

Khondker Fariha Hossain

Linkedin: Khondker Fariha Hossain

Personal Website: Fariha

Email : khondkerfarihah@nevada.unr.edu

Mobile : +1-775-229-0515

EDUCATION

- **University of Nevada, Reno** Reno, NV, USA
Ph.D. in Computer Science & Engineering Jan 2021 - Present
- **University of Nevada, Reno** Reno, NV, USA
Master of Science in Computer Science & Engineering Jan 2021 - Dec 2022
- **Deakin University** Melbourne, VIC, Australia
Master of Data Science Mar 2019 - Dec 2020
- **BRAC University** Dhaka, Bangladesh
Bachelor of Science in Computer Science & Engineering April 2013 - Aug 2017

SKILLS

- **Programming Languages::** Python, R, C++, Bash (Shell Scripting), Matlab, Git, SQL.
- **Imaging Expertise::** X-rays, Mammograms, OCT, Fundus, Fluorescein Angiography, MRI, PET, CT, Ultrasound.
- **Libraries & Programs:** NumPy, PyTorch, Monai, OpenCV, Tensorflow, Keras, Scikit-learn, Pandas, Caffe, CoreML, Streamlit, Spark, Tensorboard
- **Systems & Cloud-computing:** Slurm, Linux OS, Singularity.

WORK EXPERIENCE

- **University of Nevada, Reno** Reno, NV
Graduate Research Assistant - Prof. Alireza Tavakkoli January 2021 - Present
 - **Space-associated Neuroocular Syndrome (SANS):** Developed a Super-resolution Transformer based model for identifying SANS degenerative disease in astronauts. **Funded by NASA Grant No. 80NSSC20K1831.**
Tools: PyTorch, Pandas, NumPy, Monai, OpenCV.
Codes: [Swin-FSR](#)
 - **Adversarial Attack Detection and Mitigation:** Developed two novel generative adversarial networks for adversarial attack detection in ECG. Also, developed a Game theoretical strategy, implemented with convolutional neural network to mitigate adversarial attack
Tools: Tensorflow-keras, NumPy, Keras, OpenCV
Codes: [ECG-Adv-GAN](#), [ECG-ATK-GAN](#)
 - **Concussion Detection using Virtual Reality:** Collaborating with Neuromechanics Lab to develop a system using Virtual Reality that can detect concussions.
Tools: Tensorflow-keras, Numpy, Pandas.
 - **2D and 3D Medical Image Segmentation:** Developed a novel Swin-Transformer-based architecture for benign and malignant breast micro-mass segmentation from MRI and Ultrasound images, achieving 3-4% improvement over current state-of-the-art. Also, developed a attention-based Swin-Transformer with feature-similarity loss for 3D OCT fluid segmentation.
- **Ford Motor Company** Melbourne, Australia
Artificial Intelligence/Machine Learning Engineer Intern Aug 2020 - Oct 2022
 - **Hierarchical Graphical Network:** Worked as a Team Lead(interns) to create a hierarchical Graphical Network of organization Members using Graphical Neural Network
Tools: Tensorflow, Pandas, Matplotlib, NumPy.
 - **Visualization of analysis:** Implemented "Streamlit" for the dynamic visualization of the Machine Learning Model and the Graphical Network.
Tools: Tensorflow, Pandas, Matplotlib, NumPy.
 - **Research in "Oracle Digital Assistance"** : Created Report on "Oracle Digital Assistance" to create an Economic and Organizational suitability report emphasizing the Policy Maker and Technical perspective.
- **Kyoto Engineering and Automation Ltd.** Software Engineer Intern
Software Engineer Intern Oct 2017 - Dec 2017
 - **Organizational Software:** Built Worked in 2 Software(Private)
Tools: Platform : .NET ; Language : C#.
 - **Microsoft SQL Server:** Designed and implemented in the Company's Software(Private)
Tools: MySQL.

