

# Rabin Adhikari

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## Work Experience

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**NepAI Applied Mathematics and Informatics Institute for research (NAAMII)** *April 2022*  
*- Present*

*Research Assistant*

*Lalitpur, Nepal*

*Supervisor: Bishesh Khanal, Ph.D.*

- Contributing actively to research projects focused on **Natural Language Processing (NLP)**, **Medical Imaging**, **Semi-supervised Learning**, and **Multi-modal Learning**.
- Employed rigorous research methodologies to analyze data, draw meaningful conclusions, and contribute to advancing knowledge in these domains.

### Clamphook

*November 2019 - June 2021*

*Full Stack Developer*

*Lalitpur, Nepal*

- Participated vigorously in the development of clamphook.com by implementing the server-side functionality utilizing *MongoDB* as the database and *Flask* as the web framework.
- Leveraged *React* as the front-end technology to facilitate seamless communication between the front-end and back-end components of the website.
- Deployed servers using *nginx*, *gunicorn*, and *Cloudflare*, effectively managing the infrastructure to handle concurrent traffic of up to 5,000 users. It ensured a smooth and uninterrupted user experience even during peak traffic.

### ASMI

*May 2019 - March 2020*

*Junior Researcher*

*Remote*

Researched comprehensively on two-dimensional *In-Video Advertising*, focusing on enabling seamless advertisement integration within platform videos without disrupting the viewing experience.

## Education

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### Bachelor in Computer Engineering

*November 2017 - April 2022*

*Pulchowk Campus, Institute of Engineering, Tribhuvan University*

*Lalitpur, Nepal*

*Academic Supervisor: Aman Shakya, Ph.D.*

*Capstone Project: Epidemiological Surveillance System using NLP*

- Attained **Rank 1 in the Entrance Exam** of 2074 B.S. (2017 A.D.) out of nearly 18,000 candidates.
- Graduated with **First Division honors**, achieving an impressive **aggregate of 79.96%**.

### High School

*June 2015 - June 2017*

*SOS Hermann Gmeiner School Bharatpur*

*Bharatpur, Nepal*

- Graduated in the **top 5 of the class**, demonstrating exceptional academic performance.
- Attained a distinction with an impressive **85.3% aggregate**, reflecting a strong commitment to excellence throughout high school.
- Maintained high grades consistently and showcased diligence in academic pursuits.

## Publications

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- Preprints** Poudel, K.\*, Dhakal, M.\*, Bhandari, P.\*, **Adhikari, R.\***, Thapaliya, S.\*, & Khanal, B. (2023). Exploring Transfer Learning in Medical Image Segmentation using Vision-Language Models. *arXiv preprint arXiv:2308.07706*.
- Workshop Papers** **Adhikari, R.\***, Dhakal, M.\*, Thapaliya, S.\*, Poudel, K., Bhandari, P. & Khanal, B. (2023). Synthetic Boost: Leveraging Synthetic Data for Enhanced Vision-Language Segmentation in Echocardiography. In *International Workshop on Advances in Simplifying Medical Ultrasound*. Cham: Springer International Publishing.
- 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).
- Journal Papers** Buddhacharya, S. M., **Adhikari, R.**, Maharjan, N., & Panday, S. P. (2022). Monocular Depth Estimation using a Multi-grid Attention-based Model. *Journal of Innovative Image Processing*, 4(3), 127-146.

## Projects

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### Vision Language Model for Interpretable Medical Image Segmentation

- Developed a novel approach utilizing *multi-modal vision-language models* to extract semantic information from image descriptions and images, enabling accurate segmentation of diverse medical images.
- Conducted extensive evaluations of existing vision language models on multiple datasets, assessing their *applicability and transferability to the medical domain*.
- Explored the impact of variations in image descriptions on model performance, revealing valuable insights into the model's responsiveness to different prompts.

### Abusive Nepali Text Detection to Support IPV Research

- Implemented an *advanced system for detecting abusive texts in extensive online content*, mainly social media platforms, to aid in research on Intimate Partner Violence (IPV).
- Created a comprehensive dataset and *developed a MuRIL-based deep learning classification model* explicitly tailored to the Nepali language.
- Designed and built an interactive dashboard that enables gradual learning and visualizes various aspects of abusive texts.

### Standard Plane Navigation using Fetal Ultrasound Description

- Leveraged *vision-language models* to establish a connection between textual descriptions and ultrasound (US) images for standard plane navigation.
- Curated a dataset featuring text descriptions for each US image, showing the landmarks and artifacts.
- Aiming to aid novice radiologists in quickly navigating to the correct standard planes while reducing variance among expert radiologists.

