

Research Experience

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| <p>Deep Learning Research Lab</p> <ul style="list-style-type: none"> • Graduate Research Assistant - Executed various SOTA deep learning generative models including various GAN models (Cycle GAN, Pix2pix, Conditional GAN, SRGAN, STARGAN) for image and time series datasets - Developed a deep active learning model for data efficient classification on image data - Developed a new model for self supervised representation learning for datasets at different scales, from CIFAR10/100 to ImageNet - Developed multiple time series analysis and modeling framework for human genome sequences, age estimation using gene expression data, age-related gene identification | <p>West Virginia University
May 2020 - Present</p> |
| <p>Computer Vision Biometrics Research Lab</p> <ul style="list-style-type: none"> • Graduate Research - Developed a GAN-based model to simultaneously perform super-resolution and domain translation on Iris image data for identification purposes. | <p>West Virginia University
May 2019 - May 2020</p> |
| <p>Advance Signal Processing Research Lab</p> <ul style="list-style-type: none"> • Graduate Research Assistant - Thorough investigation of time series prediction methods for non-stationary time series using Wavelet, and AR, MA, and ARIMA modeling - Developing an accurate algorithm to process human and canine EEG signals for long term prediction of epileptic seizures up to one hour prior to the seizure onset - Developing a linear-non-linear modeling algorithm for modeling highly volatile time series | <p>Amirkabir University of Technology
Aug. 2014 - May 2019</p> |

Education

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| <p>West Virginia University</p> <ul style="list-style-type: none"> • Doctor of Philosophy in Electrical Engineering [Deep/Machine Learning] GPA: 4.0 - Title: Active Uncertainty Representation Learning—Learning More From Less
(Advised by Dr. Donald Adjeroh and Dr. Gianfranco Doretto) | <p>Morgantown, WV
May 2019 – December 2023</p> |
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Selected Publications

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- **Salman Mohamadi, Gianfranco Doretto, Donald Adjeroh:** "FUSSL: Fuzzy Uncertain Self-Supervised Learning" 2023 IEEE/CVF Winter Conference on Application of Computer Vision (**WACV 2023**), Jan. 2023
 - **Salman Mohamadi, Gianfranco Doretto, Donald Adjeroh:** "Deep Active Ensemble Sampling" 2022 IEEE/CVF Asian Conference on Computer Vision (**ACCV 2022**), Dec. 2022
 - **Moktari Mostofa, Salman Mohamadi, Nasser M Nasrabadi:** "Deep GAN-based Cross-Spectral Cross-Resolution Iris Recognition" (**IEEE Transaction 2021**)
 - **Salman Mohamadi, Donald Adjeroh:** "An Information-Theoretic Framework for Identifying Age-Related Genes Using Human Dermal Fibroblast Transcriptome Data" 2021 IEEE International Conference on Bioinformatics and Biomedicine (**BIBM 2021**)
 - **Salman Mohamadi, Gianfranco Doretto, Nasser Nasrabadi, Donald Adjeroh:** "Human Age Estimation from Gene Expression Data Using Artificial Neural Networks" 2021 IEEE International Conference on Bioinformatics and Biomedicine (**BIBM 2021**)
 - **Salman Mohamadi, Donald Adjeroh:** "A New Framework For Spatial Modeling And Synthesis of Genomic Sequences" 2020 IEEE International Conference on Bioinformatics and Biomedicine (**BIBM 2020**), 3575-3584. , 16 June, 2020
 - **Salman Mohamadi, Hamidreza Amindavar:** "ARIMA-GARCH Modeling For Epileptic Seizure Prediction" 2017 IEEE International Conference on Acoustics, Speech, and Signal Processing (**ICASSP 2017**)
 - **Salman Mohamadi, Gianfranco Doretto, Donald Adjeroh:** "More Synergy, Less Redundancy: Exploiting Joint Mutual Information for Self-Supervised Learning" 2023 IEEE International Conference on Image Processing **ICIP 2023**
 - **Salman Mohamadi, Gianfranco Doretto, Donald Adjeroh:** "GUESS: Generative Uncertainty Ensemble For Self-Supervision", Submitted to WACV 2024
 - **Salman Mohamadi, et al.:** "ChatGPT in the Age of Generative AI and Large Language Models: A Concise Survey", Recently submitted

Projects/Expertise

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- **Data-Efficiency for Machine Learning, Deep Learning, and Computer Vision:**
There is a significant need for data-efficient algorithms in AI for many applications including healthcare, security, and applications in many private and governmental entities. Following is a list of some of accomplished projects by me:
 1. A New Framework of Deep Active Learning for Computer Vision (**NSF funded - 2022**)
 2. Uncertainty Representation for Self-Supervised Learning (SSL) (**NSF funded - 2022**)
 3. Joint Mutual Information Decomposition for SSL (**NSF funded - 2023**)

4. Designing and Implementing Multiple Deep Learning methods for Gene Expression Data for Aging Process and Genome Sequence Modeling (**NSF funded - 2020-2022**)

- **GAN Models:**

1. Implemented various GAN models [STAR, CYCLE, VANILLA, Pix2pix, Conditional, etc] for Quality enhancement, and various image synthesis applications (**Departmental Scholarship - 2019-2021**)
2. Designing a GAN-based framework for efficient cross-spectral and cross-resolution Iris Recognition (**Funded by US Center for Identification Technology Research (CITeR) - 2019**)

- **ChatGPT, Generative AI and LLMs:**

1. ChatGPT in the Age of Generative AI and LLMs: A Concise Survey (**NFS funded - 2023**)
2. How to Better Adapt with the New Wave of Generative AI

- **Signal and Times Series Modeling:**

1. Long-Term EEG-based Epileptic Seizure Prediction using ARIMA and GARCH models, Wavelet, etc (**2014-2017**)
2. Modeling Signals with High Volatility (**2018**)
3. Causal Inference and Inference of Association on Gene Expression Data for Human Aging (**NSF funded - 2022**)

Current Research

Active and self-supervised visual feature learning

- ***More robust SSL and AL models***

- We re-consider uncertainty representation for AL and SSL models

Generative Models, i.e., VAE, 3D & 2D GAN

- ***Adversarial synthesis***

- Investigation of deep generative models that represent 3D scenes in neural radiance fields as well as 2D scenes
- 3D model for self supervised learning

Generative AI, i.e., LLMs, ChatGPT, etc

- ***Careful Development and Better Adaptation to Genetative AI,***

Leadership/ Awards

- **NSF Fellowship:** NSF fellowship (Bridges Digital Health NSF NRT Fellowships , 2 years with Stipends)
- **Phi Kappa Phi:** Member of The Honor Society of Phi Kappa Phi
- **Supervision:** Supervised graduate and undergraduate students in research topics under Electrical Engineering and Computer Science
- **Reviewer:** IEEE Access, Neural Network (Elsevier), IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) , IJCB conference, etc

Research Interests

- **General:** Machine Learning (ML), Deep Learning (DL), Computer Vision, and Their application with Bioinformatics
- **Specific:** Generative Models (GANs, VAEs), Uncertainty Representation in Deep Learning, Self-Supervised Learning, and Active Learning
- **Others:** Getting machines to learn **hierarchical representation of action plans** (as opposed to hierarchical representation of perception which is in part solved by deep learning)

Programming Skills

- **Platforms:** PyTorch, Tensorflow, PyCharm, TorchScript, MATLAB, Linux, Kinect-SDK
- **Languages:** Python, C#, C/C++