

Nirajan Kunwor

Software Engineer & AI/ML Researcher
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RESEARCH INTERESTS

Machine Learning, Medical AI, Computer Vision, Foundation Models, Domain Generalization, Test-Time Adaptation, Federated Learning, Parameter-Efficient Fine-Tuning, Robust and Equitable AI

PUBLICATIONS

Nirajan Kunwor, Sanjaya Poudel, Quoc-Huy Trinh, Jahidul Arafat, Sunil Kumar Gaire

Disease Burden over Skin Tone: Decomposing the Dermatology-AI Generalization Gap

Accepted at MIRASOL Workshop, MICCAI 2026

arXiv:2609.02111

Sanjaya Poudel, Nirajan Kunwor, Manish Dhakal, Debesh Jha, Sunil Kumar Gaire

Federated LoRA Adaptation of BiomedCLIP Across Four International Chest X-Ray Cohorts

Accepted at DeCaF Workshop, MICCAI 2026

arXiv:2609.02101

RESEARCH IN PROGRESS

Anchoring Against Collapse in Test-Time Adaptation. Geometric optimal-transport penalty preventing prediction collapse in test-time adaptation, with a provable collapse floor. Under double-blind review, NeurIPS 2026 (submitted).

RESEARCH EXPERIENCE

AI/ML Research

Independent / Collaborative Research

2025 – Present

- Conduct research on machine learning robustness, medical computer vision, foundation models, federated learning, and adaptation under distribution shift.
- Investigated the role of skin-tone representation and disease-distribution shift in the generalization of dermatology AI models across diverse populations.
- Studied federated parameter-efficient adaptation of BiomedCLIP across multiple international chest X-ray cohorts, including LoRA-based adaptation and federated aggregation strategies.
- Investigated test-time adaptation methods for machine learning models under distribution shift, with work submitted to a NeurIPS workshop.

PROFESSIONAL EXPERIENCE

PortPro

Senior Software Engineer (Full-time)

Feb 2025 – Present

- Architect and implement backend services and APIs supporting real-time data processing and integrations across external logistics platforms.
- Developed an AI-powered browser-automation system integrating PortPro's TMS with external carrier and customer portals using Browserbase and automated workflows.
- Designed standardized web-automation pipelines for extracting data from multiple port systems using Node.js, Puppeteer, AWS Lambda, MongoDB, and scheduled execution.
- Implemented automated generation and outbound transmission of EDI 990, 214, and 210 transactions to external trading partners.
- Led a large-scale MongoDB-to-PostgreSQL data migration using Hevo Data.

BeyondID

Senior Software Engineer (Full-time)

Jan 2023 – Feb 2025

- Developed identity-verification workflows integrating Auth0 and Plaid ID Proofing for fraud-prevention applications.
- Built real-time data synchronization between Drata and Fieldguide, supporting automated compliance workflows.
- Integrated Okta FGA, JAMF, and CrowdStrike into the BeyondID Integration Network to expand security and identity-management capabilities.
- Developed polling-based data pipelines for the Experian Dashboard to provide near-real-time insights within Okta.

Vrit Technologies

MERN Instructor (Part-time)

Mar 2023 – Feb 2024

- Taught HTML5, CSS3, JavaScript, ReactJS, NodeJS, and MongoDB through hands-on software development instruction.

Spiralogics International

Software Engineer (Full-time)

Feb 2022 – Jan 2023

- Developed and maintained client-side and server-side components for multiple software applications.
- Built deployable solutions using Docker and executable-based deployment workflows.
- Designed applications using both relational and non-relational database systems based on project requirements.

- Developed client-side web applications using AngularJS.

Encoders Inc.

MERN Stack Developer (Full-time)

Feb 2021 – Jan 2022

- Developed and maintained full-stack web applications using the MERN stack (MongoDB, Express, React, Node.js).
- Built and integrated RESTful APIs to support front-end application features and third-party services.

Maven Solutions

MERN Intern (Full-time)

Feb 2020 – Jan 2021

- Built client-side user interfaces for an e-commerce application using ReactJS.
- Developed maintainable backend services for an artist-booking application.

EDUCATION

Lincoln International College

Kathmandu, Nepal

Master of Computer Science

2023 – 2025

- Relevant coursework: Operating Systems, Data Structures and Algorithms, Artificial Intelligence, Machine Learning, Computer Networking, Databases.

Advanced College of Engineering and Management

Kathmandu, Nepal

Bachelor of Computer Engineering

2017 – 2021

- Relevant coursework: Operating Systems, Data Structures and Algorithms, Artificial Intelligence, Machine Learning, Computer Networking, Databases.

TECHNICAL SKILLS

Programming: Python, JavaScript, TypeScript, SQL

Machine Learning / AI: Computer Vision, Medical AI, Federated Learning, Foundation Models, LoRA, Parameter-Efficient Fine-Tuning, Test-Time Adaptation

Frameworks: Node.js, NestJS, React, Angular, Next.js

Databases: PostgreSQL, MongoDB, MySQL, Redis

Cloud / Infrastructure: AWS, Docker, AWS Lambda, RabbitMQ

TEACHING & SERVICE

Programming for Kids

Kathmandu, Nepal

Volunteer Instructor

Feb 2022

- Taught introductory web programming to students from Dolpa as part of a community education initiative with Spiralogs team members.

Workshop at Srijana – The Innovation

Kathmandu, Nepal

Organizer & Instructor

Jan 2018

- Organized and delivered technical workshops as part of an annual college innovation event.