## Internships

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**NepAI Applied Mathematics and Informatics Institute for research (NAAMII)** August 2021 - April 2022  
*Research Intern* Supervisor: *Bishesh Khanal, Ph.D.*

- Researched tweet classification for my *Bachelor's final year project thesis*.
- Developed a classification system to *categorize tweets into 8 inclusive COVID-related categories*.
- Applied analytical techniques and data processing methods for accurate classification results.

**Diyo.AI** June 2020 - December 2020  
*NLP Research Intern* Supervisor: *Binod Bhattarai, Ph.D.*

- Conducted extensive research on the availability of *Nepali language corpora*, resulting in a substantial corpus measuring nearly 3 GB in size.
- Leveraged the *Huggingface transformers* library to train an *ALBERT* language model specifically tailored for the Nepali language.

## Licenses and Certifications

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<b>DeepLearning.AI</b>	Generative Adversarial Networks (GANs) Specialization
<b>DeepLearning.AI</b>	Natural Language Processing Specialization
<b>DeepLearning.AI</b>	AI for Medicine Specialization
<b>DeepLearning.AI</b>	TensorFlow Developer Professional Certificate
<b>DeepLearning.AI</b>	TensorFlow: Data and Deployment Specialization
<b>University of Michigan</b>	Applied Data Science with Python Specialization
<b>Imperial College London</b>	Mathematics for Machine Learning Specialization
<b>Stanford University</b>	Machine Learning

## Technical Skills

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- Adept in *Python*, including machine learning and deep learning libraries such as *Numpy, Pandas, Scikit-Learn, TensorFlow*, and *PyTorch*.
- Experienced in server-side programming using *Node.js* frameworks like *Express*, as well as *Python* frameworks like *Django, Flask*, and *FastAPI*.
- Proficient in working with various *SQL* and *NoSQL* databases.
- Skilled in client-side programming using *JavaScript* and *TypeScript*, along with frameworks like *React*.
- Well-versed in Linux environment, possessing skills in tools like *Vim, Tmux*, and *shell scripting*, with experience across different *Linux* distributions.
- Knowledgeable in *version control* systems, specifically *Git*.

## Affiliations

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**LOCUS** March 2021 - May 2022  
*Software Coordinator* Lalitpur, Nepal

- Managed software events, effectively overseeing all aspects of planning and execution while ensuring seamless coordination and timely resolution of various technical issues.
- Demonstrated strong organizational skills by successfully organizing approximately 10 software events, handling logistics, scheduling, and ensuring a smooth and engaging participant experience.

## IEEE Pulchowk Student Branch

Event Chair

February 2020 - December 2020

Lalitpur, Nepal

- Conducted a Tech Talk titled *A Platform for Innovations and Ideas* with CEOs from Yatri Motorcycles and International Green Developers Nepal as speakers, drawing an audience of approximately 200 participants.
- Organized a successful blood donation program in collaboration with the Nepal Red Cross Society, demonstrating effective coordination and execution skills.

## Teaching Assistantships

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### Fourth Annual Nepal AI School

Kathmandu, Nepal

May 22 - June 1, 2023

- Assisted in lab sessions on *Probability and Statistics*, *Transformers*, and *Natural Language Processing (NLP)*, facilitating effective learning and practical applications for about 150 participants.
- Collaborated with *Danda Pani Paudel, Ph.D.*, *Nripesh Parajuli, Ph.D.*, and *Abhinav Joshi* for the refinement of lab materials and exercises, ensuring an optimal learning environment.
- Developed effective communication and teamwork skills through collaboration with esteemed experts and fellow teaching assistants.

### Third Nepal Winter School in AI

Bhaktapur, Nepal

December 20 - 30, 2021

- Assisted in the *ML fundamentals* lab and guided participants through a project on *Generative Adversarial Networks (GANs)*, for about 100 participants.
- Prepared engaging lab sessions and projects with *Danda Pani Paudel, Ph.D.*, *Nripesh Parajuli, Ph.D.*, and *Sandesh Ghimire, Ph.D.*, showcasing effective mentorship and guidance skills.

## References

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### 1. Bishesh Khanal, Ph.D.

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

Email: [bishesh.khanal@naamii.org.np](mailto:bishesh.khanal@naamii.org.np)

### 2. Aman Shakya, Ph.D.

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

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