BIDUR KHANAL

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Bidur-Khanal bidurkhanal5 BidurKhanal ResearchGate: Bidur-Khanal

EDUCATION

Ph.D. in Imaging Science *Aug 2020 - Present*
Rochester Institute of Technology *Rochester, NY, USA*
Advisor: Prof. Cristian A. Linte
Research Topic: *Medical Image Analysis using Deep learning from Data with Limited Label or Noisy Labels*
Courses: Introduction to Medical Imaging, Mathematics for Deep Learning, Deep Learning for Computer Vision, Image Processing and Computer Vision, Human Visual System, Fourier Methods for Imaging, Probability Noise and System Modeling

Winter School in AI *Dec 20 - 30, 2018*
NepAl Applied Mathematics and Informatics Institute for Research (NAAMII) *Dec 10 - 20, 2019*
Short Courses: Linear Algebra, Probability and Statistics, Natural Language Processing, VAEs and GANs

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

PUBLICATION

- Suman Sapkota*, **Bidur Khanal***, Binod Bhattarai, Bishesh Khanal, and Tae-Kyun Kim. Label geometry aware discriminator for conditional generative networks. *ICPR*, 2022. [* denotes equal contribution]
- **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 aasce2019 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

TECHNICAL SKILLS

Programming Languages	Python(Proficient), C/C++, MATLAB
Python Packages	Pytorch, Tensorflow, Matplotlib, Seaborn, Numpy, Scipy, Scikit-Learn, Pandas, OpenCV, Regex, Jupyter
Tools and Frameworks	Git, Bash, Conda, Slumr, AWS, LaTeX, Raspberry-Pi

RESEARCH EXPERIENCE

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

· Investigated and showed that the impact of class-dependent label noise from noisy classes on clean classes is severe in medical image classification as there is high chance of classes sharing similarity in shape and appearances.
· Working on developing multi-modal deep active method for semantic segmentation of medical 2D images that ranks the incorrect samples, in a dataset, for label correction based on their importance in learning.

Machine and Neuromorphic Perception Laboratory *May, 2021 - June 2022*
Research Assistant *Rochester, NY*

· Accessed the impact of class-dependent, task-dependent, and label-dependent noisy labels in multi-class classification, multi-task learning, and multi-label learning settings respectively, in vision tasks.
· Created efficient online learning classifier using our proposed large-margin regularized linear discriminant analysis(LDA) that improved classification performance of baseline streaming LDA.

WORK EXPERIENCE

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

- Worked on adding realism in computer rendered images: built and fine-tuned GAN models for conditional image domain translation.
- Worked on 2D image to 3D model pipeline: developed deep learning based algorithm for detecting keypoints in 2D images for 3D modeling.

Research Assistant *April 2019 - Aug 2020*
NepAl Applied Mathematics and Informatics Institute for Research (NAAMII) *Kathmandu, Nepal*

- Spine Curvature Estimation from X-ray Images: Developed deep learning framework for automatic vertebra detection, spinal curvature estimation and cobb angle calculation to detect scoliosis from X-ray images. Work presented at MICCAI 2019 AASCE Challenge.
- Estimating Pesticide Concentration with Smartphone: Created a new dataset for estimating food dye and pesticide concentration from smartphone images of assays, using machine learning framework. Designed image pre-processing pipeline and accessed/analyzed ML models (SVM, Logistic Regression, Random Forest and neural nets) in classifying concentration labels. Work is published in ACS omega journal.

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

- Prepared lab assignments on deep learning basics using pytorch, supervised and taught beginner students during the lab.

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

- Motion detection enabled security system: Wrote source code to interface Raspberry Pi with picamera and gsm/gps module, developed algorithms for robust motion detection, implemented TCP/IP server/client model on Raspberry Pi for home automation application.
- Crack detection and elongation measurement in material under strain: Developed an efficient algorithm for Raspberry-Pi using OpenCV to estimate strength of a specimen using from images of specimen under strain.

ACHIEVEMENTS AND HONORS

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

AWARE-AI NSF Research Trainee, Rochester Institute of Technology *Jan 22, 2022 - Present*

Treasurer of Nepal Student Association, Rochester Institute of Technology *April 2020 – April 2021*

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

Sujan Tuladhar Memorial Science Fair Award, Gold Medal for best science project of the year *2010*

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

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