SHIVA SHRESTHA

Applied Machine Learning • Embedded Systems • Secure Edge AI

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SUMMARY

Applied ML researcher specializing in secure on-device LLMs, multimodal medical AI, and embedded intelligent systems. Experienced in LLM fine-tuning, federated optimization, differential privacy, edge deployment, robotics, IoT, and full-stack embedded ML pipelines.

EDUCATION

PhD, Computer Science 2025–Present
Kennesaw State University, USA
Focus: Edge Security, Federated Learning, On-device LLMs
Advisor: Dr. Honghui Xu

B.E., Electronics, Communication & Information Eng. 2019–2024
IOE WRC, Tribhuvan University
82.32% (Faculty Topper)

RESEARCH & INDUSTRY EXPERIENCE

Graduate Research Assistant 2025–Present
Kennesaw State University

- **DP-FedLoRA**: Differentially private federated on-device LLM adaptation — **ICDM 2025 Best Paper Runner-Up**.
- **KDLLM (First Author)**: Knowledge-distilled medical LLM with improved QA accuracy and reduced hallucination.
- **MedSpeak**: Spoken medical QA with Whisper + knowledge-graph grounding + LLM reasoning.
- **ClinX**: Privacy-preserving multimodal VQA (OCR PHI masking, PP-GAN anonymization, LLaVA-Med scoring).
- **Edge-LLM IDS**: Syscall-based anomaly detection using n-gram + Isolation Forest + LLM explanation on Raspberry Pi.
- **Drone Damage Analysis**: Jetson Nano + YOLO disaster-mapping with GPS geo-tagging and Pixhawk telemetry.

Electronics Engineer Apr 2024–Aug 2024
Yarsa Tech, Nepal

- Built **STM32 multilingual toy**: Flash storage + DAC + amplifier audio system.
- Developed ESP8266 audio playback system with SPI Flash.
- Designed **Smart Cloud Printer**: Raspberry Pi + MQTT + CUPS for automated legacy printing.
- Automated industrial barcode printing (Python + Linux).

PUBLICATIONS

[J1] **S. Shrestha**, H. Xu, et al. *KDLLM: Knowledge-Distilled Large Language Model for Efficient Medical QA*. Tsinghua Science and Technology, 2025. Paper Link

[C1] H. Xu, **S. Shrestha**, et al. *DP-FedLoRA: Privacy-Enhanced Federated Fine-Tuning for On-Device LLMs*. **ICDM 2025 — Best Paper Runner-Up**. Award Link

[J2] P. Paudel, S. Shrestha, **S. Shrestha**, et al. *Automated Waste Sorting with Delta Arm and YOLOv8*. IRO Journal, 2024. Paper Link

[C2] **S. Shrestha**, et al. *Deep Learning for Waste Management*. IOE Graduate Conference, 2024. Paper Link

SELECTED PROJECTS

- **MedSpeak (LLM + ASR + KG)** — Medical QA with Whisper ASR, KG grounding, LLM semantic correction.
- **ClinX** — Privacy-aware medical multimodal pipeline with PP-GAN and LLaVA-Med scoring.
- **Edge-LLM Intrusion Detection** — Syscall anomaly detection using n-gram + Isolation Forest + LLM.
- **Drone Damage Classifier** — YOLO damage detection on Jetson Nano with GPS geo-tagging.
- **STM32 Storytelling Toy** — Embedded Flash-based multilingual audio playback.
- **Smart Cloud Printer** — IoT-enabled printing using Raspberry Pi + MQTT + CUPS.
- **Delta Arm Waste Classifier** — YOLOv8 + delta robot sorting (mAP@50: 0.98).
- **Smart Access System** — ESP32 RFID entry + smoke detection automation.
- **LoRa Weather System** — Long-range telemetry + ML forecasting.
- **Ambulance Triage (Sajilo)** — An uber like app for Ambulance with ML-based triage using SVM and RF.

TECHNICAL SKILLS

- **Languages:** Python, C, C++, JavaScript
- **ML/AI:** PyTorch, TensorFlow, Scikit-learn, Whisper, LLaVA, CLIP, XGBoost
- **Embedded:** STM32, ESP32/8266, Raspberry Pi, Pixhawk, Embedded Linux
- **IoT/Systems:** MQTT, CUPS, Syscall Tracing, Shell Scripting
- **Web:** React, Node.js, Tailwind, MongoDB, MySQL, Firebase
- **Tools:** Git, KiCad, Keil, VS Code, Linux, Docker

HONORS & AWARDS

- **Best Paper Runner-Up**, IEEE ICDM 2025 (DP-FedLoRA)
- **Faculty Topper**, BEI, IOE WRC (2024)
- Winners: NSU Demo (2024), E-GEN Expo (2024), MechTRIX (2023)
- Runner-Up: ICES Datathon (2024)
- District Topper, NEB +2 Science (2017)

LEADERSHIP & ACTIVITIES

- Senior Member, Robotics Club — IOE WRC (2023–2024)
- Design Transformer, Robotics Booster — IOE WRC (2022–2023)
- Member, Robotics Club — IOE WRC (2021–2022)
- Coordinator, Battle for Speed Robotics (2022)

REFERENCES

- **Dr. Honghui Xu** — Professor, Kennesaw State University ✉ hxu10@kennesaw.edu
- **Prashant Bhatta** — CTO, Yarsa Tech ✉ bhattaprashant00@gmail.com
- **Asst. Prof. Smita Adhikari** — IOE Western Regional Campus ✉ smita@wrc.edu.np