

Anshul Shah

anshulbshah.github.io

+1 240 938 5792 • ashah95@jhu.edu • Anshul Shah

Education

| | |
|--|-----------------------------|
| Johns Hopkins University <i>Ph.D in Computer Science</i> Advisor : Prof. Rama Chellappa Transferred from UMD College Park | 2020–2023(Expected) |
| University of Maryland, College Park <i>M.S. in Computer Science</i> Advisor : Prof. Rama Chellappa | 2018–2020 4.0/4.0 |
| Indian Institute of Technology Madras <i>B.Tech.(with Honors) & M.Tech. in Electrical Engineering</i> Minor in Robotics Advisor : Prof. A.N. Rajagopalan Semester Abroad : Czech Technical University in Prague (Fall'17) | 2013–2018 9.39/10 |

Research Interests

Multimodal Video Understanding, Self-Supervised Learning, Body & face generative models, Contrastive Learning, Pose-based Action Recognition, Sequence modeling, IMU-based gesture recognition, Synthetic data for ML, ML for Health

Research Internships

| | |
|--|--|
| Apple (Machine Learning Research) <i>Mentors : Raviteja Vemulapalli, Karren Yang, Anurag Ranjan, Gierad Laput, Oncel Tuzel</i> Working on synthetic IMU data generation and using it for gesture recognition. | Mar'23-Sep'23 ML for IMUs |
| Microsoft Research (Mixed Reality) <i>Mentors : Harpreet Sawhney, Benjamin Lundell</i> Developed an analysis-by-synthesis approach to drive realistic face avatars from novel multi-sensor inputs. Submitted a patent application with a plan to submit the research to an upcoming graphics conference. | Jun'22-Aug'22 Multimodal Face Avatar Tracking |
| Microsoft Research (Mixed Reality) <i>Mentors : Harpreet Sawhney, Bugra Tekin, Amol Ambardekar, Benjamin Lundell</i> An SSL-based approach to learn representations for procedural videos with access to multiple on-device and vision derived modalities. Problem motivated by the usecase of automatic AR guide creation for HoloLens. Work presented at ICCV'23. | Jun'21-Aug'21 Self-supervised Procedure Learning |
| Mitsubishi Electric Research Laboratories (MERL) <i>Mentor : Anoop Cherian</i> Proposed a contrastive learning objective motivated by SVMs which inherently tackles false and hard negatives leading to faster convergence. Shown to be beneficial in many SSL-representation learning tasks including image, video, graph and skeleton. Paper presented at AAAI-22. | Jun'20-Aug'20 Contrastive Learning & Video Representation Learning |
| IBM Research, India <i>Mentors : Pratyush Kumar, Ashok Ponkumar, Amith Singhee</i> Developed algorithms to detect key-feature in a frontal image to enable plausible placement of a jewelry item. Part of an effort to enable virtual try-on to improvise jewelry buying experience for various big retailers. Patent was filed and approved. | May'16-Jul'16 Virtual Cognitive Mirror |
| Matrix ComSec R&D, India <i>Mentor : Kaushal Kansara</i> Implemented various algorithms on the Texas Instruments DM38x media processor for IP camera video enhancement | May'15-Jul'15 Surveillance Camera Video Enhancement |

Peer-reviewed Publications

STEPs: Self-Supervised Key Step Extraction from Unlabeled Procedural Videos (ICCV 2023)

Anshul Shah, Benjamin Lundell, Harpreet Sawhney, Rama Chellappa

HaLP: Hallucinating Latent Positives for Skeleton-based Self-Supervised Learning of Actions (CVPR 2023)

Anshul Shah, Aniket Roy[†], Ketul Shah[†], Shlok Mishra, David Jacobs, Anoop Cherian, Rama Chellappa

Max-Margin Contrastive Learning (AAAI 2022)

Anshul Shah[†], Suvrit Sra, Rama Chellappa, Anoop Cherian[†]

Pose and Joint-Aware Action Recognition (WACV 2022)

Anshul Shah, Shlok Mishra, Ankan Bansal, Jun-Cheng Chen, Rama Chellappa, Abhinav Shrivastava

Few shot Learning with hard Mixup (NeurIPS 2022)

Aniket Roy, Anshul Shah, Ketul Shah, Prithviraj Dhar, Anoop Cherian, Rama Chellappa

Object-Aware Cropping for Self-Supervised Learning (TMLR 2022, CoLLA 2023)

