Vuong (Dustin) Nguyen

(346) 270-8403 | nguyenvuong29599@gmail.com | Google Scholar | LinkedIn | Github | Website

Summary

CS Ph.D. candidate with 4-year experience in Computer Vision (CV), Machine Learning (ML), and Deep Learning (DL). My work also encompasses exploring Generative AI and Vision-Language models for 3D Generation and Reconstruction.

Education

University of Houston — Houston, TX
Ph.D. in Computer Science | GPA: 3.811 — *Aug 2022 – Present*

Hanoi University of Science and Technology — Hanoi, Vietnam
B.S. in Applied Mathematics | Talent Honors Program — *Sep 2017 – Jul 2021*

Experience

University of Houston - Quantitative Imaging Lab — Houston, TX
Research Assistant | Advisor: Prof. Shishir Shah — *Aug 2022 – Present*

- Conduct research on Person Re-Identification, 3D Generation and Reconstruction, and Data Quality Assessment.
- Develop DL models for CV/ML tasks; Explore and implement CLIP, NeRF, GANs, VAEs, and Diffusion models.

Grooo International — Hanoi, Vietnam
Machine Learning Engineer — *Feb 2021 – Jul 2022*

- Preprocessed and analyzed large-scale datasets; Developed efficient and scalable ML models and pipelines.
- Collaborated with product management and development team to develop product features and deploy models.

Publications (Google Scholar)

1. **V. Nguyen**, K. Khaldi, D. Nguyen, P. Mantini, and S. Shah. "Contrastive Viewpoint-aware Shape Learning for Long-term Person Re-Identification". In *WACV*, 2024. [*Paper*]

2. **V. Nguyen**, P. Mantini, and S. Shah. "Temporal 3D Shape Modeling for Video-based Cloth-Changing Person Re-Identification". In *WACV Workshops*, 2024. [*Paper*] [*Code*].

3. K. Khaldi, **V. Nguyen**, P. Mantini, and S. Shah. "Unsupervised Person Re-Identification in Aerial Imagery". In *WACV Workshops*, 2024. [*Paper*]

4. **V. Nguyen**, S. Mirza, P. Mantini, and S. Shah. "Attention-based 3D Shape and Gait Representations Learning for Video-based Cloth-Changing Person Re-Identification". In *VISIGRAPP (VISAPP)*, 2024.

5. S. Mirza, **V. Nguyen**, P. Mantini, and S. Shah. "Data Quality Aware Approaches for Addressing Model Drift of Semantic Segmentation Models". In *VISIGRAPP (VISAPP)*, 2024.

6. **V. Nguyen**, A. Ho, A. Vu, A. Nguyen, and T. Tran. "Building Footprint Extraction in Dense Areas using Super Resolution and Frame Field Learning". In *iCAST*, 2023. [*Best paper award*] [*Paper*].

7. **V. Nguyen**, P. Mantini, and S. Shah. "Cross-Modality Spatial-Temporal Collaborative Learning for Video-based Cloth-Changing Person Re-Identification". *Under review at CVPR'24*.

8. **V. Nguyen**, and S. Shah. "CCPA: Long-term Person Re-Identification via Contrastive Clothing and Pose Augmentation". *Under review at ICME'24*.

Projects

Cloth-Changing Person Re-Identification (CCRe-ID) | *Code* — *Aug 2022 - Present*

- Lead a review paper on CCRe-ID; Develop the open-source baseline code repository for Video-based CCRe-ID.
- Design novel identity-aware 3D human reconstruction models to extract 3D SMPL body shape and gait, gain 3% accuracy improvement for Video-based CCRe-ID in the Wild; Implement in PyTorch.
- Propose Cross-Attention models for Video-based CCRe-ID, outperforming SOTA methods by 14% in accuracy.
- Develop models based on variations of Graph Neural Network (GNN)to capture shape and gait from skeleton-based pose, achieving SOTA performance in CCRe-ID; Implement using PyTorch Geometric.
- Construct a large-scale synthetic Video-based CCRe-ID dataset for a CVPR paper using GAN; Generate body segmentation masks, 2D/3D pose, and 3D SMPL human mesh using HRNet, OpenPose, and PyTorch3D.

