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*

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 research (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 research (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.**, 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. *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

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* **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

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 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*
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Aman Shakya, Ph.D.
Assistant Professor, *Pulchowk Campus, Institute of Engineering, Tribhuvan University, Nepal*
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