YASH GARG

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RESEARCH INTERESTS

Physical Reasoning, Vision-Language Models (VLMs), 3D Human Pose & Shape Estimation, Neural Radiance Fields, Gaussian Splatting, 3D Human Reconstruction, Generative AI, Multi-Task/Mulit-Domain Learning, Multi-Modal Learning, Parameter-Efficient/Low-Rank Methods, Human-object Tracking, Unsupervised Domain Adaptation, Person Re-ID/Gait Recognition.

EDUCATION

University of California Riverside

- Doctor of Philosophy (PhD), Electrical and Computer Engineering. *Sep 2023 - Present*
  Advisor : Prof. Amit K. Roy-Chowdhury, Prof. M. Salman Asif CGPA : *3.89 / 4*
- Master of Science (Research), Electrical and Computer Engineering. *Sep 2021 - Aug 2023*
  Advisor : Prof. M. Salman Asif CGPA : *3.81 / 4*

Vellore Institute of Technology (VIT), Vellore *Aug 2016 - Jun 2020*
Bachelor of Technology, Electrical and Electronics Engineering. CGPA : 8.13 / 10

EXPERIENCE

Graduate Student Researcher, University of California Riverside *Jun 2023 - Present*
Mentor: Prof. Amit K. Roy-Chowdhury, Prof. M. Salman Asif

- Developed a robust semantic segmentation framework for **3D Gaussian Splatting** that lifts noisy, partial 2D masks into 3D via **feature-guided Gaussian expansion**, improving mIoU by 8.06 points over the best baseline and enabling reliable object extraction and editing (*Under Review*).
- Proposed, VOccl3D, a video benchmark dataset for 3D human pose and shape estimation under real occlusions using the **SMPL model, Gaussian Splats/NERFs** and 3D graphics software like **Blender** and **Unity game engine**. Published as first author to **ICCV 2025**.
- Proposed STRIDE, an unsupervised method for estimating temporally continuous 3D human poses under occlusions in real-world videos. Published as co-author to **WACV 2025**.
- Worked on developing pipeline for unsupervised **Human Tracking, Silhouette & Pose extraction** under occlusion for IARPA Biometric Recognition project.

Research Intern, Mitsubishi Electric Research Laboratories (MERL) *Jun 2026 - Sep 2026*
Manager: Anoop Cherian

- Contributed to the **design and development of a synthetic dataset** for evaluating **physical reasoning**, generated with game-engine-based simulation.
- **Benchmarked state-of-the-art open and closed-source Vision-Language Models (VLMs)** to evaluate their physical reasoning capabilities. Continuing collaboration on this project, targeting a peer-reviewed publication.

ML Intern, Motional *Jun 2025 - Sep 2025*
Manager: Patrick Buehler

- Improved vehicle light (VL) classification by developing a multi-modal model that fuses image sequences with vehicle metadata (e.g., acceleration, yaw), **achieving a 14.4% error reduction** compared to the image-only baseline.
- Developed a lightweight, deployment-ready model using knowledge distillation that **runs 61.8% faster and is 55% smaller** than the high-performance "clip-based teacher" model, while **retaining over 97%** of its classification accuracy on all tasks.

Graduate Student Researcher, University of California Riverside *Sep 2021 - May 2023*
Mentor: Prof. M. Salman Asif

- Proposed a novel **PEFT** model architecture with a low-rank Factorized Tensor Networks for **Multi-Task and Multi-Domain Learning**. Published as first author to **IEEE-OJSP 2025**.
- Worked on the generative models (VAEs and GANs) to synthesize images in a controllable manner where each latent representation is responsible for specific attribute changes in the generated image.

Research Intern, Emory University *Apr 2020 - Nov 2020*
Mentor: Prof. Rishikesan Kamaleswaran

- Developed a machine learning model to early predict the onset of ARDS (Acute Respiratory Distress Syndrome) among critically ill COVID-19 patients with an AUROC of 0.89.
- Our work resulted in a co-first-author publication in **PlosOne Journal 2021**.

Computer Vision Intern, Ageye Technologies Banglore *Nov 2020 - May 2021*

- Developed a deep learning model achieving 92% accuracy in edge detection on overlapping leaf datasets while optimizing inference time for real-world deployment.
- Designed a pipeline to perform zoomed analysis to compute leaf attributes like leaf orientation, count, and center point coordinates. Successfully deployed the solution in indoor farms.

PUBLICATIONS

Yash Garg, Saketh Bachu, Arindam Dutta, Rohit Lal, Sarosij Bose, Calvin-Khang Ta, M. Salman Asif, Amit Roy-Chowdhury. "VOccl3D: A Video Benchmark Dataset for 3D Human Pose and Shape Estimation under real Occlusions" *ICCV 2025*

Yash Garg, Nebiyou Yismaw, Rakib Hyder, Ashley Prater-Bennette, M. Salman Asif. "Factorized Tensor Networks for Multi-Task and Multi-Domain Learning" *OJSP 2025*

Rohit Lal, Saketh Bachu, **Yash Garg**, Arindam Dutta, Calvin-Khang Ta, Dripta S. Raychaudhuri, Hannah Dela Cruz, M. Salman Asif, Amit K. Roy-Chowdhury. "STRIDE: Single-video based Temporally Continuous Occlusion Robust 3D Pose Estimation" *WACV 2025*

Arindam Dutta, Rohit Lal, **Yash Garg**, Calvin-Khang Ta, Dripta S. Raychaudhuri, and Amit K. Roy-Chowdhury. "POSTURE: Pose Guided Unsupervised Domain Adaptation for Human Body Part Segmentation" *Under review IEEE TIP*

Yash Garg*, Lakshya Singhal* ,Philip Yang* ,Azade Tabaie,A. Ian Wong, ..., Rishikesan Kamaleswaran. "eARDS: A multi-center validation of an interpretable machine learning algorithm of early onset Acute Respiratory Distress Syndrome (ARDS) among critically ill adults with COVID-19" *PloS one (2021)*

COURSEWORK

Graduate Courses @ UCR	Mathematical Methods for EE, Random Processes, Convex Optimization, State and Parameter Estimation Theory, Information Theory, Pattern Recognition, Introduction to Deep Learning, Advanced Computer Vision, Optimization for Machine Learning.
Undergraduate Courses @ VIT	Numerical Linear Algebra, Numerical Methods, Random Processes, Digital Image Processing, Medical Imaging, Machine Learning.

COMPUTING SKILLS

Programming Languages/Scripts	Python, MATLAB, C#, SQL, LaTeX.
Software	Blender, Unity.
ML Tools	PyTorch, PyTorch Lightning, Keras.
Scientific Computing Libraries	Numpy, Scipy, Scikit-learn, Matplotlib, OpenCV, Pandas

AWARDS

Dean's Distinguished Fellowship Award: University of California Riverside.

GVSDP Scholarship: Vellore Institute of Technology

Grant of $10,000 Microsoft Azure credit for research work on the pandemic.

PROFESSIONAL SERVICES

Reviewer: **CVPR'(24,25,26), ICCV'25, IEEE TCI'25, IEEE-OJSP ICIP'(25,26), ACCV'26, ECCV'26, 3DV'27**