

Aavash Chhetri

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Research Interests

My research lies at the intersection of **Multimodal Learning**, **Privacy-Preserving ML**, and **Healthcare AI**, with a focus on Federated Learning and robustness to missing modalities.

Keywords: Multimodal Learning, Privacy-Preserving ML, Healthcare AI

Education

Bachelor of Engineering in Computer Engineering

2021 – 2025

Institute of Engineering, Pulchowk Campus, Tribhuvan University · Lalitpur, Nepal

Academic Standing: First Division | **Enrolled Rank:** 135 (Top ~2%)

Publications/Preprints

ProMoE-FL: Prototype-conditioned Mixture of Experts for Multimodal Federated Learning with Missing Modalities MICCAI 2026

Aavash Chhetri, Bibek Niroula, Eduard Vazquez, Yash Raj Shrestha, Prashnna Gyawali, Loris Bazzani, Binod Bhattacharai

Addresses multimodal federated learning under missing modalities. Existing methods rely on additional public datasets or naive feature synthesis based solely on the available modality; we propose ProMoE-FL, a prototype-conditioned mixture-of-experts framework for robust missing-modality feature synthesis in multimodal federated learning.

[Paper/Code](#)

Med-MMFL: A Multimodal Federated Learning Benchmark in Healthcare arXiv preprint

Aavash Chhetri, Bibek Niroula*, Pratik Shrestha, Yash Raj Shrestha, Lesley A. Anderson, Prashnna K. Gyawali, Loris Bazzani, Binod Bhattacharai*

Proposes a standardized benchmark for federated learning in healthcare, evaluating multimodal models across decentralized medical data sources. Addresses data heterogeneity, privacy preservation, and modality imbalance by enabling collaborative training without sharing sensitive patient data.

[Paper/Code](#)

Multimodal Federated Learning With Missing Modalities through Feature Imputation Network MIUA 2025 (Oral)

Pranav Poudel, Aavash Chhetri, Prashnna Gyawali, Georgios Leontidis, Binod Bhattacharai

Proposes a novel lightweight, low-dimensional feature translator to reconstruct bottleneck features of missing modalities in federated settings. Experiments in both homogeneous and heterogeneous configurations consistently improve performance over competitive baselines. Accepted at the Medical

Whitepaper

PriFed: Privacy-Preserved Learning in Health AI Through Federated Learning PriFed Symposium

Binod Bhattarai, Bibek Niroula, Aavash Chhetri, Kiran Raj Pandey, Yash Raj Shrestha, Niyoj Oli

This whitepaper introduces PriFed (Privacy-preserved learning in Health AI through Federated Learning) as a decentralized framework to overcome the privacy, infrastructure, and data-silo limitations of traditional AI development in resource-constrained healthcare settings. By advocating for Federated Learning, the paper demonstrates how institutions can collaboratively train robust AI models locally without compromising sensitive patient data. Furthermore, it analyzes the specific technical and operational challenges of decentralized AI and provides strategic recommendations for building equitable, privacy-preserving healthcare ecosystems through collaborative networks like HAINet.

10.2139/ssrn.5691023

Experience

Research

Research Assistant – BBMMLL, NAAMII

Feb 2024 – Present

B. Bhattarai's Multimodal Learning Lab, NepAI Applied Mathematics and Informatics Institute for research (NAAMII)

- Worked on privacy-preserving machine learning and its applications in healthcare settings.
- Researched Methods for addressing missing modalities in multimodal medical and federated learning settings.
- Co-led development of Med-MMFL, the first comprehensive multimodal federated learning benchmark in healthcare, evaluating six algorithms across 10 medical modalities.

Industrial

Deep Learning Engineer (Part-Time) – Fogsphere, UK

May 2025 – Present

AI Systems for Safety-Critical Environments

- Developing high-precision, low-latency AI systems deployed directly into safety-critical environments where reliability is paramount.
- Engineering and optimizing traditional CNN architectures (e.g., ResNet) for robust, real-time edge inference.

Teaching

Teaching Assistant – Annual Nepal AI School

2024/2025

- Co-prepared instructional materials and assisted lab sessions on LLM Foundations, covering AI agents and a nanoGPT implementation lab. @ ANAIS2025
- Assisted lab sessions on Geometric Deep Learning, supporting hands-on exercises in graph neural networks, equivariance, and large-scale vision-language models. @ ANAIS2024/25
- Assisted lab sessions on Foundational Models led by Dr. Binod Bhattarai (University of Aberdeen). @ ANAIS24

References: [ANAIS 2024](#) and [ANAIS 2025](#)

Awards & Scholarships

MICCAI Society Registration Grant

2026

The 2026 MICCAI Society Registration Grant is awarded by MICCAI Society is intended to support in-person participation in the MICCAI conference.

Projects

De-LIMIT — Decentralized LLM Inference & Fine-Tuning

2024–2025

B.E. Capstone Project · Institute of Engineering, Tribhuvan University

- Designed a system for decentralized LLM inference and fine-tuning across consumer-grade, heterogeneous edge devices to reduce cost and improve accessibility.
- Investigated distributed coordination and efficient fine-tuning (LoRA, QLoRA) strategies for collaborative model adaptation.
- Report: aavashchhetri.com.np/assets/major_project.pdf

XenoLingo — Indigenous Language Preservation Platform

2023

UNESCO IdeaX MBM Hackathon 2023 · Winner

- Led development of XenoLingo, a platform combining indigenous language preservation with NLP-driven language-learning tools.
- GitHub: github.com/A-atmos/XenoLingo

Technical Skills

Languages	Python, Bash, Swift, C++
ML / DL	PyTorch, Flower FL, LoRA/QLoRA, Huggingface
Infrastructure	Linux, SLURM, Git, Docker
Human Languages	English (fluent), Nepali (native), Hindi (fluent)