

ISHAAN GUPTA

Gainesville, FL | ishaang1410@gmail.com | [LinkedIn](#) | [GitHub](#)

Research Interests: Federated & Decentralized Learning • Trustworthy Machine Learning • Distributed AI/LLM Systems • Evaluation & Reproducibility

M.S. Computer Science student with hands-on research in personalized federated learning under non-IID multimodal client heterogeneity and first-author peer-reviewed computer-vision research. Built auditable public-sector data/LLM pipelines and production multi-LLM integrations, with a focus on reliable, reproducible distributed learning systems.

EDUCATION

University of Florida

M.S. in Computer Science | GPA: 3.88/4.0

Expected 2027

Gainesville, FL

University of Mumbai

B.Tech in Artificial Intelligence and Machine Learning | CGPA: 9.47/10

2025

Mumbai, India

Selected Graduate Coursework: Distributed Machine Learning; Computer and Network Security; Machine Learning Engineering; Algorithms; Software Engineering

RESEARCH EXPERIENCE

Personalized Federated Learning for Heterogeneous

2026

3D Medical Image Segmentation

Distributed Machine Learning Research Project / University of Florida

- Investigated whether modality-specialized experts can reduce cross-modal interference in non-IID federated 3D abdominal segmentation, using AMOS22 with CT-only, MRI-only, and mixed client distributions.
- Built a SwinUNETR/MONAI architecture with a globally shared pretrained encoder and modality-specific bottlenecks and expert decoders; ran four controlled 110-epoch ablations to isolate which components should be shared versus personalized.
- The selected shared-encoder / separate-latent / separate-decoder design achieved 0.830 CT and 0.806 MRI validation Dice in centralized ablations.
- Deployed the selected architecture in a three-client cross-silo federated setup for 90 rounds, applying FedAvg only to the 42.58M-parameter shared encoder while keeping approximately 102M client-specific expert parameters local.
- Reduced parameters exchanged per aggregation by approximately 71% relative to full-model sharing; the federated model retained 0.83 CT Dice, and the mixed-modality client consistently learned faster than single-modality clients in the reported training curves.

GATE-Dehaze: GAN-Attention-Transformer Ensemble for Satellite Image Dehazing

2025

First-author research /

Thakur College of Engineering and Technology

- Proposed GATE-Dehaze, an adaptive ensemble combining four GAN-based U-Net variants: a standard U-Net, Transformer-enhanced U-Net, Transformer U-Net with CBAM, and Transformer U-Net with channel attention.
- Evaluated the method on public satellite dehazing benchmarks including SateHaze1k and real Sentinel imagery using PSNR and SSIM, with experiments spanning multiple haze densities and comparisons against prior dehazing methods.
- Improved SSIM in the paper's benchmark comparison from 0.9061 to 0.9257 on thin haze and from 0.9264 to 0.9516 on moderate haze, while preserving complementary local, long-range, edge, and channel information through ensemble fusion.
- Led the work through peer review as first author; the resulting research article was accepted in March 2026 and published in the Turkish Journal of Remote Sensing in July 2026.

Satellite Image Mosaicking and Visual Question Answering

Additional computer-vision research / Thakur College of Engineering and Technology

- Engineered a real-time statistical image-mosaicking pipeline for seamless stitching of satellite imagery, complementing the dehazing work with downstream geospatial image assembly.
- Implemented a visual question-answering system that accepts natural-language queries over satellite images, connecting computer-vision representations with language-based analysis.

PUBLICATIONS

Gupta, I., Rawal, Y., Gupta, S., & Alegavi, S. (2026). "GATE-Dehaze: A GAN-attention-transformer ensemble for satellite image dehazing." *Turkish Journal of Remote Sensing*, 8, 1828786. doi:10.51489/tuzal.1828786

SELECTED PROFESSIONAL EXPERIENCE

Reserve Bank of India

Jun 2026 – Aug 2026

Summer Intern, Data Science

Mumbai, India

- Engineered an end-to-end agricultural intelligence pipeline ingesting government publications from 5+ sources and converting heterogeneous PDFs and spreadsheets into normalized, linked, queryable datasets for cross-source analysis.
- Built a hybrid document-extraction system using Gemma 4 31B, Camelot, and Python with schema-constrained zero-shot extraction, chunked processing, NDJSON recovery, caching, geographic-location repair, deduplication, and auditable source-level provenance.
- Scaled analytics to 1.2M+ records by migrating pandas/CSV workflows to Parquet + DuckDB, enabling efficient SQL filtering, joins, and reproducible analyses over million-row public-sector datasets.
- Developed a FastAPI + Next.js analytical dashboard with incremental data loading, exposing the processed data through a responsive interface while preserving traceability back to source documents.

Swarmauri — USA-based Startup

Sep 2024 – Oct 2024

Software Developer, Contract

Remote

- Integrated 5+ LLM providers and 4+ vector databases into the production Swarmauri SDK, expanding support for heterogeneous model and retrieval backends behind common software interfaces.
- Implemented and optimized Pinecone, Weaviate, Redis, and Neo4j integrations, strengthening vector retrieval and NoSQL capabilities across the SDK.
- Executed 10+ integration tests, resolved critical provider/database integration bugs, and simplified implementation paths to reduce codebase size and improve maintainability.

CiteCert

Dec 2024 – Feb 2025

AI Quant Researcher

Mumbai, India

- Built an LLM-based financial-news pipeline for sentiment classification and information extraction, achieving 94%+ accuracy on evaluated samples.
- Automated ingestion and alignment of financial news with market-price data to study relationships between news sentiment and subsequent stock-price movements.

Robofly Technology Pvt. Ltd.

Oct 2023 – Nov 2023

Software Developer Intern

Patna, India

- Developed a deep-learning fire-detection system from a multi-source image dataset, achieving 98%+ classification accuracy on the project evaluation set.
- Evaluated feature-extraction and augmentation strategies across 10,000+ test samples to improve robustness and generalization across image conditions.

HONORS & SELECTED PROJECTS

1st Prize — Rajasthan Police Hackathon

₹50,000 Prize

AI Security and Surveillance System

- Built computer-vision components for traffic-violation detection, license-plate recognition, helmet compliance, camera-based pulse-rate estimation, and drone/facial-recognition security use cases; awarded first place at the state-level hackathon.

TECHNICAL SKILLS

Programming: Python, Java, SQL, JavaScript/TypeScript
ML / Research: PyTorch, Federated Learning, Deep Learning, LLMs, NLP, Computer Vision
Data / Distributed Systems: PySpark, Apache Spark, DuckDB, Parquet, Pandas, Redis, Neo4j, MongoDB, PostgreSQL, SQLite
Engineering / Compute: Git, FastAPI, REST APIs, React, Next.js, GPU-based PyTorch training and experimentation
Service: Event Manager, Super AI Community Stakeholder Connect, Thakur College of Engineering and Technology (Mar 2023 – Jan 2024).