BIDUR KHANAL

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Bidur-Khanal bidurkhanal5 BidurKhanal ResearchGate: Bidur-Khanal

EDUCATION

Ph.D. in Imaging Science *Aug 2020 - Expected Dec 2024*
Rochester Institute of Technology Rochester, NY, USA
Advisor: Prof. Cristian A. Linte
Research Focus: *Medical Image Analysis using Deep Learning with Limited Labeled Data or Noisy Labels*
Relevant Courses: Intro to Medical Imaging; Mathematics for Deep Learning; Image Processing and Computer Vision; Human Visual System; Fourier Methods for Imaging; Probability Noise and System Modeling

Bachelor's in Electronics and Communication Engineering *Nov 2013 - Dec 2017*
Institute of Engineering, Pulchowk Campus, Tribhuvan University Lalitpur, Nepal
Relevant Courses: Data Mining; Artificial Intelligence; Big Data Technologies

TECHNICAL SKILLS

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

RESEARCH EXPERIENCE

Biomedical Modeling, Visualization and Image-guided Navigation Lab *July 2021 - Present*
Graduate Research Assistant, Rochester Institute of Technology Rochester, NY

- Improved the robustness of medical image classification against noisy labels by using self-supervised pretraining (published at DEMI Workshop, MICCAI 2023).
- Developed a multimodal active learning method for 2D brain tumor segmentation and chest x-ray classification (accepted at MIUA 2023).
- Investigated the impact of class-dependent label noise in medical image classification on noise-free classes with subtle visual differences (published at SPIE Medical Imaging 2023).

Machine and Neuromorphic Perception Lab *May 2021 - June 2022*
Graduate Research Assistant, Rochester Institute of Technology Rochester, NY

- Investigated the impact of heterogeneous label noise on deep learning-based vision tasks in multi-class, multi-task, and multi-label scenarios (published at ISVC 2021).
- Conducted an extensive study of online learning classifiers (streaming LDA, PA classifier, NCM, and AROW) for efficient continual learning.

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

- Developed deep learning framework for vertebra detection, spinal curvature estimation, and, scoliosis detection from X-ray images (published at MICCAI 2019 AASCE Challenge).
- Created a colorimetric PAD image dataset for pesticide concentration estimation using smartphone cameras, and benchmarked it with various ML models. (published at ACS Omega 2021).

WORK EXPERIENCE

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.

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

- Prepared several PyTorch lab assignments and guided beginner students.

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

- Interfaced Raspberry Pi, Picamera, and GSM/GPS module with effective network communication for home automation application.
- Built OpenCV-based computer vision pipeline for edge devices to assess material strain under force.

PUBLICATION

- Bidur Khanal, Binod Bhattarai, Bishesh Khanal, and Cristian A Linte. Improving medical image classification in noisy labels using only self-supervised pretraining. In *MICCAI Workshop on Data Engineering in Medical Imaging*, pages 78–90. Springer, 2023
- **Bidur Khanal**, Binod Bhattarai, Bishesh Khanal, Danail Stoyanov, and Cristian A Linte. M-vaal: Multimodal variational adversarial active learning for downstream medical image analysis tasks. Accepted at MIUA 2023
- **Bidur Khanal**, SM Kamrul Hasan, Bishesh Khanal, and Cristian A Linte. Investigating the impact of class-dependent label noise in medical image classification. In *SPIE Medical Imaging 2023: Image Processing*
- Suman Sapkota, **Bidur Khanal**, Binod Bhattarai, Bishesh Khanal, and Tae-Kyun Kim. Label geometry aware discriminator for conditional generative networks. *ICPR*, 2022
- **Bidur Khanal**, Pravin Pokhrel, Bishesh Khanal, and Basant Giri. Machine-learning-assisted analysis of colorimetric assays on paper analytical devices. *ACS omega*, 2021
- **Bidur Khanal** and Christopher Kanan. How does heterogeneous label noise impact generalization in neural nets? In *International Symposium on Visual Computing*. Springer, 2021
- Liansheng Wang, Cong Xie, Yi Lin, Hong-Yu Zhou, **Bidur Khanal**, Bishesh Khanal, et al. Evaluation and comparison of accurate automated spinal curvature estimation algorithms with spinal anterior-posterior x-ray images: The AASCE 2019 challenge. *Medical Image Analysis*, 2021
- **Bidur Khanal**, Lavsen Dahal, Prashant Adhikari, and Bishesh Khanal. 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*. Springer, 2019

GROWTH, ACHIEVEMENTS AND HONORS

Tiger Tales Toastmasters, RIT
· Presentation Mastery pathway (level 2) *Aug 2022 - Present*
· Sergeant at Arms Role: Responsible for managing logistics at Toastmasters meetings. *May 2023 - Present*

RIT PhD. Merit Scholarship/Assistantship *Aug 2020 - Present*

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

First Treasurer of Nepal Student Association, RIT *April 2020 – April 2021*

Merit-Based Scholarship for Children of Government Employees *2018*
Provided by: Government of Nepal, Ministry of General Administration (MoGA)

Merit-Based Partial Tuition Waiver, Tribhuvan University *Nov 2013 - Dec 2017*

Appearance in National Television as an Idea Presenter *2017*
Received the best idea award under Energy and Sustainability Category