, 0.30; **Sharpe Ratio** - 1.45, 1.12, 0.85 **(PPO, Q-learning, ARIMA)** and prepared a report*
- *Demonstrated that **PPO** outperforms **Q-learning** and **ARIMA** in returns and risk-adjusted performance*

DeepVision Odyssey | Winter in Data Science *[Dec'23-Jan'24]*

Analytics Club, Undergraduate Academic Council

- *Worked on **ResNets** and **Convolutional Neural Networks** to build end-to-end **deep learning models***
- *Developed **object detection** models such as **YOLO** (Bounding Boxes) and **segmentation** models like **U-Net***
- *Studied **self-attention** and **cross-attention** mechanisms and implemented **Vision Transformers (ViT)***
- *Explored **GANs** and **Autoencoders**, implementing a **Conditional GAN** on the **Fashion MNIST** dataset*
- ***Implemented** and **analyzed** a **research paper** on the **Swin (Sliding Window) Transformer***
- *Read research papers on **Neural Radiance Fields (NeRFs)** to generate **3D views from 2D images***
- *Studied **Depth Estimation** and **Pose Estimation** models for advanced **computer vision applications***

Intro to Data Science *[Aug-Nov'23]*

Course Project, Guide: Prof Vinay Kulkarni, Centre for Machine Learning and Data Science

- *Analyzed **solar plate data** to detect and rectify anomalies using **Multiple Linear Regression (MLR)***
- *Predicted yield and hazard determining factors in **chemical plant data** using features identified by **VIF***
- *Achieved top **accuracy** of **95.22%** among **80+ teams**, **earning special mention** for our **analysis***
- *Introduction to **big data tools** like **Apache Spark** and **Google Cloud Platform** for scalable data processing*

Generative AI and Large Language Models *[May - Jun'24]*

Self-Project

- *Used **Google Gemini Pro** to build a **GenAI Calorie Tracker** app with a **Google Gemini LLM***
- *Built a **Gradio application** to create **blogs** based on keywords and user inputs, including **image generation***
- *Worked on **MultiModel RAG** on **PDFs** using **Llama Indexing** and **OpenAI Vision Models***
- *Studied fine-tuning of LLMs using **PeFT**, **LoRa**, and **Q-LoRA**, reducing trainable parameters to **0.83%***

Positions of Responsibility

Teaching Assistant | **Department of Mechanical Engineering** *[Sep '23 - Dec '23]*

Course: Makerspace, Guide: Prof. Krishna Jonnalagadda

- *Mentored **15+** students, helping teams to build an **electromechanical machine** from design to demonstration*
- *Provided support in **CAD and Hardware Assembly** ensuring the project's **robustness** and **functionality***

Web Convenor | **Institute Cultural Council (ICC)** *[Jul '23 - Apr '24]*

- *Created web pages for **11+ clubs under ICC**, enhancing their **online presence** and **engagement***
- *Developed and maintained a **General Championship** page to display scores of hostels in various competitions*

Student Mentor | **Summer of Science** *[May '24 - Jul '24]*

Summer of Science is a scientific learning project initiative by the Maths and Physics Club

- *Mentored **10+** students on **Artificial Intelligence and Computer Vision**, providing assistance and resources*
- *Aided in their projects by evaluating their **progress periodically**, ensuring **learning** and **project success***

Key Courses Undertaken

Machine Learning, Artificial Intelligence & Data Science:	Advanced Topics in Machine Learning, Introduction to Data Science and Machine Learning, Machine Learning for Remote Sensing I & II, Energy Data Analytics, Introduction to AI, Data, and Policy, Reliability and Failure Analysis of Electronic Devices, Simulation Modeling and Analysis
Computer Science & Systems:	Data Structures and Algorithms, Design and Analysis of Algorithms, Computer Networks, Programming for Data Science, Computer Programming and Utilization, Topics in Cryptology, Operations Analysis
Electrical Engineering (Core & Applied):	Digital Signal Processing, Signal Processing I, Communication Systems I, Electromagnetic Waves, Control Systems, Microprocessors, Electronic Devices & Circuits, Analog Circuits, Digital Systems, Power Engineering I & II, Introduction to Electrical Engineering
Electrical Engineering Laboratories:	Electronic Design Lab, Digital Circuits Lab, Analog Lab, Electronic Devices Lab, Control Systems Lab, Communication Systems Lab, Microprocessors Laboratory
Mathematics, Probability & Optimization:	Linear Algebra, Calculus I & II, Differential Equations, Probability and Random Processes, Operations Analysis
Interdisciplinary, Research & Design:	Supervised Research Exposition, R&D Project, Design Thinking for Innovation, Introduction to Sound Design, Environmental Studies (Science & Engineering), Technical Communication

Technical Skills

Backend, APIs & Distributed Systems:	Node.js, Express.js, NestJS, Spring Boot, FastAPI, REST, GraphQL, Microservices, Load Balancing, WebSockets, Caching, Event-driven Architecture
Machine Learning & Deep Learning:	Supervised & Unsupervised Learning, Deep Neural Networks, Optimization, Representation Learning, Model Training from Scratch, Regularization, Calibration, PyTorch, TensorFlow, Keras, Scikit-Learn
Artificial Intelligence & Applied AI Systems:	Computer Vision, NLP, Remote Sensing, Multimodal Models, Uncertainty Estimation, Explainable AI, Human-in-the-loop AI, Reinforcement Learning (foundations), OpenCV, HuggingFace, spaCy
Data, MLOps & Cloud Infrastructure:	NumPy, Pandas, SciPy, ML Pipelines, Experiment Tracking, Model Deployment, PostgreSQL, MongoDB, Redis, Kafka, ETL, AWS, Docker, Kubernetes, Terraform
Programming Languages:	Python, JavaScript, TypeScript, Go, Java, C++, SQL

Extracurricular Experience

- *Completed a year-long course under the **National Cadet Corps (NCC)** during the first year* *['22-'23]*
- *Ideated a product for **Time management** for IITB Students in a course on **Design Thinking*** *['22-'23]*
- *Machine Learning and Deep Learning Specialization at **deeplearning.ai** | **Coursera*** *['23]*
- *Completed a **Public speaking course** under the **Summer School of Cult** | **WeSpeak Club*** *['23]*
- *Worked on **RUST** and **Zero-Knowledge Proof** in a **BlockChain and Web3 Bootcamp*** *['23]*
- *Actively participated and Won several medals in **Chess and Cricket** in Inter and Intra School* *['10-'19]*