Sharif Amit Kamran

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EDUCATION

PhD. in Computer Science and Engineering — **CGPA**: 3.7 / 4.0
University of Nevada, Reno — Aug 2019 – Present

Ms. in Computer Science and Engineering — **CGPA**: 3.63 / 4.0
University of Nevada, Reno — Aug 2019 – Dec 2020

Bsc. in Computer Science and Engineering — **CGPA**: 3.45 / 4.0
BRAC University, Bangladesh — Jan 2013 – Apr 2017

WORK EXPERIENCE

Intern, Personalized Healthcare Imaging, Genentech Inc. — May 2021 – Present
(Remote) South San Francisco, CA, USA

Graduate Research Assistant, University of Nevada, Reno — Aug 2019 – Present
Department of Computer Science and UNR school of Medicine

Mentor, Research & Engineering Apprenticeship Program (REAP) — Jun 2020 – Aug 2020
US Army Educational Outreach Program

Researcher, Center for Cognitive Skill Enhancement — May 2017 – Jun 2019
Independent University Bangladesh (IUB), Dhaka, Bangladesh.

SELECTED PUBLICATIONS

BOOK CHAPTER

[1] A Comprehensive Set of Novel Residual Blocks for Deep Learning Architectures for Diagnosis of Retinal Diseases from Optical Coherence Tomography Images, 2020, *Book Chapter, in Deep Learning, Volume 2., p.25-48, Springer.*

JOURNALS

[1] CalciumGAN: Segmenting Spatio-temporal map using multi-scale generative adversarial networks, 2021, in *Journal of Cell Biology*. **Under Review**

[2] A Novel Deep Learning Conditional Generative Adversarial Network for Producing Angiography Images from Retinal Fundus Photographs, 2021, in *Scientific Reports.*, 10, 21580.

[3] A High Throughput Machine-Learning Driven Analysis of Ca 2+ Spatio-temporal Maps, 2020, in *Cell Calcium, 91*, p.102260.

CONFERENCES

[1] ECG-Adv-GAN: Detecting ECG Adversarial Examples with Conditional Generative Adversarial Networks, in *20th International Conference on Machine Learning and Applications 2021 (ICMLA)*

[2] VTGAN: Semi-supervised Retinal Image Synthesis and Disease Prediction using Vision Transformers, in *Proceedings of the IEEE/CVF International Conference on Computer Vision Workshops 2021 (ICCVW)*.

[3] RV-GAN: Retinal Vessel Segmentation from Fundus Images using Multi-scale Generative Adversarial Networks, in *24th International Conference on Medical Image Computing and Computer Assisted Intervention 2021 (MICCAI).*

[4] Attention2AngioGAN: Synthesizing Fluorescein Angiography from Retinal Fundus Images using Generative Adversarial Networks, in *25th IEEE International Conference on Pattern Recognition 2020 (ICPR).*

[5] Fundus2Angio: A Novel Conditional GAN Architecture for Generating Fluorescein Angiography Images from Retinal Fundus Photography, in *15th International Symposium on Visual Computing 2020 (ISVC).*

[6] Improving Robustness using Joint Attention Network For Detecting Retinal Degeneration From Optical Coherence Tomography Images in *27th IEEE International Conference on Image Processing 2020 (ICIP).*

[7] Optic-Net: A Novel Convolutional Neural Network for Diagnosis of Retinal Diseases from Optical Tomography Images, in *18th IEEE International Conference on Machine Learning and Applications 2019 (ICMLA).*

SKILLS

- **Programming Languages:** C++, Python, Java, Bash (Shell Scripting), Matlab, HTML-CSS, Git, PHP
- **Libraries:** OpenCV, Scikit-learn, SimpleITK, Numpy, Caffe, Keras, Tensorflow, CoreML, ImageJ, Streamlit, LabelMe, VS Code, Tensorboard, Weights & Biases.
- **Systems:** Linux OS, Google Cloud Platform, Slurm, Docker, Singularity

SELECTED COURSEWORKS

Algorithms, Linear Algebra, Statistics and Probability, Machine Learning, Deep Learning, Computer Vision, Image Processing, Database Systems

PROJECTS

Vendor specific Image-to-image translation for OCT Imaging

- Built a image-to-image translation GAN for synthesizing Opitcal Coherence Tomography Images acquired from Zeiss and Spectralis OCT. The processing pipeline included resampling and resizing of 3D OCT scans from MHD file to 2D PNG images using Pandas, SimpleITK, Keras and NumPy. Moreover, the generative network was created using Keras and Tensorflow. Qualitative results were generated by image comparision using Matplotlib and Quantitative results were determined using Peak-Signal-to-Noise-Ratio and Signal-to-Noise-Ratio using Scikit-image. The project was part of my internship at **Genentech, Inc**.

Skin Lesion Detection using Edge Computing

- Worked as freelancer developer for **SkinIq, Inc**. to create a skin lesion detection app on IOS. The model was based on a deep convolutional neural network built in Keras and Tensorflow. It was trained on four different types of Skin Lesions: Papules, Postules, Nodules and Black heads. The images were labelled by a dermatologist. After training, the model was quantized to 8 and 4 bit precision from 32 bit using Apple's CoreML library. Worked with a team of developers to embed this model as an IOS app and also as distributed web-app using Rest-api on Amazon Web Services (AWS).

Retinal Vessel Segmentation using Style-transfer GAN

- Created a novel Style-transfer GAN for segmenting retinal vessels from color fundus images acquired from three different sources (Canon CR5, Nidek NM-200-D and TopCon TRV-50). The data was pre-processed using Pillow, NumPy and the model was built using Keras and Tensorflow. The quantitative evaluation was done using Sensitivity, Specificity, Mean-Intersection-Over-Union, Structural Similarity Index (SSIM) and AUC-ROC using scikit-learn. The model is current best performing architecture for three retinal vessel segmentation benchmarks, DRIVE, CHASE & STARE. Our findings were published in **MICCAI2021**.

Calcium Event Quantification using Image-inpainting GAN

- Built a software based on a novel conditonal GAN for automated segmentation of calcium events from Calcium Imaging videos. The pipeline included generating 2D spatio-temporal from Calcium videos using ImageJ and manually segmenting the events using LabelMe software by experts. The GAN was trained on strided-crops of ST-maps and manually segmented calcium events. The model was built in Keras and Tensorflow. We used connected-components from Open-CV to segment each events and extracted the duration, spatial spread and intervals of the events using Pandas and NumPy. Collaborated with a team to build a user-friendly App using Stream-Lit. The associated publication is under review.

ACADEMIC SERVICES

Reviewer

- IEEE Transactions on Medical Imaging (IF: 6.685)
- British Machine Vision Conference (BMVC) 2020 & 2021
- IEEE Winter Conference on Applications of Computer Vision (WACV) 2021 & 2022
- Translational Vision Science & Technology (IF: 2.37)
- Medical Physics (IF:4.071)
- Biomedical Optics Express (IF: 3.921)

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