

Aditya Agarwal

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2× Published Researcher (IEEE & Springer Nature) | Reliability-Focused Engineer — Linux, Automation, Testing & Scripting

EDUCATION

S.R.M Institute of Science and Technology, Chennai, Tamil Nadu

Sept 2021 – May 2025

B.Tech in Electronics and Communication Engineering

CGPA: 9.01/10

SKILLS

Systems & Reliability: Linux/UNIX, Git, GitHub, Docker, GitHub Actions (CI/CD), automated testing, agile collaboration

Languages: Python, SQL, C

AI & LLM: RAG, LangChain, ChromaDB, Ollama, LLaMA, Groq API, OpenAI API, Prompt Engineering, Machine Learning, Deep Learning

Data & Tools: PostgreSQL, Supabase, Google Colab, PowerBI, Tableau

WORK EXPERIENCE

L&T Technology Services, Pune

Sept 2025 – Present

Associate Engineer — Embedded Systems & AI

- Wrote and validated **firmware for STM32F4 microcontrollers** across 3+ embedded projects, performing rigorous hardware-level testing on **Linux-based toolchains** to ensure system reliability and production readiness.
- Designed and implemented **FPGA logic modules** in Vivado IDE, improving the **scalability and reliability** of hardware-accelerated functionality for real-time industrial control systems.
- Integrated **LON (Local Operating Network) protocol** into the embedded communication stack, enabling reliable device-to-device messaging across industrial nodes.
- Built and maintained a **Python automation tool** using LangChain + RAG to streamline EOL component research — **collaborating cross-functionally** within a small team to reduce manual toil per component cycle.
- Conducted **EOL (End-of-Life) component analysis** across product BOMs, tracking 100+ part numbers and **sharing findings with stakeholders** to flag obsolescence risks and maintain supply chain continuity.
- Tools & Tech:** STM32CubeIDE, Vivado, VS Code, Linux, Git, Python, LangChain, FPGA, STM32

PROJECT WORK

YojanaGPT — AI Assistant for Indian Government Schemes

2025 | [GitHub](#) | [Live Demo](#)

Python, FastAPI, LangChain, RAG, ChromaDB, Groq (Llama-3.3-70B), Docker, HuggingFace Spaces

- Built and **deployed a production RAG system** that answers queries on **4,357 Indian government schemes** across 22 Indian languages — live on HuggingFace Spaces.
- Scraped and ingested the entire myscheme.gov.in dataset, chunking it into **22,467 vector embeddings** stored in ChromaDB using multilingual MiniLM-L12-v2.
- Implemented **hybrid keyword + semantic search** with language detection and auto-translation, enabling queries in all 22 constitutionally recognized Indian languages.
- Designed a **FastAPI backend with 6 specialized endpoints**: Q&A, eligibility checker, document checklist, scheme comparison, application guide, and helpline finder.
- Shipped a full **CI/CD pipeline via GitHub Actions with 69 passing unit tests**, using **peer-reviewable test coverage** across parser, chunker, and vector store to maintain code quality; **containerized with Docker** for reliable, reproducible, and scalable deployment.

Urban Library — Society Library Management App

2026 | [GitHub](#)

React Native, Expo, Supabase, JavaScript, PostgreSQL

- Designed and shipped a **production mobile app** actively used by **300+ flats** to manage a physical book library — replacing a fully manual process end-to-end with an emphasis on **system reliability** under real daily usage.
- Built a one-tap **borrow/return system** with automated 15-day due date tracking, overdue login alerts, and an admin dashboard with real-time stats and member management.
- Catalogued **700+ books** with search and filter by genre, age group, and theme; wrote a custom bulk-import script to migrate the full inventory from Excel into PostgreSQL.
- Architected a clean, **scalable 4-table PostgreSQL schema** on Supabase with row-level policies for member and admin role separation.

Medical Image Classification for OCT Scans

2025 | [GitHub](#)

Python, scikit-learn, OpenCV, CNN, Transfer Learning, KNN, Random Forest

- **Published in IEEE and Springer Nature** based on results from this project — classifying AMD-affected vs normal eyes across a dataset of **4,200 OCT retinal images**.
- Built two parallel pipelines: classical ML (KNN + Random Forest with correlation matrix feature selection) and deep learning (custom CNN + MobileNet, ResNet50, DenseNet), **benchmarking systematically** for reproducible, reliable results.
- Achieved top accuracy through **hyperparameter tuning** across learning rate, optimizer, and epoch configurations; benchmarked all architectures systematically.

RESEARCH PUBLICATIONS

Retinal Disease Detection and Classification Using CNN and Transfer Learning

June 2025

ICARECS-2025, Atlantis Press (Springer Nature) | DOI: 10.2991/978-94-6463-754-0_61

- Proposed a deep learning pipeline for automated OCT retinal image classification combining a custom CNN with transfer learning (MobileNet, ResNet50, GoogleNet, DenseNet); benchmarked across hyperparameter settings to identify the top-performing architecture.
- Published in **Atlantis Highlights in Engineering** series, Springer Nature. [View Paper](#)

Classification of OCT Images with Customized Features Using Machine Learning Models

April 2025

RAEEUCCI-2025, IEEE | DOI: 10.1109/RAEEUCCI63961.2025.11048263

- Built a complete ML pipeline to classify 4,200 OCT images into AMD-affected and normal categories using KNN and Random Forest; applied correlation matrix analysis for feature selection to improve accuracy.
- Published at **IEEE RAEEUCCI 2025**, Chennai, India. [View Paper](#)