- Implement a GAN for pose-transfer on aerial images, boosting Unsupervised Drone-based Re-ID accuracy by 2%.

Texture Generation on 3D Shapes *Jun 2023 - Present*

- Annotate Objaverse, a large-scale 3D dataset; Select objects based on quality and style for training using Blender.
- Leverage NeRF to synthesize novel views of game items from 2D sketches. Develop a model based on CLIP and Stable DreamFusion to alter texture on 3D models based on input text prompt. Implement in PyTorch.

Tackling Model Drift of Semantic Segmentation Models *Apr 2023 - Oct 2023*

- Performed Image Quality Assessment using BRISQUE to filter out noisy and distorted data for model refinement.
- Modified an SVM classifier for selecting features for retraining segmentation models; Implemented in TensorFlow.

Face Recognition at Long Distance (FRaLD) | *Code* *Dec 2022 - Jul 2023*

- Assessed quality of aerial face images using BRISQUE; Preprocessed and analyzed drone-based datasets.
- Designed a pose-guided model based on ArcFace, improving 4% accuracy for FRaLD; Implemented in PyTorch.

Building Footprint Extraction in Dense Areas | *Paper* *Sep 2022 - Jun 2023*

- Performed Super Resolution on aerial images by reimplementing and retraining RealESR-GAN in PyTorch.
- Proposed a multitask learning model comprising a U-Net-based segmentation module and a frame field learning module for extracting building contours in dense areas, outperforming Mask-RCNN by 13.9% in F1-score.

Fetal ECG Extraction using GAN | *Code* *Oct 2022 - May 2023*

- Filtered, and transformed 1D ECG signals into 2D spectrogram images using SciPy, NumPy, and MATLAB.
- Built an ECG extraction model on Pix2Pix GAN, outperforming AutoEncoder-based models by 5% in accuracy.

Automated IDs and Business Cards Extractor *Feb 2021 - Mar 2022*

- Tested OCR methods; Explored Transformers-based models for Named Entity Recognition; Implemented Multi-lingual BERT model in PyTorch, achieving 90% accuracy in Korean and Japanese.
- Deployed model with TensorFlow using ONNX, FastAPI, and Docker.

Skills

Programming: Python, C++, R, MATLAB, SQL, PHP, HTML

Frameworks & Libraries: PyTorch, TensorFlow, OpenCV, PyTorch3D, Pandas, NumPy, Scikit-Learn, Matplotlib

Tools: Git, Docker, CUDA, AWS, Spark, Hadoop, MLFlow, Vertex AI, TinyML, CUDA, API, ONNX, Blender

Professional Services

Reviewer at *IEEE International Conference on Multimedia and Expo (ICME)* 2024

Reviewer at *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)* 2024.

Honors and Awards

Cullen Graduate Student Success Fellowship: Awarded by College of Natural Sciences and Mathematics, UH.

FPT Young Talents Scholarship: Awarded by FPT Group for outstanding undergraduate researcher.

Leadership

College of Natural Sciences and Mathematics, UH: CS Graduate Student Representative *Aug 2023 - present*

Computer Science Graduate Student Association, UH: Secondary Student Officer *Aug 2022 - present*

Certificates

Generative AI with Large Language Models *Coursera*

Machine Learning Engineering for Production (MLOps) Specialization *DeepLearning.AI*

Machine Learning with Python *Coursera*

References

Prof. Shishir Shah (Advisor), Chair of Department of Computer Science, UH Email: sshah@central.uh.edu

Dr. Pranav Mantini, Lecturer & Senior Researcher, Department of Computer Science, UH Email: pmantini@cs.uh.edu