

MUTHUKKUMARAN B

Software Development Engineer | Backend Developer | Full-Stack Web Developer | Aspiring AI Engineer
mailto:muthukkumaranb@gmail.com | India | [LinkedIn](#) | [GitHub](#) | [Portfolio](#)

PROFESSIONAL SUMMARY

Second-year Information Technology student who builds backend systems and ML pipelines whose results can be checked. Led a 6-member Smart India Hackathon 2026 team on two systems (shortlisted at the college level, submitted for the national level), merged a bug fix into deepset's Haystack, and have an open PR to LlamaIndex. Seeking SDE/backend or AI/ML engineering internships.

TECHNICAL SKILLS

Languages: Java, Python, C++, C

Backend & Web: Django, Django REST Framework, Flask, Celery, HTMX, React, TypeScript, Streamlit

ML & Data: LightGBM, PyTorch, scikit-learn, conformal prediction, pandas, NumPy, OpenCV, MediaPipe

Core Concepts: OOP, Data Structures & Algorithms, REST APIs, Unit Testing & Mocking, Reproducible ML Evaluation

Tools & Platforms: Git, GitHub, VS Code, SQLite, Celery, Ollama (local LLM), pytest, g++

EXPERIENCE

Technical Trainer Intern — CSC Computer Education, Erode

Apr 2026 – May 2026

- Taught Python, C and C++ to 50+ students through structured sessions, lab exercises, practice problem sets and doubt-clearing sessions.
- Received a certificate of excellence from the organization for communication and technical delivery.

OPEN SOURCE

LlamaIndex — Bug fix in SimpleDirectoryReader (run-llama/llama_index)

Oct 2026

- Reported and fixed a crash when loading documents through an fsspec DirFileSystem ('PurePosixPath' object is not iterable) by passing string paths at three `fs.open()` call sites; added 3 regression tests, all 34 reader tests pass ([Issue #23663](#), [PR #23664](#), under review).

deepset Haystack — Bug fix in LaraDocumentTranslator (deepset-ai/haystack-core-integrations)

Oct 2026

- Reported and fixed run-time overrides being silently ignored for falsy values (`reasoning=False`, empty glossaries) caused by `x or self.x` fallbacks; switched eight parameters to explicit `None` checks with a mocked regression test ([Issue #4168](#), [PR #4169](#), merged).

PROJECTS

SHIKRA — Predictive maintenance for an aircraft fleet · SIH 2026 (SIH26249) · Team lead, team of 6

Aug 2026 – Oct 2026

Python | LightGBM | Conformal prediction | OR-Tools | Streamlit | SQLite | pytest

- Built the remaining-life model: a LightGBM quantile ensemble with conformal 80% intervals on NASA C-MAPSS, reaching RMSE 11.64 on FD001 vs 18.45 for a published CNN baseline, with 81% held-out coverage.
- Built data ingestion with a data-quality quarantine and an HMAC-SHA-256 audit log for officer sign-off; the team's 54-aircraft simulation (30 seeds) cut unscheduled engine removals from 72.7 to 0 per year; 140 tests, bitwise-reproducible results.

ShadowCat — Early network-attack warning · SIH 2026 (SIH26153) · Team lead, team of 6

Aug 2026 – Oct 2026

Python | PyTorch | scikit-learn | Ed25519 | Merkle trees | Streamlit

- Built ingestion of flow records and raw PCAP captures into a 406-feature per-minute network state, and an Ed25519-signed SHA-256 audit chain with a Merkle root giving $O(\log n)$ inclusion proofs for every forecast.
- The team's LSTM world model and stacked ensemble reached detection F1 0.990 and 5-minute onset F1 0.907 under 37-fold leave-one-episode-out validation; 75 tests and one-command reproduction.

SENTINEL — Insider-threat detection · CSI Origins 2026, VIT Chennai (finalist) · Team of 4

Aug 2026

Python | Flask | scikit-learn | React | TypeScript | pytest

- Built most of the React + TypeScript investigation console and parts of the Flask API, event processing, ML dataset builder and model registry.
- Fuses a behaviour engine, a 60-minute attack-sequence engine and a Random Forest into one risk score, with analyst feedback, gated model promotion and rollback; 47 tests.

Mini ERP — 14-module business ERP · Odoo x KAHE Hackathon (finalist) · Team of 2

Jun 2026

Django | DRF | HTMX | Celery | Ollama (local LLM) | pytest

- Built the inventory, purchasing and procurement modules with Celery background tasks, a signal-based audit log, and a voice-assistant API that maps local-LLM intents to an allowlist of ERP actions; the team app has 102 tests.

Also: **HoloTwin PINN** (Aerathon 2026, HAL x IIT Indore, team of 2): PyTorch physics-informed surrogate for a turbojet digital twin, exported to ONNX · **ASHA health voice agent** (Murf AI, 10 Days of Voice Agents for Bharat): multilingual agent with LiveKit phone calling, consent-based memory and human fallback · **Air Canva** (solo): MediaPipe gesture-controlled drawing.

EDUCATION

Bachelor of Technology — Information Technology

2025 – 2029

Sri Krishna College of Engineering and Technology, India | CGPA: 9.05 / 10.0

Relevant Coursework: Data Structures & Algorithms, OOP with C++, Discrete Mathematics, Computer Organization, Operating Systems

ACHIEVEMENTS & CERTIFICATIONS

- SIH 2026 team lead (team of 6): SHIKRA and ShadowCat shortlisted at the college level, submitted for the national level.
- 5x hackathon finalist (10+ entered): Odoo x KAHE, Samhita (MIT Chennai), Hydro Hackathon (IIT Madras), Sparkathon (CIT), CSI Origins (VIT Chennai).
- Student Hackathon Coordinator, B.Tech IT, SKCET: conducted [Tech-Escape](#), a HackerRank coding contest, leading the organising team.