

# AARADHYA DEV TAMRAKAR

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## PROFILE

Electronics, Communication and Information student at IOE, Kathmandu Engineering College (Year IV/I). Builds ML pipelines spanning classification, regression, tree-based ensembles, and agentic Text-to-SQL systems; deploys via FastAPI and Docker; develops Android apps with Kotlin/Jetpack Compose. Advancing through the Fusemachines AI Fellowship and NSSR DataCamp Fellowship, while leading SPARK, an ESP32-S3 edge-AI wearable fall-detection system.

## EDUCATION

**Bachelor of Engineering (B.E.)** Expected: January 2027  
*Electronics, Communication and Information — Institute of Engineering (IOE), Kathmandu Engineering College | Year IV / Part I*  
**Coursework:** Machine Learning · Signals and Systems · Digital Electronics · Control Systems · Communication Systems

## EXPERIENCE

- Vice Chair**  
*IEEE KEC KTM Student Branch*

2026 – Present

  - Directed branch strategy, scaling initiatives and member engagement across executive committees.
  - Managed relations across the broader technical community.
- Event Manager**  
*Electronics Project Club (EPC), Kathmandu Engineering College*

2026 – Present

  - Coordinated logistics for club workshops and department activities.
- Makerspace Ambassador**  
*KEC Maker's Space, Kathmandu Engineering College*

June 2026 – Present

  - Shipped site-wide fixes to the Maker's Space website — image repair, content consistency, UI cleanup.
- Vice Secretary**  
*IEEE KEC KTM Student Branch*

2025 – 2026

  - Streamlined operations and grew program participation by managing documentation and orchestrating workshop logistics.
  - Coordinated volunteers alongside the committee for seamless execution.
- Resource Manager**  
*Electronics Project Club (EPC), Kathmandu Engineering College*

2024 – 2026

  - Allocated scheduling and resources for workshops across multiple departments.

## FELLOWSHIPS & RECOGNITIONS

- Fuse AI Fellow — Fusemachines AI Fellowship 2026**  
*Fusemachines*

Active

  - Qualified through the Fusemachines AI Fellowship entrance exam (March 2026): linear algebra, calculus, probability, Python, ML.
  - Developed a containerized REST API with FastAPI, PostgreSQL, and Docker.
  - Engineered a five-stage agentic Text-to-SQL pipeline (Planner → Generator → Validator → Executor → Summarizer).
  - Validated the five-stage Text-to-SQL pipeline at 100% execution success and accuracy on a 50-question benchmark.
  - Created an end-to-end churn and CLV pipeline achieving 5-fold CV ROC-AUC 0.841, threshold-tuned for the top-200 high-risk segment.
  - Trained Random Forest and XGBoost ensembles with SMOTE and SHAP explainability.
  - Implemented probabilistic models spanning Bayesian estimation and Gaussian process regression via PyMC/ArviZ.
  - Segmented customers on UCI Online Retail II (~500K transactions) using K-Means and DBSCAN; delivered an executive narrative.
  - Benchmarked nine forecasting models; built a four-model ensemble that achieved MASE 2.44.
- NSSR DataCamp Fellow — Cohort 2**  
*Nepalese Society of Student Researchers*

2026 – Present

  - Secured competitive selection (April 2026) for a sponsored DataCamp Premium license, one of a limited cohort.

- Delivered six applied GenAI solutions, automating null filtering, deduplication, and schema normalization across product and data workflows.
- Completed coursework toward SQL Associate and Python Data Associate certifications in PostgreSQL, Pandas, statistics, and scikit-learn.

## PROJECTS

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### SPARK — Wearable Fall Detection System (Major Project)

ESP32-S3 · TensorFlow Lite Micro · SHAP · MQTT · FastAPI · PostgreSQL

- Designed a two-layer ESP32-S3 fall-detection system combining a <5ms threshold gate with an INT8 1D CNN confirmation layer under 100ms.
- Computed per-event SHAP explanations at a local, non-cloud gateway.
- Presented the SPARK project proposal to the review panel; demo targeted for March 2027.
- Led the AI and backend work package (WP 1.0) — CNN training pipeline, FastAPI/PostgreSQL gateway — within a 4-person team supervised by Er. Dipen Manandhar.

### Gesture-Controlled Self-Balancing Robot (GCSBR) — Minor Project

Computer Vision · Arduino · MPU6050 · Stepper Motors · Android · MATLAB

- Earned a 'major project level' rating from the examiner.
- Implemented PID stabilization firmware, validated via a MATLAB-simulation-to-hardware pipeline.
- Developed an Android gesture-control app (MediaPipe, CameraX, HC-05 BT) driving motors for real-time actuation.

### Edge AI Stability Detection System

Python · Scikit-learn · FastAPI · Joblib

- Predicted platform stability from simulated IMU data using a Random Forest model, reaching 99.8% test accuracy; served via FastAPI.

### Alpha Android Super-App

Kotlin · Jetpack Compose · Material3 · DataStore · Apache POI

- Assembled a modular Android super-app (SDK 36) with gesture control, an eSewa Gmail budget tracker, and a Material3 design system.

### Nexus — Personal AI Operating System

React (Vite) · FastAPI · SQLite + FTS5 · httpx · asyncio

- Unified Groq (Llama 3.3 70B) and Gemini into an AI workspace via parallel fan-out routing, with SQLite + FTS5 context injection.

## SKILLS

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**Programming:** Python, C, C++, Kotlin, SQL (PostgreSQL / SQLite), VHDL

**Machine Learning:** scikit-learn, NumPy, Pandas, XGBoost, Random Forest, Logistic/Ridge/SGD Classifiers, Lasso, ElasticNet, SMOTE (ImbPipeline), SHAP, GridSearchCV, Stratified K-Fold CV, Joblib, PyMC, ArviZ, pgmpy, Bayesian Inference, Gaussian Process Regression, K-Means, Hierarchical Clustering, DBSCAN, Time Series Forecasting (SARIMA, Holt-Winters, Prophet, LightGBM, LSTM)

**Android Development:** Kotlin, Jetpack Compose, Material3, DataStore, CameraX, MediaPipe, Apache POI

**Deployment:** FastAPI, REST APIs, Docker, PostgreSQL, Streamlit, asyncio, Joblib

**Embedded Systems:** Arduino, ESP32-S3, MPU6050, Stepper Motors, HC-05 BT, UART, MQTT, FPGA, Vivado

**AI / Local LLM:** Ollama, AnythingLLM, Prompt Chaining, Agentic Query Systems

**Tools:** Git, GitHub, VS Code, Jupyter Notebook, Google Colab, MATLAB, LaTeX / Overleaf, SSMS

**Other:** Project Coordination, Public Relations, Microsoft Office, Canva

## CERTIFICATIONS & ACTIVITIES

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IEEE WIE Nepal LaTeX Workshop (May 2026) · IEEE SPAX organizing team · Prompt Engineering Fundamentals, TechAxis · IEEE Xtreme 19.0 (Team ShadowXTREME) · PCB Design & Fabrication Workshop, KEC Robotics Club · AWS Cloud Computing Workshop · Microsoft Learn Student Ambassador

Participate in IEEE KEC KTM Student Branch, Electronics Project Club, KEC Maker's Space, and KEC Music Club.

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