

Aman Verma

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SCHOLASTIC ACHIEVEMENTS

- Dual Degree EE, Indian Institute of Technology Bombay GPA: 9.2/10 with a Minor in Computer Science (2022 - 2027)
- 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]

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**

RESEARCH EXPERIENCE

Domain Generalization, Model Calibration & Explainable AI

(July '25 – Ongoing)

Guide: Prof. Amit Sethi

- Architected **end-to-end research pipelines** for domain-generalized, calibrated, and accountable vision systems, integrating **CLIP-based prompting**, **post-hoc calibration**, and **human-in-the-loop decision policies** across multiple open-source frameworks: **SentinelCLIP**, **DeMUX**, **xai-subtask-pipeline**, and **megatron_classifier**.
- Designed a **multi-stage uncertainty and calibration stack** combining **temperature scaling**, **isotonic regression**, **conformal prediction**, and **ensemble- and entropy-based measures**, achieving improved **confidence-accuracy alignment (ECE)** while maintaining **OOD robustness**.
- Developed **explainability and accountability mechanisms**, including **question-based semantic probes** for class-level verification, **GPT-assisted disentanglement** of **domain-invariant vs domain-specific rationales**, and **adaptive confidence thresholds** to trigger **human review** in safety-critical or low-certainty scenarios.

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**

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.
- 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**;

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**
- Designed a **5-agent LangGraph workflow** (Planner, Retriever, Reasoner, Critic, Final Answer) enabling
- Implemented a **production-grade FastAPI backend** with **LlamaIndex + FAISS** for document indexing and retrieval,
- Delivered a full-stack system with a **Streamlit UI**, **Dockerized deployment**, async APIs,

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**
- Implemented **CDC pipelines** (PostgreSQL → Debezium → Kafka) and **Flink streaming jobs** for enrichment
- 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 platform** with **React (Web)** 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.
- 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 processing** using **RabbitMQ** and **Kafka**.

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. **observability** with **OpenTelemetry, Prometheus, and Grafana**.

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

TECHNICAL SKILLS

Backend & Distributed Systems:	Node.js, Express, NestJS, Spring Boot, FastAPI, REST/GraphQL, Microservices, WebSockets, Event-driven Systems
AI / ML Systems:	Deep Learning, Representation Learning, Optimization, CV, NLP, Multimodal AI, XAI, Uncertainty, PyTorch, TensorFlow, Scikit-Learn
Data, MLOps & Cloud:	NumPy, Pandas, ETL, ML Pipelines, Kafka, PostgreSQL, MongoDB, Redis, Docker, Kubernetes, Terraform, AWS
Languages:	Python, JavaScript, TypeScript, Go, Java, C++, SQL