Shlok Mishra, **Anshul Shah**, Ankan Bansal, Abhyuday Jagannatha, Abhishek Sharma, David Jacobs, Dilip Krishnan

Bringing Alive Blurred Moments (CVPR 2019 Oral)

Kuldeep Purohit, **Anshul Shah**, A N Rajagopalan

Learning Visual Representations for Transfer Learning by Suppressing Texture (BMVC 2022)

Shlok Mishra, **Anshul Shah**, Ankan Bansal, Abhinav Shrivastava, Abhishek Sharma, David Jacobs

Multi-View Action Recognition using Contrastive Learning (WACV 2023)

Ketul Shah, **Anshul Shah**, Chun Pong Lau, Celso de Melo, Rama Chellappa

Learning Based Single Image Blur Detection and Segmentation (ICIP 2018)

Kuldeep Purohit, **Anshul Shah**, A N Rajagopalan

Attention Driven Vehicle Re-identification and Unsupervised Anomaly Detection for Traffic Understanding (CVPRW 2019)

Pirazh Khorramshahi, Neehar Peri, Amit Kumar, **Anshul Shah** and Rama Chellappa

† Equal Contribution

Works under preparation/ submission

Video Understanding for Early Diagnosis of Autism Spectrum Disorder

A. Shah, S. Ray, J. Stenum, B. Hicks, J. Morrel, R. Roemmich, R. Reetzke, R. Landa, R. Chellappa

- Leading the action recognition effort in a multi-disciplinary team involving vision researchers, speech pathologists and movement scientists.
- Preliminary findings were presented at INSAR (International Society of Autism Research) 2023 held in Stockholm.

Temporal Max-Margin Contrastive Learning

Anshul Shah, Anoop Cherian, Rama Chellappa

- Derived a temporal extension to MMCL which can simultaneously optimize for contrastive learning and temporal ordering.

Margin-based Pooling for Video Representation Learning

Anshul Shah, Shlok Mishra, Rama Chellappa, Anoop Cherian

- A plug-and-play spatio-temporal pooling module to improve complex action recognition.

Cap2Aug: Caption guided Image data Augmentation

Aniket Roy, **Anshul Shah**[†], Ketul Shah[†], Anirban Roy, Rama Chellappa

- Leverage pre-trained generative models to augment training data for various learning tasks.

Ground-to-Air Generalization for Action Recognition via Synthesis

Ketul Shah, **Anshul Shah**, Arun Reddy, Aniket Roy, Arushi Sinha, Celso de Melo, Rama Chellappa

- An approach to generate and use synthetic data for action recognition from aerial viewpoints.

DiffNat: Fine-tuning text-to-image diffusion model with natural image statistics

Aniket Roy, Maitreya Suin, **Anshul Shah**, Prithviraj Dhar, Ketul Shah, Rama Chellappa

- Proposed an image kurtosis loss to improve training of text-to-image diffusion models.

Dual Prompt Tuning for Domain-Aware Federated Learning

Guoyizhe Wei, Feng Wang, **Anshul Shah**, Rama Chellappa

- Explored federated learning under domain shift amongst clients by prompt tuning on foundation models.

Selected Achievements

- Recipient of **Amazon Fellowship** (2022-23) as a part of JHU + Amazon initiative for Interactive AI.
- Selected as a member of **ICCV 2023 Doctoral Consortium** to be held in Paris.
- Proposal on SSL co-written with PI Rama Chellappa was awarded **Amazon Research award** (2023-24).
- Invited to give a talk on STEPs work at **CV for Metaverse Workshop** to be held at ICCV'23.
- Was named a **Highlighted reviewer for ICLR'22**.
- Awarded Kolluri Memorial Prize for **best Academic record** in Electrical Engineering at IIT Madras (2015-16).

Patents

Hybrid virtual and physical jewelry shopping experience, US10810647B2

Mohit Jain, Pratyush Kumar, Megha Nawhal, Ashok Pon Kumar, Anshul Shah, Gyanendra Sharma, Amith Singhee

Teaching Experience

- Machine Perception, JHU, Aug'22-Dec'22; Image Signal Processing & Physics I, IIT Madras, Jun'17-May'18

Reviewing

ICLR'[23,22], AAAI'[23,21,20], NeurIPS'[23,22,21,20], WACV'[23,22], ICML'[23,22,21], CVPR'23, ICCV'23, ECCV'20, TMLR[23,22]