

Akshit Singh

Email: akshitsingh21112002@gmail.com | Research Profile: [Google Scholar](#)

EDUCATION

Dartmouth College

Guarini School of Graduate and Advanced Studies

Hanover, NH

January 2027 - Present

- Masters in Computer Science

Indian Institute of Technology

Department of Electrical Engineering

Jodhpur, India

May 2025

- Bachelor of Technology in Electrical Engineering

PUBLICATIONS

- **Akshit Singh**, Shyam Marjit, Wei Lin, Paul Gavrikov, Serena Yeung-Levy, Hilde Kuehne, Rogerio Feris, Sivan Doveh, James Glass, M. Jehanzeb Mirza, "TTRV: Test-Time Reinforcement Learning for Vision Language Models", *The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2026 (CVPR-2026)*(Accepted)([project page](#))([paper link](#))([code](#))
- **Akshit Singh**, Karan Bhakuni and Rajendra Nagar, "CCNDF: Curvature Constrained Neural Distance Fields from 3D LiDAR Sequences", *17th Asian Conference on Computer Vision (ACCV-24)*(Accepted)(*Oral presentation, acceptance rate 5.6%*)([paper link](#))([code](#))
- **Akshit Singh** and Henna Rathore, "Advancing Connected Vehicle Security with Comprehensive Datasets and Novel Anomaly Detection and Recovery Techniques", *Elsevier Journal of Vehicular Communication (Impact Factor - 6.5)*(Accepted)([paper link](#))
- **Akshit Singh**, "Diverse Yet Biased: Towards Mitigating Biases in Generative AI", *38th Annual AAAI Conference on Artificial Intelligence Student Abstract (AAAI-SA, 2024)*(Accepted)([paper link](#))
- Deepanshu Solanki*, **Akshit Singh*** and Rajendra Nagar, "Deep Dense Clothed Genus-0 Human 3D Shape Matching using Spherical Harmonics", Submitted to *IEEE Signal Processing Letters (Under Review)*([paper link](#)).

* = equal contribution

RESEARCH EXPERIENCE

Student Researcher at MIT CSAIL Lab

September 2025- Present

- Supervisor - [Jehanzeb Mirza](#)
- Advisor- [James Glass](#)
- Working on test-time improvement methods, long-context reasoning, and architectural advancements for Vision-Language Models (VLMs).

Student Researcher at MIT CSAIL Lab

July 2025- September 2025

- Supervisor - [Jehanzeb Mirza](#)
- Advisor- [James Glass](#)
- Worked on Test-Time Reinforcement Learning for VLMs, enabling self-improvement without ground-truth labels through adaptive inference.
- Designed frequency-based and diversity-based reward functions that outperform standard majority voting in test-time adaptation.
- Evaluated across 15+ multimodal benchmarks, demonstrating significant accuracy gains, even with a single unlabeled test sample and surpassing GPT-4o by 2% when applied to open-source VLMs.
- Investigated the self-evolution capabilities of LLMs in multimodal settings, analyzing when and how models exhibit self-improvement.
- Manuscript accepted to *Computer Vision and Pattern Recognition 2026 (CVPR-26)* as first author.

Student Researcher at Multimodal Interaction Lab, IIT Jodhpur, India

September 2023- May 2024

- Utilized Möbius transformations to convert initial triangular mesh data into Möbius grid spheres, enabling the conversion of non-rigid shapes to rigid forms for simplified mapping.
- Applied Graph Neural Networks (GNNs) and spherical harmonics to process the transformed data.
- Employed functional map (fmap) solvers to achieve accurate shape-matching results.
- Contributed to both the conceptual framework and technical implementation of the project.
- Submitted to *IEEE Signal Processing Letters*.

Student Researcher at Multimodal Interaction Lab and Defence Research and Development Organisation

(DRDO), IIT Jodhpur, India

June 2023- May 2025

- Working on spatial-temporal representation of dynamic scenes.
- Working on extending the scope of the Signed Distance field (SDF) to include real-time use cases for autonomous vehicles that use Lidar point clouds.
- Developed a methodology to segment static and dynamic objects in a moving scene.
- Designed a novel geometric loss function leveraging NDF gradient properties to regularize the temporal domain, similar to the eikonal regularization loss.
- Our method achieves a slight improvement over existing techniques in surface reconstruction and dynamic object segmentation.

Deep Learning Researcher at Hyperverge, Bangalore, India

May 2024- July 2024

- Worked on Vision-Language models to generate labelling data for unstructured identity documents.
- Worked on various object detection models like YOLO-v8 for ID cards like voter ID cards and Adhaar cards.
- Developed datasets for task-specific needs for various ID cards and applications.
- Explore the literature about LLMs and vision models.

Student Researcher at Multimodal Interaction Lab and Defence Research and Development Organisation

(DRDO), IIT Jodhpur, India

August 2023- June 2024

- Supervisor- [Rajendra Nagar](#)
- Worked on Simultaneous Localisation and Mapping (SLAM) problem using LiDAR.
- Utilising neural networks as a means of modelling point clouds in the form of implicit surfaces.
- Using Neural Distance Fields (NDF) to map 3D surroundings.
- Developed a novel technique to extend the scope of the present NDF application to curvilinear surfaces. • Utilised the 2nd order derivative of NDF fields to calculate the radius of curvature and then utilised it to simulate neural network for better mapping for complex geometry.
- Got better mapping and localization results after using the proposed approach.
- Explored various RGB-D and Lidar-based SLAM techniques.
- Manuscript accepted to **19th Asian Conference on Computer Vision (ACCV-24)** as first author.

Research Intern at Texas State University, San Marcos, USA

April 2023-June 2024

- Supervisor- [Heena Rathore](#)
- Developed an anomaly detection and recovery framework for connected vehicles using Bayesian Online Changepoint Detection and Bayesian forecasting for real-time fault estimation.
- Mathematically simulated sensor faults including white and Lévy noise, bias, and spike errors to evaluate anomaly detection robustness.
- Created a scientific dataset by interpolating TAMPA CV data (U.S. Department of Transportation) to enable reproducible research on vehicular anomalies.
- First-author manuscript accepted to the **Elsevier Journal of Vehicular Communications**.
- Additionally, worked on Reinforcement Learning under Moral Uncertainty, designing a novel voting-based system to compare and integrate divergent ethical theories in AI decision-making.
- Developed a Bayesian framework to update the AI system's moral beliefs dynamically based on environment-derived rewards, informed by literature in machine ethics, decision-making, and human-robot interaction.

Student Researcher at Multimodal Interaction Lab, IIT Jodhpur, India

May 2022-July 2023

- Worked on creating a neural text-to-image generation model.
- Worked on using VAE and transformers for better image synthesis.
- Developed methodology for creating theme-specific datasets for generative AI systems.
- Created IID (Indian context Image caption Dataset) and IHD (Indian Heritage Dataset) consisting of 250k+ image caption pairs for capturing the Indian context.
- Studied various text-to-image models like DALL-E and Imagen.
- Manuscript **accepted** to **38th Annual AAAI Conference on Artificial Intelligence Student Abstract (AAAI-SA, 2024)** as **sole author**.

SUMMER SCHOOL

Amazon ML Summer School

Summer 2024

- Selected among the top 1000 students across India to attend this summer school.

Climate Change AI

Summer 2023

- Focused on computer vision tools to fight climate change through remote tracking and monitoring of ecosystems.