

Madhav Dogra

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EDUCATION

Institute	Degree / Exam	Year	Percentage/CGPA
Vellore Institute of Technology, Vellore	B.Tech in Computer Science	2023 – 2027	9.21
Delhi Public School R.K. Puram, New Delhi	Senior Secondary (Class XII)	2023	90.4%
Delhi Public School R.K. Puram, New Delhi	Secondary (Class X)	2021	96.4%

EXPERIENCE

- **Machine Learning Intern, DRDO – Scientific Analysis Group (SAG)** May 2026 – July 2026
 - Building a real-time, edge-deployable IoT intrusion-detection system that works on encrypted traffic from payload-free flow metadata alone: a shared Mamba (state-space) encoder feeds a supervised classifier for known attack categories and a one-class deep SVDD head that flags zero-day threats, with SHAP-explainable alerts.
 - Across a multi-source IoT-23 benchmark (6 captures, 31,960 flows), achieved 98.2% accuracy, 0.984 macro-F1, and 0.935 anomaly ROC-AUC at 5.0 ms/flow on CPU; payload-free header features separate short flows by structure (benign, scan/botnet, brute-force) rather than fine attack family, with int8 quantization and cross-dataset/FGSM-robustness validation underway.
- **Software Engineer Intern, LilySys** May 2025 – July 2025
 - Built a Dockerized REST API middleware connecting Acoem Sensors to MPPCB (Madhya Pradesh Pollution Control Board), integrating 400+ air sensor units and 43 Continuous Ambient Air Quality Monitoring Stations (CAAQMS) statewide; automated data extraction, SQL table creation, and standardized transmission.
 - Developed a Vendor Management System with a clean and responsive UI, optimized for operational efficiency and seamless vendor lifecycle tracking.
- **Independent Research Project** July 2025 – Present

Working under the supervision of Dr. Bhawana Tyagi (Assistant Professor Sr. Grade 1, VIT, Vellore) on a research paper proposing a novel cloud load balancing algorithm using a statistical approach to optimize system performance and resource allocation.

PROJECTS

- **Tatami** [\[App Store\]](#)

A minimalist logic puzzle game on the App Store, based on the Japanese Tatami room-tiling constraint puzzle. 2000+ handcrafted levels across multiple difficulty tiers with a clean, paper-inspired aesthetic and a star rating system for solving speed and accuracy. Built end-to-end in SwiftUI with a full StoreKit 2 monetization pipeline (consumables, non-consumables, and auto-renewable subscriptions) plus receipt validation, restore flow, entitlement gating, AdMob integration, and full Apple business compliance.
- **Eulerian** [\[App Store\]](#)

A minimalist graph theory puzzle game on the App Store, inspired by Euler’s path problem. 2000+ handcrafted levels across 10 packs, a procedurally generated endless mode, and a hand-drawn notebook aesthetic with a star rating system for speed and efficiency. Built end-to-end in SwiftUI with a full StoreKit 2 monetization pipeline (consumables, non-consumables, and auto-renewable subscriptions) plus receipt validation, restore flow, entitlement gating, AdMob integration, and full Apple business compliance.
- **PetnPets** [\[Details\]](#)

A comprehensive pet management and social platform combining medical record tracking, vaccination reminders, and vet visit logs with social features like pet profiles, community feeds, and lost pet alerts. Implemented role-based access control (RBAC) with distinct user, admin, and partner access levels. Backend powered by AWS (RDS, S3, Lambda) for scalable data storage and serverless compute. Includes a smart collar concept with GPS and health monitoring.
- **EchoTouch** [\[Details\]](#)

An AI-powered wearable for deaf and hard-of-hearing individuals that translates environmental sounds into haptic feedback patterns. Built with STM32 microcontrollers, Azure AI services, and edge ML models for real-time sound classification and intuitive vibration-based alerts.

- **Mathematics Resources**

[\[Details\]](#)

Driven by a deep love for mathematics and the belief that education should be free and accessible, I created and published open-source mathematical resources for learners and educators.

AWARDS

- **Winner, All India UIDAI Government Data Hackathon (2026)**

[\[Details\]](#)

50,000+ participants, 15,000+ teams

Performed large-scale data analysis on 4.94 million Aadhaar records across 873 districts to develop the Child Biometric Gap Index (CBGI), a 5-model ML ensemble framework achieving 90.2% prediction accuracy and identifying 25 critical districts for biometric intervention. Presented before and awarded by the Unique Identification Authority of India.

- **First Place, Stat-a-thon (2025)**

Led the team and was awarded first place for proposing and partially implementing a novel hybrid neural architecture for stock market trend prediction. Our model, TKLA, combined Kolmogorov-Arnold Networks, multi-scale LSTMs, hierarchical attention, and option-specific features.

- **First Place, IEEE Hack-Battle (2025)**

Led the team and won first place for creating a game interconnected with human blinking patterns, showcasing innovative human-computer interaction design.

PATENTS

- **Non-Invasive Bone-Stiffness Probe with Soft-Tissue Damping Compensation** **Published (2026)**

Indian Patent Application No. 202641096868; co-inventor. Clamp-on probe that vibrates a limb and reads bone resonance through paired accelerometers for a radiation-free stiffness index; soft-tissue damping is rejected by preload-sweep extrapolation combined with inter-sensor differential flexural-wave phase.

- **Intent-Verifying Pointing Device for Users with Hand Tremor**

Filed (2026)

Indian patent application, provisional specification; co-inventor. Assistive pointing device that gates each click on whether the press was volitional, judged from the shape of its mechanical transient (attack slope, ringdown damping, spectral centroid, not amplitude) and conditioned on the hand's 4–6 Hz tremor state captured before contact.

- **Self-Gating Piezo-Acoustic Micro-Leak Detector for Plumbing Fixtures**

Filed (2026)

Indian patent application, provisional specification; co-inventor. Clamp-on watcher that takes both valve state and leak evidence from one passive piezo channel, flagging a micro-leak when residual turbulence outlives the installation's own post-closure decay envelope, far below a domestic flow meter's threshold.

SKILLS

- **Programming Languages:** Python, Java, C, C++, Go, Swift, Dart, JavaScript, TypeScript, Embedded C, HTML, CSS, LaTeX
- **Frameworks:** SwiftUI, Flutter, React, Next.js, Node.js
- **Mathematical/AI Tools:** MATLAB, R (Language), NumPy, SciPy, TensorFlow, PyTorch, Transformers, Azure AI
- **Databases:** Supabase, MySQL, SQL Plus, NoSQL, PostgreSQL
- **Tools & Platforms:** Git, Docker, AWS, Azure, STM32, JetBrains IDEs, VS Code
- **Languages:** English (Professional), Hindi (Native), French (Basic)

CERTIFICATIONS

- **Oracle Cloud Database Services Professional**
- **Oracle Cloud Infrastructure, Generative AI Professional**
- **Oracle Analytics Cloud 2025 Certified Professional**