

Bimarsha Khanal

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📍 Kathmandu, Nepal

EDUCATION

Bachelors in Computer Engineering

Tribhuvan University, Institute Of Engineering, Pashchimanchal Campus

Nepal

2019-2024

- **Coursework:** Software Engineering, Operating Systems, DSA, AI, DBMS, Big Data Technologies, Distributed Systems
- Awarded a full undergraduate scholarship for ranking in the top 3% of the Institute of Engineering entrance examination

RESEARCH INTEREST

- Multimodal LLMs and AI Agents
- Trustworthy AI, Privacy Preserving, and Secure AI Systems

SKILLS

- **Machine Learning:** Deep Learning, Transformers, Preference Optimization, Retrieval-Augmented Generation (RAG), AI Agents, Multimodal Learning, SFT, DPO
- **Frameworks:** PyTorch, Hugging Face Transformers, Scikit-learn, OpenCV, ONNX
- **Programming:** Python, C++, JavaScript, Bash, SQL
- **Systems & Infrastructure:** Linux, Docker, AWS, HPC Environments, Vector and Graph Databases

PROFESSIONAL EXPERIENCE

Machine Learning Engineer

Fusemachines, Nepal

Kathmandu, Nepal

March 2024 - Present

- Built and delivered AI-driven systems, including document intelligence pipelines for financial workflows and research on multi-modal LLM-powered interview agent for assisting hiring managers throughout recruitment process.
- Collaborated with cross-functional teams to integrate ML solutions into production and communicate technical concepts to both technical and non-technical stakeholders.

Teaching Assistant

Fusemachines AI Fellowship

Nepal

March 2026 - Present

- Conducted sessions in a six-month AI fellowship program for students and working professionals on deep learning fundamentals and real-world applications, supporting the goal of democratizing AI education.
- Mentored fellows through project ideation, implementation, and evaluation, providing technical guidance and feedback.
- Collaborated with other teaching assistants in session planning and enhancing curriculum and teaching materials.

PROJECTS

Document Extraction Engine

- Built end-to-end AI pipelines for information extraction from KYC, financial, and rental documents using document classification, deep homography based alignment model, custom handwriting recognition model, and spelling correction to automate data entry.

- Researched and evaluated multiple approaches for document understanding like DiT, Table Transformers, vision-language models like paligemma and Qwen-VL and LLM-based methods for table and document structure recognition and retrieval.
- Developed RAG pipelines and AI agents with active learning for document validation, discrepancy detection, and deal-specific Q&A; deployed scalable parallel processing pipelines handling thousands of documents daily for a real estate lending business.

Audio-LLM Research

- Investigated and developed a multimodal interview system using Qwen2-Audio, incorporating preference optimization (LoRA fine-tuning and Direct Preference Optimization) to improve conversational alignment for structured technical interviewing tasks.
- Designed and generated a high-quality speech and conversation dataset including preference data for interview scenarios, leveraging synthetic data generation techniques including voice cloning to simulate diverse accents and speaking styles for improved robustness.
- Implemented real-time audio processing pipelines using voice activity detection (VAD) and speaker diarization to segment and structure live streaming interview conversations for downstream evaluation and analysis.

PUBLICATION

- **Paddy Disease Detection and Classification Using Computer Vision Techniques** 2024
arXiv: 2412.05996
 Conducted a comparative study of object detection and classification for paddy disease identification using deep learning models such as CNNs, Vision Transformers, and YOLO. Also developed a mobile application to provide real-time disease diagnosis and treatment suggestions.

CERTIFICATION

- **Claude Certified Architect - Foundations** August 2026
 Anthropic

AWARDS AND ACHIEVEMENTS

- **Fusemachines AI Fellowship 2023:** Year-long Microdegree program in Artificial Intelligence
- **Hackathons:**
 - **Delta Hackathon (2024):** Public Littering Detection and Waste Management System *First Runner-Up*
 - **Leapfrog Revamp Hackathon (2023):** Personalized News Portal *First Runner-Up*
 - **Ethos Hack: Cultural Hackathon:** Cultural Entities Detection and Information Center *Winner*
 - **Vertex Hacks Chapter Alpha (2023):** Remote Tourism Booking System *Finalist*
 - **Techparva Datathon (2022):** Election Outcomes of Nepal: Data Analysis and Presentation *First Runner-Up*

LEADERSHIP AND VOLUNTEER

- **Leapfrog Student Partner (2023) Leapfrog Technology**
 - Participated in a 9-month program aimed at helping IT and engineering students build career paths and create impact in the tech community.
 - Mentored undergraduate students on career development and technical skills.
- **Python and Machine Learning Mentor (2023, 2024) Innovative Computer Engineering Society**
 - Volunteered as a mentor for a month-long Call for Enthusiast program, guiding junior students in Machine Learning.
 - Provided technical insights, mentorship, and structured learning support to foster student development.