

RITHICK BHARATHWAJ S

Teaching machines to see, listen, and explain themselves.

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EDUCATION

Bachelor of Engineering, Computer Science and Engineering **Aug 2023 – May 2027 (expected)**
Chennai Institute of Technology (Anna University), Chennai, India — CGPA 8.25/10

RESEARCH INTERESTS

Large language models · MLOps & production machine learning systems · applying deep learning to new domains (demonstrated across radar, vision, and acoustics)

EXPERIENCE

Research Intern, DRDO — Electronics & Radar Development Establishment (LRDE), Bengaluru **May 2026 – Jul 2026**

- Applied deep learning to a new domain — radar signal intelligence: co-developed **RD-ViT**, a hybrid CNN–Vision Transformer framework that jointly detects and localizes small marine targets in sea clutter on range–Doppler maps.
- Reached **97.3% probability of detection** and **87.6% exact range-gate localization** (90.2% within ± 1 gate) with under 0.8M parameters per head — an order of magnitude smaller than comparable learned detectors, with zero false alarms on held-out clutter.
- Devised a donor-target transplantation training scheme that makes localization gate-agnostic; co-authoring a research paper in preparation for a radar conference.

Research Intern, Chennai Institute of Technology — Chennai, India **May 2025 – Jul 2025**

- Built a multi-objective model-compression framework unifying structured pruning, INT8 quantization, and knowledge distillation for object detectors (YOLOv5/v8, SSD, EfficientDet) on drones — up to **60% model-size reduction** and **40% inference speedup** with negligible accuracy loss, with a hardware-aware simulator for Jetson Nano and Raspberry Pi 4.
- Developed a deep-learning environmental acoustic monitoring system that classifies sound events and computes an ecosystem-health score from biophony/anthrophony patterns.
- Drafted two IEEE-format manuscripts from this work, gaining end-to-end experience in experimental design, result analysis, and technical writing.

Software Developer Intern (Testing & Backend), Anjane Technologies — Chennai, India **Nov 2024 – Jan 2025**

- Tested and developed features for a production React Native application; automated test suites with Jest, improving coverage and release reliability.
- Worked with Git branching workflows and Docker-based CI/CD pipelines on GitHub Actions in an agile, cross-functional startup team.

PROJECTS

LLM-Native Operating System (Python, Ollama, Rust)

- Designed a Linux-based OS where a small local LLM (3–4B params, CPU-only, offline) is the primary interface: intent routing, tool-calling agent, and a safety gate with action previews and a full undo audit log.
- Achieved **90% mean tool-call accuracy** on a 100-case benchmark with 48/48 destructive-action refusals; includes a from-scratch Rust kernel lab.

Mechanistic Interpretability Framework for Transformer LMs (Final-Year Project; PyTorch)

- Built an interactive framework (TransformerLens, SAE-Lens) to reverse-engineer transformer language models: logit lens, activation patching, ablation, sparse-autoencoder features, activation steering, and automated circuit discovery via edge attribution patching, with faithfulness evaluation of recovered circuits.
- Served every analysis through a FastAPI backend with a React UI for visual exploration of GPT-2's internals.

Safety-Gated Desktop Automation Assistant for macOS (Python, Groq/Gemini APIs, Ollama)

- Built a desktop assistant with semantic document search (vector embeddings), file organization, and app/system control; routes between cloud LLMs and a fine-tuned local Llama 3.2 fallback, with every file action logged and undoable.

TECHNICAL SKILLS

Languages: Python, C++, JavaScript/TypeScript, Java, SQL, Rust (basics)
AI / Machine Learning: PyTorch, TensorFlow/Keras, LLMs & local LLMs (Ollama, fine-tuning), Vision Transformers, CNNs, mechanistic interpretability (TransformerLens, SAE-Lens), reinforcement learning
Agentic AI & Claude Ecosystem: Claude Code & Claude agent environments — agent-loop engineering, tool orchestration, MCP servers, skills/subagents, prompt engineering; built and shipped multiple projects end to end inside agentic workflows
Data & Signal Processing: NumPy, pandas, SciPy, librosa, Matplotlib, Plotly
Software & MLOps: FastAPI, Streamlit, React, Node.js, Docker, GitHub Actions (CI/CD), Git, Jest, pytest, MongoDB, PostgreSQL, Firebase
Certifications: ServiceNow Certified System Administrator (CSA) & Certified Application Developer (CAD)

ACHIEVEMENTS & LEADERSHIP

- Competed in multiple local and national hackathons with several shortlistings and final-round finishes, including a 3rd-place national finish (Tech Hackathon 2025).
- Solved 400+ LeetCode problems (contest rating 1650); 50+ competitive programming contests.
- Leader, College Music Club — event planning and team coordination; experienced public speaker in panels and debates.