BIDUR KHANAL

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GitHub: Bidur-Khanal Google Scholar: BidurKhanal ResearchGate: Bidur-Khanal

RESEARCH INTEREST

General: Medical Image Analysis, Computer Vision, Deep Learning, Machine Learning, Artificial Intelligence
Specific: Robust Machine Learning for Medical Image Analysis and Healthcare Applications.

EDUCATION

Ph.D. in Imaging Science *Aug 2020 - Present*
Rochester Institute of Technology Rochester, NY, USA
Dissertation: *Towards Robust Deep Learning for Medical Imaging with Limited and Noisy Labeled Data*

Bachelor's in Electronics and Communication Engineering *Nov 2013 - Dec 2017*
Institute of Engineering, Pulchowk Campus, Tribhuvan University Lalitpur, Nepal

RESEARCH EXPERIENCE

Graduate Research Assistant *Jan 2021 - May 2025*
Rochester Institute of Technology Rochester, NY, USA

- Built a GI image-text dataset and benchmarks for studying hallucination in medical vision-language models.
- Investigated the impact of noisy labels on medical image classifiers in multiple datasets, analyzing how network architectures, pretraining strategies, and dataset characteristics influence robustness under label noise.
- Developed frameworks to robustly train deep learning models with limited and noisy labeled medical image data.

Machine Learning Research Assistant *Apr 2019 - Aug 2020*
Nepal Applied Mathematics and Informatics Institute for Research Lalitpur, Nepal

- Developed deep learning framework for vertebra detection, spinal curvature estimation, and scoliosis detection from X-ray images; presented the work at *MICCAI 2019 AASCE* Challenge.
- Created a colorimetric PAD image dataset for pesticide concentration estimation using smartphone cameras, and benchmarked it with various machine learning models.

INDUSTRY WORK EXPERIENCE

Camera Software Quality Intern *May 20, 2024 - Aug 23, 2024*
NVIDIA Corporation Santa Clara, CA, USA

- Explored and developed a deep learning-based method for assessing camera image quality.
- Investigated the use of Vision Language Models for image quality assessment.

Deep Learning Engineer *Dec 2019 - Aug 2020*
***Zeg**, 3D AI solution Company (Worked remotely, part-time consulting job)* London, UK

- Implemented several GAN models for adding realism to computer-rendered images.
- Developed deep learning-based framework for key points detection in 2D images for 3D modeling.

Firmware/Image Processing Engineer *Feb 2018 - Aug 2018*
Nepal Digital Systems (startup company) Lalitpur, Nepal

- Integrated Raspberry Pi, PiCamera, and GSM/GPS to build an IoT home automation system.
- Built OpenCV-based computer vision pipeline for edge devices to assess material strain under force.

TEACHING EXPERIENCE

Teaching Lab Assistant *Dec 10 - Dec 20, 2019*
Second Nepal Winter School in AI Pokhara, Nepal

- Prepared lab assignments for the Pytorch tutorial on deep learning.
- Supervised lab activities: Teaching and assigning lab works in Python to beginner students.

PUBLICATIONS

- **Khanal*, Bidur**, Pokhrel*, S., Bhandari*, S., et al. (2025). Hallucination-aware multimodal benchmark for gastrointestinal image analysis with large vision language models. *Submitted at International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI).* [* denotes equal contribution]
- **Khanal, Bidur**, Bhattarai, B., Khanal, B., and Linte, C. (2025). How does self-supervised pretraining improve robustness against noisy labels across various medical image classification datasets? *Submitted to Medical Image Analysis.* [Under review]
- Kundu, B., **Khanal, Bidur**, Simon, R., and Linte, C. A. (2025b). Investigating the domain adaptability of general-purpose foundation models for left atrium segmentation from MRI images. *Accepted at 13th Functional Imaging and Modeling of the Heart International Conference (FIMH).*
- Kundu, B., **Khanal, Bidur**, Simon, R., and Linte, C. A. (2025a). Assessing the performance of the DINOv2 self-supervised learning vision transformer model for the segmentation of the left atrium from mri images. *SPIE Medical Imaging.*
- **Khanal, Bidur**, Dai, T., Bhattarai, B., and Linte, C. (2024a). Active label refinement for robust training of imbalanced medical image classification tasks in the presence of high label noise. *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI).*
- **Khanal, Bidur**, Shrestha, P., Amgain, S., Khanal, B., Bhattarai, B., and Linte, C. A. (2024b). Investigating the robustness of vision transformers against label noise in medical image classification. *46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC).*
- Shrestha, P., Amgain, S., **Khanal, Bidur**, Linte, C. A., and Bhattarai, B. (2024). Medical vision language pretraining: A survey. *Preprint arXiv:2312.06224.*
- **Khanal, Bidur**, Bhattarai, B., Khanal, B., and Linte, C. A. (2023a). Improving medical image classification in noisy labels using only self-supervised pretraining. In *MICCAI Workshop on Data Engineering in Medical Imaging.*
- **Khanal, Bidur**, Bhattarai, B., Khanal, B., Stoyanov, D., and Linte, C. A. (2023b). M-vaal: Multimodal variational adversarial active learning for downstream medical image analysis tasks. In *Annual Conference on Medical Image Understanding and Analysis (MIUA).*
- **Khanal, Bidur**, Hasan, S. K., Khanal, B., and Linte, C. A. (2023c). Investigating the impact of class-dependent label noise in medical image classification. In *SPIE Medical Imaging 2023: Image Processing.*
- Sapkota, S., **Khanal, Bidur**, Bhattarai, B., Khanal, B., and Kim, T.-K. (2022). Label geometry aware discriminator for conditional generative networks. *International Conference on Pattern Recognition (ICPR).*
- **Khanal, Bidur**, Pokhrel, P., Khanal, B., and Giri, B. (2021). Machine-learning-assisted analysis of colorimetric assays on paper analytical devices. *American Chemical Society (ACS) omega.*
- **Khanal, Bidur** and Kanan, C. (2021). How does heterogeneous label noise impact generalization in neural nets? In *International Symposium on Visual Computing (ISVC).*

