

# Safal Thapaliya

Kathmandu, Nepal

[safalthapaliya.com.np](https://safalthapaliya.com.np)

[safalthapaliya@gmail.com](mailto:safalthapaliya@gmail.com)

[thapaliya19](#)

[thapaliya19](#)

## EDUCATION

### Bachelor in Computer Engineering

November 2017 - April 2022

Pulchowk Campus, Institute of Engineering, Tribhuvan University (#1 engineering campus in Nepal)

Lalitpur, Nepal

Capstone Project: Epidemiological Surveillance System using NLP

Academic Supervisor: Aman Shakya, Ph.D.

- Achieved Rank 24 in the Entrance Exam of 2017 A.D. out of nearly 18,000 candidates - *top* 0.3%
- Top of the class in the sixth semester.
- Graduated in *First Division honors* with 77.48%.

### High School

June 2015 - June 2017

Kathmandu Model Higher Secondary School

Kathmandu, Nepal

Majors: Physics, Mathematics, Chemistry

- Graduated in *First division with Distinction* with 84%.

## WORK EXPERIENCE

### Nepal Applied Mathematics and Informatics Institute for Nepal (NAAMII)

May 2022 - Present

Research Assistant

Lalitpur, Nepal

- Supervisor: Bishesh Khanal, Ph.D.
- Currently researching interpretability in vision-language models and their potential applications for medical image segmentation.
- Researched transfer learning of multi-modal vision-language models in 2D medical image segmentation, including a first benchmark study of vision-language segmentation models on medical images and implementing a novel adapter module for fine-tuning large models for 2D endoscopic and radiology images.
- Trained and evaluated UNet and nnUNet models for bone segmentation and angle measurement in CT scans and deployed the trained models in a cloud server.
- Developed a real-time data collection platform for uploading and annotating microscopic slide images, currently preparing a large microscopic image dataset.
- Trained and evaluated different object detection models (FasterRCNN, RetinaNet, YOLO, Deformable-DETR) to detect diarrhea parasites in microscopic images.
- Trained and evaluated UNet model for multi-label organ segmentation in abdominal CT scans.

### LogPoint Inc.

January 2022 - May 2022

Support and Solutions Intern

Lalitpur, Nepal

- Participated in the Hands-on Sessions on Linux System Administration, SIEM, and LogPoint architecture.

### Nepal Applied Mathematics and Informatics Institute for Nepal (NAAMII)

August 2021 - March 2022

Research Intern

Remote

- Worked on "Public Discourse Analysis System", supervised by Bisesh Khanal, PhD

## PUBLICATIONS

\* indicates equal contribution.

### Conference Papers

- Poudel, K.\*, Dhakal, M.\*, Bhandari, P.\*, Adhikari, R.\*, **Thapaliya, S.\***, & Khanal, B. (2024, February). **Exploring Transfer Learning in Medical Image Segmentation using VLMs**. In *Medical Imaging with Deep Learning*.

### Workshop Papers

- Adhikari, R.\*, Dhakal, M.\*, **Thapaliya, S.\***, Poudel, K., Bhandari, P., & Khanal, B. (2023, October). **Synthetic Boost: Leveraging Synthetic Data for Enhanced Vision-Language Segmentation in Echocardiography**. In *International Workshop on Advances in Simplifying Medical Ultrasound* (pp. 89-99). Cham: Springer Nature Switzerland.
- Adhikari, R., **Thapaliya, S.**, Basnet, N., Poudel, S., Shakya, A., & Khanal, B. (2022, October). **COVID-19-related Nepali Tweets Classification in a Low Resource Setting**. In *Proceedings of The Seventh Workshop on Social Media Mining for Health Applications, Workshop & Shared Task* (pp. 209-215).

### Pre-prints and under review

- Nakarmi, S., Pudasaini, S., **Thapaliya, S.**, Upreti, P., Shrestha, R., Giri, B., ... & Khanal, B. (2023). **Deep-learning assisted detection and quantification of (oo) cysts of Giardia and Cryptosporidium on smartphone microscopy images**. arXiv preprint arXiv:2304.05339. *under review*
- Dhakal, M., Adhikari R., **Thapaliya, S.**, & Khanal, B. (2024, March). **VLSM-Adapter: Finetuning Vision-Language Segmentation Efficiently with Lightweight Blocks**. *under review*

## TEACHING EXPERIENCE

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### Fourth Annual Nepal AI School 2023 by NAAMII

Teaching Assistant

May 2023

Lalitpur, Nepal

- Involved in designing the lab materials for the Foundations on Machine Learning lab session.

### Third Winter School in AI 2021 by NAAMII.

Teaching Assistant

December 2021

Lalitpur, Nepal

- Involved in developing the lab materials for the Generative Adversarial Networks lab.

## PROJECTS

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### AI Assisted Smartphone Microphony | NAAMII

2022-Present

- Working with *Kathmandu Institute of Applied Sciences (KIAS)* to develop object detection models to detect diarrhea cysts from vegetables, stool, and water samples using images captured from smartphone microscopes, and brightfield microscopes.
- Developed an online data collection and annotation platform to upload sample images from different locations in Nepal.

### Lower Limb Angle Measurement for corrective osteotomy | NAAMII

2023

- Trained, evaluated, and deployed UNet and nnUNet for bone segmentation, landmark detection, and angle measurement in lower limb CT scans for corrective osteotomy.
- Set up a deployment environment using Flask and Docker to deploy the trained models.

### Public Discourse Analysis System | IOE, Pulchowk Campus & NAAMII

2022

- Developed COVID tweets analysis platform that allows health decision-makers to view a real-time analysis of narratives of tweets, particularly in Nepali and Devanagari scripts
- Researched and fine-tuned the MuRIL model for tweets in Nepalese language
- Assisted in the design and optimization of the backend and frontend of the web application

## TECHNICAL SKILLS

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**Programming Languages:** Python, C++, JavaScript

**ML Frameworks:** Pytorch, Numpy, Scikit-learn, Matplotlib

**Database Technologies:** MongoDB, SQL, Postgres

**Other Technologies:** Git, CI/CD, Docker

## LICENSES AND CERTIFICATIONS

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- Deep Learning Specialization by DeepLearning.AI
- Machine Learning by Stanford Online

## REFERENCES

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### Bishesh Khanal, Ph.D.

Director/Research Scientist, *Nepal Applied Mathematics and Informatics Institute for research (NAAMII)*, Nepal

✉ bishesh.khanal@naamii.org.np

### Taman Upadhaya, Ph.D.

Project Scientist, *Cedars-Sinai Medical Center*, LA, California

✉ taman.upadhaya@cshs.org

### Aman Shakya, Ph.D.

Assistant Professor, *Pulchowk Campus, Institute of Engineering, Tribhuvan University*, Nepal

✉ aman.shakya@ioe.edu.np