

Ayush Gupta

443-679-8704 | agupt120@jh.edu |
<https://ayush-00.github.io/>
Google Scholar

CURRENT RESEARCH INTEREST

Computer Vision, Multi-modal learning, LLMs, Foundational models, Scene Understanding, Domain Adaptation, Gait Recognition, Person Re-ID

EDUCATION

Johns Hopkins University

Ph.D. in Computer Science (Advisor: Prof. Rama Chellappa)
M.S.E in Computer Science (GPA: 4.0/4.0)

Baltimore, USA
2022 – current

Birla Institute of Technology and Science, Pilani

B.E. in Computer Science (GPA: 9.58/10)
Thesis: Temporal self-similarity for Unsupervised Gait Recognition.

Pilani, India
2018 – 2022

EXPERIENCE

Research Intern

Amazon Ring Devices Team. Mentor: Dr. Srinivas Parthasarathy

May 2025 – present

Research Intern

SRI International. Mentor: Dr. Anirban Roy

May 2024 – April 2025

Teaching Assistantship

Machine Perception, JHU. Mentor: Prof. Rama Chellappa

Aug. 2023 – Dec. 2023

Research Assistant

CRCV Lab, University of Central Florida, Mentor: Dr. Yogesh S Rawat

May 2021 – June 2022

Research Intern

Indian Institute of Remote Sensing, ISRO. Mentor: Dr. Rekha Anandrao

May 2020 – July 2020

PUBLICATIONS

- *Ayush Gupta*, Anirban Roy, Rama Chellappa, Nathaniel D. Bastian, Alvaro Velasquez, Susmit Jha. “**TOGA: Temporally Grounded Open-Ended Video QA with Weak Supervision**” ICCV 2025.
- *Ayush Gupta*, Ramneet Kaur, Anirban Roy, Adam D. Cobb, Rama Chellappa, Susmit Jha. “**Polysemantic Dropout: Conformal OOD Detection for Specialized LLMs**” *under submission*.
- *Ayush Gupta*, Siyuan Huang, Rama Chellappa. “**Mind the Gap: Bridging Occlusion in Gait Recognition via Residual Gap Correction**” IJCB 2025.
- *Ayush Gupta*, Rama Chellappa “**MimicGait: A Model-Agnostic Approach for Occluded Gait Recognition using Correlational Knowledge Distillation**” WACV 2025.
- Yuxiang Guo, Anshul Shah, Jiang Liu, *Ayush Gupta*, Cheng Peng, Rama Chellappa “**GaitContour: Efficient Gait Recognition based on a Contour-Pose Representation**” WACV 2025.
- *Ayush Gupta*, Rama Chellappa “**You Can Run but not Hide: Improving Gait Recognition with Intrinsic Occlusion Type Awareness**” WACV 2024 (Oral)
- Vuong Nguyen, Samiha Mirza, Abdollah Zakeri, *Ayush Gupta*, Rahma Aloui, Khadija Khaldi, Pranav Mantini, Shishir Shah, Fatima Merchant “**Tackling Domain Shifts in Person Re-Identification: A Survey and Analysis**” CVPR 2024 Continual Learning Workshop.
- Basudha Pal, *Ayush Gupta*, Vishal Patel “**EchoSAM: Predicting Ejection Fraction using Segmentation Guided Vision Transformers**” *under submission*.

- *Ayush Gupta*, Alexander Matasa, Shruti Vyas, Yogesh S Rawat “**GaitZero: Temporal Self-similarity for Unsupervised Gait Recognition**” under submission.
- *Ayush Gupta**, Ashrya Agrawal*, Poonam Goyal, Navneet Goyal “**Visually Guided Knowledge selection for Video Captioning**” under submission.
- Laura McDaniel, *Ayush Gupta*, Ime Essien, Ryan Roemmich, Peter Abadir, Rama Chellappa “**Transfer Learning for Frailty Classification in Older Adults**” under submission.

PROJECTS

Assured Neuro Symbolic Learning and Reasoning (ANSR) DARPA Program

- Developed a framework for reasoning on complex QA pairs with temporal grounding assurance
- Focus on open-vocabulary question answering with temporal grounding abilities in unconstrained videos
- Enhanced visual reasoning in multimodal LLMs through reinforcement learning techniques.

Biometrics Recognition and Identification at Altitude and Range (BRIAR) IARPA program

- Implemented a multi-view gait recognition framework on turbulent data captured from upto 1000m
- Improved gait recognition under occlusion scenarios
- Fusing this approach with other modalities like face and body to identify subjects
- Algorithms integrated into deployable IARPA system pipeline

Undergraduate Thesis: Vision Based Gait Recognition CRCV Lab, University of Central Florida

- Developed approaches for unsupervised gait recognition using RGB datasets like FVG and CASIA-B
- Utilized self-similarity matrices for capturing gait patterns using Transformers
- Implemented unsupervised contrastive learning losses to train the model

Natural Language Video Description Generation ADAPT Lab, BITS Pilani

- Designed a framework for generating natural language descriptions of videos of real scenes
- Utilized external object detectors to extract generalized nouns for the caption
- Used external knowledge bases to supplement the captioning model with specialized versions of the nouns.

CLARIN COVID-19 Disinformation Hackathon LT Group, Universität Hamburg

- Developed models for automatic fact-checking
- Used news crawling APIs and existing datasets like EUvsDisinfo and LIAR Plus to verify a claim.

Landcover Classification using Satellite Imaging IIRS, ISRO

- Used Google Earth Engine to classify satellite image pixels into landcover categories
- Implemented the Spectral Angle Mapper, SVMs and K-Means learning algorithms

Transfer Learning in Semantic Segmentation for Autonomous Vehicles Course Project, Computer Vision

- Collected a dataset, JHUSStreet, of street images from a car and pedestrian perspective around Baltimore.
- Trained and evaluated the DeepLabV3 model on the segmentation task on JHUSStreet dataset.

Adversarial Attacks and Defences on CNNs Course Project, Machine Perception

- Implemented FGSM, Noise and Carlini Wagner attacks on CNNs
- Implemented Adversarial training to defend against these attacks.

REVIEWING EXPERIENCE

IEEE T-BIOM, ICCV 2025, CVPR 2025, WACV 2025, NeurIPS 2024

AWARDS AND HONORS

- Merit Scholarship for being in **top 2% of students at BITS Pilani** consistently since Aug. 2018
- Recipient of **DAAD-WISE 2021 scholarship** for a summer project in Universität Hamburg, Germany
- State Rank 1 in National Science and Talent Search Examination (NSTSE) 2017

TECHNICAL SKILLS

Languages: Python, C, Matlab, Java.

Frameworks: PyTorch, Tensorflow, Keras.

RELEVANT COURSEWORKS

Computer Vision, Artificial Intelligence, Machine Perception, Machine Intelligence, Neural Networks and Fuzzy Logic, Digital Image Processing, Data Structures and Algorithms, Computer Programming, Probability and Statistics, Multi-Variable Calculus, Linear Algebra and Complex Analysis, Differential Equations, Database Systems, Object Oriented Programming

VOLUNTEERING

Project Lead: Participatory Community Development, Nirmaan Organization May 2019 - Dec. 2019

- Led a team of 10+ members for scouting infrastructural deficiencies in villages nearby Pilani
- Worked on building a rainwater harvesting system and a solar light in Baas Village.