- Wang, L., Xie, C., Lin, Y., Zhou, H.-Y., **Khanal, Bidur**, Khanal, B., et al. (2021). Evaluation and comparison of accurate automated spinal curvature estimation algorithms with spinal anterior-posterior x-ray images: The AASCE 2019 challenge. *Medical Image Analysis*
- **Khanal, Bidur**, Dahal, L., Adhikari, P., and Khanal, B. (2019). Automatic cobb angle detection using vertebra detector and vertebra corners regression. In *International Workshop and Challenge on Computational Methods and Clinical Applications for Spine Imaging*
- **Khanal, Bidur**, Pant, S., Pokharel, K., and Gaire, S. (2018). Mental state prediction by deployment of trained svm model on eeg brain signal. In *2018 IEEE 3rd International Conference on Computing, Communication and Security (ICCCS).*

PROFESSIONAL SERVICE

Reviewer, Neural Networks 2025

Reviewer, International Conference on Medical Image Computing and Computer Assisted Intervention 2025

Reviewer, AAAI Conference on Artificial Intelligence 2025

Reviewer, Healthcare Technology Letters 2024

Reviewer, IEEE Transactions on Medical Imaging 2024

Reviewer, International Conference on Medical Image Computing and Computer Assisted Intervention 2024

Reviewer, Technical Program Committee Data Engineering in Medical Imaging Workshop, MICCAI 2024

Reviewer, PLOS ONE Journal 2024

Reviewer, AAAI Conference on Artificial Intelligence 2024

Reviewer, International Conference on Medical Image Computing and Computer Assisted Intervention 2023

Reviewer, Technical Program Committee Data Engineering in Medical Imaging Workshop, MICCAI 2023

MENTORSHIP

- *Bipasha Kundu*, Ph.D., Lab Member, RIT.
  Provided supervision on initial research work and paper writing. *2024 - 2025*
- *Prashant Shrestha* and *Sanskar Amgain*, Research Assistants at NAAMII, Nepal.
  Mentored on two research projects. *2023 - 2024*
- *Sandesh Pokhrel* and *Sanjaya Bhandari*, Research Assistants at NAAMII, Nepal.
  Led a research project and provided mentorship. *2025*

TECHNICAL SKILLS

Programming Languages	Python(Proficient), MATLAB (Intermediate), C/C++ (Basics)
Python Packages	Pytorch, Tensorflow, Keras, Matplotlib, Seaborn, Numpy, Scipy, Scikit-Learn, Pandas, OpenCV, Regex, PyQt5, Jupyter
Tools and Frameworks	Git, Docker, Bash, Conda, SLURM, AWS, ITK-SNAP, Weight & Biases

ACADEMIC HONORS AND ACHIEVEMENTS

Scholarship Full Financial support for Ph.D. in Imaging Science, RIT *2021 - 2025*

Award, IEEE EMBC NextGen Scholar *2024*

Award, Graduate Student Research and Creativity Reimbursement, RIT *2023*

Traineeship, AWARE-AI NSF Research Trainee, RIT *Jan 2022 - May 2022*

Scholarship, MoGA Nepal Bachelor's Merit Scholarship for Gov't Employees' Children *2018*

Scholarship, Earned merit-based stipend for top 24 class rank, IOE Pulchowk Campus, TU *2013 - 2017*

LEADERSHIP AND PERSONAL GROWTH

Invited guest talk, *NPLAcademia's* Second Session: *Exploring PhD/MS Opportunities in USA* *Mar 2025*

Invited talk, *NAAMII Annual AI School* Information session: Experience sharing *Nov 2024*

Member, RIT Tiger Tales Toastmasters Member *Rochester, NY, USA* *Aug 2022 - April 2025*

Service, Sergeant at Arms at RIT Tiger Tales Toastmasters *May 2023 - Dec 2023*

Service, Treasurer at RIT Tiger Tales Toastmasters *Jan 2024 - May 2024*

Research showcase presentation, *Industrial Associates Fall Symposium, Rochester, NY* *Oct 2023*

Service, First Treasurer of Nepal Student Association at RIT *Apr 2020 – Apr 2021*

Featured speaker, *Nepal Nirman* Idea Pitch Competition, Himalayan TV, Nepal *2017*