

## Research Interests

Multimodal LLMs, LLM Agents, Action Recognition, Synthetic Data, Domain Adaptation

## Education

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|--|------------------------------|
| <b>Johns Hopkins University</b>  | <b>2020–Present</b>          |
| • <i>Ph.D. in Electrical and Computer Engineering</i><br>Advisor: Prof. Rama Chellappa   | <i>Baltimore, MD, USA</i>    |
| <b>University of Maryland, College Park</b>  | <b>2018–2020</b>             |
| • <i>M.S. in Electrical and Computer Engineering; GPA: 3.67/4.0</i>  | <i>College Park, MD, USA</i> |
| <b>Indian Institute of Technology, Madras</b>  | <b>2013–2018</b>             |
| • <i>B.Tech &amp; M.Tech in Electrical Engineering; GPA: 8.30/10.0</i><br>Minor in Operations Research<br>Advisor: Prof. Kaushik Mitra | <i>Chennai, India</i>        |

## Current Work

- **VRAgent: Self-Refining Agent for Multimodal and Interactive Video Retrieval**  
**Ketul Shah**, Pankaj Nathani, Rama Chellappa, Fabian Caba Heilbron  
Under submission
- **MV2MAE: Multi-View Video Masked Autoencoders**  
**Ketul Shah**, Robert Crandall, Jie Xu, Peng Zhou, Marian George, Vipin Pillai, Mayank Bansal, Rama Chellappa  
Under submission

## Publications

- **Diffuse2Adapt: Controlled Diffusion for Synthetic-to-Real Domain Adaptation**  
**Ketul Shah**, Arushi Sinha, Arun Reddy, Aniket Roy, Rama Chellappa  
ICIP 2025
- **AeroGen: Ground-to-Air Generalization for Gesture Recognition**  
**Ketul Shah**, Anshul Shah, Arun Reddy, Aniket Roy, Arushi Sinha, Celso M. de Melo, Rama Chellappa  
FG 2025
- **Multi-View Action Recognition using Contrastive Learning**  
**Ketul Shah**, Anshul Shah, Chun Pong Lau, Celso M. de Melo, Rama Chellappa  
WACV 2023
- **Synthetic-to-Real Domain Adaptation for Action Recognition: A Dataset and Baseline Performances**  
**Ketul Shah\***, Arun Reddy\*, William Paul, Rohita Mocharla, Judy Hoffman, Kapil D. Katyal, Dinesh Manocha, Celso M. de Melo, Rama Chellappa  
ICRA 2023
- **Improved Modeling of 3D Shapes with Multi-view Depth Maps**  
**Ketul Shah\***, Kamal Gupta\*, Susmija Jabbireddy\*, Abhinav Shrivastava, Matthias Zwicker  
3DV 2020 (Oral Presentation)
- **DiffNat: Improving Diffusion Image Quality Using Natural Image Statistics**  
Aniket Roy, Maitreya Suin, Anshul Shah, **Ketul Shah**, Jiang Liu, Rama Chellappa  
TMLR 2025
- **Cap2Aug: Caption guided Image to Image data Augmentation**  
Aniket Roy, **Ketul Shah\***, Anshul Shah\*, Anirban Roy, Rama Chellappa  
WACV 2025

- **Unsupervised Video Domain Adaptation with Masked Pre-Training and Collaborative Self-Training**  
Arun Reddy, William Paul, Corban Rivera, **Ketul Shah**, Celso M de Melo, Rama Chellappa  
CVPR 2024
- **HaLP: Hallucinating Latent Positives for Skeleton-based Self-Supervised Learning of Actions**  
Anshul Shah, **Ketul Shah\***, Aniket Roy\*, Shlok Mishra, David Jacobs, Anoop Cherian, Rama Chellappa  
CVPR 2023
- **FeLMi : Few shot Learning with hard Mixup**  
Aniket Roy, Anshul Shah, **Ketul Shah**, Prithviraj Dhar, Anoop Cherian, Rama Chellappa  
NeurIPS 2022
- **Photorealistic Image Reconstruction from Hybrid Intensity and Event based Sensor**  
Prasan A Shedligeri, **Ketul Shah**, Dhruv Kumar, Kaushik Mitra  
arXiv

## Professional Experience

- **Amazon Web Services** **Summer 2025**  
Applied Scientist Intern. Mentor: Dr. Mayank Bansal  
Santa Clara, CA
  - Developed VideoMimic, an approach for video-based task replay for UI Agents.
- **Adobe Research** **Summer 2024**  
Research Scientist Intern. Mentor: Dr. Fabian Caba Heilbron  
San Jose, CA
  - Designed a self-refining agent for multimodal video retrieval; created benchmarks for this novel task.
- **Amazon Just Walk Out** **Summer 2023**  
Applied Scientist Intern. Mentor: Dr. Robert Crandall  
Seattle, WA
  - Worked on large-scale pre-training using multi-view videos.
- **Amazon Web Services** **Summer 2021**  
Applied Scientist Intern. Mentors: Dr. Kaustav Kundu, Dr. Xinyu Li  
Seattle, WA (Remote)
  - Worked on using self-supervised representation learning for improving batch active learning.
- **University of Maryland** **Summer 2019**  
Research Assistant under Prof. Rama Chellappa  
College Park, MD
  - Worked on spatio-temporal action detection in untrimmed videos, specifically for infrared videos. Improved performance of the proposal-based method by 13.5% on infrared modality. Exploring GAN formulations for leveraging multiple modalities available at training time.
- **NVIDIA Graphics Pvt. Ltd.** **Summer 2016**  
Software Engineering Intern  
Bengaluru, India
  - Part of a multi-team venture to extract usage data of CPU farm from logged data; streamlined load allocation to the CPU farm, also incorporated peak load times.

## Voluntary Service

- TPAMI, WACV 2026, ICCV 2025, AAAI 2025, CVPR 2024, WACV 2024, ICLR 2024, NeurIPS 2024, NeurIPS 2023, ICLR 2022, NeurIPS 2022, ECCV 2020

## Teaching Experience

- **Machine Perception** **Fall 2024, Fall 2022, Fall 2020**  
Course Assistant  
Johns Hopkins University
- **Advanced Data Structures** **Spring 2019**  
Teaching Assistant  
University of Maryland, College Park

## Programming Skills

- **Libraries and Tools:** PyTorch, Amazon SageMaker, PyTorch Lightning, Weights & Biases, Tensorboard, Caffe, TensorFlow, OpenCV, Blender, AWS
- **Languages:** Python, C, C++, MATLAB, Java