Bipasha Kundu

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Education

Rochester Institute of Technology — Rochester, NY
Doctor of Philosophy in Imaging Science — *Aug. 2022 – Present*

Texas Tech University — Lubbock, TX
Doctor of Philosophy in Electrical Engineering — *Aug. 2021- June 2022*

University of Minnesota Duluth — Duluth, MN
Master of Science in Electrical Engineering — *Aug. 2018 – May 2021*

Khulna University Of Engineering & Technology — Bangladesh
Electronics & Communication Engineering — *Feb. 2011 – July 2015*

Technical Skills

Languages: Matlab, Python, C, R, SQL
Windows: Windows, Linux
Python Libraries: Pytorch, Pandas, NumPy, Matplotlib, TensorFlow, Sklearn, Keras, OpenCV, SimpleITK
Visualization Tools: Power BI, Tableau
Tools: 3D Image Slicer, ITK-Snap, Office Suite, CUDA, GPU, Git, Grad Cam, Weight & Bias

Experiences

Research Assistant, BiMVisIGN Lab — August 2022 – Present
Rochester Institute of Technology — *Rochester, NY*

Research Assistant, SmartBiomed Lab — August 2021 – June 2022
Texas Tech University — *Lubbock, TX*

- Conduct research and literature review on designated projects, prepare materials for submission to granting agencies and foundations, summarize project results, prepare IRB, progress reports for the PI and funding agency, prepare other articles, reports, and presentations

Teaching Assistant — August 2018 – May 2021
University of Minnesota Duluth — *Duluth, MN*

- Prepare and grade Electrical Circuit Analysis, Electronics 2, Digital Logic Design, and Power Electronics homework and laboratory assignments

Power and Infrastructure Specialist — Jan 2018 – July 2018
Banglalink Digital Communication Ltd. — *Dhaka, Bangladesh*

- Database maintenance and project management of access projects with a new solution, resolving project-related conflicts and ensuring appropriate levels of communication.

Presales Engineer — Jan 2016 – Dec 2017
Express Systems Ltd. — *Dhaka, Bangladesh*

- Attending meetings with prospective clients to determine technical and business requirements for data center power products and ensuring that all necessary information is collated before developing a solution.

Research Experience

- Contributed in "Remote COVID-19 detection from coughing sound analysis and breathing rate extraction using a smartphone", "Temperature detection from images using smartphones", "SpO2 detection using smartphone fingertip videos", Funded by NSF I-corps."
    - **Platform** : Matlab, Image Processing, Signal Processing, Machine learning
- Contributed in patient database management part for developing an windows application for Speech Intervention via tele-practice for children, collaboration between Texas Tech University and Texas Tech University Health Science Center (TTUHSC), Funded by NIH.
    - **Platform** : Python Tkinter (GUI)
- Contributed in developing and implementing the requirement of surgery from the images of different grades of burns and wounds in a continuous monitoring process using Deep Learning.", collaboration between Texas Tech University and Texas Tech University Health Science Center Burn unit (Prepared and received funding from NSF I-corps, June 2022).
    - **Platform** : Matlab, Image Processing, Deep learning

Publications

Conference Publications

- Are Natural Domain Foundation Models the Future of Medical Image Segmentation? (preparing for submission)
- Assessing the Performance of the DINOv2 Self-supervised Learning Vision Transformer Model for the Segmentation of the Left Atrium from MRI Images, Accepted in SPIE Medical Imaging, 2024
- Comparative Analysis of Non-Rigid Registration Techniques for Liver Surface Registration, SPIE Medical Imaging, 2023
- Temperature Detection from Images Using Smartphones, (Available on arXiv.org)
- Classification and Feature Extraction of Different Hand Movements from the EMG Signal using Machine Leaning based Algorithms. **B Kundu**, Desineni Subarram Naidu,(International Conference on Electrical, Communication, and Computer Engineering, 2021)
- An algorithm for reduction of packet delay and waiting time for unstable ONUs in PON. **B Kundu**, M Hossen, S Basu, MI Arefeen (International Conference on Electrical Engineering and Information Communication Technology, 2015)
- An efficient multi-OLT and multi wavelengths passive optical network for differentiated classes of services. S Basu, M Hossen, MI Arefeen,**B Kundu**. (International Conference on Informatics, Electronics and Vision, 2016)

Journal Publication

- Modified early DBA algorithm for reducing packet delay and waiting time of unstable ONUs in PON. **B Kundu**, M Hossen, S Basu, MI Arefeen. International Journal of Innovative Research in Electronics and Communications (IJIREC)
- LSTM-Based COVID-19 Detection Method Using Coughing. T. Ankur, **B Kundu**, Jo woon Chong. (Preparing for submission)
- Cataract Classification (type) using Hybrid Convolution Neural Networks T. Ankur, **B Kundu**, Jo woon Chong. (Preparing for submission)

Projects

Classifying if there is a C. elgan worms and no worms using support vector machine (SVM).

- An SMO approach has been applied after applying image flattening and PCA to identify if there is a worm or no worm with a test accuracy of 91.9%.

Digital Halftoning of Continuous-Tone Images and Halftone Removal.

- Implemented independent quantization, error diffused quantization, and then injected white noise and blue noise from scratch. Halftone removal was implemented using three different types of filters.

Determination presence of cataract and classification of different grades of cataract using conventional CNN.

- Various image processing technique has been applied to detect if there is any cataract eye or healthy eye. Further, a CNN is implemented to classify different grades of cataracts from the cataract eye images with an accuracy of 83.4%. Both Python and Matlab were used for the implementation.

Worm-Segmentation and Tracking from video.

- Different Image processing techniques have been applied to segment and track C. Elegant. This project takes the video as input and shows the tracking frame by frame.

Rank and Suit Detection of Playing Cards.

- Different Image processing techniques have been applied to segment rank suit from the playing card images. Further, a CNN is applied to classify the rank & suit.

SVM dual form, Kernel techniques, Naive bayes classifier from scratch using synthetic data

Honors/Awards

- Wise Travel Award – Dec 2024
- EE Gage Scholarship – June 2019
- Dean's List Award – 2011 to 2015
- Board Scholarship (Junior, SSC, HSC) – 2005 to 2010