BIDUR KHANAL

Naikap, Chandragiri -14, Kathmandu, Nepal | (977) 9849811838 | bk9618@rit.edu | bidurkhanal255@gmail.com
GitHub: https://github.com/Bidur-Khanal, LinkedIn: https://www.linkedin.com/in/bidur-khanal-840b95134/

EDUCATION

Rochester Institute of Technology, Rochester NY **Aug 2020 - Present**
1st Year PhD, Imaging Science
Chester F. Carlson Center for Imaging Science

Institute of Engineering, Pulchowk, Tribhuvan University, Nepal **Nov 2013 - Dec 2017**
Bachelor of Electronics and Communication Engineering

First Nepal Winter School in AI **Dec 20 - 30, 2018**
Second Nepal Winter School in AI **Dec 10 - 20, 2019**
Received Full Scholarship
Topics covered: Linear Algebra, Probability and Statistics, Optimization, Computer Vision, Deep Learning, Computational Neuroscience, Natural Language Processing, VAEs and GANs

PUBLICATIONS

Bidur Khanal, Pravin Pokhrel, Bishesh Khanal, Basant Giri. **Colorimetric Pesticide Residue Analysis on Paper Analytical Device using Machine Learning.** *In preparation to be submitted to Nature - Scientific Reports. Manuscript is Under Revision for Submission*

Bidur Khanal, Lavsen Dahal, Prashant Adhikari, Bishesh Khanal. **Automatic Cobb Angle Detection using Vertebra Detector and Vertebra Corners Regression**. *In MICCAI 2019 Challenge on Accurate Automated Spinal Curvature Estimation & Workshop on Computational Methods and Clinical Applications for Spine Imaging.* doi: https://doi.org/10.13140/RG.2.2.36580.32649 [Oral Presentation]

Bidur Khanal, Satish Pant, Kushal Pokharel, Susan Gaire. **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)*. IEEE, 2018. doi: https://doi.org/10.1109/CCCS.2018.8586846 [Oral Presentation]

RELATED WORK EXPERIENCE

Research Assistant **April, 2019 – Aug 2020**
NepAl Applied Mathematics and Informatics Institute for Research (NAAMII),
Supervisors: Dr. Bishesh Khanal and Dr. Binod Bhattarai

- **Conditional GAN with Additive Angular Margin Loss in Discriminator** (with Dr. Binod Bhattarai)
  - Worked on a novel idea in class-based conditional GAN for Image Translation by introducing Additive Margin Loss in Discriminator's Class. Significantly improved classification accuracy in translated images.
  - Datasets Used: CIFAR100 and Radboud Face Database. Additional Experiments are in progress. Aiming to target **CVPR 2021**.

- **Spine Curvature Estimation from X-ray Images** (with Dr. Bishesh Khanal)
  - Worked on deep learning methods for Accurate Vertebra Detection, Spinal Curvature Estimation and Cobb Angle Calculation in X-ray images. Presented its paper at MICCAI 2019 AASCE Challenge
  - Improved the Vertebra Detection Using Object Detection task specific augmentation and ensemble based post processing.

- **Estimating Pesticide Concentration with Smartphone** *(Collaboration: Analytical Chemistry & Machine Learning, under supervision of Dr. Bishesh Khanal & Dr. Basant Giri)*
  - Prepared a new Image dataset for Food Dye and Pesticide assays to study the smartphone based colorimetric detection using data-driven machine learning approach.
  - Accessed machine learning models (SVM, Logistic Regression, Random Forest and ANN) in classifying pesticide concentration labels based on its residue color strength.

Machine Learning Engineer (Part Time, Worked Remotely) **Dec 1, 2019- Aug 2020**

Zeg.ai, United Kingdom, 3D AI solution Company, with Dr. Binod Bhattarai

- Developed the 1st stage pipeline for 2D Image to 3D reconstruction. 1st stage pipeline includes image segmentation and keypoints estimation.
- Implemented Conditional Shape Preserving GANs to Translate Computer Rendered Image to Natural Image. Also, worked in Image to 3D Mesh reconstruction using Geometric Deep learning.

Teaching Assistant **Dec 10 – 20, 2019**

Second Nepal Winter School in AI, organized by NAAMII

- Prepared Lab assignments of Pytorch Tutorial on Deep Learning (with Dr. Danda Pani Paudel) Supervised Lab activities: Teaching and assigning lab works in python to beginner students.

Firmware / Image Processing Engineer **Feb 2018 – Sept 2018**

Nepal Digital Systems, Kathmandu, Nepal (Startup Company)

- **Motion detection and tracking enabled camera surveillance 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.

- **Crack Detection and Elongation measurement in material under strain**
  Implemented image pre-processing techniques, homography and affine transformation, and OpenCV camera calibration. Wrote codes to implement Digital Image Correlation in Raspberry Pi.

PREVIOUS PROJECTS

Brain Signal Interfacing for Control Applications using Machine Learning

*Institute of Engineering, Tribhuvan University***;** *Major Project*

- Controlled a robot using processed real-time EEG signal. Used SVM to classify the signal into 3 attention states (which were used as control commands to manipulate robot's speed).

Vehicle Guidance using Image Processing

*Institute of Engineering, Tribhuvan University***;** *Minor Project*

- Extracted features from 2D maze using Hough Line Algorithm and HSV color segmentation, and used Wall Follower Algorithm to solve the maze and guide a robot along the path.

3D Simulation of Blender Model

*Institute of Engineering, Tribhuvan University***;** *Project on Computer Graphics*

- Developed an application in C++ using OpenGL and SDL to simulate the blender models from extracted Vertices, Normals and Materials from .obj and .mtl extension files.

SKILLS

- **Programming Language**: C, C++, Python, SQL, MATLAB, Assembly language
- **Frameworks and Tools**: OpenCV, PyTorch, Tensorflow, Keras, Pandas, NumPy, SciPy, Matplotlib, Scikit-learn, Theano (Basics), Git, AWS

HONOURS AND ACHIEVEMENTS

- **Received Merit-Based Scholarship** for Children of Government Employees , Category: Engineering Provided by: Government of Nepal, Ministry of General Administration (MoGA)
- **Awarded** *Sujan Tuladhar Memorial Science Fair Award* – 2010, **Gold Medal** for best science project of the year.
- **Received** Merit-Based Partial Tuition Waiver, *Institute of Engineering, T.U,* Duration: 4 Years
- Appearance in National Television as an Idea Presenter; **received** the best idea award under Energy and Sustainability Category.
- **Achieved** first award in *Global Game Jam Nepal*, 2016; Developed an android game application "Bull Chase" (Team Work).
- **1st Runner Up** in Tech Bihani 2016, software competition organized at *Advanced College of Engineering* ; Contribution: Backend programming for database management using SQL and PHP

HOBBIES/ INTERESTS

Playing Football, Trekking, Playing Guitar, Singing