Vuong (Dustin) Nguyen

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Summary

CS Ph.D. candidate with 4-year experience in Computer Vision, Deep Learning (DL), and Graph Neural Network (GNN). My work also encompasses exploring GenerativeAI 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*

Skills

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

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

Tools: Git, Jira, Linux, Blender, Docker, AWS, Spark, Azure, MLFlow, TensorRT, TinyML, CUDA, API, ONNX

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 and GNN-based models for CV tasks; Explore and implement CLIP, NeRF, GANs, and Diffusion.

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.

Selected 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 - Real-World Surveillance: Applications and Challenges Workshop*, 2024. [*Paper*] [*Github*].

3. K. Khaldi, **V. Nguyen**, P. Mantini, and S. Shah. "Unsupervised Person Re-Identification in Aerial Imagery". In *WACV - Real-World Surveillance: Applications and Challenges Workshop*, 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 anonymous review.*

Projects

Cloth-Changing Person Re-Identification (CCRe-ID) | *GitHub* — *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 3D cross-attention CNN for Video-based CCRe-ID, outperforming SOTA methods by 14% in accuracy.

- Develop models based on Graph Attention Network (GAT) and Spatial-Temporal GAT to capture 3D pose-based shape and gait, achieving state-of-the-art (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 for 3D Games *Jun 2023 - Present*

- Annotate Objaverse, a large-scale 3D dataset; Select objects based on quality and style for training using Blender.
- Leverage NeRF to generate 3D models of game items from 2D sketches. Modify and implement CLIP and DreamFusion to alter texture on 3D models based on text prompt 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) | *GitHub* *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 Pix2Pix GAN | *GitHub* *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; Implemented BERT model in PyTorch, achieving 90% accuracy in Korean and Japanese.
- Packaged source code into Docker; Wrote API using FastAPI; Deployed model with TensorFlow using ONNX.

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*

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