Sharif Amit Kamran

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EDUCATION

University of Nevada, Reno — Reno, NV, USA
PhD Candidate in Computer Science & Engineering — Aug 2019 - May 2023

University of Nevada, Reno — Reno, NV, USA
Master of Science in Computer Science & Engineering — Aug 2019 - Dec 2020

BRAC University — Dhaka, Bangladesh
Bachelor of Science in Computer Science & Engineering — Jan 2013 - Apr 2017

SKILLS

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

WORK EXPERIENCE

University of Nevada, Reno — Reno, NV
Graduate Research Assistant - Prof. Alireza Tavakkoli and Prof. Sal Baker — August 2019 - Present

- **Space-associated Neuroocular Syndrome (SANS)**: Developed three novel image-to-image translation generative adversarial network (GAN) for Fundus to Fluorescein Angiography image generation. Also, built a deep convNet for identifying SANS degenerative disease in astronauts. **Funded by NASA Grant No. 80NSSC20K1831**.
  Tools: PyTorch, Pandas, NumPy, Monai, OpenCV.
  Codes: Vision-Transformer GAN, RV-GAN, Robust-Attention-Network,OpticNet-71

- **Calcium Event Extraction and Quantificaiton**: Developed a software for automated tracking, segmentation, extraction and quantification of sub-cellular calcium events from videos using semi-supervised GAN and pseudo-labels generated by kernel-based trackers. **Funded by NIH (NIDDK) Grant No. R01 DK120759**.
  Tools: Tensorflow, Streamlit, NumPy, Keras, OpenCV, LabelMe, ImageJ.
  Codes: 4SM, STMapAuto

- **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.
  Tools: PyTorch, Monai, NumPy, SimpleITK.

Genentech, Inc. — South San Fransisco, CA
Data, Analytics and Imaging Intern — May 2022 - Aug 2022

- **3D Foveal Center Detection**: Built a 3D deep learning model for foveal-center detection from Optical Coherence Tomography Images. Submitted a provincial patent.
  Tools: SimpleITK, Tensorflow, Slurm, Pandas, Matploblib, Pillow, NumPy.

- **Retinal Attribute Measurement** : Developed and deployed retinal fluid area and retinal layer thickness interpolation pipeline using volumetric OCT images. The quantification module has been incorporated and deployed in Flywheel for usage by clinicians.
  Tools: Pandas, JSON, Pillow, NumPy.

Genentech, Inc. — South San Fransisco, CA
Data Science Intern — May 2021 - Dec 2021

- **Vendor-specific OCT GAN**: Built a training and inference pipeline for a novel image-to-image translation GAN for synthesizing vendor-specific Optical Coherence Tomography (OCT) Images acquired from Zeiss and Spectralis.
  Tools: SimpleITK, Tensorflow, Slurm, SciPy, Pandas, OpenCV, Docker.

- **Treatment-arm Prediction using Deep-learning**: Designed and evaluated multi-modal ML and CNN architectures for identifying between placebo and treatment arm for Ranibizumab (Lucentis) and Faricimab using Fundus and OCT-enface images. The drugs are for treating Wet Age-related Macular Degeneration (AMD) and Diabetic Macular Edema (DME).
  Tools: Tensorflow, Keras, Scikit-learn, NumPy, Pillow, Tensorboard, Docker.

- **GA growth prediction**: Built a multi-modal regression network for estimating the growth rate of Geographical Atrophy.
  Tools: Tensorflow, Slurm, Scikit-learn, NumPy, Pandas, OpenCV, Tensorboard.

Selected Publications

- **[J1]**: **Sharif A. Kamran**, Alireza Tavakkoli, Khondker F. Hossain and Stewart L. Zuckerbroad, A Novel Deep Learning Conditional Generative Adversarial Network for Producing Angiography Images from Retinal Fundus Photographs, 2021, *Scientific Reports, Nature.*
- **[J2]**: **Sharif A. Kamran**, Khondker F. Hossain, Hussein Moghnieh, Sarah Riar, Allison Bartlett, Alireza Tavakkoli, Kenton M. Sanders, and Salah A. Baker, New open-source software for subcellular segmentation and analysis of spatiotemporal fluorescence signals using deep learning, 2022, in *iScience, Cell Press.*
- **[J3]**: Joshua Ong, Alireza Tavakkoli, Nasif Zaman, **Sharif A. Kamran**, Ethan Waisberg, Nikhil Gautam and Andrew G. Le, Terrestrial health applications of visual assessment technology and machine learning in spaceflight associated neuro-ocular syndrome, 2022, in *npj Microgravity, Nature.*
- **[J4]**: Wesley Leigh, Guillermo Del Valle, **Sharif A. Kamran**, Bernard T Drumm, Alireza Tavakkoli, Kenton M Sanders, Sal Baker A High Throughput Machine-Learning Driven Analysis of Ca2+ Spatio-temporal Maps, 2020, *Cell Calcium, Elseiver.*
- **[J5]**: Ethan Waisberg, Joshua Ong, **Sharif Amit Kamran**, Phani Paladugu, Nasif Zaman, Andrew G Lee, Alireza Tavakkoli, Transfer Learning as an AI-based Solution to Address Limited Datasets in Space Medicine, 2023, *Life Sciences in Space Research, Elseiver.*
- **[J6]**: Joshua Ong, Alireza Tavakkoli, Gary Strangman, Nasif Zaman, **Sharif Amit Kamran**, Quan Zhang, Vladimir Ivkovic, Andrew G Lee, Neuro-ophthalmic imaging and visual assessment technology for spaceflight associated neuro-ocular syndrome (SANS), 2022, *Survey of Ophthalmology , Elseiver.*
- **[C1]**: **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.*
- **[C2]**: **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.*
- **[C3]**: **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.*
- **[C4]**: **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.*
- **[C5]**: **Sharif A. Kamran**, Alireza Tavakkoli, Stewart L. Zuckerbrod, Improving Robustness using Joint Attention Network For Detecting Retinal Degeneration From Optical Coherence Tomography Images, in *ICIP 2020.*
- **[C6]**: **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, in *IEE ISBI 2023.*

Honors and Awards

- Received Best Reviewer Award at 32nd British Machine Vision Conference (BMVC) 2021.
- Received MICCAI Student Travel Award 2021 out of thousands of presenters.
- Only CSE graduate student out of 4,000+ students, to receive UNR Graduate Dean's Merit Scholarship for 2019-2020.
- Received Outstanding Graduate Student Award Spring'21 and Spring'22 by University of Nevada, Reno.

Academic Services

- **Reviewer**: IEEE TMI, JAMA Ophthalmology, Medical Physics, Biomed Optics Express, TVST, BMVC'20-'21, WACV'21-'22.
- **Instructor**: CS687/CS487 : Fundamentals of Deep Learning, Spring'23, University of Nevada, Reno.
- **Graduate Mentor**: US Army Educational Outreach Program, Fall'20.
- **Student Organizer**: International Symposium on Visual Computing, ISVC'20, ISVC'22.
- **Teaching Assistant**:
  - CS791: Mass Detection in Mammograms, Spring'22 and Fall'22, University of Nevada, Reno
  - CS687/487: Fundamentals of Deep Learning, Spring'21 and Spring'20, University of Nevada, Reno

References

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

- **Dr. Sal Baker**
  Associate Professor, Department of Physiology and Cell Biology
  University of Nevada, Reno, NV, 89557
  Email: sabubaker@med.unr.edu