AAYAM ADHIKARI

Computer Science Graduate Researcher
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EDUCATION

University of Nebraska-Lincoln, Lincoln, NE Spring 2026 - Expected Fall 2027
Master of Science in Computer Science | **GPA: 4.0/4.0**
Relevant Coursework: Communication Networks, Multi-access Edge Computing, Internet Systems and Programming

Kathmandu University, Dhulikhel, Nepal 2019-2024
Bachelor of Engineering in Computer Engineering | **CGPA: 3.92/4.0 (Batch Topper, ranked 1st of 60)**
Relevant Coursework: Artificial Intelligence, Data Structures & Algorithms, Cloud Computing, Digital Signal Processing

EXPERIENCE

Graduate Research Assistant | University of Nebraska-Lincoln | Lincoln, NE | January 2026 - Present *(Part time, 20 hours/week)*
Advisor: Dr. Hongzhi Guo. Research funded by the NASA Nebraska Space Grant and the Layman Seed Award.

Live holographic video streaming over 5G (first-author paper submitted to NCC 2027)

- Built an end-to-end live holographic video conferencing testbed: 3 Intel RealSense RGB-D cameras fused into one point cloud at 10 fps (cwipc, ArUco-based alignment), streamed over a private OpenAirInterface (OAI) 5G standalone network (USRP B210 UEs, gNB + core, band n78), and rendered in Unity/C#.
- Designed region-aware head/body point cloud coding (PCA-based segmentation, separate octree depths per region) that raised head-weighted D1 PSNR by **6.5 dB** at nearly the same traffic over live 5G.
- Formulated a system model linking encoding precision, point cloud size, and network capacity to frame rate and end-to-end latency, showing when the bottleneck shifts from the 5G link to point cloud processing.
- Trained an offline reinforcement learning controller (Conservative Q-Learning) on 4,588 transitions from 58 live sessions; it delivered **1.38 fps higher** frame rate than a threshold-based controller at similar traffic and cut time spent in the lowest-quality mode from **41.0% to 9.3%**.
- Benchmarked Google Draco vs. MPEG G-PCC across 11 single- and dual-stream configurations; G-PCC needed **2.7× less bandwidth** (14.7 vs. 39.6 Mbps at ∼10 fps) at the cost of ∼80 ms more end-to-end latency.

Semantic mulsemedia communication (first-author paper, IEEE/IFIP WiOpt 2026)

- Developed a cross-modal semantic communication framework (CNN-LSTM sensor predictor + 3D-convolutional conditional GAN video reconstructor) that sends one frame plus sensor data instead of full video, cutting transmitted data by **over 96%**.
- Achieved 89.4% wind-speed prediction accuracy from video and 0.88 temperature accuracy from satellite image sequences; reconstructed video at SSIM 0.83 (clean channel) with acceptable quality down to 3 dB SNR.

Graduate Mentor, Senior Design Program | University of Nebraska-Lincoln | Lincoln, NE | January 2026 - Present

- Authored the industry-sponsor pitch for migrating a holographic communication system from HoloLens 2 to Meta Quest 3 with AI-based quality enhancement; mentor 5-member undergraduate teams (Spring 2026 delivered, Fall 2026 in progress) on point cloud capture, transmission, and system integration.

Researcher | Kathmandu University | Dhulikhel, Nepal | October 2024 - October 2025 *(Full time, 42 hours/week)*

- Built and deployed Kathmandu University's venue booking system (MERN stack) on a self-managed Ubuntu VM, used by all KU departments, affiliated colleges, and students (hallbooking.ku.edu.np).
- Designed and developed the AICKU employee logsheet management system used by 300+ staff (logsheet.aic.ku.edu.np) and the official Nepal Technology Innovation Center website (ntic.ku.edu.np).
- Delivered digital literacy programs in 8 remote schools in partnership with local municipalities.

Software Intern | LIS Nepal - A Yomari Company | Nepal | April 2024 - July 2024 *(Full time, 40 hours/week)*

- Containerized and deployed components of an international point-of-sale (POS) application using Docker and Kubernetes across AWS and Azure.
- Developed Python ETL processes for data warehousing (SQL, Snowflake) and built Power BI business reports.
- Deployed an EFK stack (Elasticsearch, Fluentd, Kibana) for centralized Kubernetes cluster log monitoring.

Web Developer | Freelance Projects | Nepal | 2024 *(Part time)*

- Built and deployed websites for the 9th IPSF APRO Good Pharmacy Practice Education (GPPed) program and the Kathmandu University Architecture Club (archclub.ku.edu.np) using HTML, CSS, and JavaScript, with search engine optimization (SEO).

PUBLICATIONS AND PRESENTATIONS

- **Adhikari, A.**, Guo, H., and Akyildiz, I. F., "Cross-Modal Creation and Recovery for Semantic Mulsemedia Communication," in *Proc. 24th IEEE/IFIP International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, 2026. DOI: 10.23919/WiOpt71098.2026.11568227
- **Adhikari, A.**, Sarpong, D. A., Bhusal, R., Guo, H., Wang, P., and Akyildiz, I. F., "Region-Aware Adaptive Streaming for Holographic Video Conferencing," submitted to the *National Conference on Communications (NCC)*, 2027.
- Poster presentation of the WiOpt paper, Nebraska Research Days, University of Nebraska-Lincoln (April 2026) (Poster)
- Talk on the WiOpt paper, 136th Annual Meeting of the Nebraska Academy of Sciences, Aeronautics and Space section (April 2026) (Slides)

TECHNICAL SKILLS

Languages: Python, C#, C++, C, JavaScript, SQL, Swift
Machine Learning: PyTorch, scikit-learn, NumPy, Pandas; CNN, LSTM, conditional GAN, offline reinforcement learning (CQL)
Wireless & 5G: OpenAirInterface (OAI) 5G Core/RAN, USRP/SDR, OctoClock synchronization
XR & Point Clouds: Unity, cwipc, Draco, MPEG G-PCC, octree coding, Intel RealSense, ArUco calibration
Systems & Tools: Docker, Kubernetes, AWS, Azure, Linux, Git, Node.js, MySQL, Firebase, Snowflake, Power BI

SELECTED PROJECTS

MeroTutor *(Web application to find home tutors)* **|** github.com/aayam07/MeroTutorApp

- Built a home-tutor marketplace (Node.js, MySQL, HTML/CSS/JavaScript) with real-time chat via Socket.io and online payments via Stripe.

eLibrary *(iOS application to manage library activities)* **|** github.com/aayam07/eLibrary

- Built an iOS library-management app (Swift, SwiftUI, Firebase) with Twilio SMS due-date reminders; demonstrated at Kathmandu University's library.

SELECTED LEADERSHIP AND VOLUNTEERING SERVICES

Mentor, Watson Codefest Bio-Hackathon | Kathmandu University (2024) (Certificate)

Lead Curator, TEDx Kathmandu University (2023)

- Led a 17-member organizing team (technical, design, social media, marketing) and curated 7 speakers for an event with 140+ attendees.