Safal Thapaliya

Kathmandu, Nepal

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EDUCATION

Bachelor in Computer Engineering   **November 2017 - April 2022**

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

    Undergraduate Thesis: Epidemiological Surveillance System using NLP [Thesis Link]

    Academic Supervisor: Aman Shakya, Ph.D.

- Achieved Rank 24 in the entrance examination of 2017 A.D. out of nearly 18,000 candidates - top 0.3%, and received the scholarship provided by Government of Nepal covering full tuition expenses.
- Top of the class in the sixth semester.
- Graduated in *First Division* with 77.48%.
- **Relevant Courses**: Object Oriented Programming, Engineering Mathematics, Theory of Computation, Discrete Structure, Data Structure & Algorithm, Microprocessor, Applied Mathematics, Numerical Methods, Software Engineering, Computer Organization & Architecture, Computer Graphics, Probability & Statistics, Database Management System, Artificial Intelligence, Operating System, Computer Networks, Digital Signal Analysis & Processing, Image Processing & Pattern Recognition

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 research (NAAMII)   **May 2022 - Present**

Research Assistant   *Lalitpur, Nepal*

- Supervisor: Bishesh Khanal, Ph.D.
- Currently researching joint image-text representation 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.
- Worked on projects relating to medical image segmentation using CT scans and object detection in microscopic images. (*see projects section below*)

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's architecture.

Nepal Applied Mathematics and Informatics Institute for research (NAAMII)   **August 2021 - March 2022**

Research Intern   *Remote*

- Worked on undergraduate thesis and developed a COVID-19 tweets analysis platform that allows health decision-makers to view a real-time analysis of narratives of tweets, particularly in Nepali and Devanagari scripts
- Published a workshop paper due to the work done. [Paper link]

Clamphook   **November 2019 - June 2021**

Backend Engineer   *Lalitpur, Nepal*

- Participated in designing and developing the server-side architecture for clamphook.com using *Flask* and *MongoDB*.
- Prepared setup for server deployment and network traffic handling using *nginx* and *redis* services.

PUBLICATIONS

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*. [Paper link] [**MIDL'24 poster**]

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. [Paper link] [**ASMUS'23 Workshop**]

- 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). [Paper link] [**SMM4H'22 Workshop**]

Pre-prints and under review
- Nakarmi, S., Pudasaini, S., **Thapaliya, S.**, Upretee, 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. [Paper link] [*under review at MELBA journal*]
- Dhakal, M., Adhikari R., **Thapaliya, S.**, & Khanal, B. (2024, March). **VLSM-Adapter: Finetuning Vision-Language Segmentation Efficiently with Lightweight Blocks**. [*under review*]

Teaching Experience

Fourth Annual Nepal AI School 2023 by NAAMII   May 2023
Teaching Assistant   *Lalitpur, Nepal*
- Involved in designing the lab materials for the Foundations on Machine Learning lab session.

Third Winter School in AI 2021 by NAAMII.   December 2021
Teaching Assistant   *Lalitpur, Nepal*
- Involved in developing the lab materials for the Generative Adversarial Networks lab.

Projects

AI Assisted Smartphone Microphony | *NAAMII*, [Project Link] [Paper link]   **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.
- Trained and evaluated different object detection models (FasterRCNN, RetinaNet, YOLO, Deformable-DETR) to detect diarrhea parasites in microscopic images.
- 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*, [Project Link] [Paper link]   **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

- Proficient in Python, including different machine learning frameworks: Pytorch, Numpy, Scikit-learn, Pandas, and matplotlib
- Skilled in server-side programming using FastAPI, Flask, and Django, and designing functional databases using PostgreSQL, SQLite, and MongoDB
- Practiced in Linux server administration, handling multiple GPUs
- Well-versed in using Git and Docker

Licenses and Certifcations

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

References

- 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`