

Madhav Arora

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EDUCATION

Thapar Institute of Engineering & Technology

Patiala, Punjab

B.E. Electronics & Computer Engineering | CGPA: 8.02/10

2023 – 2027

- Coursework: DSA, OS, DBMS, Computer Networks, Computer Architecture, Control Theory, Cloud Computing, Data Science & AI, AI/ML & Applications
- URF Awardee FY25-26 (University Research Fellowship)
- Won **InovateX** (1st, Little'Learners AI platform) and **Create'n'Conquer** (3rd, egocentric data pipeline)

EXPERIENCE

Research Intern — Federated Learning: eICU Mortality Study

Sep 2025 – Mar 2026

Washington State University

- Built and version-controlled (Git) a multimodal federated learning pipeline across 10,000 ICU patients from 140 hospitals; designed a three-branch FixedFusionNet (BiLSTM + TF-IDF + note-type) to prevent modality collapse in distributed training.
- Refined via twice-weekly reviews with two mentors; best config (FixedFusionNet + FedProx) reached AUROC 0.7406 (120/217 deaths detected), and a proposed local weighted BCE correction cut per-hospital variance by 32.4% vs. FedAvg. Under review: *IEEE Trans. Dependable & Secure Computing*.

AI Engineer & Head — Planning and Outreach

Dec 2025 – Present

Little'Learners (Start-up)

- Leading technical development and product planning for an assistive web and mobile learning platform for children ages 4–12 with learning disabilities (dyslexia, dyscalculia, dysgraphia), using Computer Vision, NLP, and AR to power therapeutic mini-games.
- Architecting the MVP — database, admin dashboard, and parent/teacher/clinician tracking portals — while reviewing code and coordinating a cross-functional team of engineers and paediatric specialists across India, California, and Zurich.
- Running an efficacy research and survey track in parallel with development to validate mini-game interventions.

ELC Research Activity — Invisible Watermarking Attacks

Summer 2025

Thapar Institute of Engineering & Technology

- Designed and evaluated black-box adversarial attacks (GANs, CNNs) against four benchmark invisible watermarking systems — StegaStamp, InvisMark, TreeRing, and StableSignature — achieving 71.4–79.86% removal rate.

PUBLICATIONS & PROJECTS

AI/ML Research Publications | *PyTorch, ViT, BERT, EfficientNet, ResNet, VGGNet*

Feb 2024 – Present

- Published** “Enhancing Strabismus Diagnosis from Detection to Classification with Deep Learning,” AIMLA 2025 — self-acquired dataset; benchmarked EfficientNet, ResNet, and VGGNet, achieving 92% accuracy.
- 1st author**, “Pixels Meet Words” (I2ITCON 2026, accepted) — ViT-B16+BERT fusion for CrisisMMD informativeness classification, 85% accuracy (F1 0.81, AUC 0.892); **co-authored** “DisasterNet” (CVIP 2025) — TPF-MBT fusion for damage-severity classification, 80.95% accuracy, 8+ points above prior SOTA.
- Presented 2 full papers at THEC 2025 — “MOSAIC,” a cultural-knowledge-graph-guided multimodal fusion framework (1st author), and a mixed-methods internship-impact study introducing the CCTM career-growth model (2nd author); 1st-author abstract “CrisisStream” (TICSR’26) on real-time CrisisMMD triage, $\leq 2s$ latency.

Full-Stack & App Development | *React, Node.js, Express, MongoDB, PostgreSQL, React Native*

2024 – Present

- Designed and deployed a live client website for a printing press business (dharamyugpress.com).
- Developing *Modern Monopoly*, a MERN business-simulation game with a reinforcement-learning bot opponent and dynamic market events; core game logic complete, bot and UI in progress.
- Engineering a capstone platform for PSPCL Punjab that consolidates billing, fraud detection, and OCR/YOLO model-integration pipelines — currently split across three vendor systems — into one application with a unified database, dashboard, and user interface.

TECHNICAL SKILLS

Languages: Python, C/C++, JavaScript, SQL, HTML/CSS

AI/ML: PyTorch, TensorFlow, Keras, Scikit-Learn, OpenCV, YOLO, CNNs, RNNs, GANs, Transformers, LLMs, Federated Learning, Prompt Engineering

Data & Cloud: Pandas, NumPy, Matplotlib, Seaborn, AWS (S3, EC2), Big Data (Hadoop), Git, GitHub, Claude Code, Jupyter, Google Colab

Web, Databases & Tools: React, Node.js, PostgreSQL, MySQL, Figma, VS Code, Notion

CO-CURRICULAR & LEADERSHIP

Official Mentor & Society Representative

2023 – Present

Thapar Institute of Engineering & Technology

- Mentored 300+ students through technical workshops and one-on-ones; coordinated logistics and content strategy for events across multiple campus societies reaching 4000+ audience.

Executive Committee Member — Saturnalia & URJA Annual Festivals

2023 – Present

Thapar Institute

- Managed *Rs.*2.5+ lakh budgets; led marketing and outreach across 4 large-scale events with 10,000+ participants; grew events reach by more than 10%.