SELECTED PUBLICATIONS

- [J1]: Sharif A. Kamran, Alireza Tavakkoli, **Khondker F. Hossain** and Stewart L. Zuckerbrod [*Equal Contribution*] [A Novel Deep Learning Conditional Generative Adversarial Network for Producing Angiography Images from Retinal Fundus Photographs](#), 2021, *Scientific Reports, Nature*.
- [C1]: **Khondker Fariha Hossain**, Sharif Amit Kamran, Joshua Ong, Andrew G. Lee and Alireza Tavakkoli [Revolutionizing Space Health \(Swin-FSR\): Advancing Super-Resolution of Fundus Images for SANS Visual Assessment Technology](#), *26th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2023*
- [C2]: Sharif Amit Kamran, **Khondker Fariha Hossain**, Alireza Tavakkoli, George Bebis, Sal Baker, [SWIN-SFTNet: Spatial Feature Expansion and Aggregation using Swin Transformer For Whole Breast micro-mass segmentation](#), 2022, *20th IEEE International Symposium on Biomedical Imaging, (ISBI) 2023*
- [C3]: **Khondker Fariha Hossain**, Sharif Amit Kamran, Alireza Tavakkoli, Xingjun Ma, [ECG-ATK-GAN: Robustness Against Adversarial Attacks on ECGs Using Conditional Generative Adversarial Networks](#), 2022, *Applications of Medical Artificial Intelligence, MICCAI 2022*
- [C4]: **Khondker Fariha Hossain**, Sharif Amit Kamran, Alireza Tavakkoli, Lei Pan, Xingjun Ma, Sutharshan Rajasegarar, Chandan Karmaker [ECG-Adv-GAN: Detecting ECG Adversarial Examples with Conditional Generative Adversarial Networks](#), 2021, in *20th IEEE International Conference on Machine Learning and Applications (ICMLA)*
- [C5]: **Khondker Fariha Hossain**, Sharif Amit Kamran, Prithul Sarker, Philip Pavilonis, Isayas Adhanom, Nicholas Murray, Alireza Tavakkoli [Virtual-Reality based Vestibular Ocular Motor Screening for Concussion Detection using Machine-Learning](#), 2022, *ISVC 2022: Advances in Visual Computing*
- [C6]: **Khondker Fariha Hossain**, Alireza Tavakkoli, Shamik Sengupta, [A Game Theoretical vulnerability analysis of Adversarial Attack](#), *ISVC 2022: Advances in Visual Computing*
- [C7]: Sharif A. Kamran, **Khondker F. Hossain**, Alireza Tavakkoli, Stewart L. Zuckerbrod, and Salah A. Baker, [Feature Representation Learning for Robust Retinal Disease Detection from Optical Coherence Tomography Images](#), in *MICCAI 2022*.
- [C8]: Sharif A. Kamran, **Khondker F. Hossain**, Alireza Tavakkoli, Stewart L. Zuckerbrod, and Salah A. Baker, [VTGAN: Semi-supervised Retinal Image Synthesis and Disease Prediction using Vision Transformers](#), in *ICCV 2021*.
- [C9]: Sharif A. Kamran, **Khondker F. Hossain**, Alireza Tavakkoli, Stewart L. Zuckerbrod, Kenton M. Sanders and Salah A. Baker, [RV-GAN: Segmenting Retinal Vascular Structure in Fundus Photographs Using a Novel Multi-scale Generative Adversarial Network](#), in *MICCAI 2021*.
- [C10]: Sharif A. Kamran, **Khondker F. Hossain**, Alireza Tavakkoli, Stewart L. Zuckerbrod, [Attention2AngioGAN: Synthesizing Fluorescein Angiography from Retinal Fundus Images using Generative Adversarial Networks](#), in *ICPR 2020*.

HONORS AND AWARDS

- Awarded with Doctoral Research in Innovation, Vision and Excellence (Nevada Drive Scholar) for 2023-2024.
- CSE graduate student out of 4,000+ students to receive UNR Graduate Dean's Merit Scholarship for 2021-2022.
- Received Outstanding International Graduate Student Award Spring'22 and Fall'22 by University of Nevada, Reno.
- Received Institutional Methodology Grant in January 2021, 2022

ACADEMIC SERVICES

- **Graduate Mentor:** US Army Educational Outreach Program, Summer'21, Summer'23.
- **Teaching Assistant:**
 - CS791: Mass Detection in Mammograms, Spring'22
 - Course: CS 302- Data Structure, Fall'22
 - Course: CPE 201- Digital Design, Spring'21'23, Fall'21
- **Instructor:** GRAD -778
 - Documentation and Communication (Overleaf)
 - Source Version Control and Visualization
 - Classification with Deep Architectures
 - Segmentation with Deep Architectures

REFERENCES

- **Dr. Alireza Tavakkoli**
Associate Professor, Department of Computer Science and Engineering
University of Nevada, Reno, NV, 89557
Email: tavakkol@unr.edu