Nazmul Karim

+1 (929) 601 5917 | nazmul.karim170@gmail.com | nazmul-karim170.github.io | github.com/nazmul-karim170 | linkedin.com/in/nazmul-karim-1b5805115/

Experience

Bosch, *Research Scientist* | Pittsburgh, PA *Feb 2024 - Present*

- Working on foundations models.

Amazon, *Applied Scientist Intern* | Seattle, WA *May 2023 - Sep 2023*

- Developed a generalized **image matching and pose estimation** technique using **foundation models such as CLIP and DinoV2**.
- Achieved **8% accuracy improvement** over SOTA when deployed in real-world scenarios, e.g. **Amazon Go**

University of Central Florida, *Graduate Research Assistant* (Prof. Rahnavard) | Orlando, FL *Aug 2018 - Nov 2023*

- Developed multiple advanced frameworks for improving **DNN robustness** that achieved SOTA performance across various settings, e.g. Image Classification, Object Detection, **Video Action Recognition**, **3D Point Cloud**, **Natural Language Generation**, etc.
- Formulated an innovative training framework for noisy labels, resulting in a noteworthy **11% improvement in accuracy**.
- Engineered multiple diffusion-based frameworks to facilitate **text-to-image, text-to-video and text-to-3D scene generation**.
- Devised a framework founded on Generative Adversarial Network (GAN), tailored for the **image and video compression**.

SRI International, *Research Intern* | PrinceTon, NJ *May 2022 - Aug 2022*

- Pioneered an innovative technique for **source-free domain adaptation**, resulting in a consistent average accuracy improvement of 2% across seven distinct tasks that span the domains of image classification and **semantic segmentation**.
- Developed a **low-light enhancement network** that improves segmentation performance for low-light scenes.

Semion Inc., *Machine Learning Researcher* | Dhaka, Bangladesh *Aug 2016 - Mar 2017*

- Development of a **tumor detection** framework through the utilization of convolutional neural networks.
- Development of **text summarization and sentiment analysis** methodologies employing Long-Short-Term Memory (LSTM).

Education

3.91/4.00 **Ph.D. in Electrical Engineering**, *University of Central Florida* | Orlando, FL *2018-23*

3.93/4.00 **MS in Computer Engineering**, *University of Central Florida* | Orlando, FL *2018-20*

3.82/4.00 **B.Sc. in Electrical Engineering**, *Bangladesh Univeristy of Engineering and Technology* | Dhaka, Bangladesh *2011-16*

Achievements: Runner-Up @ Cadence DSP Design Contest (Mumbai, India) | University Merit Scholarship (Dhaka, Bangladesh)
Top ML/CV Conferences: CVPR'22 (3 Papers), CVPR'23, ECCV'24 (3 Papers), ACM CCS'24, IEEE TIFS, MLSP'19, SPIE'22
Courses: Computer Vision | Advanced Computer Vision | Reinforcement Learning | 3D Computer Vision | Image Processing | Compressive Sensing | Advanced Linear Algebra | Stochastic Process | Convex Optimization| LLM Fine-tuning

Skills

Programming Python, C/C++, R, SQL, CUDA, CMake, Matlab, Git, Scripting (Bash), LaTeX, HTML
Software Linux, Tensorflow, Pytorch, Docker, OpenCV, ZeroMQ, LangChain, MLOps, Django, Gradio, Open3D, Hadoop
Systems AWS Cloud, AWS Sagemaker, TinyML, LLM Tuning, RLHF, NeRFStudio

Projects

Text-to-4D dynamic scene generation *Oct 2023 - Present*

University of Central Florida

- Developing a real-time photorealistic dynamic scene generation framework using **Gaussian splatting and video diffusion model**

Text-guided-3D Scene Generation and Editing *April 2023 - Nov 2023*

University of Central Florida

- Developed a framework that can edit **Neural Radiance Field (NERF)**-based 3D scenes using a text-to-image diffusion model. By editing a single image, it is possible to edit a 3D scene without re-training the model, **Project Page**.
- Another front of this work deals with *Local Editing of a 3D Scene*, **Project Page**

Text-driven-Video Generation and Editing *Jan 2023 - Sep 2023*

University of Central Florida

- Developed a diffusion-based framework to control edits in a video, e.g. style transfer, based on text input. **Project Page**

Multimodal Sensing and Deep Learning *Feb 2022 - Aug 2022*

University of Central Florida (Supported by Leonardo DRS)

- Developed a sensing-aided beam prediction framework that employs **multimodal sensor data** for the prediction. **DeepSense**

AI Safety and Privacy *May 2021 - Feb 2022*

University of Central Florida (Supported by DARPA)

- Developed a universal adversarial perturbation framework that can fool state-of-the-art deep models.
- Addressed the problem of backdoor attacks and defenses where large deep models can be attacked during pre-training.

Deep Learning in Computational Imaging *Nov 2020 - Jun 2021*

University of Central Florida

- Developed a GAN-based high-resolution reconstruction framework for single-pixel video. **GitHub Repo**